The Journal of FINANCE
The Journal of THE AMERICAN FINANCE ASSOCIATION

THE JOURNAL OF FINANCE • VOL. LXXI, NO. 1 • FEBRUARY 2016

Earnings Announcements and Systematic Risk

PAVEL SAVOR and MUNGO WILSON*

ABSTRACT

Firms scheduled to report earnings earn an annualized abnormal return of 9.9%. We propose a risk-based explanation for this phenomenon, whereby investors use announcements to revise their expectations for nonannouncing firms, but can only do so imperfectly. Consequently, the covariance between firm-specific and market cash flow news spikes around announcements, making announcers especially risky. Consistent with our hypothesis, announcer returns forecast aggregate earnings. The announcement premium is persistent across stocks, and early (late) announcers earn higher (lower) returns. Nonannouncers' response to announcements is consistent with our model, both over time and across firms. Finally, exposure to announcement risk is priced.

FIRMS ON AVERAGE EXPERIENCE stock price increases during periods when they are scheduled to report earnings. This earnings announcement premium was first discovered by Beaver (1968) and has subsequently been documented by Chari, Jagannathan, and Ofer (1988), Ball and Kothari (1991), Cohen et al. (2007), and Frazzini and Lamont (2007). Kalay and Loewenstein (1985) obtain the same finding for firms announcing dividends. None of these papers find that the high excess returns around announcement days can be explained in the conventional manner by increases in systematic risk.

In this paper, we propose and test a risk-based explanation for the announcement premium that combines two ideas. First, earnings reports provide valuable information about the prospects of not only the issuing firms but also their peers and more generally the entire economy. However, investors face a signal extraction problem: they only observe total firm earnings and hence must infer the news relevant to expected aggregate cash flows, the common component of

*Pavel Savor is at the Fox School of Business at Temple University. Mungo Wilson is at the Said Business School and the Oxford-Man Institute at Oxford University. We thank Cam Harvey (the Editor), an anonymous Associate Editor, two anonymous referees, John Campbell, Robert de Courcy-Hughes, Ľuboš Pástor, Stephanie Sikes, Rob Stambaugh, Laura Starks, Amir Yaron, and seminar participants at Acadian Asset Management, AHL, American Finance Association annual meeting, Arrowstreet Capital, Auckland Finance Meeting, Bristol University, Carnegie Mellon University (Tepper), the European Summer Symposium in Financial Markets, Georgia Institute of Technology (Scheller), Kepos Capital, NBER Summer Institute Asset Pricing Workshop, Quantitative Management Associates, PDT Partners, SAC Capital Advisors, UCLA (Anderson), the University of North Carolina (Kenan-Flagler), and the University of Pennsylvania (Wharton) for valuable comments. The authors gratefully acknowledge financial support from the George Weiss Center for International Financial Research at the Wharton School.

DOI: 10.1111/jofi.12361

an announcing firm's earnings news.[1] This spillover from the cash flow news of an individual announcer to the wider market creates a high conditional covariance between firm- and market-level cash flow news, generating a high risk premium for the announcing firm. Although nonannouncing stocks also respond to the news in announcements, they should respond less, since investors learn less about these firms.

Second, realized firm-level returns contain a component unrelated to expected future cash flows, namely, discount rate news (Campbell and Shiller (1988)). If discount rate news is more highly correlated across firms (Cohen, Polk, and Vuolteenaho (2003)), market betas will mainly reflect covariance between firm- and market-level discount rate news (Campbell and Mei (1993)). In consequence, an announcing firm can have higher fundamental risk than the market, even after controlling for its market beta.[2] In other words, although a firm's market beta may rise on the day it announces earnings, the increase in its expected return will be larger than can be explained by its higher beta alone. This means that we expect a positive announcement return even if the actual earnings surprise is zero.[3]

Under our hypothesis, the market return will be a poorer predictor of future aggregate earnings than the returns of announcing firms. Moreover, nonannouncing firms, and the market in general, will respond more to announcements offering more informative signals about aggregate earnings, such as those by firms announcing early in a given period, when less is known about aggregate earnings. The response to the announcement portfolio return should be stronger when more firms are announcing, since this provides a more precise signal of aggregate cash flow news. The sensitivity of nonannouncing firms to announcements will also increase with the time that has elapsed since their own last announcement. Finally, exposure to announcement risk, which in our model is a proxy for aggregate cash flow risk, should command a risk premium.

We start our empirical analysis by establishing that the earnings announcement premium is a significant and robust phenomenon. A portfolio strategy that buys all firms expected to report their earnings in a given week and sells short all the nonannouncing firms earns an annualized abnormal return of 9.9%. The premium is remarkably consistent across periods, is not restricted to small stocks, and does not depend on the choice of a particular asset pricing model. The weekly Sharpe ratio for the value-weighted (equal-weighted) long-short earnings announcement portfolio is 0.112 (0.055), compared to 0.049 for the market, 0.076 for the value factor, and 0.072 for the momentum factor. The announcement portfolio has positively skewed returns and exhibits positive coskewness, which means that the high announcement premium is not due to negative skewness (assuming investors are averse to negative skewness as in

[1] Patton and Verardo (2012) evaluate this idea in the context of firms' stock market betas.

[2] If realized returns were only affected by cash flow news, announcing firm and market returns would be perfectly correlated, so that announcers' high returns would be fully explained by their market betas.

[3] This prediction is shared by models based on the resolution of uncertainty in the sense of Knight (1921).

Harvey and Siddique (2000)). Furthermore, our announcement premium based on expected announcement dates likely understates the true premium, since any algorithm for forecasting announcement dates misses many announcements.

The announcement risk premium is quite persistent across stocks: those with high (low) historical announcement returns continue earning high (low) returns on future announcement dates.[4] This effect exists for horizons as long as 20 years, and is distinct from the earnings momentum first documented by Bernard and Thomas (1990) and recently explored by Brandt et al. (2008), as it holds when we exclude announcement returns over the previous year. When we sort weekly announcers into portfolios based on average announcement returns over the previous 10 years, those in the lowest quintile enjoy excess returns of 0.07%. As we move to the highest quintile, the excess returns grow monotonically to 0.44%. The abnormal return of the corresponding long-short portfolio (highest minus lowest) is 0.37% (t-statistic = 6.06), or about 19.2% on an annual basis. This evidence is consistent with our intuition. Different firms have different exposure to earnings announcement risk, and it is likely that this characteristic does not change frequently. If announcement returns do indeed represent compensation for this risk, then we would expect them to be persistently different across stocks, which is exactly what we document.

Another proxy for a firm's exposure to announcement risk is the timing of its earnings announcement. For a given period in which all firms report earnings, such as a calendar quarter, investors should learn more from firms announcing early in the period than from those announcing late, making the former riskier and thus resulting in higher expected announcement returns (we confirm this intuition formally in our model). To test this hypothesis, we examine whether the amount of time between the start of a quarter and the expected announcement date is related to abnormal announcement returns. The findings confirm our hypothesis: early announcers enjoy higher (0.16%, with a t-statistic of 2.29) abnormal returns and late announcers earn lower (−0.23%, with a t-statistic of −3.83) abnormal returns than "regular" announcers.

We next explore which factors influence the relation between the market return (or the returns of just nonannouncing firms) and announcement returns. We find that the market responds more strongly to early announcers, which is consistent with the intuition that early announcers provide more new information as well as with our result that such announcers enjoy higher announcement returns.[5] We also show that the covariance between the market returns and the earnings announcement portfolio return is much higher when more firms are reporting in a given week (controlling for diversification effects), presumably because more announcements provide a stronger signal about the common component of earnings. Finally, we find that the nonannouncing firms that have reported their earnings a long time ago respond more strongly to

[4] Frazzini and Lamont (2007) obtain a similar result for monthly announcement portfolios.

[5] Patton and Verardo (2012) document a similar result, where individual firms' stock market betas increase more for early announcers.

announcements than those nonannouncers that reported recently, which is consistent with the hypothesis that announcements provide more information about (nonannouncing) firms with more dated earnings reports. All of these findings are predicted by our model, where investors use announcements to learn about nonannouncing firms (in addition to the announcers themselves), but are less easily reconciled with alternative explanations for the earnings announcement premium.

We next test directly whether earnings announcements offer relevant information about the economy. We show that the performance of the announcement portfolio predicts future aggregate earnings growth in an economically and statistically significant way. The R^2 of a univariate regression of quarterly aggregate earnings growth on the previous quarter's (long-short) announcement portfolio return is 6.3%, which compares favorably with other potential predictors. If earnings announcers outperform nonannouncers by 5% in a quarter (which approximately equals a one-standard-deviation increase), next quarter's aggregate earnings will grow at a rate that is 105% higher than its sample mean. Given that this rate is strongly persistent over short horizons, aggregate earnings should grow at a pace that is on average 36% above the mean for the following four quarters as well. These magnitudes suggest that the performance of the announcement portfolio reflects meaningful news about future aggregate earnings growth. Indeed, the announcement portfolio return forecasts aggregate earnings growth not just one, but also two and three quarters ahead.

In contrast, market returns have significantly less predictive power for aggregate earnings growth, with lower and mostly statistically insignificant point estimates and lower R^2s. It is only when we group firms into those reporting earnings in a given period and those not reporting that we can establish a strong relation between returns and aggregate earnings. This relation is very robust, holding in each half of our sample. We further explore how the ability to forecast aggregate earnings growth varies across firms, and find that it is most pronounced for large firms and for firms with low idiosyncratic volatility around past earnings announcements.

Shocks to earnings growth represent a systematic risk because aggregate earnings, together with labor income, determine consumption and investment (and therefore future consumption). Consequently, exposure to this risk should be priced in equilibrium. Having established that a portfolio tracking the performance of earnings announcers covaries with future earnings, we next explore whether it represents a priced risk factor and find support for this hypothesis. First, we sort stocks into portfolios based on their betas with the earnings announcement portfolio, which we estimate by regressing individual stock returns on the earnings announcement factor return (a portfolio long all stocks that are expected to announce in a given week and short all other stocks, rotated each week to new expected announcers). We find that the resulting portfolios' average excess returns increase with these betas. The relation is almost monotonic, and the difference between the abnormal returns of the top and bottom quintiles is economically and statistically significant (0.09% per week, with a

t-statistic of 3.09). This pattern is most pronounced in the weeks when stocks report their earnings, with a difference of 0.24% per week (t-statistic = 2.21), but holds during other weeks as well.

The announcement portfolio also demonstrates an ability to explain cross-sectional variation in returns. As our test assets, we use portfolios sorted on size, book-to-market, past short-run returns, past long-run returns, industry, and earnings announcement betas. Earnings announcement betas explain 22.0% of the cross-sectional variation in returns of these 55 test portfolios (relative to 12.2% for a single-factor market model). The implied risk premium associated with the announcement factor is positive and significant (t-statistic = 2.71), while the intercept term is not significant. Taken together, these results suggest that our announcement factor helps explain cross-sectional return variation and represents a priced risk.

Our results are consistent with the hypothesis of Campbell (1993) and Campbell and Vuolteenaho (2004) that cash flow risk should earn higher compensation than discount rate risk (see also Brennan, Wang, and Xia (2004)). Long-term investors should primarily care about cash flow risk, as they can "ride out" changes in discount rates. The methodology and results in Campbell and Vuolteenaho (2004) have been criticized, notably in Chen and Zhao (2009), because of the indirect way in which cash flow news is measured. As we show in the next section, our earnings announcement portfolio is a plausible direct measure of cash flow news.

Savor and Wilson (2013) study macroeconomic announcements (Federal Open Market Committee (FOMC), employment, and inflation) and show that the stock market enjoys much higher average returns on days when these announcements are made.[6] They rationalize this result using a model that relies on the positive covariance of stock market returns with state variables such as expected long-run economic growth and inflation. Their main finding is similar to ours in that it shows that announcement risk, defined as the risk of learning adverse information about the economy through a scheduled news release, is associated with high risk premia. However, this paper explores the phenomenon in more depth by establishing a direct link between earnings announcements and future fundamentals and also by showing that announcement risk is priced in the cross-section.

Kothari, Lewellen, and Warner (2006) show that stock market returns are negatively related to contemporaneous aggregate earnings growth, despite being unrelated to lagged earnings growth. They do not explore the earnings announcement premium or the ability of asset returns to predict future aggregate earnings. To explain their results, they propose that stock market discount rates correlate positively with aggregate earnings, but are also more volatile. As a result, good news about current earnings is more than offset by increases in discount rates. If correct, then this could also explain why stock market returns fail to predict future aggregate earnings, even though future aggregate earnings are highly predictable.

[6] Lucca and Moench (2015) confirm this result for just prescheduled FOMC announcements.

Sadka and Sadka (2009) explore the relation between returns and earnings for individual firms and in the aggregate, and find that returns have significant predictive power for earnings growth in the latter case. This result would appear to differ from our finding that market returns are poor predictors of aggregate earnings growth, but can be explained by differences in samples. Their sample ends in 2000, while ours goes through 2012. When they use a sample ending in 2005, their results are very similar to ours, with positive but insignificant coefficients.

Da and Warachka (2009) find that analyst earnings forecast revision betas explain a significant share of cross-sectional return variation across portfolios sorted on size, book-to-market, and long-term returns, but they do not examine the earnings announcement premium or announcement returns. Many studies, mostly in the accounting literature and commencing with Beaver (1968), study the contemporaneous relation between a firm's stock return, volatility, and trading volume and its earnings surprise.[7] The conclusion of these studies is that earnings surprises cannot fully explain abnormal returns around announcements, with which we concur (and for which we offer an explanation), and that earnings surprises are serially correlated, consistent with postearnings announcement drift (Ball and Brown (1968), Bernard and Thomas (1989)). By contrast, our study is not concerned with the ability of earnings surprises to explain abnormal returns, nor with postearnings announcement drift (which we explicitly control for in our tests), but rather with the effect of a typical earnings announcement, for which the surprise is presumably close to zero, on average returns. Furthermore, we are more interested in the potential spillover between an earnings announcement and the wider market.

The paper proceeds as follows. Section I provides our explanation. Section II describes the data. Section III documents the earnings announcement premium, Section IV presents evidence on the persistence in announcement premia across stocks, and Section V studies the relation between the timing of earnings announcements and announcement returns. Section VI explores the response of the market and of nonannouncing firms to announcements, while Section VII relates the returns of announcing firms to future aggregate earnings and Section VIII tests whether the announcement portfolio represents a priced risk factor. Section IX concludes. The Appendix provides the details of our model.

I. Why Should Earnings Announcers Earn High Returns?

In this section, we describe our explanation for the earnings announcement premium. We only provide the basic intuition behind our model and its principal predictions, and show all the details and derivations in the Appendix.

[7] See Lev (1989) for a review of papers up to that date. More recent examples from this large literature are Liu and Thomas (2000), Landsman and Maydew (2002), and Ryan and Zarowin (2003).

Our setup is quite straightforward: firms report their earnings each quarter, and the timing of these announcements is known in advance and differs across firms.[8] Investors use individual firm announcements to update their expectations about aggregate earnings.[9] Consider an atomistic firm i that announces its earnings. The unexpected part of the firm's announcement return can be decomposed into cash flow news, $N_{CF,i}$, and discount rate news, $N_{DR,i}$, as in Cohen, Polk, and Vuolteenaho (2003). We can express $N_{CF,i}$ as the sum of underlying but not directly observed market cash flow news η and firm-specific cash flow news v_i. If investors learn $N_{CF,i}$ but not its components, then market cash flow news revealed by firm i's announcement equals

$$N_{CF,MKT} = \frac{\text{Var}[\eta]}{\text{Var}[\eta] + \text{Var}[v_i]} N_{CF,i}, \tag{1}$$

and therefore

$$N_{CF,i} = \left(1 + \frac{\text{Var}[v_i]}{\text{Var}[\eta]}\right) N_{CF,MKT}. \tag{2}$$

If cash flow news and discount rate news are uncorrelated (and if investors do not learn anything else about market cash flows on firm i's announcement day), firm i's cash flow risk is a large multiple of the market's cash flow risk. (This result holds when we relax the no-correlation assumption, but with a much more complicated expression for the multiple. The only scenario in which it does not hold is if discount rate and cash flow news are perfectly correlated, in which case we would have a simple one-factor model.) The ratio of the two cash flow risks is just the reciprocal of the variance ratio in equation (1) above, and is always weakly greater than one. In essence, the firm's systematic cash flow risk spikes around its announcements because investors face a signal extraction problem: firm i's cash flow news is a noisy signal about market cash flow news, which means that, for an earnings surprise of X, investors revise their aggregate earnings expectations by less than X. Thus, the announcing firm's cash flow risk effectively "superloads" on market cash flow risk.

Crucially, the firm's market beta, however, only partially reveals this risk if discount rate news is important. Market beta equals

$$\beta_{i,MKT} = \frac{\text{Cov}[N_{CF,i}, N_{CF,MKT}] + \text{Cov}[N_{DR,i}, N_{DR,MKT}]}{\text{Var}[N_{CF,MKT}] + \text{Var}[N_{DR,MKT}]}. \tag{3}$$

[8] See Kim and Verrecchia (1991a, 1991b) and Kim and Verrecchia (1994) for examples of early theoretical work on how investors react to anticipated news announcements.

[9] This idea of information spillovers has been extensively studied in both finance and accounting. For information spillovers across firms, see Foster (1981), Clinch and Sinclair (1987), Han, Wild, and Ramesh (1989), Pownall and Waymire (1989), Han and Wild (1990), Pyo and Lustgarten (1990), Freeman and Tse (1992), Ramnath (2002), Anilowski, Feng, and Skinner (2007), and Thomas and Zhang (2008). For information spillovers across markets, see King and Wadhwani (1990), Collin-Dufresne, Goldstein, and Helwege (2003), Easton, Monahan, and Vasvari (2009), and Kraft, Vasvari, and Wittenberg-Moerman (2011).

When the variance of market discount rate news is negligible, this market beta will equal the superloading factor in parentheses in equation (2), and betas of announcing firms will be proportionately higher. But, if the variance of market discount rate news is not small, as most studies indicate (Campbell and Ammer (1993)), then the increase in announcing firms' market betas is less than proportional to the elevated cash flow risk of announcing firms.[10] Because cash flow risk is generally believed to carry a higher risk price, market betas will therefore fail to account for announcing firms' higher risk premia. Thus, a strategy (the "announcement portfolio") that buys firms when they are reporting earnings and sells short all other stocks will earn a high return that is not fully explained by the strategy's market beta.

Our explanation relies on two fundamental assumptions. First, investors cannot observe underlying market cash flow news directly, and thus must learn about it from earnings announcements. It is this signal extraction problem that makes the stocks of announcing firms especially risky by superloading on market cash flow risk. Second, market discount rate news accounts for a significant fraction of the variation in stock market returns, as shown by Campbell and Ammer (1993) and numerous other studies and implied by the results in Shiller (1981). This causes the earnings announcement portfolio to exhibit a positive abnormal return relative to the market model (and other factor models that do not fully capture cash flow news). Taken together, these two assumptions also imply that the announcement portfolio return will have greater predictive power than the market return for forecasting future market cash flows, which we proxy by aggregate earnings growth. This additional prediction implied by our model is not shared by other explanations for the earnings announcement premium, such as those premised on limits to arbitrage (Cohen et al. (2007), Frazzini and Lamont (2007)).

In the Appendix, we present a formal model that captures the essence of our explanation. The model also allows us to add additional features, such as the passing of time and the fact that the number of announcing firms varies across subperiods. These features allow us to derive additional testable implications, which we list below.

(i) The returns of firms expected to announce earnings in a given period (one week in our empirical work) should on average be high during that period, and these high average returns should not be explained by announcing firms' market betas.

(ii) Firms with higher past announcement returns should continue to enjoy higher future announcement returns. If the announcement premium is indeed a risk premium, firms with higher average announcement returns are riskier. To the extent that firm characteristics that determine its announcement risk do not change rapidly, average announcement returns should be persistent.

[10] Patton and Verardo (2012) estimate increased betas for announcing firms using high-frequency data.

(iii) Firms that announce earlier in the quarter (before many other firms have announced) should be riskier, all else equal, than firms that announce later (after most other firms have announced). Early announcers reveal more information about aggregate cash flows than late announcers for the simple reason that there is less information to acquire about fundamentals after many firms have already reported their earnings. Therefore, early (late) announcers should enjoy a higher (lower) announcement premium relative to the unconditional announcement premium. Over the entire quarter, however, average returns should not differ between early and late announcers.

(iv) The announcement portfolio return should have a higher covariance with future aggregate earnings growth than the market return, as discussed above. Provided the volatility of market discount rate news is not very low, announcer returns should have higher correlations with future aggregate earnings growth than those of nonannouncers, and this difference should be increasing in the number of announcing firms. Basically, a higher proportion of announcers' news represents news about future aggregate cash flows, first because announcers have a higher loading on cash flow news and second because the market has a higher proportion of discount rate news. Having more firms announce means that the firm-specific component of news aggregates out more, providing a less noisy signal about future aggregate earnings.

(v) The market, or the portfolio of nonannouncers to be more precise, should have a higher beta with the earnings announcement portfolio when the number of firms announcing is higher (a clearer signal induces a greater response per unit of announcer return variance), and a lower beta when more firms have already announced. More firms already having announced is equivalent to the passing of time and greater resolution of uncertainty about aggregate cash flows, reducing the importance of the marginal announcement and therefore reducing the response from the rest of the market. Additionally, firms that have recently reported their earnings should exhibit a lower sensitivity to announcements than firms that are due to report in the near future. Recent announcers have revealed most of their relevant information, and little time has elapsed with new developments, so there is little to be learned from the announcements of other firms about the prospects of such firms. By contrast, much more can be learned about the prospects of soon-to-announce firms, whose last report occurred a while ago.

(vi) Covariance with the announcement portfolio return should explain cross-sectional variation in average returns for different test assets, and such covariance should be priced in the sense that higher covariance should be associated with higher average returns. The reason is that the announcement portfolio return, given our two assumptions, likely represents a better proxy for market cash flow news than the market return.[11]

All of these implications can be derived from a simple representative agent model, with ex-ante identical firms (except for their announcement dates). Most of our assumptions are the same as in Campbell (1993), except that we require the representative investor to learn about underlying market cash flow news through earnings announcements.

Because our model is a representative agent model, it has nothing to say about trading volumes for announcing versus nonannouncing firms. As pointed out by, for example, Kim and Verrecchia (1997), volume primarily reflects disagreement between heterogeneous agents.[12] Although Beaver (1968) and Frazzini and Lamont (2007), as well as others, show interesting volume patterns around earnings announcements, our model is unable to address these (we do control for volume in our regression analysis).

In the Appendix, we also show that firms whose announcements offer a more informative signal about aggregate earnings do not necessarily enjoy higher announcement premia, as our model does not predict a monotonic relation between how much investors learn from a particular firm's announcement and expected returns. For example, in the extreme case where investors learn everything about aggregate earnings from a particular firm's announcement (i.e., learn as much about nonannouncers as about the announcing firm), the announcement risk premium would actually be zero. The simple intuition behind this result is that the innovation in aggregate cash flow expectations would then always be equal to the firm-specific innovation, thus making the firm as risky, but not riskier, than the market. At the other extreme, when investors learn nothing about aggregate earnings from a firm's announcement, the announcement risk premium would again be zero, as announcement news then represents a purely idiosyncratic risk that should not be priced in equilibrium. (See equations (A.9) and (A.10) in the Appendix for a formal proof.) More generally, the announcement risk premium at first increases with the covariance between a firm's earnings surprise and aggregate earnings but then decreases. This means that we cannot simply test whether the announcement risk premium increases with certain parameters in our model.

[11] As a caveat, we note that earnings announcements may not necessarily affect only cash flow expectations. Investors may also learn more about the riskiness of future cash flows, for individual firms and in aggregate, and therefore change the discount rates they apply to cash flows. In support of this hypothesis, Ball, Sadka, and Sadka (2009) find that the principal components of aggregate earnings and returns are highly correlated.

[12] See also Kim and Verrecchia (1991b, 1994), which contains more theoretical predictions on how returns and volumes should be affected by earnings announcements.

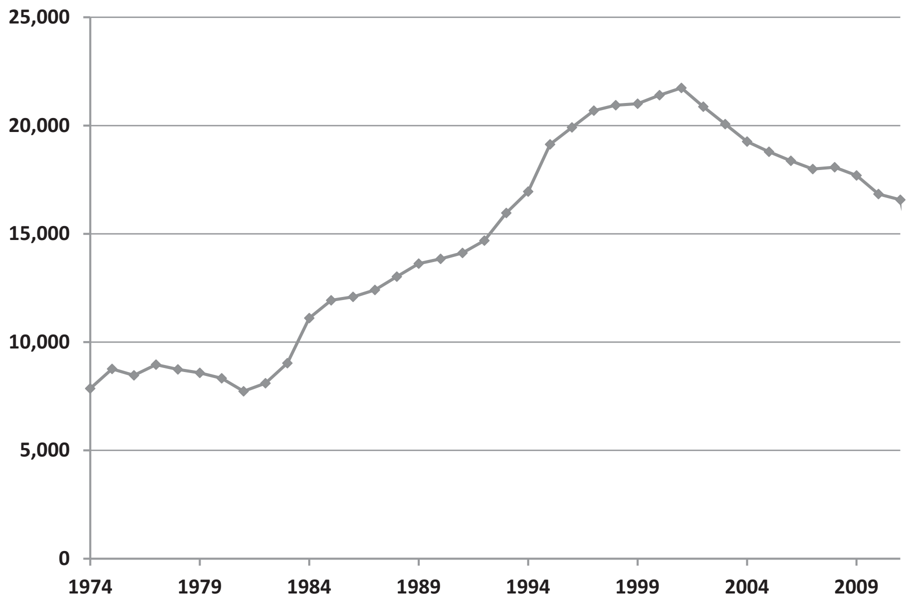

Figure 1. Time-series distribution of earnings announcements. This figure plots the total number of quarterly earnings announcements over time. It covers all NYSE, NASDAQ, and Amex firms available from the Compustat quarterly file with nonmissing earnings and at least four prior earnings reports.

II. Data

A. Sample Construction

Our sample covers all NYSE, NASDAQ, and Amex stocks on the Compustat quarterly file from 1974 to 2012.[13] To be included, a firm has to have at least four prior quarterly earnings reports and nonmissing earnings and book equity for the current quarter. In total, we have 626,567 observations. Figure 1 plots the number of earnings announcements over time.

In our analysis, we focus on weekly stock returns, which are computed using daily stock returns from the Center for Research in Security Prices (CRSP) and include delisting returns where needed. The earnings announcement portfolio return is calculated as the weekly value-weighted (equal-weighted) return of a portfolio containing all firms expected to announce earnings in that week minus the value-weighted (equal-weighted) return of a portfolio containing all nonannouncing firms.

We choose a weekly horizon (Monday through Friday) for a number of reasons. First, working with weekly instead of daily returns makes our algorithm for predicting announcement dates (see details in the next section), which in

[13] The first year when quarterly earnings data become fully available in Compustat is 1973. It is also the first year when Nasdaq firms are comprehensively covered by Compustat. We need at least one year of prior Compustat data to compute expected earnings dates.

this case means predicting the week of the announcement, much more precise. Firms shift the exact day of the announcement much more frequently than the week of the announcement, which makes it easier to predict the correct window for weekly returns. Furthermore, earnings dates in Compustat, which we rely on to create our forecasts of expected announcement dates, are not perfectly accurate, sometimes giving the day of the announcement and sometimes the day after, the latter probably reflecting a reporting lag in the primary data source. Earnings announcements also can happen before the market opens or after it closes. Both of these facts complicate any analysis centered on a particular day, so a longer horizon is more appropriate.

A weekly horizon represents a compromise between various approaches in the literature. Many papers (e.g., Cohen et al. (2007)) employ a very tight (typically two- or three-day) window centered around the announcement date, while Frazzini and Lamont (2007) study monthly returns, arguing that much of the premium is realized outside this window. The longer window may make sense for testing the Frazzini and Lamont inattention hypothesis, which proposes that limited investor attention drives the announcement premium, but makes less sense in our context. We want to focus on the news content of earnings announcements, which would invariably be greatly diluted with a long window around the announcement. Finally, weekly returns may reduce possible bid-ask bounce, large liquidity shift, and other microstructure issues that might arise with daily returns. Given that earnings announcements are times of higher than usual volatility, such problems may be especially severe in our analysis.

Earnings are defined as income before extraordinary items plus deferred taxes minus preferred dividends (as in Fama and French (1992)). Book equity is defined as stockholders' equity. If that item is missing in Compustat, then it is defined as common equity plus preferred equity. If those items are unavailable as well, then book equity is defined as total assets minus total liabilities (as in Cohen, Polk, and Vuolteenaho (2003)).

The paper's findings are also robust to various screens for inclusion in the sample. All the main findings remain if we restrict our study to firms with share prices above $1, if we exclude the very smallest firms by market capitalization, or if we do not require firms to have four prior earnings reports. Similarly, the exact choice of announcement window does not impact our results, which do not change if we use daily returns with either shorter or longer holding periods than a week.

B. Announcement Dates

We rely on earnings announcement dates that are reported in Compustat. However, in some cases investors may not have known the exact announcement date in advance. Firms occasionally preannounce their earnings or delay their publication. Such events often are not fully anticipated and can reveal pertinent information regarding a firm's performance. Early announcers tend to enjoy positive returns (Chambers and Penman (1984)), while late ones sometimes postpone their announcements as a result of negative developments such as restatements. A trading strategy of buying stocks shortly before they are expected to report earnings may thus miss out on preannouncement gains on the one hand and incur losses when postponements are disclosed on the other hand. Consequently, a strategy based on Compustat dates is not always available to investors and may overstate the returns investors would have earned by following it. Previous work by Cohen et al. (2007) suggests that the magnitude of this potential bias is not negligible, although the premium is robust to following a strategy based on expected rather than actual announcement dates, as we show below.

However, expected announcement dates are not a problem-free approach. A major issue with expected announcement dates is that they are frequently wrong. Typically, they are calculated based on just the timing of previous announcements, and investors have access to much more information. Any firm that changes its reporting date (e.g., by changing its fiscal year-end) and informs investors about this would have its expected announcement date misclassified under this approach. In manual spot-checking, we find that this concern is significant: of the 100 randomly chosen instances of significant differences between expected and actual dates, only 27 are cases in which investors would possibly not have known the actual date. Thus, while the earnings announcement premium calculated with actual announcement dates may be overstated, that based on expected announcement dates could be understated (assuming the average announcement return is positive).

In order to be conservative, we perform our analysis using expected announcement dates. Almost all of our findings are stronger with actual announcement dates. This is not surprising, given that many of the expected dates are incorrect (in the sense that investors would actually have known in advance the true announcement date).

Our algorithm for calculating expected announcement dates is as follows:

(i) Set the expected announcement date equal to the actual date for the earnings announcement occurring in the same calendar quarter a year ago plus 52 weeks.

(ii) If the firm changes its fiscal year-end in the meantime, then set the expected announcement date equal to the actual date for its last earnings announcement plus an adjustment factor. The adjustment factor is computed as the median distance between consecutive earnings announcements for firms of similar size, and is conditioned on whether the reporting quarter corresponds to the end of a firm's fiscal year (since annual reports are typically released later than quarterly earnings).

(iii) If the expected announcement date is too far or too close to the date of the last earnings announcement (where the cutoffs are defined as the 1^{st} and 99^{th} percentile for firms of similar size), then set the expected announcement date equal to the actual date for its last earnings announcement plus the adjustment factor (computed as in step 2).

This simple algorithm helps greatly increase the accuracy of expected announcement dates, defined as the proportion of earnings announcements where the expected date occurs in the same week as the actual one. The accuracy jumps from less than 50% if we just use step 1) to about 60%. Further refinements that we explored resulted in only marginal improvements.

III. Earnings Announcement Premium

A. Summary Statistics

We begin by showing that the earnings announcement premium is an economically important and robust phenomenon. Panel A of Table I provides descriptive statistics for the long-only announcement portfolio, which comprises all firms expected to report earnings in a given week, and the nonannouncer portfolio, which consists of all other firms. The average excess return of the value-weighted (equal-weighted) announcement portfolio is 0.32% (0.35%) per week, or 16.7% (18.3%) per year. These numbers represent very impressive performance, both in absolute terms and relative to nonannouncers. The value-weighted (equal-weighted) return for the long-short announcement portfolio, where investors buy all the expected announcers and sell short all the other firms, is 0.19% (0.13%) per week.

The high returns of announcers are associated with higher volatility, as one would expect, but the relative difference in volatilities is much smaller than the difference in average returns. The volatility of the long-only announcement portfolio is only 22% higher than that of the nonannouncer portfolio, compared to a 146% difference in average returns. Consequently, the strategy of buying announcing firms delivers high returns per unit of risk. Assuming independent and identically distributed returns, the annualized Sharpe ratio for the value-weighted (equal-weighted) long-short announcement portfolio is 0.807 (0.400), which is considerably higher than the market's (0.353), the value factor's (0.550), or the momentum factor's (0.520).

Furthermore, the long-short announcement portfolio actually has positively skewed returns and exhibits positive coskewness (0.24 when we estimate it using the approach in Harvey and Siddique (2000)). Therefore, negative skewness or coskewness cannot explain the high return on the announcement portfolio.

Panel B shows the excess and abnormal returns across all announcements (i.e., in event time), which further confirm that announcing firms enjoy high returns. The average excess (abnormal) return for an announcement in our sample equals 0.26% (0.15%), with a t-statistic of 21.73 (13.14). These numbers are slightly lower than those for calendar-time portfolios, which suggests that the number of announcers in a given week may be negatively related to announcement premia, an issue that we explore further in the next section.

All the returns discussed above are computed using expected announcement dates. As argued in the previous section, this likely represents a conservative estimate of the announcement premium, since many expected dates are not accurate. In Table A.1, we provide the same analysis as in Table I but with

Table I

Summary Statistics with Expected Announcement Dates

This table presents summary statistics for calendar-time announcer and nonannouncer portfolios (Panel A) and event-time announcer returns (Panel B). *Ret Ann* is the weekly excess return (value- or equal-weighted) of a portfolio consisting of all firms announcing in a given week, based on expected announcement dates. *Ret Non* is the weekly excess return (value- or equal-weighted) of a portfolio consisting of all nonannouncing firms. *N(Ann)* is the number of firms in the announcer portfolio, and *N(Non)* is the number of firms in the nonannouncer portfolio. *Excess Ret* is an announcing firm's excess return, and *Ab. Ret* is the same firm's return in excess of the market return. The sample is from 1974 to 2012. Returns are expressed in percentage points.

	Mean	Median	Min	Perc. 10	Perc. 90	Max	t-stat	*SD*	Skew.	Kurt.
Panel A: Calendar Time ($N = 2{,}035$)										
Ret Ann (vw)	0.32	0.40	−17.27	−2.94	3.35	17.54	5.00	2.86	−0.11	4.08
Ret Non (vw)	0.13	0.28	−18.77	−2.42	2.52	16.09	2.45	2.35	−0.41	6.79
Ann – Non (vw)	0.19	0.11	−9.10	−1.41	1.88	12.48	5.27	1.62	0.65	8.23
Ret Ann (ew)	0.35	0.40	−18.43	−2.52	3.06	17.34	6.06	2.60	−0.53	6.13
Ret Non (ew)	0.22	0.34	−19.06	−2.13	2.44	15.81	4.37	2.25	−0.84	8.79
Ann – Non (ew)	0.13	0.11	−4.31	−0.97	1.30	12.48	6.06	0.98	0.15	2.43
N(Ann)	308	176	0	55	747	1,509		305	1.6	2.0
N(Non)	6,305	6,393	4,250	4,730	7,970	9,047		1,114	0.2	−0.5
Panel B: Event Time ($N = 626{,}567$)										
Excess Ret	0.26	−0.11	−96.47	−8.50	9.03	473.28	21.73	9.50	3.26	76.60
Ab. Ret	0.15	−0.24	−97.35	−8.26	8.53	473.86	13.14	9.50	3.26	76.60

actual announcement dates. As predicted, the magnitudes are higher, though mostly for equal-weighted returns, for which the average announcement portfolio return jumps from 0.13% to 0.34%, and in event time, where the average abnormal announcement return increases from 0.15% to 0.26%. It seems that most of the announcements that our algorithm for estimating expected dates misses are associated with small firms, which is not very surprising.

B. Abnormal Returns

Of course, it could be the case that announcers' exposure to standard risk factors can explain their high returns. It is not implausible that factor betas may change dramatically for a firm when it is reporting earnings. Thus, we next explore the abnormal returns associated with the earnings announcement portfolio, controlling for its exposure to the market, size, value, and momentum factors.[14] As Table II shows, these abnormal returns are only slightly (almost imperceptibly) lower than raw returns, and this is true for all three asset pricing models we consider.[15] The alphas we compute are not only economically meaningful but also statistically significant, with a t-statistic of 5.19 (5.54) for the value- (equal-) weighted portfolio.

The stock market beta of the earnings announcement portfolio, although greater than zero, is quite small at 0.02 for value-weighted returns and 0.10 for equal-weighted returns, which is exactly what our model predicts. Patton and Verardo (2012) estimate daily betas of earnings announcers around their announcements using high frequency returns. They argue, as we do, that investors should attempt to infer a common component from firms' announcements, and that as a result market betas of announcing firms should be higher. They estimate an average increase in market beta of 0.16 for an announcer on its announcement day, which is close to our estimate of 0.10 for the long-short equal-weighted portfolio using weekly returns. We conclude that, although the market beta of announcers is higher than that of other firms, this difference cannot explain the much higher average returns of earnings announcers.

When we divide the data into different subsamples, these patterns remain remarkably consistent. Panel C shows that the four-factor alpha is 0.10% (t-statistic = 2.15) in the period between 1974 and 1986, 0.24% (t-statistic = 4.44) between 1987 and 1999, and 0.21% (t-statistic = 2.59) between 2000 and 2012. In Table A.2, we study the abnormal returns of the announcement portfolio with actual announcement dates. We get very similar results for value-weighted returns, and significantly higher alphas for equal-weighted returns, which is consistent with our previous results.

In sum, we find that the earnings announcement premium is a major economic phenomenon that is highly statistically significant and robust to the choice of sample and asset pricing model. Although the strategy occasionally

[14] We obtain these factor portfolio returns from Kenneth French's Web site.

[15] Frazzini and Lamont (2007) obtain the same result that none of the four factors have much impact on abnormal returns of the earnings announcement strategy.

Table II

Earnings Announcement Premium

This table presents calendar-time abnormal returns for the long-short earnings announcement factor portfolio. Every week all stocks are divided into those that announce earnings and those that do not, based on their expected announcement dates. Portfolio returns equal those of a strategy that buys all announcing stocks and sells short nonannouncing stocks. Alphas are computed using the CAPM, the Fama-French three-factor model, and the Fama-French + momentum model. Returns are expressed in percentage points. t-statistics are given in brackets.

	Excess Ret.	Alpha	Mktrf	SMB	HML	UMD	R^2
Panel A: Value-Weighted Earnings Announcement Premium (%)							
1974–2012	0.19	0.19	0.02				0.12
	[5.27]	[5.18]	[1.54]				
1974–2012	0.19	0.19	0.01	0.06	−0.10		0.90
	[5.27]	[5.40]	[0.52]	[1.93]	[−3.27]		
1974–2012	0.19	0.19	0.01	0.06	−0.08	0.03	1.06
	[5.27]	[5.19]	[0.88]	[1.88]	[−2.66]	[1.82]	
Panel B: Equal-Weighted Earnings Announcement Premium (%)							
1974–2012	0.13	0.12	0.10				5.25
	[6.06]	[5.66]	[10.61]				
1974–2012	0.13	0.12	0.10	0.00	0.03		5.36
	[6.06]	[5.49]	[10.61]	[0.21]	[1.55]		
1974–2012	0.13	0.12	0.10	0.00	0.02	−0.01	5.39
	[6.06]	[5.54]	[10.24]	[0.23]	[1.29]	[−0.77]	
Panel C: Value-Weighted Earnings Announcement Premium (Subsamples) (%)							
1974–1986	0.11	0.10	0.08	0.08	0.06	0.01	1.93
	[2.28]	[2.15]	[3.30]	[1.83]	[1.17]	[0.17]	
1987–1999	0.26	0.24	0.03	0.13	−0.10	0.11	3.63
	[4.92]	[4.44]	[0.94]	[2.86]	[−1.51]	[2.43]	
2000–2012	0.20	0.21	−0.02	0.02	−0.10	0.02	0.84
	[2.48]	[2.59]	[−0.47]	[0.29]	[−1.76]	[0.58]	

loses money, the only recent periods in which it earned significantly negative returns were during the financial crisis in 2008 (−19.5%) and the euro crisis in 2011 (−24.6%). This observation is consistent with our hypothesis, since these were periods in which market participants were likely to have sharply revised down their forecasts of future earnings.

In a calibration of our model using annual, value-weighted returns based on actual announcement dates, which have higher average returns than those based on predicted dates, we find that we can match means, standard deviations, and market betas of announcement and market portfolio returns with an implied coefficient of relative risk aversion γ of 16.8. Thus, despite its very restrictive assumptions, our simple model can explain the earnings announcement return premium, although it does require us to assume somewhat high levels of risk aversion to fit the means, variances, and covariances closely. In addition, the fitted example requires that the volatility of cash flow (20.0%) and discount rate news (18.4%) at the firm level be about the same, consistent with the results of Cohen, Polk, and Vuolteenaho (2003), but that the correlation of cash flow news across firms be much lower (0.24) than the correlation of discount rate shocks (0.96). Because market discount rate news is then implied to be the dominant component of market volatility, and because the announcement portfolio, by virtue of the restrictive assumptions of the model, has no covariance with market discount rate news, the market beta of the announcement portfolio should be quite low, as we show above.

Our model predicts that the expected return of the long-short announcement portfolio is negatively related to the number of announcers in a given period (see equations (A.9) and (A.10) in the Appendix). The simple intuition for this relation is that investors learn more about aggregate cash flow news as the number of announcers increases. Consequently, returns of nonannouncers become more highly correlated with the long-only announcement portfolio, leading to a lower announcement premium. In the extreme case of a very large number of announcers, their earnings reports would, when aggregated, fully reveal market cash flow news, and thus there would be no signal extraction problem and the announcement premium would equal zero.

We test this hypothesis by constructing two time series of quarterly announcement returns. For the first, we simply compound weekly announcement portfolio returns to get quarterly returns. For the second, each weekly return is weighted by the number of announcers in that week and then compounded (i.e., we compute the weighted sum of log returns and then convert the result into simple returns). If the announcement portfolio return is negatively related to the number of announcers in a period, the average return of the weighted series should be lower. The reason is that weeks with a high number of announcers, which are assumed to have lower announcement portfolio returns, receive a higher relative weight, leading to an overall lower average return.

When we compare the two quarterly return series, we find that the average return (on a weekly basis) for the value-weighted (equal-weighted) announcement portfolio is 0.185% (0.118%) when each week is weighted equally versus 0.128% (0.089%) when weeks are weighted by the number of announcers, and the difference between the two is 0.057% (0.029%), with a *t*-statistic of 2.21 (1.53). This result suggests that the relation between the number of announcers and the announcement portfolio return is indeed negative (though not quite significant for the equal-weighted portfolio), exactly as our model predicts.[16]

C. Trading Costs

The turnover for the "buy-announcers" strategy should be very high. Basically, an investor would rotate his entire long position every week. It is thus very likely that transaction costs could significantly decrease the profitability of this strategy.

[16] We thank the referee for suggesting this test.

It is very hard to directly estimate transaction costs for a given trading strategy, especially since those costs are likely to differ greatly across different types of investors and across different types of strategies. A recent study by Frazzini, Israel, and Moskowitz (2013) directly measures actual trading costs for a large institutional money manager, and finds that they are quite a bit lower than those reported in previous studies. The costs documented in the study vary significantly across strategies, with the most similar one to the announcement premium being the short-term reversals. This is also a high-turnover strategy, which buys the previous month's losers and sells the previous month's winners, and has a turnover of 305% each month. Its annual trading costs are 6.75% (by far the highest of all the strategies considered in the paper), which is about 0.13% per week. However, about 50% of this strategy involves shorting stocks, which is on average more expensive than going long, and the impact is likely even more severe for short-term reversals, where some of the short positions involve hard-to-short securities. By contrast, the buy-announcer strategy is essentially a long-only strategy, as the short position can simply consist of shorting the entire market through an index. Therefore, we believe that a sophisticated investor could execute the announcement premium strategy at a lower cost than 0.13% per week (exactly how much so is hard to determine).

The value-weighted announcement portfolio based on expected announcement dates, which is likely a conservative estimate of the strategy's profitability, earns a weekly alpha of 0.19% in our sample. Thus, even though trading costs would significantly impact the profitability of the announcement strategy, it would still earn a positive abnormal return.[17]

IV. Persistence in Announcement Premia

So far, our analysis has only distinguished between firms that report earnings in a given period and those that do not. However, announcing firms are not a uniform group. They differ in terms of both how much information their announcements provide about aggregate earnings and how much uncertainty surrounds their earnings estimates. This should translate into differences in the risk associated with earnings announcements and consequently into differences in risk premia. A direct test of this hypothesis would estimate the two parameters across stocks and try relating them to returns. A significant obstacle here is that it is not obvious how to perform the first step. Estimating the relation between firm-level and aggregate earnings shocks may present an especially difficult problem. Furthermore, as we argue above, our model does not imply a monotonic relation between how much investors learn from a particular firm's announcement and expected returns, so the only way to directly relate this parameter to risk premia is through structural estimation.

[17] Even if transaction costs could explain why investors do not arbitrage the announcement premium away (under the assumption that it actually does represent a positive alpha strategy), the question of why the premium arises in the first place would still remain.

An alternative approach would be to test whether earnings announcement premia are persistent. High (low) historical announcement returns should reflect high (low) exposure to aggregate earnings risk (through the relevant parameters). Under the assumption that the parameters do not change rapidly over time, we can use past returns as a proxy for current announcement risk. We then expect announcement premia to be persistent across stocks: those with high (low) past announcement returns should experience high (low) future announcement returns.

To evaluate this hypothesis, each week we sort all announcing firms into five portfolios based on their historical announcement returns. The lowest quintile contains stocks with the worst historical average announcement returns and the highest quintile those with the best historical returns. We define the announcement return as a firm's return during an announcement week minus the market return.

Table III presents excess returns, defined as raw returns minus the risk-free rate, for the portfolios based on sorts over horizons ranging from 5 to 20 years. For example, Panel B shows that the average excess return for the portfolio containing announcing stocks with the lowest historical announcement returns over the previous 10 years is 0.07% per week (0.21% equal-weighted).[18] The number then monotonically increases to 0.44% (0.58% equal-weighted) for the portfolio containing stocks with the best past announcement returns. The corresponding long-short (*High* − *Low*) portfolio has an average return of 0.37% per week (0.37% equal-weighted), with a *t*-statistic of 6.08 (5.30 equal-weighted). This dispersal in returns, 19.1% on an annual basis, is very large and represents a significantly greater difference than that between announcing and nonannouncing stocks, suggesting earnings announcement premia are very persistent. The results do not change when we compute portfolio alphas (relative to the Fama-French plus momentum model). In that case, the "*High*" portfolio outperforms the "*Low*" portfolio by 0.37% (0.32% equal-weighted), with a *t*-statistic of 6.06 (4.66 equal-weighted).

The market beta for the *High* − *Low* portfolio is positive and significant (0.113, with a *t*-statistic of 4.28). This is consistent with our explanation for the earnings announcement premium, which predicts that announcement risk premia should be positively related to firms' market betas around their announcements (even if these betas do not fully explain the magnitude of the premium). This result is also in line with our assumption that a firm's past announcement returns serve as a useful proxy for its current announcement risk.

One potential concern is that these findings stem from the well-known earnings momentum anomaly first discovered by Bernard and Thomas (1990),

[18] An average excess return of 0.07% is lower than that of nonannouncers (0.13%). Our model allows for this, as it is definitely possible that certain announcers exhibit lower risk premia than nonannouncers, for example, because their earnings contain no common component. We predict that firms become riskier when they are reporting earnings. However, it is still possible, and perhaps probable, that some low-risk firms, even with the increase in risk associated with announcements, will be less risky during announcements than the average nonannouncer.

Table III
Persistence in Earnings Announcement Premia

This table presents excess returns, defined as raw returns minus the risk-free rate, for five earnings announcement portfolios. Each week all announcing stocks are sorted into quintiles based on their historical average announcement returns (estimated as the raw return minus the market return), and excess returns are computed for the corresponding portfolios. *H-L* is a long-short portfolio that buys all announcing stocks in the highest quintile and sells short all announcing stocks in the lowest quintile. The alpha for this portfolio is calculated using the Fama-French + momentum model. Panel B also provides characteristics of stocks making up the different portfolios. N is the average number of firms in each portfolio. *ME* is the average market equity of all firms in each portfolio (in millions of dollars). *BM* is the average book-to-market ratio. *Mom* is the average past one-year return. *Beta* is the market beta of a portfolio. Returns are expressed in percentage points. t-statistics are given in brackets. The numbers in the bold font may be of special interest to readers.

	All Years							Excluding Last Year						
	Low	2	3	4	High	H-L	H-L(α)	Low	2	3	4	High	H-L	H-L(α)
Panel A: Sorts Based on Average Announcement Return over Previous Five Years														
VW	0.05	0.17	0.25	0.30	0.42	**0.37**	**0.38**	0.24	0.20	0.22	0.26	0.34	**0.10**	**0.13**
	[0.67]	[3.05]	[4.78]	[5.16]	[5.84]	**[6.11]**	**[6.22]**	[3.29]	[3.64]	[4.03]	[4.48]	[4.79]	**[1.70]**	**[2.16]**
EW	0.22	0.32	0.38	0.42	0.60	**0.37**	**0.34**	0.37	0.38	0.30	0.39	0.49	**0.12**	**0.13**
	[2.63]	[4.94]	[5.86]	[6.55]	[8.02]	**[5.43]**	**[4.95]**	[4.48]	[5.61]	[4.80]	[5.98]	[6.44]	**[1.76]**	**[1.90]**
Panel B: Sorts Based on Average Announcement Return over Previous 10 Years														
VW	0.07	0.20	0.24	0.34	0.44	**0.37**	**0.37**	0.17	0.20	0.22	0.28	0.35	**0.17**	**0.20**
	[0.97]	[3.67]	[4.37]	[5.80]	[5.96]	**[6.08]**	**[6.06]**	[2.50]	[3.70]	[3.95]	[4.68]	[4.86]	**[2.90]**	**[3.36]**
EW	0.21	0.28	0.39	0.48	0.58	**0.37**	**0.32**	0.33	0.33	0.37	0.43	0.50	**0.17**	**0.18**
	[2.58]	[4.21]	[5.87]	[7.40]	[7.82]	**[5.30]**	**[4.66]**	[4.09]	[4.76]	[5.82]	[6.54]	[6.60]	**[2.54]**	**[2.61]**
N	58.2	58.2	58.2	58.2	58.2			56.9	56.9	56.9	56.9	56.9		
ME	458.6	2,036.0	3,083.5	2,722.2	1,154.6			500.6	2,091.0	3,168.4	2,767.1	1,137.5		
BM	0.88	0.87	0.81	0.79	0.72			0.82	0.85	0.82	0.80	0.78		
Mom	6.6	13.4	16.4	20.2	29.1			18.9	17.1	16.2	17.4	17.3		
Beta (ew)	0.98	0.89	0.89	0.94	1.05			0.98	0.88	0.89	0.92	1.05		
Beta (vw)	1.02	0.87	0.85	0.94	1.13			1.02	0.84	0.86	0.96	1.08		
Panel C: Sorts Based on Average Announcement Return over Previous 20 Years														
VW	0.04	0.22	0.22	0.36	0.38	**0.34**	**0.34**	0.16	0.22	0.23	0.29	0.30	**0.14**	**0.18**
	[0.53]	[3.92]	[4.09]	[6.13]	[5.10]	**[5.53]**	**[5.62]**	[2.27]	[4.12]	[4.21]	[4.85]	[4.22]	**[2.40]**	**[2.94]**
EW	0.17	0.32	0.39	0.50	0.55	**0.38**	**0.34**	0.33	0.36	0.36	0.47	0.48	**0.16**	**0.16**
	[2.16]	[4.77]	[5.95]	[7.61]	[7.36]	**[5.47]**	**[4.87]**	[4.04]	[5.22]	[5.39]	[7.04]	[6.35]	**[2.33]**	**[2.25]**

where firms with positive (negative) earnings surprises continue outperforming (underperforming) over the following three quarters. To address this concern, we rerun our analysis with sorts that exclude announcement returns from the previous year (so that in Panel B, for example, average announcement returns would be calculated from year $t-2$ to $t-10$). Our findings remain the same with this approach. For a 10-year horizon, the top quintile outperforms the bottom one by 0.20% per week (0.18% equal-weighted), which is 10.6% (9.2%) annualized.

These results remain the same when we shorten the horizon to five years (Panel A) or lengthen it to 20 years (Panel C). They also continue to hold when we use different measures of announcement returns, when we measure performance as abnormal rather than excess returns, when we rely on actual instead of expected announcement dates, and when we limit the weight of each individual stock in a portfolio to 10% (a very small number of weeks with few announcements have portfolios with fewer than 10 stocks). We can thus conclude that announcing stocks exhibit significant (predictable) variation in expected announcement returns, and that the pattern is consistent with the hypothesis that firms exhibit persistent differences in their exposure to announcement risk.

Heston and Sadka (2008) find a strong seasonality effect in the cross-section of U.S. stock returns, where stocks with high historical returns in a given calendar month continue to experience high future returns in that same month.[19] While this could potentially explain the persistence in earnings announcement premia, we show that it is a distinct phenomenon. First, when we sort nonannouncing stocks using the same methodology as we do for announcers (basically looking only at historical returns at quarterly lags of 13 weeks, 26 weeks, 39 weeks, and so on), we do not document any dispersion in returns between different portfolios. Second, we still observe strong persistence in announcement premia even if we exclude annual lags of announcement returns when forming portfolios (i.e., if we do not include historical announcement returns occurring in the same quarter as the current one).[20]

Brandt et al. (2008) find that recent earnings announcement returns (up to one year) predict future announcement returns. Our results are consistent with theirs, but we look at persistence over much longer past horizons of up to 20 years. Moreover, we show that our results are robust to dropping the most recent year of past announcement returns, so the two sets of results are distinct.

V. Timing of Earnings Announcements

While it is not easy to directly relate firm characteristics to how much information a firm's earnings announcement provides about aggregate earnings,

[19] Heston and Sadka (2010) obtain the same result for various international markets.

[20] See Table IA.I in the Internet Appendix, available in the online version of this article on the *Journal of Finance* website, for details.

the impact of announcement timing is relatively clear. Investors should, all else equal, learn more from those firms reporting their earnings early in a quarter than from those reporting late. Consequently, early (late) announcers should be riskier (less risky) and command higher (lower) expected announcement returns. This is a very intuitive hypothesis, also confirmed more formally by our model, which we test in this section (see equation (A.24) in the Appendix for details).

It is important to repeat here that our analysis relies on expected announcement dates. In Section II, we discuss how firms occasionally preannounce or delay reporting their earnings for reasons related to their performance, which means an approach based on actual dates could produce misleading results. For example, if preannouncements are typically associated with good news, we would find that early announcers enjoy higher returns, but this would have nothing to do with the amount of new information investors expect to learn from these firms.

We first study the impact of earnings announcement timing by running OLS regressions, where the dependant variable is a firm's abnormal announcement return, based on its expected announcement date and computed as the raw announcement return minus the equal-weighted nonannouncer portfolio return.[21] All standard errors are clustered by year-quarter. Our main objects of interest are two variables: *Early*, a dummy variable set to one if a firm's expected announcement date falls in the earliest quartile in a given fiscal quarter, and *Late*, a dummy variable set to one if a firm's expected announcement date falls in the latest quartile in a given fiscal quarter.

The average abnormal return of early announcers is 0.324% (t-statistic = 12.67), and that of late announcers is 0.080% (t-statistic = 2.48). Even late announcers earn a positive announcement premium, but, as column (1) of Table IV shows, it is significantly lower than the announcement premium of early and "normal" announcers (0.146%, with a t-statistic of 8.36).

In column (2), we add as controls various firm characteristics, such as size, book-to-market ratio, leverage, and past returns, as well as industry fixed effects, where industries are defined using the Fama-French 12-industry classification scheme, and time (year-quarter) fixed effects. The coefficient on *Early* is positive and significant (t-statistic = 3.24), whereas that on *Late* is negative and significant (t-statistic = -5.05). Furthermore, these effects are economically meaningful: early announcers earn returns that are 0.150% higher (over a five-day horizon) and late announcers earn returns that are 0.232% lower than those of similar announcing firms that do not report their earnings early or late. The coefficients on the controls confirm previous results: small firms, value firms, and firms with high leverage tend to earn higher announcement returns.

[21] Our results are the same if we instead run Fama-MacBeth regressions (Table IA.II in the Internet Appendix). They also do not change if we use the market return or the risk-free rate as our benchmark instead of the equal-weighted nonannouncer portfolio return (Table IA.III in the Internet Appendix).

Table IV

Earnings Announcement Timing and Announcement Returns

This table presents results of OLS regressions where the dependent variable is the abnormal announcement return (*AAR*), computed as the return net of the equal-weighted nonannouncer return and expressed in percentage points. *Early* is a dummy variable set to one if a firm's expected announcement date falls in the earliest quartile in a given quarter. *Late* is a dummy variable set to one if the expected announcement date falls in the latest quartile in a quarter. *Time* is the amount of time (in days) elapsing between the beginning of a quarter and the expected announcement date. *BE/ME* is the book-to-market ratio (equal to zero if negative). *Neg-BM* is a dummy variable set to one if the book-to-market ratio is negative. *Debt/Assets* is the ratio of debt to total assets. *ME* is the market value of equity. *Lagged return (1Y)* and *(1M)* are the return over the previous year and the previous month, respectfully. *Ann. return (Q1-Q3)* is the average *AAR* over the previous three quarters. *Ann. return (Q4)* is the *AAR* four quarters ago. *Long-term average ann. return* is the average *AAR* over the previous 10 years, skipping the last year. *Ann. return volatility* is the volatility of the *AAR* over the last 10 years. *Bid-ask spread* is the average bid-ask spread (divided by the bid-ask midpoint) over the 20 trading days preceding the earnings announcement. *Trading volume* is the average trading volume (shares traded/shares outstanding) over the 20 trading days preceding the earnings announcement. *Fiscal year-end* is a dummy variable set to one if a firm's fiscal year ends in that particular quarter. *FYR* is the month when a firm's fiscal year ends. Firms are assigned into industries based on the Fama-French 12-industry classification scheme. *t*-statistics are calculated using clustered (by year-quarter) standard errors and are given in brackets.

	(1)	(2)	(3)	(4)	1st Half	2nd Half	FYR = 3,6,9,12
Early	0.178	0.150	0.156		0.195	0.130	0.120
	[3.65]	[3.24]	[2.29]		[2.73]	[1.42]	[1.48]
Late	−0.066	−0.232	−0.230		−0.112	−0.276	−0.127
	[−1.10]	[−5.05]	[−3.83]		[−1.38]	[−3.58]	[−1.83]
Log(time)				−0.256			
				[−2.73]			
BE/ME		0.088	0.119	0.112	0.080	0.121	0.205
		[3.29]	[3.55]	[3.31]	[1.55]	[3.31]	[3.03]
neg-BM dummy		0.548	0.362	0.390	0.627	0.283	0.358
		[3.14]	[1.65]	[1.75]	[2.12]	[1.05]	[1.40]
Debt/Assets		0.003	0.005	0.005	0.148	0.004	0.004
		[2.69]	[1.70]	[1.58]	[2.21]	[1.57]	[1.56]
log(ME)		−0.158	−0.083	−0.076	−0.004	−0.111	−0.066
		[−8.83]	[−3.27]	[−2.97]	[−0.08]	[−3.86]	[−2.32]
Lagged return (1Y)		0.118	0.012	0.012	0.309	−0.070	0.003
		[2.31]	[0.18]	[0.17]	[4.15]	[−0.84]	[0.04]
Lagged return (1M)		−0.798	−0.329	−0.371	−1.001	−0.149	−0.226
		[−3.24]	[−1.00]	[−1.06]	[−2.78]	[−0.37]	[−0.60]
LT Av. Ann. Ret.			10.222	10.943	3.482	12.379	10.680
			[8.58]	[8.60]	[1.96]	[8.88]	[8.77]
Av. Ann. Ret. (Q1-3)			4.339	4.482	5.351	3.979	4.750
			[8.42]	[8.10]	[6.74]	[6.45]	[8.21]
Ann. Ret. (Q4)			0.236	0.188	−1.327	0.670	0.190
			[0.80]	[0.62]	[−2.44]	[2.01]	[0.61]
Ann. Ret. Volatility			−3.823	−3.627	−3.781	−3.849	−4.584
			[−3.76]	[−3.34]	[−2.81]	[−3.34]	[−4.31]
Trading Volume			−9.444	−9.599	−15.806	−8.864	−8.413
			[−1.63]	[−1.54]	[−1.88]	[−1.43]	[−1.29]

(*Continued*)

Table IV—*Continued*

	(1)	(2)	(3)	(4)	1st Half	2nd Half	FYR = 3,6,9,12
Bid-ask Spread			9.208	8.566	12.516	6.963	8.521
			[5.76]	[5.08]	[5.06]	[3.69]	[4.96]
Fiscal Year-End			0.227	0.467	0.259	0.212	0.175
			[2.99]	[4.24]	[2.85]	[1.99]	[1.92]
Industry FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter FE	No	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (%)	0.01	0.32	0.55	0.53	0.91	0.50	0.59

In column (3), we introduce additional controls that are focused on earnings announcements (rather than general firm characteristics): (i) the abnormal announcement return in the same quarter of the previous year (since Bernard and Thomas (1990) find reversals at that horizon); (ii) the average abnormal announcement return over the last three quarters (since Bernard and Thomas (1990) find momentum at that horizon); (iii) the long-term average abnormal announcement return, skipping the last year (given our persistence results from the previous section); (iv) the volatility of abnormal announcement returns (over the previous 10 years); and (v) a dummy variable set to one if the quarter corresponds to the end of a firm's fiscal year. We also add controls for trading volume and liquidity, which we measure over the 20 trading days preceding the announcement window.

Our results do not change. Early announcers earn 0.156% (t-statistic = 2.29) higher returns and late ones 0.230% (t-statistic = −3.83) lower returns, for a very large difference of 0.386%. The new control variables based on past announcement returns all have the expected signs, but by far the most important one both economically and statistically is the long-term announcement return (10.222, with a t-statistic of 8.58), which further confirms the strong persistence in announcement premia. The coefficient on past announcement return volatility is negative (−3.823, with a t-statistic of −3.76), suggesting that more volatile announcers earn lower returns. The trading volume coefficient is positive, but not quite significant (t-statistic = −1.63), while the bid-ask spread coefficient is positive and significant (t-statistic = 5.76), indicating that less liquid stocks have higher announcement risk premia.[22] These last three results are consistent with those in Cohen et al. (2007).

Interestingly, the coefficient on the fiscal year-end dummy is positive at 0.227% and significant (t-statistic = 2.99). Announcers seem to enjoy significantly higher returns when releasing annual reports, which in principle is consistent with our explanation for the announcement premium, under the assumption that annual reports provide more information than quarterly ones.

In column (4), we replace the *Early* and *Late* dummy variables with the continuous variable *log*(*time*), which is defined as the log of the difference between

[22] In Table IA.IV in the Internet Appendix, we also include as a control trading volume during the announcement window. This again does not change any of our results.

the expected announcement date and the beginning of the current fiscal quarter (measured in days). The coefficient on this variable is negative and significant (-0.256, with a t-statistic of -2.73), again showing that announcement timing has a strong impact on expected announcement returns.

These results are robust to not only the inclusion of various controls but also the choice of sample period. In the fifth and sixth columns of Table IV, we run our analysis on the first and second half of our sample, respectively, and find that our findings continue to hold in both subsamples. As a further robustness test, meant to address concerns that our findings are driven by different reporting practices for firms with different fiscal year-ends, we perform our analysis only for firms with fiscal years ending in March, June, September, and December. We find generally similar results, though with lower significance levels.[23]

To sum up, the timing of earnings announcements has a very strong influence on announcement returns, with early announcers earning significantly higher returns than late ones, which is consistent with the hypothesis that investors demand a higher premium to hold stocks that offer more information about the aggregate economy. This finding also helps address the alternative hypothesis that high announcement returns stem from a decrease in discount rates associated with earnings announcements. After reporting earnings, firms may face lower uncertainty and thus experience a temporary reduction in risk, which would then increase their price relative to firms that have yet to announce (e.g., Kumar et al. (2008) develop a model where investors face estimation risk and demand a premium to bear this risk). However, this hypothesis, at least in its simplest form, does not predict different announcement risk premia for early and late announcers.[24]

VI. Market Response to Announcements

Our explanation for the earnings announcement premium relies on investors using individual firms' earnings reports to revise their expectations about aggregate earnings. There exists a very large literature on such information spillovers, covering both theory and empirical work (see Section I for references). The evidence supports the existence of information spillovers, across both firms and markets. We build on this work by exploring some specific predictions, already described in Section I, about the variation in the market's response to announcements that stem from our explanation for the earnings announcement premium.

Additionally, firms that have recently reported their earnings should exhibit a lower sensitivity to announcements than firms that are due to report in the near future. Recent announcers have revealed most of their relevant information, and little time has elapsed with new developments, so there is little to

[23] We also show that early announcers outperform late ones in calendar time, with results provided in Table IA.V in the Internet Appendix.

[24] If one set of firms (early announcers) is always associated with greater cash flow risk than others (late announcers), then the former should (counterfactually) enjoy higher average returns over the course of an *entire* quarter.

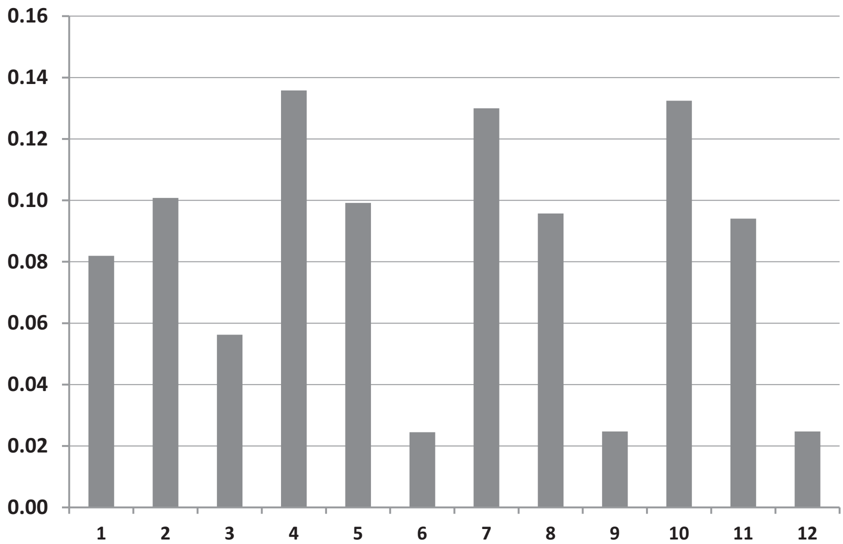

Figure 2. Monthly distribution of earnings announcements. This figure plots the proportion of quarterly earnings announcements occurring in each month of the year. It covers all NYSE, NASDAQ, and Amex firms available from the Compustat quarterly file with nonmissing earnings and at least four prior earnings reports from 1974 to 2012.

be learned from the announcements of other firms about the prospects of such firms. By contrast, much more can be learned about the prospects of soon-to-announce firms, whose last earnings report was released a while ago.

A. Time-Series Variation

Table I and Figure 2 show that the distribution of announcements over a typical quarter is nowhere near uniform. Certain months and weeks have many more announcements than others. This pattern provides us an opportunity to further study whether investors do indeed use the performance of announcers to learn about nonannouncers. The basic intuition is simple: the announcement portfolio should, all else equal, provide a clearer signal to investors about the common component of earnings in weeks with more announcements.[25] We test this hypothesis with the following regression specification:

$$ret_{mkt} = \alpha + \beta_{ann} aret + \gamma Weight + \delta(aret * Weight) + \varepsilon, \tag{4}$$

where ret_{mkt} is the weekly market excess return, *aret* is the excess return of the (long-only) announcement portfolio, and *Weight* is the proportion of all announcers in a quarter that are reporting during a particular week.

The coefficient of interest is the interaction coefficient δ, which we expect to be positive (so that the market response to the announcement portfolio return

[25] We provide a formal proof in the Appendix. See equations (A.15) and (A.23).

Table V

Market and Nonannouncer Response to Announcement Returns

This table reports results of the following OLS regression:

$$Ret = Int. + b(1) * Ann.\ Ret + b(2) * Weight + b(3) * (Ann.\ Ret{*}Weight) + b(4) * Announced + \mathrm{b}(5) * (Ann.\ Ret{*}Announced) + \varepsilon,$$

where *Ret* is the market/nonannouncer portfolio excess return, *Ann. Ret* is the excess return of the announcement portfolio, *Weight* is the proportion of all announcers in a given quarter that are reporting during a particular week, and *Announced* is the proportion of all announcers in a given quarter that have already reported their earnings in previous weeks (going from zero in week 1 to one after the last week). Portfolio returns are computed weekly and are value-weighted. t-statistics are given in brackets. In the row below t-statistics, the table gives the coefficient estimate position within confidence intervals based on a simulation with randomly assigned announcers.

	Intercept	Ann. Ret	Weight	Ann. Ret * Weight	Announced	Ann. Ret * Announced	Adj. R^2%
Market Ret	−0.09	0.67					68.3
	[−3.07]	[67.49]					
	<0.1%	<1%					
Market Ret	−0.10	0.52	0.30	2.27			71.6
	[−2.49]	[39.61]	[0.74]	[15.80]			
	<0.1%	<1%	>99.9%	>99%			
Market Ret	−0.06	0.78			−0.04	−0.20	69.3
	[−1.25]	[46.46]			[−0.55]	[−8.27]	
	<0.1%	<5%			<0.1%	<5%	
Market Ret	−0.07	0.59	0.20	2.08	−0.04	−0.10	71.8
	[−1.02]	[27.66]	[0.46]	[13.87]	[−0.53]	[−4.00]	
	<0.1%	<5%	>99.9%	>95%	<0.1%	<10%	
Non-Ann. Ret	−0.08	0.66					66.6
	[−2.80]	[64.98]					
	<0.1%	<1%					
Non-Ann. Ret	−0.09	0.52	0.23	2.21			69.8
	[−2.14]	[38.10]	[0.54]	[14.81]			
	<0.1%	<1%	>99.9%	>95%			
Non-Ann. Ret	−0.06	0.76			−0.04	−0.18	67.4
	[−1.16]	[43.80]			[−0.47]	[−7.02]	
	<0.1%	<5%			<0.1%	<5%	
Non-Ann. Ret	−0.06	0.57	0.13	2.07	−0.04	−0.08	69.9
	[−0.83]	[25.83]	[0.28]	[13.23]	[−0.52]	[−2.93]	
	<0.1%	<5%	>99.9%	>90%	<0.1%	<10%	

increases when more firms are reporting). As Table V shows, this is indeed the case, as δ is positive and strongly significant (2.27, with a t-statistic of 15.80). The implied economic effect is large: when 10% more firms announce in a given week, the covariance between the market and the announcement portfolio return increases by 44%.

One potential issue affecting the above results arises from the fact that announcing firms appear on both sides of the regression (as announcers and as firms included in the market portfolio), which may represent a problem since a larger number of firms obviously accounts for a bigger fraction (even if still relatively small in any given week) of the market. To address this concern, we repeat our analysis, but instead of the market return our dependent variable is now the value-weighted excess return of all firms not expected to report their earnings during a particular week ("nonannouncement" portfolio). This change does not affect our finding, with δ remaining almost exactly the same (2.21, with a t-statistic of 14.81).

While these results are consistent with our hypothesis that earnings announcements provide investors with information about nonannouncers, there is an alternative simple explanation for our results. A larger number of firms in the announcement portfolio can reduce the portfolio's idiosyncratic volatility through diversification, leading to a higher correlation between its return and that of the market, which is exactly the relation we document in Table V.

Whether and how much diversification and announcement effects matter in terms of driving our results is an empirical question. To address it, we conduct a simulation exercise. We first construct 1,000 samples, where stocks are randomly assigned to be announcers, but following the same time-series distribution as the actual announcements (in other words, the number of pseudo-announcers in each week equals the actual number of announcers in that week). While diversification should still play a role in driving δ for these samples, there should be no announcements effects, enabling us to quantify the impact of diversification. We do so by running the same regression as in equation (4) for each of the 1,000 samples, and then computing the distribution of the resulting coefficients.

Our results show that diversification does indeed play a major role in determining the positive interaction coefficient δ. In each of the 1,000 random samples, the δ estimate is positive, and its minimum magnitude is 0.9894.[26] However, the δ estimate in Table V, computed using actual announcers, is higher than 99% of coefficient estimates from the simulation, as we show just below the t-statistics in Table V. The difference between the δ computed using actual announcers and the median δ estimate in our simulation is 0.78, which is an economically meaningful difference. Therefore, even when we take diversification into account, we still detect announcement effects that are consistent with our model.

We next test whether the market response to announcements depends on their timing. We expect that the market should react more to earlier announcements. The intuition behind this hypothesis, which is again confirmed by our model, is straightforward: investors learn, all else equal, more from early announcements than from late ones, since a lot of information about aggregate earnings has already been released by the time late announcements take place. Thus, it is not time per se that determines how much information a particular announcement provides, but rather how many firms have already reported their earnings previously in the same quarter. In other words, an early

[26] Details of the coefficient distribution are available in Tables IA.VI and IA.VII in the Internet Appendix.

announcer is one that reports before most other firms have reported (which is obviously highly correlated with reporting during the early weeks of a given calendar quarter). To explore whether the market reacts more to early announcers, we use the following regression specification:

$$ret_{mkt} = \alpha + \beta_{ann} aret + \gamma Announced + \delta(aret * Announced) + \varepsilon, \tag{5}$$

where ret_{mkt} is the market excess return, $aret$ is the excess return of the announcement portfolio, and *Announced* is the proportion of all announcers in a given quarter that have already reported their earnings in previous weeks (going from zero in week 1 to one after the last week).

The coefficient of interest is again the interaction coefficient δ: if the market responds more to early announcements, it should be negative (in other words, the market response to announcements should decrease when more firms have already reported). The data strongly support this hypothesis. The δ coefficient is negative and very significant (-0.20, with a t-statistic of -8.27). The coefficient magnitudes imply that the covariance between the market and the announcement portfolio returns is 13% lower when 50% of firms have already reported earnings relative to the case in which all firms are yet to report. As before, these findings remain the same when we use the nonannouncement portfolio return as our dependent variable, with δ equaling -0.18 (t-statistic $= -7.02$). The results also continue to hold when we include both *Announced* and *Weight* and their interactions with the announcement portfolio return as our independent variables.

It is again possible that the relation we document reflects diversification rather than any impact of announcements. To address this issue, we repeat our simulation, the only difference being that we now estimate equation (5). We find that diversification does represent an important driver of the interaction coefficient δ, as δ is positive in more than 95% of samples. Crucially, however, the δ estimated using our sample of actual announcers is more negative than 95% of simulation estimates, showing that announcement effects likely have an impact even controlling for diversification.

B. Cross-Sectional Variation

The timing of a particular firm's announcement may affect not only how the announcement impacts nonannouncing firms, but also how the firm responds to announcements of other firms during weeks when it is not reporting. More specifically, a firm should be more sensitive to announcements when more time has elapsed since its last earnings report, since the passage of time makes its last report less relevant, thereby increasing the importance of new (indirect) signals about its prospects. We explore this issue by classifying all nonannouncers according to how much time is left before their next announcement. Announcements typically occur roughly every 13 weeks, so we simply divide nonannouncers into two groups: "near nonannouncers," which comprise those firms expected to announce in the next six weeks, and "far

Table VI

Nonannouncer Response to Announcement Returns: Distance to Next Report

This table reports results of the following OLS regression:

$$Non.\ Ret = Int. + b(1) * Ann.\ Ret + b(2) * Weight + b(3) * (Ann.\ Ret * Weight) + \varepsilon,$$

where *Non. Ret* is the nonannouncer portfolio excess return, *Ann. Ret* is the excess return of the announcement portfolio, and *Weight* is the proportion of all announcers in a given quarter that are reporting during a particular week. Nonannouncers are divided into two groups: "near nonannouncers," which are those firms expected to announce in the next six weeks, and "far nonannouncers," which are all other nonannouncers. Portfolio returns are computed weekly and are value-weighted. t-statistics are given in brackets. The numbers in the bold font may be of special interest to readers.

	Intercept	Ann. Ret	Weight	Ann. Ret * Weight	Adj. $R^{2(\%)}$
Near Non-Ann.	−0.09	0.69			63.7
	[−2.85]	[60.97]			
Near Non-Ann.	−0.08	0.53	−0.05	2.44	67.1
	[−1.69]	[35.08]	[−0.12]	[14.80]	
Far Non-Ann.	−0.07	0.65			64.8
	[−2.24]	[62.38]			
Far Non-Ann.	−0.07	0.51	0.20	2.24	68.0
	[−1.70]	[36.21]	[0.47]	[14.68]	
Near − Far	−0.03	**0.04**			1.5
	[−1.37]	**[5.81]**			
Near − Far	−0.01	**0.02**	−0.26	**0.20**	1.7
	[−0.19]	**[2.67]**	[−0.91]	**[2.05]**	

nonannouncers," which consist of all other nonannouncers. Under our hypothesis, near nonannouncers should respond more to announcement returns than far nonannouncers. We test this hypothesis using the following regression:

$$(nret_{near} - nret_{far}) = \alpha + \beta aret + \gamma Weight + \delta(aret * Weight) + \varepsilon, \tag{6}$$

where $nret_{near}$ is the excess return of the "near nonannouncement" portfolio, $nret_{far}$ is the excess return of the "far nonannouncement" portfolio, $aret$ is the excess return of the announcement portfolio, and $Weight$ is the proportion of all announcers in a given quarter that are reporting during a particular week. Our hypothesis predicts that β and δ should be positive and is confirmed by the data. As Table VI shows, the β estimate equals 0.02 (t-statistic = 2.67) and increases to 0.04 (t-statistic = 5.81) if we do not include the interaction coefficient δ. The interaction coefficient estimate is 0.20 (t-statistic = 2.05). This pattern, where nonannouncers react more to announcements when they are far away from their last earnings report, provides further support for the principal assumption behind our explanation for the earnings announcement premium: investors use announcements to rationally update their forecasts for nonannouncers.[27]

VII. Earnings Announcement Returns and Aggregate Earnings Growth

We now investigate the information contained in earnings announcement returns about future aggregate earnings. Our explanation for the announcement premium depends on the idea that announced earnings are informative about future earnings prospects for announcing firms as well as other firms. Therefore, we expect returns of announcing firms to forecast aggregate earnings better than those of nonannouncing firms (see equation (A.15) in the Appendix for a formal proof of this idea).

Given that firms report earnings at a quarterly frequency, we define aggregate earnings as the sum of the individual earnings of all announcing firms in a given calendar quarter. Our earnings announcement portfolio is formed each week, so to test whether it covaries with aggregate earnings we first compute its quarterly return. The distribution of announcements means that simply cumulating or compounding weekly returns is not the best approach. Figure 3 shows why. The figure plots the number of announcements occurring in each month. It is immediately obvious that the proportion of firms announcing is not uniform over the course of the year. Although all firms announce over a given quarter, they do so in different months in different quarters. Typically, April, July, and October observe the largest number of announcements, so in the first quarter the distribution is fairly uniform over months, but it is dominated by the first month in the other quarters. The distribution is even less uniform at the weekly level, with the proportion of firms reporting in a given week ranging from 0.6% to 20.2% (see Table IA.VIII in the Internet Appendix for details). Since the number of reporting firms should be related to the combined news content of their announcements with respect to aggregate earnings, we weigh each week's announcement return by the number of firms reporting in that week as a fraction of all firms reporting in the quarter. This gives greater weight to those weeks in a quarter when a larger fraction of firms report, which corresponds to the intuition that more announcements provide more information about the state of the economy. (Our model formally confirms the intuition that announcement portfolio returns exhibit greater predictive power for aggregate earnings when there are more announcing firms. See equation (A.15) in the Appendix for details.) This approach is also likely closer to the one actual investors would follow if they were following the "buy-announcers" strategy, and is advocated by Fama (1998) for calendar-time portfolios with clustered events.

Earnings growth is calculated as the difference between aggregate earnings in quarter i of year t and aggregate earnings in the same quarter of year $t-1$

[27] Simulation results show that diversification, or other effects unrelated to announcements, does not play a role in driving these findings.

Table VII

Aggregate Earnings Growth and Earnings Announcement Returns

This table presents results of predictive OLS regressions of quarterly aggregate earnings growth on the previous quarter's earnings announcement portfolio return and various other controls. Earnings growth (*E. growth*) is given by the seasonally adjusted growth in earnings scaled by total market (book) equity of all firms in the sample. Earnings announcement return (*Ann. Ret.*) is a quarterly return computed by compounding weekly announcement portfolio returns, where each week is weighed by the number of announcements occurring in that week relative to the total number of announcements in the quarter. *Mktrf* is the quarterly market excess return. *SMB, HML,* and *UMD* are small-minus-big, high-minus-low, and up-minus-down quarterly factor returns, respectively. The earnings-to-price ratio (E/P) is the sum of the last four quarterly aggregate earnings divided by total market (book) equity of all firms in the sample. *Term spread* is the lagged term spread, and *Default spread* is the lagged default spread. t-statistics are calculated using Newey-West standard errors (with four lags) and are given in brackets. The numbers in the bold font may be of special interest of readers.

	E. Growth (t)	E. Growth (t)	E. Growth (t)	E. Growth (t)	E. Growth (t+1)	E. Growth (t+2)	E. Growth (t) (Book Eq.)
Intercept	0.001	0.001	0.000	−0.001	−0.001	−0.003	0.007
	[1.46]	[0.97]	[0.60]	[−1.14]	[−0.87]	[−1.59]	[1.05]
Mktrf	0.012		0.013	0.013	0.007	−0.002	0.021
	[1.54]		[1.80]	[1.62]	[1.30]	[−0.19]	[1.41]
Ann. Ret.		**0.029**	**0.030**	**0.025**	**0.024**	**0.017**	**0.037**
		[2.63]	**[2.65]**	**[2.29]**	**[1.92]**	**[1.65]**	**[2.02]**
SMB				−0.001	−0.001	0.005	−0.006
				[−0.11]	[−0.09]	[0.45]	[−0.33]
HML				0.006	−0.002	−0.018	0.004
				[0.64]	[−0.36]	[−2.01]	[0.25]
UMD				−0.002	−0.027	−0.011	−0.001
				[−0.39]	[−2.76]	[−1.90]	[−0.05]
Term spread				0.000	0.001	0.001	0.000
				[1.29]	[2.27]	[2.02]	[−0.21]
Default spread				0.000	0.000	0.004	0.002
				[0.19]	[0.12]	[1.40]	[1.16]
E/P				0.009	0.010	−0.010	−0.078
				[0.64]	[0.57]	[−0.37]	[−1.21]
E. growth (t−1)				0.432	0.284	0.267	0.420
				[4.46]	[2.98]	[2.24]	[4.43]
E. growth (t−2)				0.125	0.108	−0.206	0.230
				[1.22]	[1.04]	[−0.81]	[2.12]
E. growth (t−3)				0.083	−0.194	0.047	0.125
				[0.86]	[−0.87]	[0.35]	[1.04]
E. growth (t−4)				−0.218	−0.007	0.005	−0.156
				[−1.04]	[−0.09]	[0.09]	[−0.66]
R^2 (%)	3.5	6.3	10.3	42.0	40.0	27.1	42.4
Observations	156	156	156	156	156	156	156

(thereby seasonally adjusted), divided by total market capitalization (first six columns of Table VII) or total book equity (the last column of Table VII). Our method for calculating aggregate earnings growth is identical to that of Kothari, Lewellen, and Warner (2006).[28] We use the same set of firms to compute current and future earnings to ensure that our aggregate earnings growth measure reflects actual growth rather than the change in the number of firms covered by Compustat. To be more specific, we start with all eligible firms in a given quarter, compute their current earnings, and then also compute their earnings in the same quarter of the next year. If a firm disappears from Compustat, we set its future earnings to zero (this way we do not ignore bankruptcies, and we do not double-count mergers).

Aggregate earnings growth (for quarter t in columns (1) to (4) and column (7), $t+1$ in column (5), and $t+2$ in column (6)) is the dependant variable in Table VII. Coefficients are computed using OLS, while t-statistics are calculated using Newey-West standard errors with four lags. In the first column, we only include the market excess return (for quarter $t-1$) as our independent variable, and in the second column we only include the long-short earnings announcement portfolio return. The coefficients are much larger and more statistically significant for the announcement portfolio than for the market. When only the market return is included, its coefficient is positive at 0.012 but not quite significant (t-statistic $= 1.54$), and the R^2 of the regression is 3.5%. When only the announcement return is included, its coefficient equals 0.029, with a t-statistic of 2.63. These numbers imply that a 1% increase in the quarterly announcement return results in a 0.029% increase in aggregate earnings growth over the following quarter. The mean quarterly earnings growth over the entire 1974 to 2012 period is 0.12%, so this is a substantial effect. The explanatory power of the announcement portfolio return is also considerable, and higher than for the market return, with an R^2 of 6.3%. When both the earnings announcement return and the market return are included (in the third column), both coefficients remain essentially the same, confirming that the earnings announcement portfolio return is a more important predictor of earnings growth. The market return coefficient is marginally significant (t-statistic $= 1.80$) in this specification.

In the next column we introduce a number of additional controls. First, we add the three standard risk factors, namely, the returns on the size (SMB; small-minus-big), value (HML; high-minus-low), and momentum (UMD; up-minus-down) portfolios. Second, we include the term spread (defined as the difference between the log yield on the 10-year U.S. constant maturity bond and the log yield on the three-month U.S. Treasury bill), the default spread (defined as the difference between the log yield on Moody's BAA and AAA bonds), and the aggregate earnings yield (defined as the sum of the last four quarterly earnings scaled by total market capitalization). Stock market valuation measures may contain information pertinent to future earnings, although existing studies indicate, if anything, the opposite. Third, we include four lags of earnings growth, mainly to estimate the incremental power of earnings announcement and market returns to forecast earnings (i.e., the extent to which they provide news about future earnings), but also to explore the implications of

[28] Our results remain the same if we instead use quarter-to-quarter aggregate earnings growth.

the announcement portfolio's ability to forecast near-term earnings for longer term earnings growth.

Our main findings do not change with this full set of controls. The magnitude of the announcement portfolio coefficient decreases slightly (from 0.030 to 0.025), but it is still economically and statistically significant (t-statistic = 2.29). The market coefficient is essentially the same, though its statistical significance drops somewhat (t-statistic = 1.62). None of the coefficients on the additional risk factors are remotely significant. The term and default spreads also do not predict earnings growth, nor does the earnings yield, whose coefficient is positive but not significant (t-statistic = 0.64), consistent with previous studies. The result that none of the standard portfolio returns or valuations measures, which are often assumed to reveal important state variables, forecast aggregate earnings growth shows that this is not an easy task, making the predictive power of the announcement portfolio even more impressive.

The coefficient on the first lag of earnings growth is highly significant and positive (0.432, with a t-statistic of 4.46), while later lags are not significant, with smaller coefficients (the second lag is significant when we scale earnings growth by book instead of market equity). These results are comparable to those in previous work (e.g., Kothari, Lewellen, and Warner (2006)). The persistence in aggregate earnings growth means that earnings announcement returns impact earnings growth for more than just one quarter. If earnings announcers outperform nonannouncers by 5% in a quarter (which approximately equals a one-standard-deviation increase), next quarter's aggregate earnings will grow at a rate that is 105% higher than its sample mean. Given that this rate is strongly persistent over short horizons, aggregate earnings would grow at a pace that is on average 36% above the mean for the following four quarters as well. These magnitudes suggest that the performance of the announcement portfolio reflects meaningful news about future aggregate earnings growth.

Indeed, the announcement portfolio forecasts aggregate earnings growth not just one, but also two and three quarters ahead. In columns (5) and (6) of Table VII, we replace the dependent variable with aggregate earnings growth two and three quarters ahead, respectively, retaining all the controls from our most extensive specification. The market return coefficients are not significant at either horizon, and the one for quarter $t+2$ is actually negative. In contrast, the announcement return coefficients for quarter $t+1$ and $t+2$ earnings are, respectively, 0.024 (t-statistic = 1.92) and 0.017 (t-statistic = 1.65), further strengthening our conclusion that announcements provide valuable signals about aggregate earnings.

In the last column of Table VII, we compute aggregate earnings growth by scaling it with book rather than market equity, and find that our principal results do not change. Most importantly for our purposes, the coefficient on the announcement portfolio is even larger and still significant (0.037, with a t-statistic of 2.02). In the last two columns of Table VIII, we examine whether our findings are robust to sample period selection. We divide our sample into two halves (1974 to 1993 and 1994 to 2012), and show that the announcement return coefficient is positive and significant in both subsamples, equaling 0.015

Table VIII

Aggregate Earnings Growth and Earnings Announcement Returns

This table presents results of predictive OLS regressions of quarterly aggregate earnings growth on the previous quarter's earnings announcement portfolio return and various other controls. Earnings growth (*E. growth*) is given by the seasonally adjusted growth in earnings scaled by total market equity of all firms in the sample. Earnings announcement return (*Ann. Ret.*) is a quarterly return computed by compounding weekly announcement portfolio returns, where each week is weighed by the number of announcements occurring in that week relative to the total number of announcements in the quarter. *Mktrf* is the quarterly market excess return. *SMB, HML,* and *UMD* are small-minus-big, high-minus-low, and up-minus-down quarterly factor returns, respectively. The earnings-to-price ratio (E/P) is the sum of the last four quarterly aggregate earnings divided by total market equity of all firms in the sample. *Term spread* is the lagged term spread, and *Default spread* is the lagged default spread. t-statistics are calculated using Newey-West standard errors (with four lags) and are given in brackets. Large/high-vol. firms are those in the top quintile by size/historical idiosyncratic announcement return volatility in a given year-quarter, and small/low-vol. firms are those in the bottom quintile by the same metric. The numbers in the bold font may be of special interest of readers.

	Large Firms	Small Firms	Low Vol. Firms	High Vol. Firms	All Firms (1974–1993)	All Firms (1994–2012)
Intercept	−0.001	−0.001	−0.001	0.000	0.000	0.000
	[−1.04]	[−0.57]	[−0.76]	[−0.36]	[−0.06]	[0.07]
Mktrf	0.013	0.008	0.019	0.014	0.003	0.034
	[1.63]	[1.25]	[1.85]	[1.54]	[0.63]	[2.00]
Ann. Ret.	**0.022**	**0.004**	**0.016**	**−0.002**	**0.015**	**0.031**
	[2.19]	**[1.25]**	**[2.57]**	**[−0.92]**	**[2.33]**	**[2.52]**
SMB	0.003	−0.005	0.002	0.001	0.012	−0.028
	[0.34]	[−0.40]	[0.18]	[0.10]	[1.62]	[−1.37]
HML	0.006	−0.001	0.001	−0.001	−0.005	0.017
	[0.68]	[−0.15]	[0.10]	[−0.08]	[−0.91]	[1.04]
UMD	−0.002	−0.002	−0.003	−0.003	−0.002	0.003
	[−0.36]	[−0.32]	[−0.42]	[−0.52]	[−0.52]	[0.41]
Term spread	0.000	0.000	0.000	0.000	0.000	0.001
	[1.13]	[1.10]	[1.04]	[0.69]	[0.08]	[2.30]
Default spread	0.000	0.000	0.000	0.001	0.000	0.001
	[0.18]	[0.26]	[0.19]	[0.68]	[0.09]	[0.69]
E/P	0.008	0.003	0.002	−0.005	0.003	−0.092
	[0.60]	[0.19]	[0.15]	[−0.32]	[0.22]	[−1.14]
E. growth (t−1)	0.434	0.487	0.431	0.456	0.666	0.258
	[4.40]	[4.92]	[4.44]	[4.42]	[6.67]	[2.43]
E. growth (t−2)	0.136	0.147	0.147	0.180	0.124	0.105
	[1.31]	[1.44]	[1.28]	[1.71]	[1.04]	[0.71]
E. growth (t−3)	0.069	0.044	0.083	0.052	0.021	0.244
	[0.74]	[0.45]	[0.78]	[0.49]	[0.15]	[1.74]
E. growth (t−4)	−0.222	−0.213	−0.237	−0.231	−0.213	−0.179
	[−1.07]	[−1.02]	[−1.09]	[−1.04]	[−1.97]	[−0.73]
R^2 (%)	41.9	39.0	41.2	38.6	56.7	50.1
Observations	156	156	140	140	80	76

(t-statistic = 2.33) and 0.031 (t-statistic = 2.52) in the first and second half, respectively. In the second half, the market return coefficient is also positive and significant (0.034, with a t-statistic of 2.00), which is consistent with the result in Sadka and Sadka (2009). In another robustness test (see Table IA.IX in the Internet Appendix), we limit our sample to those firms whose fiscal quarter-ends coincide with calendar quarter-ends (as in Kothari, Lewellen, and Warner (2006)) and find that the coefficient on the announcement return remains positive and significant (0.027, with a t-statistic of 2.15). We conclude that the return on the earnings announcement portfolio robustly forecasts aggregate earnings and does so significantly better than the market return (or other factor returns).

One alternative explanation for our finding that the announcement factor helps predict aggregate earnings growth is that the rate at which investors incorporate new information into their forecasts of future earnings is too slow. This hypothesis would imply that the announcement factor should also forecast future market returns, as investors initially underreact to the information provided by announcements and are subsequently surprised when other firms report earnings. However, we find no such evidence at any horizon (weekly, monthly, quarterly, or annual).

The results in Table VII confirm that returns of announcing firms are positively correlated with news about future aggregate earnings, which is consistent with our hypothesis that information spillovers, and the resultant superloading of announcers on market cash flow risk, can justify the high earnings announcement premium. Furthermore, announcers as a group predict future earnings better than the market, consistent with the claim that market returns reflect shocks other than cash flow news. An obvious follow-on question is whether certain types of announcers provide more informative announcement signals with respect to aggregate earnings. We identify two firm characteristics as likely candidates: size and idiosyncratic volatility around announcements. Announcements of large firms are likely to provide a better signal about aggregate earnings,[29] while higher (lower) idiosyncratic volatility makes it harder (easier) for investors to infer the common component of a firm's earnings surprise, in which case we expect announcements of firms with high (low) such volatility to offer less (more) information about aggregate earnings.

Table VIII addresses these conjectures. We sort firms into quintiles based on their market capitalization at the start of each quarter, and then examine whether the five resulting announcement portfolios exhibit differential ability to forecast aggregate earnings. We use the same regression specification with the full set of controls as in Table VII, the only difference being that now the announcement portfolio returns are computed separately for firms falling into different size bins. We find that the positive and significant relation between announcement returns and future aggregate earnings growth only holds for

[29] Even though we do not have size in our model, we can indirectly explore its effect by changing the number of announcers in a given week (more announcers = larger firm).

the largest firms (those in the top quintile). As the first two columns show, for the portfolio containing the largest firms the coefficient on the announcement return is 0.022 (t-statistic = 2.19), whereas for the portfolio containing the smallest firms the coefficient is only 0.004 (t-statistic = 1.25).[30]

In the third and fourth columns, we sort all announcers into five portfolios based on their announcement return idiosyncratic volatility, and then compare the forecasting power of low-volatility (bottom quintile in a given quarter) and high-volatility (top quintile) announcers. The intuition here is that low idiosyncratic volatility should increase announcers' ability to predict aggregate earnings, as idiosyncratic volatility makes it harder for investors to infer the common earnings component. Consistent with this hypothesis, announcement returns of low-volatility firms are positively related to aggregate earnings growth (0.016, with a t-statistic of 2.57), whereas there is no such relation for high-volatility firms (−0.002, with a t-statistic of −0.92).[31]

VIII. Earnings Announcement Betas

We have shown that a portfolio tracking the performance of announcers enjoys high returns, which are not explained by standard risk factors. The market and nonannouncers respond to this announcement portfolio in a manner consistent with information spillovers. The portfolio's return covaries positively with future aggregate earnings growth, which indicates that it provides relevant information about the state of the economy in general and about market cash flow news in particular. A portfolio with such a characteristic is risky and investors should demand a risk premium to hold it. Assets with higher exposure to this risk should command higher expected returns. This is the hypothesis we test in this section. Our goal is to determine whether there exists a positive relation between exposure to announcement factor risk and expected returns.

A. Announcement Beta-Sorted Portfolios

We begin by constructing portfolios based on individual stocks' earnings announcement betas, which we use as a measure of exposure to announcement risk. If exposure to announcement risk is indeed priced, we should find that the high-announcement-beta portfolio earns higher returns than the low-announcement-beta portfolio. We use the classic two-step testing procedure, where we first estimate historical (over rolling 52-week windows) earnings announcement betas for individual stocks through a simple time-series regression:

$$ret_i = \alpha + \beta_{earn} aret + \varepsilon_i, \tag{7}$$

[30] We do not document a significant relation for any of the other size-sorted portfolios.

[31] We also document a positive and significant relation for the portfolio containing the second-lowest volatility announcers.

Table IX

Earnings Announcement Beta-Sorted Portfolios

This table presents average excess returns and alphas (relative to the Fama-French + momentum model) for portfolios sorted on an individual firm's earnings announcement betas. For each firm, we first estimate the following (rolling) time-series regression:

$$Ret_i = Int. + beta_{ann} * Ann.\ Ret + \varepsilon_i,$$

where Ret_i is firm i's excess return and *Ann. Ret* is the (long-short) equal-weighted announcement portfolio return. We then sort stocks into five portfolios based on their estimated earnings announcement betas ($beta_{ann}$), going from low- to high-beta stocks. Portfolio returns are computed weekly and are value-weighted. t-statistics are given in brackets.

	Low	2	3	4	High	H-L (α)
			Panel A: All Firms			
Excess Ret	0.09	0.13	0.14	0.13	0.15	**0.09**
	[1.48]	[2.65]	[2.94]	[2.50]	[2.27]	**[3.06]**
Alpha	−0.05	0.01	0.01	0.02	0.04	**0.09**
	[−2.48]	[0.75]	[1.04]	[2.07]	[1.89]	**[2.74]**
			Panel B: Announcing Firms			
Excess Ret	0.15	0.24	0.29	0.36	0.39	**0.24**
	[1.67]	[3.31]	[4.32]	[4.68]	[3.73]	**[2.21]**
Alpha	0.00	0.11	0.17	0.24	0.26	**0.26**
	[0.05]	[1.98]	[3.50]	[4.21]	[3.17]	**[2.38]**
			Panel C: Nonannouncing Firms			
Excess Ret	0.08	0.12	0.13	0.13	0.13	**0.08**
	[1.38]	[2.45]	[2.89]	[2.42]	[2.01]	**[2.71]**
Alpha	−0.06	0.00	0.01	0.02	0.02	**0.08**
	[−2.70]	[−0.13]	[0.84]	[1.55]	[1.05]	**[2.42]**

where ret_i is firm i's weekly excess return and *aret* is the long-short equal-weighted announcement portfolio return (announcers minus nonannouncers).[32] (We omit time subscripts for ease of notation.)

We next sort stocks into five portfolios based on these betas and examine the performance of the portfolios. Table IX shows that the portfolios' alphas (relative to the Fama-French + momentum model) increase monotonically with their announcement betas, which suggests that announcement risk is priced in the cross-section. We observe a similar pattern for simple excess returns.[33] Stocks with high announcement betas outperform those with low announcement betas by 0.09% per week (t-statistic = 3.06). This pattern is most pronounced during weeks when firms report earnings, where the long-short high-minus-low announcement beta portfolio has an alpha of 0.24% (t-statistic

[32] Including the market return in the first stage does not change any of our findings.

[33] CAPM alphas are only significant for the lowest-beta portfolio (t-statistic = −1.64) and the middle portfolio (t-statistic = 2.31).

= 2.21). However, it even holds during other weeks (i.e., for nonannouncers), where the corresponding alpha is 0.08% (t-statistic = 2.71). Thus, stocks with high (low) exposure to our announcement factor earn higher (lower) returns on average, with the relation holding both when they are themselves reporting earnings and when they are not, which represents strong evidence in favor of the hypothesis that exposure to announcement risk is priced.

B. Other Test Assets

We next explore whether the announcement factor can help explain return variation for a variety of test assets. In total, we include 55 portfolios in our tests. We have 40 portfolios, 10 each sorted on book-to-market, size, past short-run return, and past long-run return. Each of those variables is associated with substantial cross-sectional variation in returns, and the differences in average returns for portfolios sorted on these four characteristics have persisted in the data since their discovery, which may suggest that their fundamental origin is rooted in risk rather than a temporary phenomenon that is arbitraged away over time. Book-to-market and size are well-known predictors of returns (Fama and French (1992, 1993)) and are routinely used in asset pricing tests. Recent work by Lewellen, Nagel, and Shanken (2010) advocates expanding the set of test portfolios beyond those based on book-to-market and size, to present a higher hurdle for a given model. We follow this advice by adding portfolios sorted on the past one-month return (so-called "short-run reversal" portfolios; see Lo and MacKinlay (1990), Lehmann (1990), and Jegadeesh (1990)) and on the past year $t-1$ to $t-5$ returns (so-called "long-run reversal" portfolios; see DeBondt and Thaler (1985)). In both instances, past losers significantly outperform past winners. All the portfolio returns are downloaded from Kenneth French's Web site. To these 40 portfolios, we add 10 industry portfolios and our five portfolios based on firms' earnings announcement betas, as advocated by Lewellen, Nagel, and Shanken (2010) and Daniel and Titman (2012).

For each of our test portfolios, we first run one time-series regression over the full sample:

$$ret_i = \alpha + \beta_{earn} aret + \beta_{mkt} ret_{mkt} + \varepsilon_i, \tag{8}$$

where ret_i is portfolio i's weekly excess return, $aret$ is the equal-weighted announcement portfolio return, and ret_{mkt} is the market excess return. (We omit time subscripts for ease of notation.)

B.1. Betas and Pricing Errors

Table X presents Capital Asset Pricing Model (CAPM) alphas, alphas relative to the two-factor model given in equation (8), and earnings announcement betas for each of the 55 test portfolios. The pattern of announcement betas offers support for the risk hypothesis—they are higher for value stocks, stocks with poor short-run or long-run performance, and stocks in economically sensitive industries such as "Manufacturing" and "Durables." These stocks are

Table X

Earnings Announcement Betas for Different Portfolios

This table presents the earnings announcement betas for portfolios sorted on firm book-to-market, size, short-run return, long-run return, industry affiliation, and earnings announcement beta. The earnings announcement betas are estimated using the following model:

$$\mathrm{r}^i{}_t = \alpha + \beta^{ann_t} * \mathrm{r}^{ann_t} + \beta^{mkt_t} * \mathrm{r}^{mkt_t} + \varepsilon_t,$$

where r^i is the portfolio i's excess return, r^{ann} is the earnings announcement portfolio return, and r^{mkt} is the market excess return. $Alpha_{CAPM}$ is the portfolio alpha computed using a single-factor market model. $Alpha_{two\text{-}factor}$ is the portfolio alpha computed using the two-factor model given in the equation above. t-statistics are in brackets.

	Low	2	3	4	5	6	7	8	9	High
Panel A: Book-to-Market Sorted Portfolios										
Alpha_{CAPM}	−0.0411	0.0047	0.0265	0.0276	0.0251	0.0240	0.0515	0.0441	0.0735	0.0847
$\mathrm{Alpha}_{\text{two-factor}}$	−0.0386	0.0016	0.0231	0.0240	0.0202	0.0186	0.0463	0.0381	0.0644	0.0762
	[−2.04]	[0.11]	[1.46]	[1.37]	[1.00]	[1.01]	[2.24]	[1.56]	[2.64]	[2.29]
$\mathrm{Beta}_{\text{ann}}$	−0.037	0.042	0.048	0.050	0.067	0.076	0.074	0.083	0.126	0.122
	[−1.82]	[2.68]	[2.78]	[2.65]	[3.04]	[3.81]	[3.31]	[3.15]	[4.76]	[3.38]
R^2 (two-factor)	0.89	0.92	0.90	0.89	0.84	0.86	0.81	0.77	0.77	0.70
Panel B: Size-Sorted Portfolios										
Alpha_{CAPM}	0.0534	0.0399	0.0473	0.0364	0.0457	0.0390	0.0389	0.0244	0.0186	−0.0134
$\mathrm{Alpha}_{\text{two-factor}}$	0.0537	0.0366	0.0426	0.0316	0.0408	0.0341	0.0339	0.0199	0.0152	−0.0119
	[1.76]	[1.23]	[1.58]	[1.29]	[1.83]	[1.83]	[2.03]	[1.40]	[1.40]	[−1.22]
$\mathrm{Beta}_{\text{ann}}$	−0.005	0.044	0.064	0.067	0.067	0.068	0.068	0.064	0.047	−0.019
	[−0.14]	[1.37]	[2.20]	[2.51]	[2.78]	[3.39]	[3.74]	[4.15]	[4.02]	[−1.81]
R^2 (two-factor)	0.61	0.72	0.77	0.81	0.84	0.88	0.90	0.93	0.96	0.96
Panel C: Short-Run Return-Sorted Portfolios										
Alpha_{CAPM}	0.4850	0.1123	0.0568	0.0100	0.0247	0.0412	−0.0085	−0.0300	−0.0689	−0.3671
$\mathrm{Alpha}_{\text{two-factor}}$	0.4800	0.1059	0.0516	0.0057	0.0211	0.0383	−0.0094	−0.0319	−0.0715	−0.3663
	[9.70]	[3.45]	[2.19]	[0.30]	[1.24]	[2.31]	[−0.56]	[−1.72]	[−3.07]	[−11.03]
$\mathrm{Beta}_{\text{ann}}$	0.073	0.087	0.073	0.058	0.047	0.039	0.014	0.029	0.039	−0.011
	[1.37]	[2.62]	[2.84]	[2.82]	[2.53]	[2.20]	[0.75]	[1.45]	[1.53]	[−0.31]
R^2 (two-factor)	0.67	0.80	0.84	0.88	0.89	0.89	0.89	0.87	0.81	0.71

(*Continued*)

Table X—*Continued*

Panel D: Long-Run Return-Sorted Portfolios										
	Low	2	3	4	5	6	7	8	9	High
Alpha_{CAPM}	0.0668	0.0762	0.0617	0.0558	0.0317	0.0599	0.0343	0.0185	−0.0087	−0.0115
$\text{Alpha}_{\text{two-factor}}$	0.0560	0.0666	0.0544	0.0479	0.0278	0.0579	0.0325	0.0158	−0.0084	−0.0103
	[1.53]	[2.68]	[2.34]	[2.32]	[1.42]	[3.24]	[1.79]	[0.88]	[−0.42]	[−0.44]
Beta_{ann}	0.154	0.134	0.109	0.110	0.056	0.029	0.025	0.035	−0.006	−0.018
	[3.87]	[4.99]	[4.32]	[4.90]	[2.62]	[1.51]	[1.28]	[1.79]	[−0.28]	[−0.72]
R^2 (two-factor)	0.71	0.81	0.81	0.84	0.84	0.85	0.86	0.87	0.86	0.87
Panel E: Industry Portfolios										
	Durable	Energy	HiTech	Health	Manuf	No Durbl	Other	Retail	Telecom	Utils
Alpha_{CAPM}	−0.0214	0.0596	−0.0214	0.0322	0.0134	0.0812	−0.0063	0.0326	0.0289	0.0565
$\text{Alpha}_{\text{two-factor}}$	−0.0337	0.0569	−0.0157	0.0252	0.0049	0.0762	−0.0113	0.0287	0.0340	0.0555
	[−0.86]	[1.20]	[−0.43]	[0.73]	[0.26]	[2.99]	[−0.51]	[1.07]	[1.03]	[1.67]
Beta_{ann}	0.174	0.047	−0.084	0.095	0.120	0.070	0.069	0.052	−0.072	0.009
	[4.12]	[0.92]	[−2.13]	[2.55]	[5.72]	[2.54]	[2.88]	[1.81]	[−1.99]	[0.24]
R^2 (two-factor)	0.68	0.46	0.74	0.62	0.87	0.68	0.86	0.77	0.61	0.42
Panel F: Earnings Announcement Beta-Sorted Portfolios										
	Low	2	3	4	High					
Alpha_{CAPM}	−0.0405	0.0172	0.0288	0.0072	0.0027					
$\text{Alpha}_{\text{two-factor}}$	−0.0101	0.0302	0.0319	0.0026	−0.0244					
	[−0.42]	[2.18]	[2.52]	[0.26]	[−1.03]					
Beta_{ann}	−0.243	−0.106	−0.024	0.036	0.218					
	[−13.21]	[−9.93]	[−2.44]	[4.63]	[12.03]					
R^2 (two-factor)	0.84	0.92	0.93	0.96	0.87					

plausibly more vulnerable to a deterioration in economic conditions and consequently are riskier. This result is consistent with many models that treat such stocks as riskier, but, more importantly, corresponds to the pattern of average returns for different portfolios.

For book-to-market portfolios, we find an almost monotonically increasing pattern in announcement betas as we go from low to high book-to-market (BM) portfolios. For the lowest BM portfolio, the announcement beta is actually negative though not quite significant (−0.037, with a t-statistic of −1.82), while the announcement beta for the highest BM portfolio is positive and very significant (0.122, with a t-statistic of 3.38). In terms of alphas, four are significant with our two-factor model, most prominently for the lowest BM portfolio (−0.039%, with a t-statistic of −2.04) and the highest BM portfolio (0.076%, with a t-statistic of 2.29). However, the announcement factor still helps explain the time series of returns for the BM portfolios; the absolute alpha, which is a pricing error measure, decreases for all 10 portfolios with the inclusion of this factor relative to a one-factor market model. The average decrease equals 0.005% (t-statistic = 7.29), which represents a 13% drop.

We get similar results for long-term and short-term reversal portfolios, where the announcement beta decreases monotonically as we go from past losers (which enjoy high future returns) to past winners (which suffer low future returns). Absolute alphas decrease for all long-term reversal portfolios, with an average decrease of 11% (t-statistic = 5.47). For short-term reversal portfolios, absolute alphas fall for 7 out of 10 portfolios.

The absolute alpha falls for 9 of the 10 size portfolios (the one exception is the smallest stock portfolio), with an average decrease of 10% (t-statistic = −6.44). Announcement betas do not vary monotonically with size, but neither do average excess returns during our sample period. The average returns are lowest for the portfolio of largest stocks, and this is the portfolio with the lowest announcement beta. Finally, and unsurprisingly, the announcement betas monotonically increase for the portfolios based on individual stocks' announcement betas.

An important caveat here is that, while the pricing errors mostly fall when we add the announcement factor, they still remain significant, economically and statistically, for many test assets. Thus, the announcement factor does not resolve asset pricing puzzles such as value or reversals; we only argue that test assets with high returns seem to generally have higher announcement betas, which is consistent with the hypothesis that they proxy for exposure to systematic risk.[34]

B.2. Betas and Cross-Sectional Return Variation

Using the announcement betas estimated above, we test whether the exposure to the announcement factor is priced in the cross-section (i.e., whether

[34] Gilbert, Hrdlicka, and Kamara (2014) find evidence that *SMB* and *HML* factors help reduce pricing errors through a mechanism related to earnings announcements.

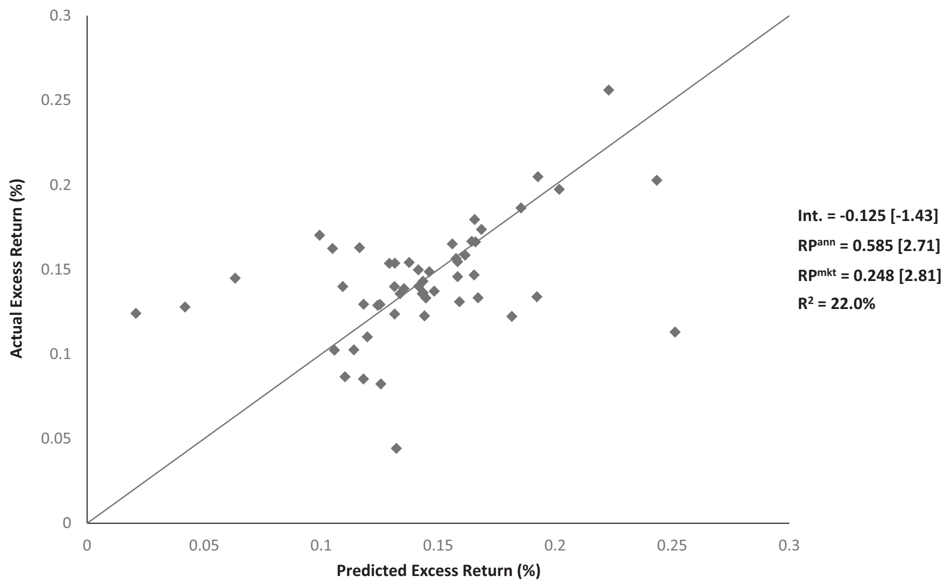

Figure 3. Earnings announcement betas and the cross-section of returns. This figure plots the average realized excess return for 55 test portfolios versus their predicted excess returns for the full sample (1974 to 2012). The portfolios include 10 each sorted on book-to-market, size, past short-run return, and past long-run return, 10 industry portfolios, and 5 announcement-beta-sorted portfolios. Predicted returns are computed from the regression $r_i = Int. + RP^{ann}\beta_i^{ann} + RP^{mkt}\beta_i^{mkt} + \varepsilon_i$, where r_i is the average realized excess return for portfolio i, β_i^{ann} is its earnings announcement beta, and β_i^{mkt} is its market beta. Estimates for the intercept (*Int.*) and the two implied risk premia (*RP*) are given above, together with t-statistics in brackets, which reflect estimation error for the two betas.

there exists a relation between these betas and the average returns for our test portfolios). We do so by running the following cross-sectional regression:

$$ret_i = Int. + RP_{earn}\overline{\beta_{i,earn}} + RP_{mkt}\overline{\beta_{i,mkt}} + \varepsilon_i, \tag{9}$$

where ret_i is portfolio i's average excess return, $\overline{\beta_{i,earn}}$ is portfolio i's estimated announcement beta (from equation (8)), and $\overline{\beta_{i,mkt}}$ is portfolio i's estimated market beta (again from equation (8)). The coefficients are estimated using OLS, while standard errors are computed to reflect the estimation error in betas (as in Chapter 12 of Cochrane (2001)).

We show the findings in Figure 3, which plots the realized average return versus its predicted value from equation (9). The implied risk premium for the announcement factor RP_{earn} is high and positive, equaling 0.585% (t-statistic = 2.71), which is a meaningful economic magnitude (and actually higher than the actual average return of the announcement factor). The R^2 for the cross-sectional regression is 22.0%, which represents a substantial increase from 12.2% for a (single-factor) market model. The intercept is not statistically different from zero (t-statistic = −1.43), which is an important additional result in support of our model. Interestingly, in our two-factor model, the implied market risk premium is also positive and significant for the market factor (0.248%, with a t-statistic of 2.81). However, only the announcement factor implied premium is robustly positive across the entire sample. When we divide our sample into two halves (1974 to 1993 and 1994 to 2012), the implied risk premium for the announcement factor is positive and significant in both subsamples, while the market one actually switches signs (see Figures A.1. and A.2. in the Appendix). Our results are substantially stronger if we exclude the short-term reversal portfolios, with a t-statistic for the implied announcement risk premium of 5.08 and an R^2 of 39.2%.

In conclusion, our analysis supports the hypothesis that exposure to announcement factor risk commands a positive and significant risk price, which is consistent with our explanation for the earnings announcement risk premium. While the two-factor model that we adopt definitely does not fully explain the return patterns for our 55 test portfolios, the inclusion of the announcement factor reduces the pricing errors for almost all of our test assets, even when we include the market factor. In robustness tests, the addition of further factors has no significant effect on our findings.

IX. Conclusion

The earnings announcement premium is one of the oldest and most significant asset pricing anomalies. Previous studies show that this premium cannot be explained by loadings on standard risk factors such as the market, size, value, and momentum factors. Frazzini and Lamont (2007) offer a behavioral explanation based on limited investor attention, while Cohen et al. (2007) argue that the premium persists due to limits to arbitrage.

In this paper, we provide a risk-based explanation for the premium. We show that, if investors are unable to perfectly distinguish the common component of a firm's earnings announcement news from the firm-specific component, then the announcing firm "superloads" on the revision to expected market cash flows, making it especially exposed to aggregate cash flow risk.

Our explanation can rationalize the high observed average abnormal return for announcing firms (using conventional benchmarks), and suggests new testable predictions. First, we show that stocks with high (low) past announcement returns continue to earn high (low) subsequent announcement returns. Second, firms that are expected to report their earnings early in a quarter earn substantially higher announcement returns than those that are expected to report earnings late in a quarter. Third, nonannouncing firms respond to announcements in a manner consistent with our model of information spillovers, both over time and cross-sectionally. Fourth, we document that the performance of earnings announcers helps forecast future aggregate earnings growth, and does so much better than the market return. The implied magnitudes reveal an economically significant effect: a one-standard-deviation increase in the quarterly announcement return leads to aggregate earnings growth next quarter that is 105% higher than the average. Finally, we find that covariance with the announcement return is priced in the cross-section, with a positive and significant implied price of such covariance risk.

Some of these results allow us to distinguish our hypothesis from the leading alternative explanation for the earnings announcement premium, namely, that an earnings announcement represents an attention-grabbing event that alerts retail investors to the existence or importance of the announcer and so temporarily drives up demand for the announcer's stock (Frazzini and Lamont (2007)). In particular, the variation in market response to announcements (both in aggregate and across different types of firms), the forecasting power of announcement returns for future aggregate earnings, higher (lower) returns for early (late) announcers, and the pricing of announcement risk in the cross-section are not, at least without further assumptions, obviously implied by the behavioral hypothesis.

Our results suggest that fundamental news commands a much higher price of risk than other market risk factors, as argued previously by Campbell (1993). They are also consistent with the idea in Savor and Wilson (2013, 2014) that fundamental news often arrives in the form of prescheduled announcements, thus offering a natural method for isolating and distinguishing fundamental risks and risk premia from other sources of market volatility.

Initial submission: December 15, 2011; Final version received: July 20, 2015
Editor: Campbell Harvey

Appendix: Model of Scheduled Earnings Announcements and Expected Returns

This appendix presents a simple formal model with which we derive most of our main results. The model assumes the existence of a large number (N) of symmetric firms, whose cash flows add up to the market cash flow held by a representative investor with Epstein-Zin preferences, as in Campbell (1993). Some of our claims depend on taking limits as N goes to infinity. Firms differ only in the timing of their announcements relative to each other, with all firms announcing over a given quarter.

There are S weeks in one quarter t, denoted by $s = 1 \cdots S$. By the end of week s, a cumulative total of M_s firms have "announced" (i.e., released their earnings report for the previous quarter $t-1$). From this report, market participants infer the change in the present value of expected future earnings (discounted at constant rates) $A_{j,t+s/S}$ for any announcing firm j (firm j's cash flow news). By the end of the quarter, all N firms have announced, and the market has fully observed all firms' cash flow news for quarter $t-1$. In quarter $t+1$, firms then report their cash flow news for quarter t, and so on.

The common component, market cash flow news, is given by

$$\eta_{t+1} = \frac{1}{N}\Sigma_{j=1}^{N} A_{j,t+s/S}, \tag{A1}$$

where η_{t+1} is only fully observed at the end of quarter t. This is equivalent to the beginning of quarter $t+1$, so we date this information as arriving at $t+1$. Thus, our model differs from Campbell (1993) in that we assume market cash flow news is not directly observed by investors, but must be rationally inferred from individual firms' cash flow news as released over the quarter.

Each individual announcer's cash flow news is the sum of the common news component and its own firm-specific news:

$$A_{j,t+s/S} = \eta_{t+1} + \upsilon_{j,t+s/S}, \tag{A2}$$

where the variance of the common component is σ_η^2 , the variance of the firm-specific component is σ_υ^2 (the same for all firms), and the firm-specific shocks are, in the limit as N becomes large, uncorrelated across firms. (Clearly, this can only be true asymptotically, as these shocks are assumed to sum to zero.)

Firm returns also involve revisions to firm discount rates ("discount rate news," or just "noise"), $\omega_{j,t+s/S}$. These are uncorrelated with any firm's cash flow news, but have identical pairwise correlation ρ across all pairs of firms and variance σ_ω^2 for all firms. Market participants can distinguish cash flow news from discount rate news and observe discount rate news directly without having to infer them.

The First Subperiod

Most of our results, with the exception of those concerning the relative timing of announcements, can be derived from a one-period model, so we do so for simplicity. We derive additional results for the multiperiod model when they can be derived only in that setting.

When the first M_1 firms announce, investors update their expected value of the remaining firms' announcements and the common component η_{t+1},

$$E[A_{j>M_1}|A_{1,t+1/S}\ldots A_{M_1,t+1/S}] = \frac{\sigma_\eta^2}{M_1\sigma_\eta^2 + \sigma_\upsilon^2}\Sigma_{k=1}^{M_1} A_{k,t+1/S}, \tag{A3}$$

and therefore market cash flow news (the revision to the expected value of the common component η_{t+1}) is

$$\begin{aligned} E[\eta_{t+1}|A_{1,t+1/S}\ldots A_{M_1,t+1/S}] &= \frac{1}{N}\sum_{j=M_1+1}^{N}\frac{\sigma_\eta^2}{M_1\sigma_\eta^2+\sigma_\upsilon^2}\Sigma_{k=1}^{M_1}A_{k,t+1/S} \\ &\quad + \frac{1}{N}\sum_{j=1}^{M_1}A_{j,t+1/S} \\ &= \frac{1}{N}\left(\frac{N\sigma_\eta^2+\sigma_\upsilon^2}{M_1\sigma_\eta^2+\sigma_\upsilon^2}\right)\sum_{j=1}^{M_1}A_{j,t+1/S}. \end{aligned} \tag{A4}$$

Thus, market cash flow news is perfectly correlated with the cash flow news of a portfolio long all the announcers in the market in the first subperiod, but scaled by the filtering coefficient $\sigma_\eta^2/(M_1\sigma_\eta^2+\sigma_v^2)$. Because of this scaling, the long-only announcer portfolio has a loading of its own cash flow news on market cash flow news greater than one (a phenomenon we term "superloading").

Market news is the sum of market cash flow news and (the negative of) market discount rate news, which for convenience we transform into a positive number and write

$$R_{MKT,t+1/S}-E_t[R_{MKT,t+1/S}]=\frac{1}{N}\left(\frac{N\sigma_\eta^2+\sigma_v^2}{M_1\sigma_\eta^2+\sigma_v^2}\right)\sum_{j=1}^{M_1}A_{j,t+1/S}+\frac{1}{N}\sum_{j=1}^{N}\omega_{j,t+1/S}. \quad \text{(A5)}$$

Using the standard arguments from Campbell (1993), the risk premium for any portfolio is then given by

$$\begin{aligned} rp_{P,t} &= \gamma \mathrm{Cov}_t\left[R_{P,t+1/S},\ \frac{1}{N}\left(\frac{N\sigma_\eta^2+\sigma_v^2}{M_1\sigma_\eta^2+\sigma_v^2}\right)\sum_{j=1}^{M_1}A_{j,t+1/S}\right] \\ &\quad + \mathrm{Cov}_t\left[R_{P,t+1/S},\ \frac{1}{N}\sum_{j=1}^{N}\omega_{j,t+1/S}\right]. \end{aligned} \quad \text{(A6)}$$

The portfolio long all announcers has a risk premium

$$\begin{aligned} rp_{A,t} &= \gamma \mathrm{Cov}_t\left[\frac{1}{M_1}\sum_{j=1}^{M_1}A_{j,t+1/S},\ \frac{1}{N}\left(\frac{N\sigma_\eta^2+\sigma_v^2}{M_1\sigma_\eta^2+\sigma_v^2}\right)\sum_{j=1}^{M_1}A_{j,t+1/S}\right] \\ &\quad + \mathrm{Cov}_t\left[\frac{1}{M_1}\sum_{j=1}^{M_1}\omega_{j,t+1/S},\ \frac{1}{N}\sum_{j=1}^{N}\omega_{j,t+1/S}\right] \\ &= \gamma\frac{1}{N}(N\sigma_\eta^2+\sigma_v^2)+\frac{1}{N}[1+(N-1)\rho]\sigma_\omega^2, \end{aligned} \quad \text{(A7)}$$

which is independent of M_1, the number of announcing firms.

Moving slightly beyond the model, this long-only announcer risk premium is increasing in σ_v^2. Therefore, if this parameter varies across portfolios and is persistent, portfolios of announcers with high past announcement returns should continue to enjoy high future announcement returns. In other words, average earnings announcement excess returns should be persistent. Beyond this simple test, we do not believe it is straightforward to identify a convincing proxy for σ_v^2 for individual firms or portfolios.

The portfolio long all nonannouncers, by analogous reasoning, has a risk premium

$$rp_{N,t}=\gamma\frac{1}{N}\left(N\sigma_\eta^2+\sigma_v^2\right)\frac{M_1\sigma_\eta^2}{M_1\sigma_\eta^2+\sigma_v^2}+\frac{1}{N}[1+(N-1)\rho]\sigma_\omega^2, \quad \text{(A8)}$$

which is smaller than the announcer portfolio risk premium and is increasing and concave in the number of announcers M_1. Because the announcing stocks have a loading greater than one on market cash flow news, they earn an announcement premium. Because of the discount rate news terms, this premium is not explained by their market betas, which are only mildly elevated relative to nonannouncers.

An important portfolio is the portfolio long all announcers and short all nonannouncers (in the main body of the paper, the "announcement portfolio," but in this Appendix the "long-short" announcer portfolio to avoid confusion). This portfolio has a risk premium equal to

$$rp_{A-N} = \gamma \frac{1}{N} \left(N\sigma_\eta^2 + \sigma_v^2 \right) \frac{\sigma_v^2}{M_1\sigma_\eta^2 + \sigma_v^2}, \tag{A9}$$

which has the desirable property, given our assumptions, of having zero covariance with market discount rate news.

In the limit, as N becomes large, this risk premium converges to

$$rp_{A-N} = \gamma\sigma_\eta^2 \frac{\sigma_v^2}{M_1\sigma_\eta^2 + \sigma_v^2}. \tag{A10}$$

When underlying market cash flow volatility is zero ($\sigma_\eta = 0$), this premium is zero, because announcements do not matter for aggregate earnings: there is nothing to reveal. When σ_v^2, the variance of the announcer-specific cash flow shocks is zero, the announcements are perfectly revealing of aggregate cash flow news, and again there is no announcement premium, because an announcement fully reveals all firms' fundamentals (and not just those of the announcing firms). In this case, all portfolios earn the maximum cash flow risk premium $\gamma\sigma_\eta^2$. The premium is increasing in σ_v^2 but converges to an upper limit of $\gamma\sigma_\eta^2$.

We now show that this long-short announcer portfolio has a positive alpha in the presence of discount rate news. Its market beta is given by

$$\beta_{A-N,MKT} = \frac{N\left(N\sigma_\eta^2 + \sigma_v^2\right)}{M_1\left(N\sigma_\eta^2 + \sigma_v^2\right)^2 + \left(M_1\sigma_\eta^2 + \sigma_v^2\right)N(1+(N-1)\rho)\sigma_\omega^2} \tag{A11}$$

and its corresponding alpha by

$$\alpha_{A-N} = (\gamma - 1)\frac{(1+(N-1)\rho)\sigma_\omega^2\left(N\sigma_\eta^2 + \sigma_v^2\right)\sigma_v^2}{M_1\left(N\sigma_\eta^2 + \sigma_v^2\right)^2 + \left(M_1\sigma_\eta^2 + \sigma_v^2\right)N(1+(N-1)\rho)\sigma_\omega^2}. \tag{A12}$$

The beta is decreasing in M_1, ρ, and σ_ω^2. The discount rate news term in the denominator reduces the market beta of this long-short portfolio, as it has no loading on market discount rate news. The alpha is positive provided relative risk aversion γ is greater than one, and is increasing in ρ and σ_ω^2. If discount rate news variance is zero, the alpha is zero because the market beta explains the entire risk premium of announcers. If σ_v^2 is zero, the alpha is also zero, as fundamentals are perfectly observed for all firms.

To summarize, our model explains the earnings announcement premium puzzle as arising from information spillovers in the presence of discount rate news.

Predictive Power for Future Earnings

In univariate regressions of η_{t+1} on either $R_{A,t}$ (the realized return on the long-only announcer portfolio) or $R_{N,t}$ (the realized return on the long-only nonannouncer portfolio), the R^2s from these regressions implied by the model are:

$$R^2(\eta_{t+1}, R_{A,t}) = \frac{M_1 \frac{1}{N^2}\left(N\sigma_\eta^2 + \sigma_v^2\right)^2}{\sigma_\eta^2\left(\left(M_1\sigma_\eta^2 + \sigma_v^2\right) + (1 + (M_1 - 1)\rho)\sigma_\omega^2\right)} \tag{A13}$$

for $R_{A,t}$ and

$$R^2(\eta_{t+1}, R_{N,t}) = \frac{M_1 \frac{1}{N^2}\left(N\sigma_\eta^2 + \sigma_v^2\right)^2}{\sigma_\eta^2\left(\left(M_1\sigma_\eta^2 + \sigma_v^2\right) + \frac{M_1}{N-M_1}\left(\frac{M_1\sigma_\eta^2 + \sigma_v^2}{\sigma_\eta^2}\right)^2 (1 + (N - M_1 - 1)\rho)\sigma_\omega^2\right)} \tag{A14}$$

for $R_{N,t}$.

The R^2 of the announcer portfolio is larger provided that

$$\left(\frac{M_1\sigma_\eta^2 + \sigma_v^2}{\sigma_\eta^2}\right)^2 \frac{M_1(1 + (N - M_1 - 1)\rho)}{(N - M_1)(1 + (M_1 - 1)\rho)} > 1. \tag{A15}$$

This is essentially a condition on ρ, the correlation of firm-level discount rate news, and on M_1, the number of announcing firms, relative to N, the total number of firms. When $\rho = 0$, discount rate news at the firm level aggregates out at the portfolio level, and so the returns on portfolios of nonannouncers mostly reflect cash flow news. In that case, having few firms in the announcer portfolio is a disadvantage for predicting cash flows, as the firm-level discount rate news terms do not aggregate out very well. Thus, for low ρ and small enough M_1, it is possible for the nonannouncer portfolio to predict future fundamentals better than the announcer portfolio. Provided $N > 2(M_1 - 1)$, the ratio is increasing in ρ. Furthermore, the ratio is always increasing in M_1. For high enough ρ, the ability of the announcer portfolio to predict future fundamentals will be much higher than that of the nonannouncer portfolio, and increasing in the number of announcers.

Since our argument that earnings announcer alphas should be positive depends on ρ being high, it implies that the announcer return should always be a superior predictor of future earnings growth than the nonannouncer return, and that this predictive power should be greater, both in absolute and relative terms, when more firms are announcing.

We also give the beta of a regression of η on the return on the long-short announcer portfolio, $\beta_{\eta,A-N}$, to show that the risk premium and this beta are not monotonically related:

$$\beta_{\eta,A-N} = \frac{\frac{1}{N}\left(N\sigma_\eta^2 + \sigma_v^2\right)\frac{\sigma_v^2}{M_1\sigma_\eta^2+\sigma_v^2}}{\frac{\left(\sigma_v^2\right)^2}{M_1\sigma_\eta^2+\sigma_v^2} + \frac{N(1-\rho)\sigma_\omega^2}{M_1(N-M_1)}}. \quad \text{(A16)}$$

This magnitude, roughly speaking, measures the differential ability of announcers versus nonannouncers to predict future aggregate cash flows' long-run component. It will be larger than that for the market when ρ is high, as discussed above. When $\sigma_v^2 = 0$, there is no special premium for announcers, and they have no special ability to predict future cash flows either. Both rp_{A-N} and $\beta_{\eta,A-N}$ are zero. As σ_v^2 increases, both magnitudes increase at first. As σ_v^2 goes to infinity, the long-short announcer risk premium converges to its upper bound of $\gamma\sigma_\eta^2$, while $\beta_{\eta,A-N}$ goes back toward zero (the numerator converges to σ_η^2 and the denominator goes to infinity, so the whole ratio goes to zero again) because announcer returns are too noisy to reveal any fundamentals well. Thus, there is no simple relationship between a portfolios' announcement risk premium and the relative ability of its announcement returns to predict future aggregate earnings, even though the announcement portfolio should outperform the market as an earnings predictor.

Correlation of Earnings Announcer Portfolio Beta with Risk Premium in the Cross-Section

Using the approach in Campbell (1993) for revealed market cash flow news, N_{CF} (i.e., the change in the conditional expectation of η conditional some announcements), the long-short announcer portfolio return has an announcer beta with an arbitrary portfolio P's return given by

$$\beta_{P,A-N} = \frac{\mathrm{Cov}[R_P, N_{CF}]\mathrm{Cov}[R_{A-N}, N_{CF}] + \mathrm{Cov}[v_A, v_P]\mathrm{Var}[N_{CF}]}{Cov[R_{A-N}, N_{CF}] + \mathrm{Var}[v_A]\mathrm{Var}[N_{CF}]}, \quad \text{(A17)}$$

which varies cross-sectionally with portfolio P's systematic cash flow risk, and therefore with the high-priced component of its risk premium. The announcer beta also varies with the covariance of portfolio P's and the announcer portfolio's systematic risk, which is not related to portfolio P's risk premium. Thus, announcer beta measures a portfolio's cash flow risk with an error, but, to the extent that the error is uncorrelated with a portfolio's cash flow risk, announcer beta will be positively related to risk premia. By contrast, market beta depends on both cash flow and discount rate betas, and so variation in market beta is not necessarily related to the main source of variation in risk premia in the cross-section. Provided cross-sectional variation in discount rate betas is greater than cross-sectional variation in the covariance of the idiosyncratic component with that of the long-short announcer portfolio, beta with long-short announcer return will be a better proxy for market cash flow risk in the cross-section than the market return beta.

Later Periods

At the start of subperiod $t + (s - 1)/S$, a total of M_{s-1} firms have announced. During the same subperiod, a further total of $M_s - M_{s-1}$ firms announce. The revision in expected cash flow news for firms that have already announced (j less than or equal to M_{s-1}) is obviously zero. For the announcers the revision is

$$E_{t+s/S}[A_{M_{s-1}<j\le M_s}] - E_{t+(s-1)/S}[A_{M_{s-1}<j\le M_s}] = A_j - \frac{\sigma_\eta^2}{M_{s-1}\sigma_\eta^2 + \sigma_v^2}\sum_{\kappa=1}^{M_{s-1}} A_k, \quad \text{(A18)}$$

so that cash flow news for the portfolio of announcers is

$$\varepsilon_{t+s/S} = \frac{1}{M_s - M_{s-1}}\left(\sum_{j=M_{s-1}+1}^{M_s} A_j - \frac{(M_s - M_{s-1})\sigma_\eta^2}{M_{s-1}\sigma_\eta^2 + \sigma_v^2}\sum_{\kappa=1}^{M_{s-1}} A_k\right). \quad \text{(A19)}$$

For firms that have yet to announce, the cash flow news is

$$\begin{aligned} E_{t+s/S}[A_{j>M_s}] - E_{t+(s-1)/S}[A_{j>M_s}] &= \frac{\sigma_\eta^2}{M_s\sigma_\eta^2 + \sigma_v^2}\sum_{\kappa=1}^{M_s} A_k \\ &\quad - \frac{\sigma_\eta^2}{M_{s-1}\sigma_\eta^2 + \sigma_v^2}\sum_{\kappa=1}^{M_{s-1}} A_k \\ &= \frac{\sigma_\eta^2}{M_s\sigma_\eta^2 + \sigma_v^2}(M_s - M_{s-1})\varepsilon_{t+s/S}, \quad \text{(A20)} \end{aligned}$$

so that, for the portfolio of such firms, the cash flow news is

$$\begin{aligned} \frac{1}{N - M_s}\sum_{j=M_s+1}^{N}\left(\frac{\sigma_\eta^2}{M_s\sigma_\eta^2 + \sigma_v^2}\sum_{\kappa=1}^{M_s} A_k - \frac{\sigma_\eta^2}{M_{s-1}\sigma_\eta^2 + \sigma_v^2}\sum_{\kappa=1}^{M_{s-1}} A_k\right) \\ = \frac{(M_s - M_{s-1})\sigma_\eta^2}{M_s\sigma_\eta^2 + \sigma_v^2}\varepsilon_{t+s/S}. \quad \text{(A21)} \end{aligned}$$

Market cash flow news is then

$$N_{CF,t+s/S} = \frac{1}{N}\left(\frac{N\sigma_\eta^2 + \sigma_v^2}{M_s\sigma_\eta^2 + \sigma_v^2}\right)(M_s - M_{s-1})\varepsilon_{t+s/S}, \quad \text{(A22)}$$

while market discount rate news is the same as always.

The beta of the market on the long-only announcer portfolio is

$$\beta_{MKT,A} = \frac{\left(\sigma_\eta^2 + \frac{\sigma_v^2}{N}\right)\left(\frac{\Delta M_s \sigma_\eta^2 + \sigma_v^2}{(M_{s-1}+\Delta M_s)\sigma_\eta^2 + \sigma_v^2}\right) + \frac{1}{N}(1+(N-1)\rho)\sigma_\omega^2}{(\sigma_\eta^2 + \frac{\sigma_v^2}{\Delta M_s}) + \left(\frac{1}{\Delta M_s} + \left(1 - \frac{1}{\Delta M_s}\right)\rho\right)\sigma_\omega^2}. \tag{A23}$$

This is increasing in ΔM_s and decreasing in M_{s-1}.
The risk premium of the long-only announcer portfolio is then

$$rp_{A,t+(s-1)/S} = \gamma \frac{1}{N}\left(N\sigma_\eta^2 + \sigma_v^2\right)\left(\frac{\Delta M_s \sigma_\eta^2 + \sigma_v^2}{(M_{s-1} + \Delta M_s)\sigma_\eta^2 + \sigma_v^2}\right) + \frac{1}{N}[1 + (N-1)\rho]\sigma_\omega^2. \tag{A24}$$

This is decreasing in M_{s-1}, the number of firms that have already announced, which in our model is equivalent to the passing of time. Thus, although all announcers should earn a premium, early announcers should earn a higher premium and later announcers a lower one.

REFERENCES

Anilowski, Carol, Mei Feng, and Douglas J. Skinner, 2007, Does earnings guidance affect market returns? The nature and information content of aggregate earnings guidance, *Journal of Accounting and Economics* 44, 36–63.

Ball, Ray, and Philip Brown, 1968, An empirical evaluation of accounting numbers, *Journal of Accounting Research* 6, 159–178.

Ball, Ray, and S. P. Kothari, 1991, Security returns around earnings announcements, *The Accounting Review* 66, 718–738.

Ball, Ray, Gil Sadka, and Ronnie Sadka, 2009, Aggregate earnings and asset prices, *Journal of Accounting Research* 47, 1097–1133.

Beaver, William H., 1968, The information content of annual earnings announcements, *Journal of Accounting Research* 6, 67–92.

Bernard, Victor L., and Jacob K. Thomas, 1989, Postearnings-announcement drift: Delayed price response or risk premium? *Journal of Accounting Research* 27, 1–36.

Bernard, Victor L., and Jacob K. Thomas, 1990, Evidence that stock prices do not fully reflect the implications of current earnings for future earnings, *Journal of Accounting and Economics* 13, 305–340.

Brandt, Michael W., Runeet Kishore, Pedro Santa-Clara, and Mohan Venkatachalam, 2008, Earnings announcements are full of surprises, Working paper, Duke University.

Brennan, Michael J., Ashley W. Wang, and Yihong Xia, 2004, Estimation and test of a simple model of intertemporal capital asset pricing, *Journal of Finance* 59, 1743–1775.

Campbell, John Y., 1993, Intertemporal asset pricing without consumption data, *American Economic Review* 83, 487–512.

Campbell, John Y., and John Ammer, 1993, What moves the stock and bond markets? A variance decomposition for long-term asset returns, *Journal of Finance* 48, 3–37.

Campbell, John Y., and Jianping Mei, 1993, Where do betas come from? Asset price dynamics and the sources of systematic risk, *Review of Financial Studies* 6, 567–592.

Campbell, John Y., and Robert J. Shiller, 1988, Stock prices, earnings, and expected dividends, *Journal of Finance* 43, 661–676.

Campbell, John Y., and Tuomo Vuolteenaho, 2004, Bad beta, good beta, *American Economic Review* 94, 1249–1275.

Chambers, Anne, and Stephen Penman, 1984, Timeliness of reporting and the stock price reaction to earnings announcements, *Journal of Accounting Research* 22, 21–47.

Chari, V. V., Ravi Jagannathan, and Aharon R. Ofer, 1988, Seasonalities in security returns: The case of earnings announcements, *Journal of Financial Economics* 21, 101–121.

Chen, Long, and Xinlei Zhao, 2009, Return decomposition, *Review of Financial Studies* 22, 5213–5249.

Clinch, Greg J., and Norman A. Sinclair, 1987, Intra-industry information releases: A recursive systems approach, *Journal of Accounting and Economics* 9, 89–106.

Cochrane, John, 2001, *Asset Pricing* (Princeton University Press, Princeton, New Jersey).

Cohen, Daniel A., Aiyesha Dey, Thomas Z. Lys, and Shyam V. Sunder, 2007, Earnings announcement premia and the limits to arbitrage, *Journal of Accounting and Economics* 43, 153–180.

Cohen, Randolph B., Christopher Polk, and Tuomo Vuolteenaho, 2003, The value spread, *Journal of Finance* 58, 609–641.

Collin-Dufresne, Pierre, Robert S. Goldstein, and Jean Helwege, 2003, Is credit-event risk priced? Modeling contagion risk via the updating of beliefs, NBER Working Paper 15733.

Da, Zhi, and Mitch Craig Warachka, 2009, Cashflow risk, systematic earnings revisions, and the cross-section of stock returns, *Journal of Financial Economics* 94, 448–468.

Daniel, Kent, and Sheridan Titman, 2012, Testing factor-model explanations of market anomalies, *Critical Finance Review* 1, 103–139.

DeBondt, Werner F. M., and Richard Thaler, 1985, Does the stock market overreact? *Journal of Finance* 40, 793–805.

Easton, Peter D., Steven J. Monahan, and Florin P. Vasvari, 2009, Initial evidence on the role of accounting earnings in the bond market, *Journal of Accounting Research* 47, 721–766.

Fama, Eugene F., 1998, Market efficiency, long-term returns, and behavioral finance, *Journal of Financial Economics* 49, 283–306.

Fama, Eugene F., and Kenneth R. French, 1992, The cross-section of expected stock returns, *Journal of Finance* 47, 427–465.

Fama, Eugene F., and Kenneth R. French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics* 33, 3–56.

Foster, George, 1981, Intra-industry information transfers associated with earnings releases, *Journal of Accounting and Economics* 3, 201–232.

Frazzini, Andrea, Ronen Israel, and Tobias J. Moskowitz, 2013, Trading costs of asset pricing anomalies, Chicago Booth Research Paper No. 14–05.

Frazzini, Andrea, and Owen Lamont, 2007, The earnings announcement premium and trading volume, NBER Working Paper 13090.

Freeman, Robert, and Senyo Tse, 1992, An earnings prediction approach to examining intercompany information transfers, *Journal of Accounting and Economics* 15, 509–523.

Gilbert, Thomas, Christopher Hrdlicka, and Avraham Kamara, 2014, Information release and the fit of the Fama-French model, Working paper, University of Washington.

Han, Jerry C. Y., and John J. Wild, 1990, Unexpected earnings and intraindustry information transfers: Further evidence, *Journal of Accounting Research* 28, 211–219.

Han, Jerry C. Y., John J. Wild, and K. Ramesh, 1989, Managers' earnings forecasts and intra-industry information transfers, *Journal of Accounting and Economics* 11, 3–33.

Harvey, Campbell R., and Akhtar Siddique, 2000, Conditional skewness in asset pricing tests, *Journal of Finance* 55, 1263–1295.

Heston, Steven L., and Ronnie Sadka, 2008, Seasonality in the cross-section of stock returns, *Journal of Financial Economics* 87, 418–445.

Heston, Steven L., and Ronnie Sadka, 2010, Seasonality in the cross-section of stock returns: The international evidence, *Journal of Financial and Quantitative Analysis* 45, 1133–1160.

Jegadeesh, Narasimhan, 1990, Evidence of predictable behavior of security returns, *Journal of Finance* 45, 881–898.

Kalay, Avner, and Uri Loewenstein, 1985, Predictable events and excess returns: The case of dividend announcements, *Journal of Financial Economics* 14, 423–449.

Kim, Oliver, and Robert E. Verrecchia, 1991a, Market reaction to anticipated announcements, *Journal of Financial Economics* 30, 273–309.

Kim, Oliver, and Robert E. Verrecchia, 1991b, Trading volume and price reactions to public announcements, *Journal of Accounting Research* 29, 302–321.

Kim, Oliver, and Robert E. Verrecchia, 1994, Market liquidity and volume around earnings announcements, *Journal of Accounting and Economics* 17, 41–67.

Kim, Oliver, and Robert E. Verrecchia, 1997, Preannouncement and event-period private information, *Journal of Accounting and Economics* 24, 395–419.

King, M. A., and S. Wadhwani, 1990, Transmission of volatility between stock markets, *Review of Financial Studies* 3, 5–33.

Knight, Frank H., 1921, *Risk, Uncertainty and Profit* (Houghton Mifflin, Boston and New York).

Kothari, S. P., Jonathan Lewellen, and Jerold Warner, 2006, Stock returns, aggregate earnings surprises, and behavioral finance, *Journal of Financial Economics* 79, 537–568.

Kraft, Pepa, Florin P. Vasvari, and Regina Wittenberg-Moerman, 2011, The information spillover effect of earnings announcements in the credit market, Working paper, New York University.

Kumar, Praveen, Sorin M. Sorescu, Rodney D. Boehme, and Bartley R. Danielsen, 2008, Estimation risk, information, and the conditional CAPM: Theory and evidence, *Review of Financial Studies* 21, 1037–1075.

Landsman, Wayne. R., and Edward L. Maydew, 2002, Has the information content of quarterly earnings announcements declined in the past three decades? *Journal of Accounting Research* 40, 797–808.

Lehmann, Bruce N., 1990, Fads, martingales, and market efficiency, *Quarterly Journal of Economics* 105, 1–28.

Lev, Baruch, 1989, On the usefulness of earnings and earnings research: Lessons and directions from two decades of empirical research, *Journal of Accounting Research* 27, 153–192.

Lewellen, Jonathan, Stefan Nagel, and Jay Shanken, 2010, A skeptical appraisal of asset pricing tests, *Journal of Financial Economics* 96, 175–194.

Liu, Jing, and Jacob Thomas, 2000, Stock returns and accounting earnings, *Journal of Accounting Research* 38, 71–101.

Lo, Andrew W., and Craig A. MacKinlay, 1990, When are contrarian profits due to stock market overreaction? *Review of Financial Studies* 3, 175–205.

Lucca, David O., and Emanuel Moench, 2015, The pre-FOMC announcement drift, *Journal of Finance* 70, 329–371.

Patton, Andrew, and Michela Verardo, 2012, Does beta move with news? Firm-specific information flows and learning about profitability, *Review of Financial Studies* 25, 2789–2839.

Pownall, Grace, and Gregory Waymire, 1989, Voluntary disclosure choice and earnings information transfer, *Journal of Accounting Research* 27, 85–105.

Pyo, Youngin, and Steven Lustgarten, 1990, Differential intra-industry information transfer associated with management earnings forecasts, *Journal of Accounting and Economics* 13, 365–379.

Ramnath, Sundaresh, 2002, Investor and analyst reactions to earnings announcements of related firms: An empirical analysis, *Journal of Accounting Research* 40, 1351–1376.

Ryan, Stephen, and Paul Zarowin, 2003, Why has the contemporaneous linear returns-earnings relation declined? *Journal of Accounting Research* 78, 523–553.

Sadka, Gil, and Ronnie Sadka, 2009, Predictability and the earnings-returns relation, *Journal of Financial Economics* 94, 87–106.

Savor, Pavel, and Mungo Wilson, 2013, How much do investors care about macroeconomic risk? Evidence from scheduled economic announcements, *Journal of Financial and Quantitative Analysis* 48, 343–375.

Savor, Pavel, and Mungo Wilson, 2014, Asset pricing: A tale of two days, *Journal of Financial Economics* 113, 171–201.

Shiller, Robert J., 1981, Do stock prices move too much to be justified by subsequent changes in dividends? *American Economic Review* 71, 421–436.

Thomas, Jacob K., and Frank Zhang, 2008, Overreaction to intra-industry information transfers? *Journal of Accounting Research* 46, 909–940.

Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

Appendix S1: Internet Appendix.