Earnings Announcements and Systematic Risk

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Abstract

Firms enjoy high returns at times when they are scheduled to report earnings. A simple strategy that buys all announcers and short sells all other stocks earns an annualized return of 9.9%, with a Sharpe ratio that is significantly higher than that of value and momentum strategies. Standard pricing models cannot explain this performance, with the strategy's abnormal return typically almost equal to its raw return. We propose a risk-based explanation for this phenomenon, in which investors use announcements to revise their earnings expectations for non-announcing 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, we find that returns of earnings announcers robustly predict aggregate earnings growth. Furthermore, non-announcing firms respond to announcements in a manner consistent with our model, both across time and cross-sectionally. We also show that the announcement premium is extremely persistent across stocks, and that early (late) announcers earn higher (lower) returns. Finally, exposure to earnings announcement risk is priced in the cross-section, and the inclusion of the announcement portfolio as a factor reduces pricing errors for almost all of our 55 test portfolios.

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Introduction

Firms on average experience stock price increases during periods when they are scheduled to announce earnings. This earnings announcement premium was first discovered by Beaver (1968) and was subsequently documented by Chari, Jagannathan, and Ofer (1988), Ball and Kothari (1991), Cohen, Dey, Lys, and Sunder (2007), and Frazzini and Lamont (2007). Kalay and Loewenstein (1985) obtain the same finding for firms announcing dividends.[1] 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. Cohen, Dey, Lys, and Sunder (2007) argue that limits to arbitrage allow the survival of the earnings announcement premium, while Frazzini and Lamont (2007) suggest that its cause is limited investor attention, citing a relationship between past trading volume and the magnitude of the premium as support for their hypothesis.

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 not only about the prospects of the issuing firms but also about those of their peers and more generally the entire economy.[2] However, investors face a signal extraction problem: they only directly observe total firm earnings and must infer the news relevant to expected aggregate cash flows, the common component of an announcing firm's earnings news.[3] 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 non-announcing stocks also respond to the news in announcements, they should respond less, since investors learn less about these firms.[4]

Second, realized firm-level returns contain a component unrelated to expected future cash

[1] The premium simply rewards investors for holding the shares of announcing firms and is therefore distinct from post-earnings announcement drift (Ball and Brown (1968); Bernard and Thomas (1989)).

[2] Foster (1981), Clinch and Sinclair (1987), Han, Wild, and Ramesh (1989), Pownall and Waymire (1989), Han and Wild (1990), King and Wadhwani (1990), Pyo and Lustgarten (1990), Freeman and Tse (1992), Ramnath (2002), Collin-Dufresne, Goldstein, and Helwege (2003), Anilowski, Feng, and Skinner (2007), Thomas and Zhang (2008), Easton, Monahan, and Vasvari (2009), and Kraft, Vasvari, and Wittenberg-Moerman (2011) are examples of work on such information spillovers.

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

[4] The required assumption here is that earnings announcements provide some information about the prospects of non-announcing firms, but not as much as they do about announcing firms.

flows: 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.[5] In other words, although a firm's market beta may rise on the day it announces earnings (relative to other times), the increase in its expected return will be larger than can be explained just by its higher beta. This means that we expect a positive announcement return even if the actual earnings surprise is zero.[6] We provide a formal model behind our intuition in the next section and the Appendix.

Under our hypothesis, the market return will be a poorer predictor of future aggregate earnings than the returns of announcing firms. Moreover, non-announcing firms, and the market in general, will respond more to the 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 at those times when more firms are announcing, since this provides a more precise signal of aggregate cash-flow news. The sensitivity of non-announcing firms to announcements will also increase with time 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 non-announcing firms earns an annualized abnormal return of 9.9%. The premium is remarkably consistent across different 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

[5] 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.

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

earnings announcement portfolio is 0.112 (0.055), compared to 0.049 for the market, 0.076 for a value portfolio, and 0.072 for a momentum portfolio. Furthermore, the long-short announcement portfolio has positively skewed returns and exhibits positive coskewness, which means that the strategy is even more attractive than suggested just by its Sharpe ratio, assuming investors are averse to negative skewness (Harvey and Siddique (2000)). By any measure, announcers enjoy extraordinarily high returns, and 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 very persistent across stocks: those with high (low) historical announcement returns continue earning high (low) returns on future announcement dates.[7] 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, Kishore, Santa-Clara, and Venkatachalam (2008), as it holds when we exclude announcement returns over the previous year. The magnitudes suggest significant dispersion in expected announcement returns. When we sort weekly announcers into portfolios based on average announcement returns over the previous 10 years (excluding the previous year), those in the lowest quintile enjoy excess returns of 0.10% (t-statistic=1.79). As we move to the highest quintile, the excess returns grow monotonically to 0.22% (t-statistic=4.11). The abnormal return of the corresponding long-short portfolio (highest minus lowest) is 0.15% (t-statistic=4.67), or about 7.8% on annual basis. This evidence is consistent with our intuition. Different firms have different exposure to earnings announcement risk, and it is probable that this characteristic does not change frequently. If announcement returns indeed represent compensation for this risk, we then 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 announce, such as a calendar quarter, investors should learn more from firms announcing early in the quarter than from later ones,

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

making the former riskier and consequently resulting in higher expected returns (we confirm this intuition formally in our model). To test this hypothesis, we examine whether the amount of time elapsing 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 (0.21%, with a t-statistic of 2.46) abnormal returns and late announcers earn lower (-0.27%, with a t-statistic of -3.32) abnormal returns than 'regular' announcers. The result holds when we construct calendar-time portfolios, with the early-announcer portfolio outperforming the late-announcer portfolio by 0.18% per week (t-statistic=2.43).

We next explore which factors influence the relation between the market return (or the returns of just non-announcing firms) and announcement returns. We find that the market (or just non-announcing firms) responds more strongly to early announcers, which is consistent with the intuition that early announcers provide more new information and with our result that such announcers enjoy higher announcement returns.[8] Similarly, the market and non-announcers respond more strongly to announcements of large firms, firms with low idiosyncratic volatility around past announcements (which makes it easier for investors to infer the common component of a firm's earnings surprise), and firms with high earnings announcement risk premia, all of which likely provide better signals about aggregate earnings.[9]

We also show that the covariance between the market (or non-announcer) returns and the earnings announcement portfolio return is much higher when more firms are reporting in a given week, presumably because more announcements provide a stronger signal about the common component of earnings. Finally, we find that the non-announcing firms that have reported their earnings a long time ago respond more strongly to announcements than those non-announcers that reported recently, which is consistent with the hypothesis that announcements provide more information about (non-announcing) firms with more dated earnings reports. All of these

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

[9] Importantly, a firm whose announcements offer a more informative signal does not necessarily always enjoy higher announcement premia in our model, which does not predict a monotonic relation between how much investors learn from a particular firm's announcement and expected returns.

findings are predicted by our model, where investors use announcements to learn about non-announcing firms (in addition to the announcers themselves), but are less easily reconciled with alternative explanations for the earnings announcement premium.

We then 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 non-announcers 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 performance of the announcement portfolio has very important implications for 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 announcing earnings in a given period and those not announcing that we can establish a strong relation between returns and aggregate earnings.[10] This relation is a very robust one, 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, which is consistent with our model and with our previous result that the market reacts most to the announcements of such firms.

Shocks to earnings growth represent a systematic risk because aggregate earnings, together

[10] Portfolios based on book-to-market, size, or past momentum also have no explanatory power for future aggregate earnings, and neither do the term and default spreads.

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 strong support for this hypothesis. First, we sort stocks into portfolios based on their betas with the earnings announcement portfolio (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), which we estimate by regressing individual stock returns on the earnings announcement factor return. 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 quintile 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 a considerable ability to explain cross-sectional variation in returns. As our test assets, we use portfolios sorted on size, book-to-market, past short-run (one month) returns, past long-run (years $t-1$ through $t-5$) returns, industry, and earnings announcement betas. Announcement betas for these test portfolios are typically positive, even when including the market excess return as a second factor in the regression, and exhibit substantial cross-sectional variation. 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 plausibly more vulnerable to a deterioration in economic conditions and consequently riskier. The addition of the announcement factor to the market factor reduces pricing errors for a large majority of our test assets (45 out of 55).

Earnings announcement betas explain 22.0% of the cross-sectional variation in returns of the 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. Together these results strongly suggest that our announcement factor helps explain cross-sectional variation in returns and represents a priced risk.

All of these findings are robust to the inclusion of other factors, hold in different subperiods, are not sensitive to the exact methodology for computing the earnings announcement portfolio return, and do not change if we use actual announcement dates instead of expected ones. If we restrict our analysis to a smaller set of test assets (such as just size and book-to-market portfolios, as is standard), our results become significantly stronger.

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)). Campbell and Vuolteenaho (2004) argue that the value and size premia are compensation for higher cash-flow risk as opposed to discount-rate risk for these portfolios. Long-term investors should primarily care about cash-flow risk, as they can "ride out" changes in discount rates. The methodology and results of their study 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, and our findings for the value and size-sorted portfolios are similar to those of Campbell and Vuolteenaho (2004).[11]

Savor and Wilson (2013) study macroeconomic announcements (FOMC, employment, and inflation) and show that the stock market enjoys much higher average returns on days when these announcements are made.[12] They rationalize this result through a model which 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 very high risk premia. However, this paper explores the phenomenon in more depth by establishing a direct link between earnings

[11]As a caveat, we note that earnings announcements do not necessarily affect only cash-flow expectations. Investors may also learn more about the riskiness of future cash flows, for individual firms and in the 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]Lucca and Moench (2013) confirm this result for just pre-scheduled FOMC announcements.

announcements and future fundamentals and also showing that announcement risk is priced in the cross-section of stock returns. Furthermore, while Savor and Wilson (2013) can explain why all stocks should earn high returns at risky (announcement) times, their model cannot explain why being an announcer makes a firm riskier. In their model, any market-relevant news revealed by an announcing firm should affect all stocks equally. The key additional insight in this paper is that investors face a signal extraction problem, making announcers' returns particularly sensitive to inferred news about aggregate earnings.

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. However, it is not necessary for discount-rate news to be negatively correlated with cash-flow news to explain why market returns forecast future earnings poorly. Uncorrelated news is enough.

Sadka and Sadka (2009) explore the relationship 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 findings that market returns do not forecast well aggregate earnings growth, but can be explained by differences in samples. Their sample ends in 2000, while ours goes through 2012. When they perform their analysis on a sample ending in 2005, their results are very similar to ours, with positive but insignificant coefficients.

Da and Warachka (2009) construct an analyst earnings beta for each stock, which depends positively on the covariance of revisions in analyst earnings forecasts for a given stock with those of the entire stock market. They find that analyst earnings betas explain a significant share of cross-sectional variation in returns across portfolios sorted on size, book-to-market, and long-term returns. They do not discuss the earnings announcement portfolio. Their findings are consistent with those in this paper, but our results focus directly on covariance with actual subsequent realized earnings and on covariance with a portfolio of actual earnings announcers, and thus avoid potential identification issues concerning analyst bias and its tendency to comove with investor sentiment. In particular, if analyst earnings forecasts are driven by sentiment, stocks with high analyst cash-flow betas may simply be stocks with high exposure to aggregate sentiment, which may justify a higher risk premium for reasons unconnected with fundamentals. Since the earnings announcement portfolio return correlates with actual subsequent earnings, it is potentially unbiased by sentiment.

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.[13] 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 post-earnings announcement drift. By contrast, our study is not concerned with the ability of earnings surprises to explain abnormal returns, nor with post-earnings announcement drift (which we explicitly control for in our tests), but 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 about the persistence in announcement premia across stocks; Section V studies the relation between the timing of earnings announcements and announcement returns; Section VI explores the response of the market and of non-announcing firms to announcements; Section VII relates the returns of announcing firms to future aggregate earnings; Section VIII tests whether the

[13] 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).

announcement portfolio represents a priced risk factor; and Section IX concludes.

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 place all the details and derivations in the Appendix.

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.[14] Investors use individual firm announcements to update their expectations about aggregate earnings.[15] Consider a lone 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). $N_{CF,i}$ is 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

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

Therefore

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

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.[16] The ratio of the two cash-flow risks is just the reciprocal of the variance ratio in Eq. (1) above, and is always weakly greater than one. In

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

[15] This idea of information spillovers has been extensively studied in both finance and accounting. Please see the Introduction for some important references.

[16] This result holds when we relax the no-correlation assumption, but with a much more complicated expression for the multiple. The only scenario where it does not hold is if discount-rate and cash-flows news are perfectly correlated, in which case we would have a simple one-factor model.

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

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

When the variance of market discount-rate news is negligible, this market beta will equal the superloading factor in parentheses in (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)), the increase in announcing firms' market betas is less than proportional to the elevated cash-flow risk of announcing firms.[17] 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 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, but 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 large 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 premium to have a positive abnormal return relative to the market model (and other factor models that do not fully capture cash-flow news). Together, these two assumptions

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

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.

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

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

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.

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 more firms have announced. 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, the announcer returns should have higher correlations with future aggregate earnings growth than those of non-announcers, 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 non-announcers 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.

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.

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 non-announcing firms. As pointed out by for example Kim and Verrecchia (1997), volume primarily reflects disagreement between heterogeneous agents.[18] 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 non-announcers 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 obviously be zero, as announcement news then represents a purely idiosyncratic risk that should not be priced in equilibrium.[19] 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

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

[19] See Eqs. (22) and (23) in the Appendix for a formal proof.

II. Data

II.A. Sample Construction

Our sample covers all NYSE, AMEX, and NASDAQ stocks on the COMPUSTAT quarterly file from 1974 to 2012.[20] To be included, a firm has to have at least four prior quarterly earnings reports and non-missing earnings and book equity for the current quarter. In total, we have 626,567 observations. Figure 1 plots the number of earnings announcements across time. The increase in the first few years is driven partly by expanding coverage, as COMPUSTAT back then did not include many smaller firms, and later on tracks the total number of listings.

[**FIGURE 1 ABOUT HERE**]

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 return of a portfolio containing all firms expected to announce earnings in that week minus the value-weighted return of a portfolio containing all non-announcing 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 this case really 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 much 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 actual day of the announcement and sometimes the day after, the latter probably reflecting a reporting lag in its 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 may be more appropriate.

[20] The first year when quarterly earnings data becomes 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.

A weekly horizon represents a compromise between various approaches in the literature. Many papers (e.g., Cohen, Dey, Lys, and Sunder (2007)) employ a very tight (typically 2- or 3-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, but makes less sense in our context, where 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; and if those items are unavailable as well, then it is 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 ones remain the same 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 the 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.

II.B. Announcement Dates

We rely on earnings announcement dates that are reported in COMPUSTAT. In some cases though, investors may not have known the exact announcement date in advance. Firms occasionally pre-announce their earnings or delay their publication, both of which 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 both miss out on pre-announcement gains and incur losses when postponements are disclosed. Consequently, a strategy based on COMPUSTAT dates is not always available to investors and may overstate returns investors would have earned by following it. Previous work by Cohen, Dey, Lys, and Sunder (2007) suggests 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. We have done some spot-checking, which indicates this is a very significant concern. Of the 100 randomly-chosen instances of significant differences between expected and actual dates, only twenty-seven are cases where investors would possibly not have known the actual date. The earnings announcement premium calculated with actual announcement dates may be overstated, but the one 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, which 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:

1) 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.

2) If the firm changed 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).

3) 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 1st and 99th 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%. We tried further refinements, but those resulted in only marginal improvements.

III. Earnings Announcement Premium

III.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 the descriptive statistics for the long-only announcement portfolio, which is just the portfolio buying all firms expected to report earnings in a given week, and the non-announcer portfolio, which is made up of all the 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 absolutely and relative to non-announcers. 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.

[TABLE I ABOUT HERE]

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 non-announcer portfolio, compared to a 146% difference in average returns. Consequently, the strategy of buying announcing firms delivers extraordinary returns per unit of risk. Assuming i.i.d. 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)). If investors are averse to negative skewness, this means that the announcement portfolio is even more attractive than suggested just by its Sharpe ratio.

In Panel B, we show the excess and abnormal returns across all announcements (i.e., in event time), which further confirm that announcing firms enjoy very high returns. The average excess (abnormal) return for an announcement in our sample equals 0.26%, with a t-statistic of 21.73 (0.15%, with a t-statistic of 13.14). These numbers are slightly lower than those for calendar-time portfolios, which could suggest that the number of announcers in a given week is negatively related to announcement premia. However, when we formally study this relation, we find no statistically significant relation between announcement returns and the number of firms reporting during a particular week.

All the returns discussed above are computed using expected announcement dates. As argued in the previous section, this likely represents a very conservative estimate of the announcement premium, since many expected dates are not accurate. In Appendix Table I, we provide the same analysis as in Table I but with actual announcement dates. As predicted, the magnitudes are higher, though mostly so 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 goes from 0.15% to 0.26%. It seems that most of the announcements that our expected dates miss are associated with small firms, which is not at all surprising.

III.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.[21] 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.[22] The alphas we compute are not only economically very meaningful, but also statistically significant, with a t-statistic of 5.19 (5.54) for the value- (equal-) weighted portfolio.

[TABLE II ABOUT HERE]

The stock market beta of the earnings announcement portfolio, although greater than zero, is quite small at 0.02 with 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 in consequence 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 very close to our estimate of 0.10 for the long-short equal-weighted portfolio using weekly returns. 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. The only other significant factor beta is for the value-weighted portfolio with the value factor, which is negative at -0.08 (t-statistic=-2.66) and, if anything, makes the performance of the announcement portfolio even more puzzling.

When we divide the data into different subsamples, these patterns remain remarkably consis-

[21] We obtain these factor portfolio returns from Kenneth French's website.

[22] 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.

tent. 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 Appendix Table II, 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.

We conclude that the earnings announcement premium is a large economic premium, highly statistically significant, and robust to the choice of sample and asset pricing model. Although the strategy occasionally loses money, the only recent period in which it earned significantly negative returns was in the second half of 2008 (not reported). This observation is consistent with our hypothesis, since that was a period in which market participants must have sharply revised down their forecasts of future earnings.

In a calibration of our model, 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 between 16.6 (all moments) to 18.2 (means and betas). 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 and discount-rate news 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 is much lower than the correlation of discount-rate shocks. Because market discount-rate news is then implied to be the dominant component of market volatility, and 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.

III.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.

It is very hard to directly estimate transaction costs for a given trading strategy, especially since those costs likely greatly differ 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 different strategies, with the most similar one to the announcement premium being the short-term reversals. This is also a high-turnover strategy, which buys previous month's losers and sells last 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 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.[23]

[23] And 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.

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 will differ both in terms of 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 hard 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 that the only way to directly relate this parameter to risk premia is through structural estimation.

An alternative approach would 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 for the portfolios based on sorts over horizons ranging from 5 to 20 years.[24] For example, Panel B shows that the average excess return for the portfolio

[24] In order to measure past announcement premia with at least some precision, we require a minimum of three years of previous announcement returns for inclusion in the sample. Our findings are unaffected if we relax this

containing announcing stocks with the lowest historical announcement returns over the previous 10 years is 0.06% per week (0.20% equal-weighted). The number then monotonically increases to 0.27% (0.57% 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 0.21% per week (0.35% equal-weighted), with a t-statistic of 6.54 (4.71 equal-weighted). This dispersal in returns, 11% on annual basis, is very large and actually represents a greater difference than that between announcing and non-announcing stocks, suggesting earnings announcement premia are very persistent.[25] The results do not change at all when we compute portfolio alphas (relative to the Fama-French plus momentum model). In that case, "$High$" portfolio outperforms "Low" portfolio by 0.22% (0.32% equal-weighted), with a t-statistic of 6.58 (4.18 equal-weighted).

The market beta for the $High - Low$ portfolio is positive and significant (0.058, with a t-statistic of 4.09).[26] 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). It is also in line with our assumption that a firm's past announcement returns serve a useful proxy for its current announcement risk.

[TABLE III ABOUT HERE]

One potential worry is that these findings stem from the well-known earnings momentum anomaly first discovered by Bernard and Thomas (1990), where firms with positive (negative) earnings surprises continue outperforming (underperforming) over the following three quarters. To address this concern, we redo our analysis with sorts that exclude announcement returns from the previous year (so that in Panel B, e.g., 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

constraint.

[25] Frazzini and Lamont (2007) document a similar persistence result.

[26] The reason that the alpha of the $High - Low$ portfolio is higher than its raw average return is the inclusion of other factors (SMB, HML, and UMD); the portfolio has negative and significant SMB and HML betas. When we include only the market factor, the $High - Low$ portfolio market beta is 0.058 (t-statistic = 4.09), while its alpha is 0.205% (t-statistic = 6.32), which is lower than its average raw return of 0.213%

horizon, the top quintile outperforms the bottom one by 0.15% per week (0.29% equal-weighted), which is 7.8% (15.1%) annualized.

These results remain the same if we either shorten the horizon to 5 years (Panel A) or lengthen it to 20 years (Panel C). They also do not change if we use different measures of announcement returns, if we measure performance as abnormal rather than excess returns, if we rely on actual instead of expected announcement dates, or if 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 experiencing high future returns in that same month.[27] While this could potentially explain the persistence in earnings announcement premia, we show it is a distinct phenomenon. First, when we sort non-announcing 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).[28]

Brandt, Kishore, Santa-Clara, and Venkatachalam (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.

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

[28] We do not tabulate those findings, but they are available on request.

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, 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.[29]

It is important to repeat here that our analysis relies on expected announcement dates. We discuss in Section III how firms occasionally pre-announce 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 pre-announcements 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 computed based on its expected announcement date and using the approach in Section IV.[30] All standards errors are clustered by year-quarter. Our main objects of interest are two variables: *Early*, which is 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*, which is a dummy variable set to one if a firm's expected announcement date falls in the latest quartile in a given fiscal quarter. 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 fixed effects.

Column (1) of Table IV shows our results. The *Early* coefficient is positive and significant (t-statistic=4.44), whereas the *Late* coefficient is negative and significant (t-statistic=-4.09).

[29] See Eq. (37) in the Appendix for details.

[30] Our results are the same if we instead run Fama-MacBeth regressions.

Furthermore, these are economically meaningful effects: early announcers earn returns that are 0.284% higher (over a five-day horizon) and late announcers earn returns that are 0.270% lower than those of similar announcing firms that do not report their earnings either early or late. The coefficients on controls confirm previous results: small firms, value firms, and firms with high leverage tend to earn higher announcement returns.

[TABLE IV ABOUT HERE]

In column (2), we introduce additional controls that are focused on earnings announcements (rather then 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 further add controls for trading volume and liquidity, which we measure over the 20 trading days preceding the announcement window.

Our results do not change in this specification. Early announcers earn 0.212% (t-statistic=2.46) higher returns and late ones 0.271% (t-statistic=-3.32) lower returns, for a very large difference of 0.483%. The new control variables based on past announcement returns all have the expected signs, but by far the most important one economically and statistically is the long-term announcement return one (10.869, with a t-statistic of 8.52), which further confirms the strong persistence in announcement premia. The coefficient on the past announcement return volatility is negative (-3.697, with a t-statistic of -3.42), suggesting that more volatile announcers earn lower returns. The trading volume coefficient is positive, but not quite significant (t-statistic=-1.58), while the bid-ask spread one is positive and significant (t-statistic=4.99), indicating that less liquid stocks have higher announcement risk premia.[31] These last three results are consistent

[31] In unreported results, we also include as a control trading volume during the announcement window, and this again does not change any of our results.

with those in Cohen, Dey, Lys, and Sunder (2007).

Interestingly, the coefficient on the fiscal year-end dummy is positive at 0.264% and significant (t-statistic=2.35). 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 (3), we replace the *Early* and *Late* dummy variables with a continuous variable $\log(time)$, which is defined as the log of the difference between the expected announcement date and the beginning of the current fiscal quarter (measured in days). The coefficient on this variable is negative and significant (-0.385, with a t-statistic of -4.15), again showing that announcement timing has a strong impact on expected announcement returns.

These results are robust not only to the inclusion of various controls but also to the choice of sample period. In the fourth and fifth columns of Table IV, we perform our analysis for the first and second half of our sample respectively, and find that our findings still hold in both. As a further robustness test, meant to address worries 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, and find that this has no impact on our results.

As a final test, we study the performance of early and late announcers with calendar-time portfolios. The only issue with the calendar-time approach in the context of early vs. late announcers is that the number of observations for the two groups will vary a lot across a quarter; in the early weeks, the portfolio of early announcers will contain many more firms than the portfolio of late announcers, and vice versa in the late weeks. We address this problem partially by dividing all announcers into just two groups: early announcers, which are those firms for which the difference between their expected announcement date and the beginning of the fiscal quarter is below the median (for the current quarter), and late announcers, which are all the other firms.

We show the results in Table V. The alpha for the early-announcer portfolio is 0.26% per week (t-statistic = 5.02) and only 0.08% (t-statistic = 1.56) for the late-announcer portfolio, which is a significant difference. When we construct a long-short $Early - Late$ portfolio (with the caveat about the varying number of firms given above), its alpha is 0.18% (t-statistic = 2.43). Thus, our finding that early announcers have higher returns than late announcers is confirmed by calendar-time analysis.

[TABLE V ABOUT HERE]

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 are yet to announce (e.g., Kumar, Sorescu, Boehme, and Danielsen (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.[32]

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 the Introduction for references). The evidence supports the existence of information spillovers, both across firms and across markets.[33] We build on this work by exploring here some specific

[32] 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.

[33] 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

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 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.

VI.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 provides us with an opportunity to further study whether investors indeed use the performance of announcers to learn about non-announcers. The basic intuition is very 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.[34] 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 special interest is the interaction coefficient δ, which we expect to be positive (so that the market response to the announcement portfolio return increases when more firms are reporting). As Table VI shows, this is indeed the case, as δ is positive and very significant (2.27, with a t-statistic of 15.80). The implied economic effect is very large: when 10% more firms

across markets, see Easton, Monahan, and Vasvari (2009) and Kraft, Vasvari, and Wittenberg-Moerman (2011).

[34] We give a formal proof in the Appendix. See Eqs. (28) and (36).

announce in a given week, the covariance between the market and the announcement portfolio return increases by 44%.

[TABLE VI ABOUT HERE]

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 higher 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 ("non-announcement" portfolio). This change does not in any way affect our finding, with δ remaining almost exactly the same (2.08, with a t-statistic of 13.87).

We next test whether the market response to announcements depends on their timing. We expect that the market should react more to earlier announcements.[35] The intuition, which is again confirmed by our model, behind this hypothesis 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 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 then 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

[35] Patton and Verardo (2012) develop and test a similar hypothesis.

their earnings in previous weeks (going from zero in week 1 and ending at one after the last week).

The coefficient of interest is again the interaction coefficient δ: if the market indeed 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 when all firms are yet to report. As before, these findings remain the same when we use the non-announcement 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 the $Announced$ and $Weight$ variables and their interactions with the announcement portfolio return as our independent variables.

VI.B. Cross-Sectional Variation: Announcers

Information spillovers likely vary with firm characteristics. If certain characteristics are associated with more informative announcements about aggregate earnings, then the market should respond more to announcement by firms with those characteristics. This prediction is not directly implied by our model, in which all firms are ex-ante the same, but is generally consistent with our principal assumption that investors face a signal extraction problem when interpreting earnings reports.

We identify three characteristics as likely candidates: size, idiosyncratic volatility around announcements, and the earnings announcement risk premium (for an individual firm). Announcements of large firms should provide a better signal about aggregate earnings. 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), and find that the market indeed responds more to larger firms. Higher (lower) idiosyncratic volatility makes it harder (easier) for investors to infer the common component of a firm's earnings surprise, and therefore we expect the market to react less (more) to announcements of firms with high (low) such volatility. Finally, announcement risk premia across firms should be related to how much information the firms' announcements offer. A major caveat here is that our model does not predict a monotonic relation between the two, so although we conjecture that higher announcement premia should result in a greater market response, this ultimately is an empirical question.[36]

We begin by testing whether the market responds more to the announcements of larger firms. We sort all announcers into quintiles based on their market capitalization at the start of each quarter, and then run the following regression:

$$ret_{mkt} = \alpha + \beta_{lar} aret_{lar} + \beta_{small} aret_{small} + \varepsilon, \tag{6}$$

where ret_{mkt} is the market excess return, $aret_{lar}$ is the excess return of the announcement portfolio containing the largest announcers (top quintile), and $aret_{small}$ is the excess return of the announcement portfolio containing the smallest announcers (bottom quintile). If the market responds more to announcements of larger firms, we should find that $\beta_{lar} > \beta_{small}$. This hypothesis is strongly confirmed by the data, with results given in Panel A of Table VII. Our estimate for β_{lar} equals 0.550 (t-statistic = 53.44) and 0.154 (t-statistic = 17.66) for β_{small}, which is a very significant difference. To confirm that the two betas are indeed statistically different, we also run this specification:

$$ret_{mkt} = \alpha + \beta_{diff}(aret_{lar} - aret_{small}) + \beta_{sum}(aret_{lar} + aret_{small}) + \varepsilon, \tag{7}$$

and show that β_{diff}, which is the coefficient of interest, is positive and statistically significant (t-statistic = 25.24).

When we limit our analysis to just non-announcers, we get the same results: β_{lar} is still much larger than β_{small} (0.540 vs. 0.164), and β_{diff} is positive and significant (0.188, with a t-statistic of 23.32).

[36] See Eqs. (22) and (29) in the Appendix for details.

[TABLE VII ABOUT HERE]

In Panel B, we repeat the same analysis for firms with low (bottom quintile in a given quarter) and high (top quintile) idiosyncratic volatility around past announcements (last 10 years), which we use as proxy for current idiosyncratic volatility:

$$ret_{mkt} = \alpha + \beta_{low\_vol} aret_{low\_vol} + \beta_{high\_vol} aret_{high\_vol} + \varepsilon, \tag{8}$$

where ret_{mkt} is the market excess return, $aret_{low\_vol}$ is the excess return of the announcement portfolio containing the low-volatility announcers, and $aret_{high\_vol}$ is the excess return of the announcement portfolio containing the high-volatility announcers. We find that β_{low_vol} (0.428, with a t-statistic of 35.65) is much higher than β_{high_vol} (0.168, with a t-statistic of 27.20), and the difference is statistically significant (t-statistic = 17.25). The market seems to react much more to returns of low-volatility announcers, which, as we will show shortly, also are much better predictors of aggregate earnings growth. These results are the same when we study just non-announcing firms.

In order to study how the impact of announcements varies with firms' earnings announcement risk premia, we first need to develop a method for estimating these premia. The simplest approach would be to just take the average of all announcement returns for a given firm, but the problem there is that announcement returns are very volatile, meaning this estimate of announcement premia would be quite noisy. Therefore, we choose another approach, which is based on our finding, described in detail in Section VIII, that expected returns in the cross-section are positively related to firms' earnings announcement betas (computed by regressing firm returns on the earnings announcement factor). This pattern is most pronounced when firms report earnings, with a return differential between the high- and low-announcement-beta portfolios of 24 bps per week. Thus, we can use the high-beta (low-beta) portfolio as our proxy for firms with high (low) announcement risk premia.

We then test whether the market's reaction to announcements depends on announcement risk premia by estimating the following regression:

$$ret_{mkt} = \alpha + \beta_{high} aret_{high} + \beta_{low} aret_{low} + \varepsilon, \tag{9}$$

where ret_{mkt} is the market excess return, $aret_{high}$ is the excess return of the high-announcement-beta announcers, and $aret_{low}$ is the excess return of the low-announcement-beta announcers. If the market responds more to high-premium announcers, we should find that $\beta_{high} > \beta_{low}$. This is indeed the case: β_{high} equals 0.303 (t-statistic = 26.96) and β_{low} of 0.233 (t-statistic = 19.42), which represents a very significant difference (economically and statistically). We provide these results in Panel C of Table VII. As we did for our previous tests, we do the same analysis for just non-announcing firms, and get essentially the same results.

VI.C. Cross-Sectional Variation: Non-Announcers

The timing of a particular firm's announcement does not necessarily only determine the impact of its announcement on other non-announcing firms. It should also influence how that firm responds to announcements of other firms during those weeks when it is not reporting itself. 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 non-announcers according to how much time is left before their next announcement. Typically, announcements occur every 13 weeks, so we simply divide non-announcers in two groups: "near non-announcers," which are those firms expected to announce in the next six weeks, and "far non-announcers," which are all the other non-announcers. Under our hypothesis, near non-announcers should respond more to announcement returns than far non-announcers. We test this hypothesis through a simple regression:

$$(nret_{near} - nret_{far}) = \alpha + \beta aret + \gamma Weight + \delta(aret * Weight) + \varepsilon, \tag{10}$$

where $nret_{near}$ is the excess return of the "near non-announcement" portfolio, $nret_{far}$ is the excess return of the "far non-announcement" 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 VIII shows, the β coefficient estimate equals 0.02 (t-statistic = 2.67), and it 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 non-announcers 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 non-announcers.

[TABLE VIII ABOUT HERE]

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 both about future earnings prospects for announcing firms and also for those of other firms. Therefore, we expect that returns of announcing firms forecast aggregate earnings better than those of non-announcing firms.[37]

Given that firms report earnings at a quarterly frequency, we define aggregate earnings as the sum of 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 2 shows why. It plots the number of announcements occurring in each month, and 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 are months when the largest number of firms announce, so that in the first quarter the distribution is fairly uniform over months, but dominated by the

[37] See Eq. (28) in the Appendix for a formal proof of this idea.

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% (not reported). 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 a greater weight to those weeks in a quarter when a larger fraction of firms report, which corresponds to the intuition that more announcements offer more information about the state of the economy. (Our model formally confirms this intuition that announcement portfolio returns exhibit greater predictive power for aggregate earnings when there are more announcing firms.[38]) 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.

[**FIGURE 2 ABOUT HERE**]

Earnings growth is calculated as the difference between current quarter's aggregate earnings and those in the same quarter of the previous year (thereby seasonally adjusted), divided by total market capitalization (first six columns of Table IX) or total book equity (the last column of Table IX). Our method for calculating aggregate earnings growth is identical to that of Kothari, Lewellen, and Warner (2006).[39] This aggregate earnings growth (for quarter t in columns 1-4 and column 7, $t+1$ in column 5, and $t+2$ in column 6) is the dependant variable in Table IX. Coefficients are computed using OLS regressions, while t-statistics are calculated using Newey-West standard errors with 4 lags.

In the first column of Table IX 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

[38] See Eq. (28) in the Appendix for details.

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

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 1974-2012 period is 0.12%, so this is a very 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.

[TABLE IX ABOUT HERE]

In the next column we introduce a number of additional controls. First, we add the three standard risk factors, the returns on the size (SMB), value (HML), and momentum (UMD) 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 3-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 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 slightly decreases (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, and neither 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 a quarter. If earnings announcers outperform non-announcers 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 performance of the announcement portfolio has very important implications for 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 IX, 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 $t + 1$ and $t + 2$ quarter earnings are, respectively, 0.024 (t-statistic=1.92) and 0.017 (t-statistic=1.65), further strengthening our hypothesis that announcements provide valuable signals about aggregate earnings.

In the last column of Table IX, 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 X, we examine whether our findings are robust in terms of sample period selection. We divide our sample into two halves (1974-1993 and 1994-2012), and show that the announcement return coefficient is positive and significant in both subsamples, equalling 0.015 (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 (untabulated) robustness test, we limit our sample just 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 (0.037, with a t-statistic of 2.02). 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 investors incorporate new information too slowly into their forecasts of future earnings. 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 IX 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 returns of certain announcers returns exhibit more predictive power. In the previous section, we show that the market reacts more to returns of large firms, firms with low idiosyncratic volatility around announcements, and high-announcement-premium firms. It is reasonable to expect that these same firms should provide more informative announcement signals with respect to aggregate earnings.

Table X addresses these conjectures. As in Section VI, 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 IX, and the only difference is 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 holds only for 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).[40]

[TABLE X ABOUT HERE]

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- (bottom quintile in a given quarter) and high- (top quintile) volatility announcers. The intuition here is that low idiosyncratic volatility should increase the announcers' ability to predict aggregate earnings, as idiosyncratic volatility makes it harder for investors to infer the common component of a firm's earnings news. Consistent with this hypothesis and our results in Section VI, 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).[41] We performed the same analysis for announcement premium-sorted portfolios, but found no significant results for any of the portfolios.[42]

[40] In unreported results, we do not document a significant relation for any of the other size-sorted portfolios.

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

[42] As emphasized above, our model does not imply a monotonic relation between predictive power and announcement premia, so this result is not inconsistent with our explanation for the announcement premium.

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 non-announcers 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, and 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.

VIII.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 windows) earnings announcement betas for individual stocks through a simple time-series regression:

$$ret_i = \alpha + \beta_{earn} aret + \varepsilon_i, \tag{11}$$

where ret_i is firm i's weekly excess return and $aret$ is the long-short announcement portfolio return (announcers minus non-announcers), weighted by the proportion of all announcers reporting in that particular week. (We omit time subscripts for ease of notation.)

We then sort stocks into five portfolios based on these betas, and examine the performance of the portfolios. Table XI 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. Stock 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=2.21). However, it even holds during other weeks (i.e., for non-announcers), 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.

[**TABLE XI ABOUT HERE**]

VIII.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, ten 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 their fundamental origin is rooted in risk rather than them representing a temporary phenomenon that is arbitraged away over time. Book-to-market and size are well-known predictors of returns (Fama and French (1992), Fama and French (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 just those based on book-to-market and size, in order 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 $t-1$ through $t-5$ 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 website. To these 40 portfolios, we add ten 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 entire sample:

$$ret_i = \alpha + \beta_{earn} aret + \beta_{mkt} ret_{mkt} + \varepsilon_i, \tag{12}$$

where ret_i is portfolio i's weekly excess return, $aret$ is the long-short announcement portfolio return (weighted by the proportion of all announcers reporting in that particular week), and ret_{mkt} is the market excess return. (We omit time subscripts for ease of notation.)

VIII.B.1. Betas and Pricing Errors

Table XII presents CAPM alphas, alphas relative to the two-factor model given in Eq. (12), and earnings announcement betas for each of the 55 test portfolios. The first thing to notice is that these betas are positive for a large majority of the portfolios. This suggests that the announcement portfolio is indeed a proxy for risk that is not fully captured by the market portfolio, since we include the market excess return as a second factor in the regression and since the announcement portfolio is a long-short portfolio that only marginally covaries the market. The pattern of announcement betas offers additional 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 plausibly more vulnerable to a deterioration in economic conditions and consequently riskier. This is consistent with many models that treat such stocks as riskier, but more importantly corresponds to the pattern of average returns for different portfolios.

[TABLE XII ABOUT HERE]

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). Importantly, even when controlling for the market factor, announcement betas are positive and significant for nine out of ten BM portfolios. 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 ten 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). Announcement betas are positive for eight and nine (out of ten) long-term and short-term reversal portfolios, respectively. 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 seven out of ten portfolios.

The absolute alpha falls for nine of the ten 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 then 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.

VIII.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 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:

$$ret_i = Int. + RP_{earn}\overline{\beta_{i,earn}} + RP_{mkt}\overline{\beta_{i,mkt}} + \varepsilon_i, \tag{13}$$

where ret_i is portfolio i's average excess return, $\overline{\beta_{i,earn}}$ is portfolio i's estimated announcement beta (from Eq. (12)), and $\overline{\beta_{i,mkt}}$ is portfolio i's estimated announcement beta (again from Eq. (12)). 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 Eq. (13). The implied risk premium for the announcement factor RP_{earn} is high and positive, equalling 0.585% (t-statistic=2.71), which is a very 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 (1974-1993 and 1994-2012), the implied risk premium for the announcement factor is positive and significant in both subsamples, while the market one actually switches signs.[43] 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%.

[FIGURE 3 ABOUT HERE]

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 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

[43] See Figures A1 and A2 in the Appendix for details.

market factor. In robustness tests, we add further factors, but this has no significant effect on our findings.

IX. Conclusion

The earnings announcement premium is one of the oldest and most significant asset pricing anomalies in the asset pricing literature. Previous studies have shown that the premium could not be explained by loadings on standard risk factors such as the market, size, value, and momentum. Frazzini and Lamont (2007) offer a behavioral explanation based on limited investor attention, while Cohen, Dey, Lys, and Sunder (2007) argue that the premium persists due to limits to arbitrage.

In this paper we offer 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, non-announcing firms respond to announcements in a manner consistent with our model of information spillovers, both across 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 in Frazzini and Lamont (2007), who propose 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. More specifically, the variation in market response to announcements (both in the 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 all 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) that fundamental news often arrives in the form of pre-scheduled announcements, thus offering a natural method for isolating and distinguishing fundamental risks and risk premia from other sources of market volatility.

Appendix

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. The 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 $s = 1...S$. 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 then given by

$$\eta_{t+1} = \frac{1}{N}\Sigma_{j=1}^{N} A_{j,t+s/S}, \tag{14}$$

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 firm cash-flow news when released over the quarter.

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

$$A_{j,t+s/S} = \eta_{t+1} + v_{j,t+s/S} \tag{15}$$

where the variance of the common component is σ_η^2, of the firm specific component σ_v^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 only when they can only be derived 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}:

$$E[A_{j>M_1}|A_{1,t+1/S}...A_{M_1,t+1/S}] = \frac{\sigma_\eta^2}{M_1\sigma_\eta^2+\sigma_v^2}\Sigma_{k=1}^{M_1}A_{k,t+1/S} \tag{16}$$

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

$$\begin{aligned} E[\eta_{t+1}|A_{1,t+1/S}...A_{M_1,t+1/S}] &= \frac{1}{N}\sum_{j=M_1+1}^{N}\frac{\sigma_\eta^2}{M_1\sigma_\eta^2+\sigma_v^2}\Sigma_{k=1}^{M_1}A_{k,t+1/S}+\frac{1}{N}\sum_{j=1}^{M_1}A_{j,t+1/S} \quad (17)\\ &= \frac{1}{N}\left(\frac{N\sigma_\eta^2+\sigma_v^2}{M_1\sigma_\eta^2+\sigma_v^2}\right)\sum_{j=1}^{M_1}A_{j,t+1/S}. \end{aligned}$$

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

$$R_{MKT,t+1/S} - E_t[R_{MKT,t+1/S}] = \frac{1}{N}\left(\frac{N\sigma_\eta^2 + \sigma_v^2}{M_1\sigma_\eta^2 + \sigma_v^2}\right)\sum_{j=1}^{M_1} A_{j,t+1/S} + \frac{1}{N}\sum_{j=1}^{N} \omega_{j,t+1/S}. \quad (18)$$

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

$$rp_{P,t} = \gamma Cov_t\left[R_{P,t+1/S}, \frac{1}{N}\left(\frac{N\sigma_\eta^2 + \sigma_v^2}{M_1\sigma_\eta^2 + \sigma_v^2}\right)\sum_{j=1}^{M_1} A_{j,t+1/S}\right] + Cov_t\left[R_{P,t+1/S}, \frac{1}{N}\sum_{j=1}^{N}\omega_{j,t+1/S}\right]. \quad (19)$$

The portfolio long all announcers has a risk premium:

$$\begin{aligned} rp_{A,t} &= \gamma Cov_t\left[\frac{1}{M_1}\sum_{j=1}^{M_1} A_{j,t+1/S}, \frac{1}{N}\left(\frac{N\sigma_\eta^2 + \sigma_v^2}{M_1\sigma_\eta^2 + \sigma_v^2}\right)\sum_{j=1}^{M_1} A_{j,t+1/S}\right] \quad (20) \\ &\quad + Cov_t\left[\frac{1}{M_1}\sum_{j=1}^{M_1}\omega_{j,t+1/S}, \frac{1}{N}\sum_{j=1}^{N}\omega_{j,t+1/S}\right] \\ &= \gamma\frac{1}{N}(N\sigma_\eta^2 + \sigma_v^2) + \frac{1}{N}[1 + (N-1)\rho]\sigma_\omega^2. \end{aligned}$$

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 non-announcers, by analogous reasoning, has a risk premium:

$$rp_{N,t} = \gamma\frac{1}{N}(N\sigma_\eta^2 + \sigma_v^2)\frac{M_1\sigma_\eta^2}{M_1\sigma_\eta^2 + \sigma_v^2} + \frac{1}{N}[1 + (N-1)\rho]\sigma_\omega^2, \quad (21)$$

which is smaller than the announcer portfolio risk premium, and 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 non-announcers.

An important portfolio is the portfolio long all announcers and short all non-announcers (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:

$$rp_{A-N} = \gamma \frac{1}{N}(N\sigma_\eta^2 + \sigma_v^2)\frac{\sigma_v^2}{M_1\sigma_\eta^2 + \sigma_v^2}, \tag{22}$$

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

$$rp_{A-N} = \gamma\sigma_\eta^2 \frac{\sigma_v^2}{M_1\sigma_\eta^2 + \sigma_v^2}. \tag{23}$$

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 the announcing firm's). 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, in particular, has a positive alpha in the presence of discount-rate news. Its market beta is given by

$$\beta_{A-N,MKT} = \frac{N(N\sigma_\eta^2 + \sigma_v^2)}{M_1(N\sigma_\eta^2 + \sigma_v^2)^2 + (M_1\sigma_\eta^2 + \sigma_v^2)N(1 + (N-1)\rho)\sigma_\omega^2} \tag{24}$$

and its corresponding alpha by

$$\alpha_{A-N} = (\gamma - 1)\frac{(1+(N-1)\rho)\sigma_\omega^2(N\sigma_\eta^2+\sigma_v^2)\sigma_v^2}{M_1(N\sigma_\eta^2+\sigma_v^2)^2+(M_1\sigma_\eta^2+\sigma_v^2)N(1+(N-1)\rho)\sigma_\omega^2}. \tag{25}$$

The beta is decreasing in M_1, in ρ, and in 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 non-announcer portfolio), the R^2s from these regressions implied by the model are:

$$R^2(\eta_{t+1}, R_{A,t}) = \frac{M_1\frac{1}{N^2}\left(N\sigma_\eta^2+\sigma_v^2\right)^2}{\sigma_\eta^2((M_1\sigma_\eta^2+\sigma_v^2)+(1+(M_1-1)\rho)\sigma_\omega^2)} \tag{26}$$

for $R_{A,t}$ and

$$R^2(\eta_{t+1}, R_{N,t}) = \frac{M_1\frac{1}{N^2}\left(N\sigma_\eta^2+\sigma_v^2\right)^2}{\sigma_\eta^2((M_1\sigma_\eta^2+\sigma_v^2)+\frac{M_1}{N-M_1}\left(\frac{M_1\sigma_\eta^2+\sigma_v^2}{\sigma_\eta^2}\right)^2(1+(N-M_1-1)\rho)\sigma_\omega^2)} \tag{27}$$

for $R_{N,t}$.

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

$$\left(\frac{M_1\sigma_\eta^2+\sigma_v^2}{\sigma_\eta^2}\right)^2\frac{M_1(1+(N-M_1-1)\rho)}{(N-M_1)(1+(M_1-1)\rho)} > 1. \tag{28}$$

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 non-announcers 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 non-announcer 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 non-announcer 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 non-announcer return, and that this predictive power should be greater, both absolutely and relatively, when there are more firms 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:

$$\beta_{\eta,A-N} = \frac{\frac{1}{N}(N\sigma_\eta^2 + \sigma_v^2)\frac{\sigma_v^2}{M_1\sigma_\eta^2+\sigma_v^2}}{\frac{(\sigma_v^2)^2}{M_1\sigma_\eta^2+\sigma_v^2} + \frac{N(1-\rho)\sigma_\omega^2}{M_1(N-M_1)}} \tag{29}$$

This magnitude, roughly speaking, measures the differential ability of announcers versus non-announcers 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 towards 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:

$$\beta_{P,A-N} = \frac{Cov[R_P, N_{CF}]Cov[R_{A-N}, N_{CF}] + Cov[v_A, v_P]Var[N_{CF}]}{Cov[R_{A-N}, N_{CF}] + Var[v_A]Var[N_{CF}]}, \tag{30}$$

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 sub-period $t + (s-1)/S$, a total of M_{s-1} firms have announced. During the same sub-period, 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

$$E_{t+s/S}[A_{M_{s-1}<j\leq M_s}] - E_{t+(s-1)/S}[A_{M_{s-1}<j\leq M_s}] = A_j - \frac{\sigma_\eta^2}{M_{s-1}\sigma_\eta^2 + \sigma_v^2} \sum_{\kappa=1}^{M_{s-1}} A_k \tag{31}$$

so that cash-flow news for the portfolio of announcers is

$$\varepsilon_{t+s/S} = \frac{1}{M_s - M_{s-1}} \left(\sum_{j=M_{s-1}+1}^{M_s} A_j - \frac{(M_s - M_{s-1})\sigma_\eta^2}{M_{s-1}\sigma_\eta^2 + \sigma_v^2} \sum_{\kappa=1}^{M_{s-1}} A_k \right). \tag{32}$$

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

$$\begin{aligned} E_{t+s/S}[A_{j>M_s}] - E_{t+(s-1)/S}[A_{j>M_s}] &= \frac{\sigma_\eta^2}{M_s\sigma_\eta^2 + \sigma_v^2} \sum_{\kappa=1}^{M_s} A_k - \frac{\sigma_\eta^2}{M_{s-1}\sigma_\eta^2 + \sigma_v^2} \sum_{\kappa=1}^{M_{s-1}} A_k \\ &= \frac{\sigma_\eta^2}{M_s\sigma_\eta^2 + \sigma_v^2} (M_s - M_{s-1})\varepsilon_{t+s/S}, \end{aligned} \tag{33}$$

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

$$\frac{1}{N - M_s} \sum_{j=M_s+1}^{N} \left(\frac{\sigma_\eta^2}{M_s\sigma_\eta^2 + \sigma_v^2} \sum_{\kappa=1}^{M_s} A_k - \frac{\sigma_\eta^2}{M_{s-1}\sigma_\eta^2 + \sigma_v^2} \sum_{\kappa=1}^{M_{s-1}} A_k \right) = \frac{(M_s - M_{s-1})\sigma_\eta^2}{M_s\sigma_\eta^2 + \sigma_v^2} \varepsilon_{t+s/S}. \tag{34}$$

Market cash flow news is then

$$N_{CF,t+s/S} = \frac{1}{N} \left(\frac{N\sigma_\eta^2 + \sigma_v^2}{M_s\sigma_\eta^2 + \sigma_v^2} \right) (M_s - M_{s-1})\varepsilon_{t+s/S} \tag{35}$$

while market discount-rate news is the same as always.

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

$$\beta_{MKT,A} = \frac{(\sigma_\eta^2 + \frac{\sigma_v^2}{N}) \left(\frac{\Delta M_s \sigma_\eta^2 + \sigma_v^2}{(M_{s-1} + \Delta M_s)\sigma_\eta^2 + \sigma_v^2} \right) + \frac{1}{N}(1 + (N-1)\rho)\sigma_\omega^2}{(\sigma_\eta^2 + \frac{\sigma_v^2}{\Delta M_s}) + \left(\frac{1}{\Delta M_s} + \left(1 - \frac{1}{\Delta M_s}\right)\rho \right) \sigma_\omega^2}. \tag{36}$$

This is increasing in ΔM_s and decreasing in M_{s-1}.

The risk premium of the long-only announcer portfolio is then

$$rp_{A,t+(s-1)/S} = \gamma \frac{1}{N}(N\sigma_\eta^2 + \sigma_v^2)\left(\frac{\Delta M_s \sigma_\eta^2 + \sigma_v^2}{(M_{s-1} + \Delta M_s)\sigma_\eta^2 + \sigma_v^2}\right) + \frac{1}{N}[1 + (N-1)\rho]\sigma_\omega^2 \tag{37}$$

This is decreasing in M_{s-1}, the number of firms which 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.

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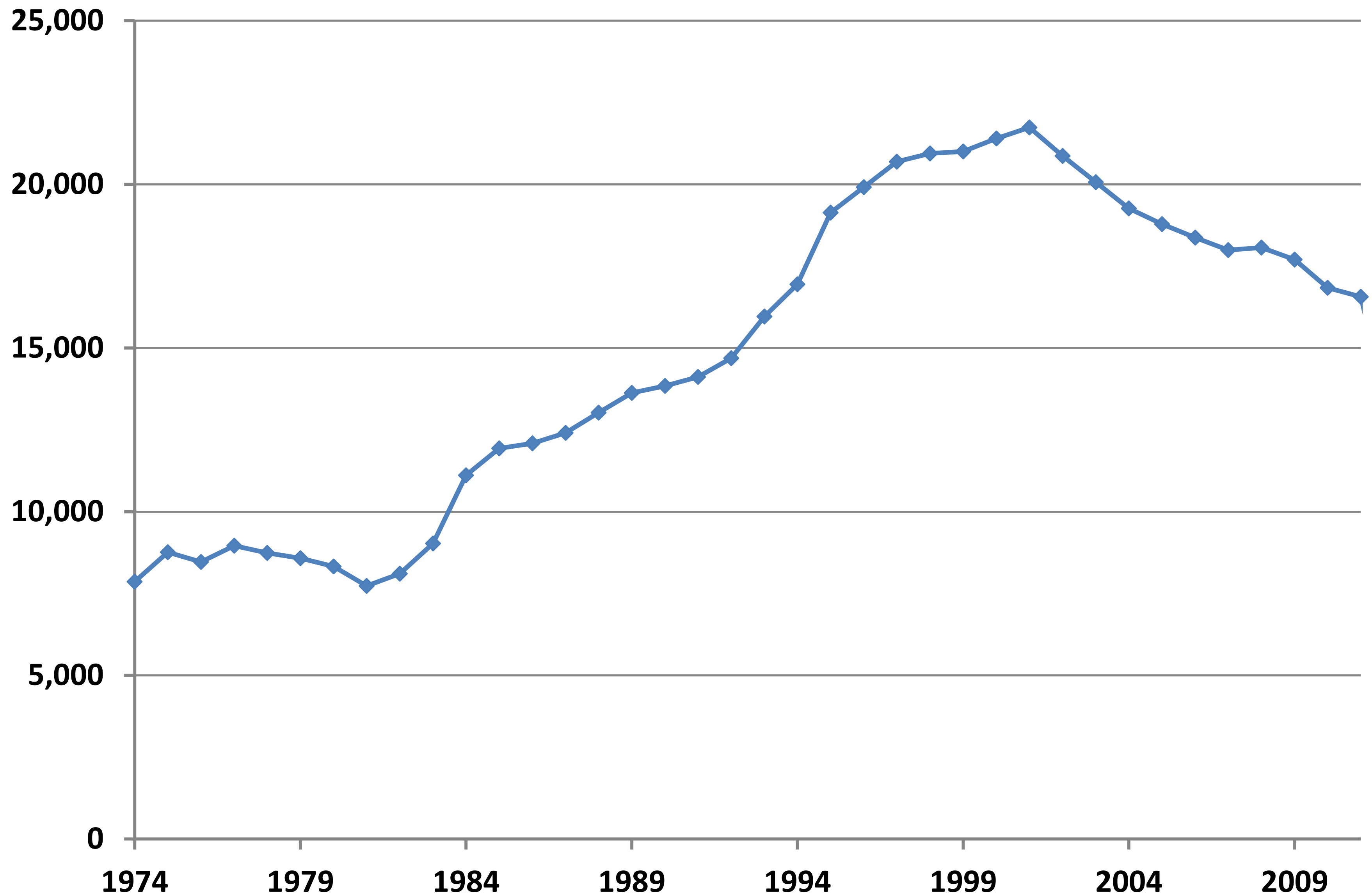

Figure 1. Time-Series Distribution of Earnings Announcements. This chart plots the total number of quarterly earnings announcements over time. It covers all NYSE, AMEX, and NASDAQ firms available from the COMPUSTAT quarterly file with non-missing earnings and at least four prior earnings reports.

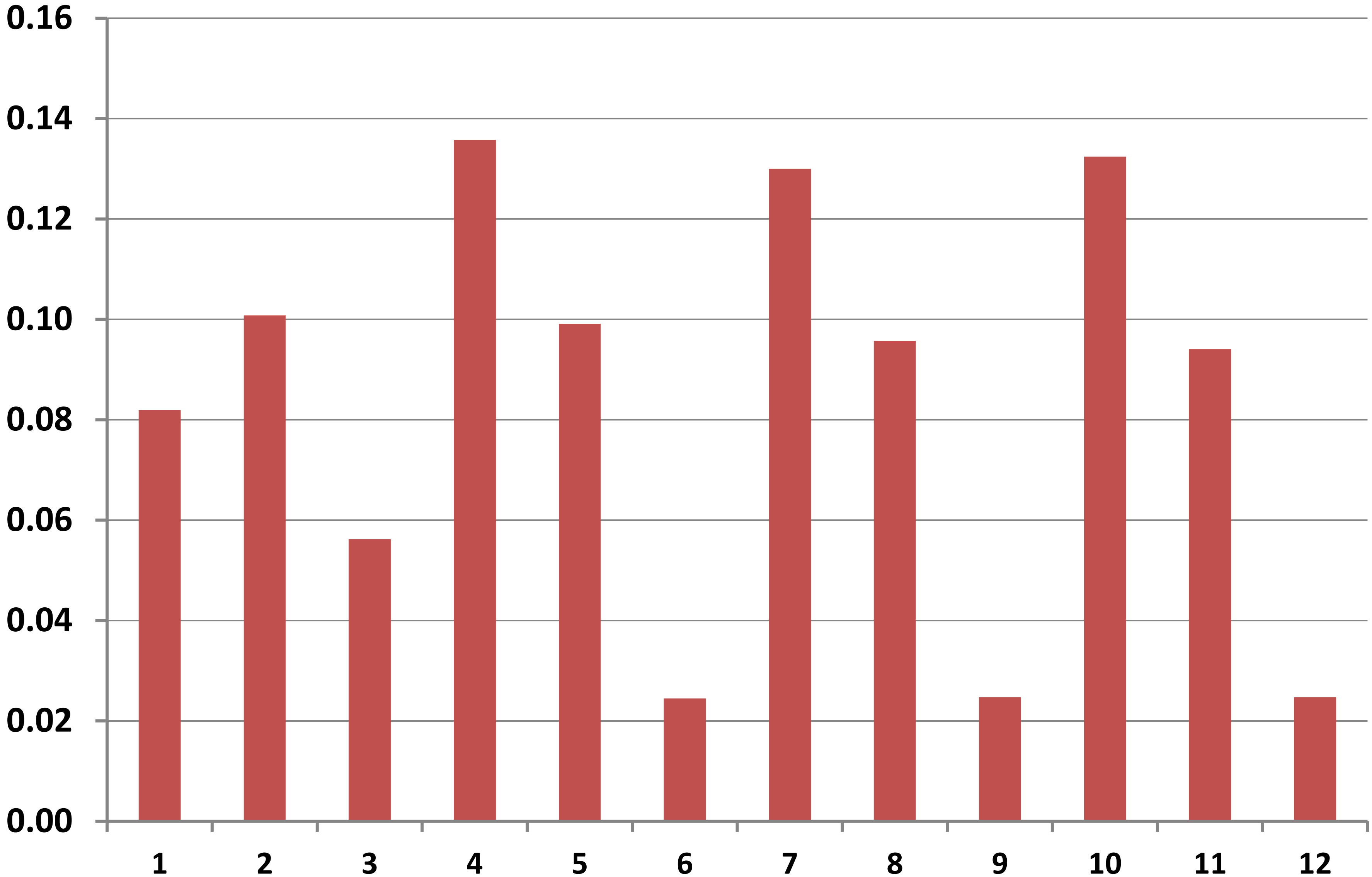

Figure 2. Monthly Distribution of Earnings Announcements. This chart plots the proportion of quarterly earnings announcements occurring in each month of the year. It covers all NYSE, AMEX, and NASDAQ firms available from the COMPUSTAT quarterly file with non-missing earnings and at least four prior earnings reports from 1974 to 2012.

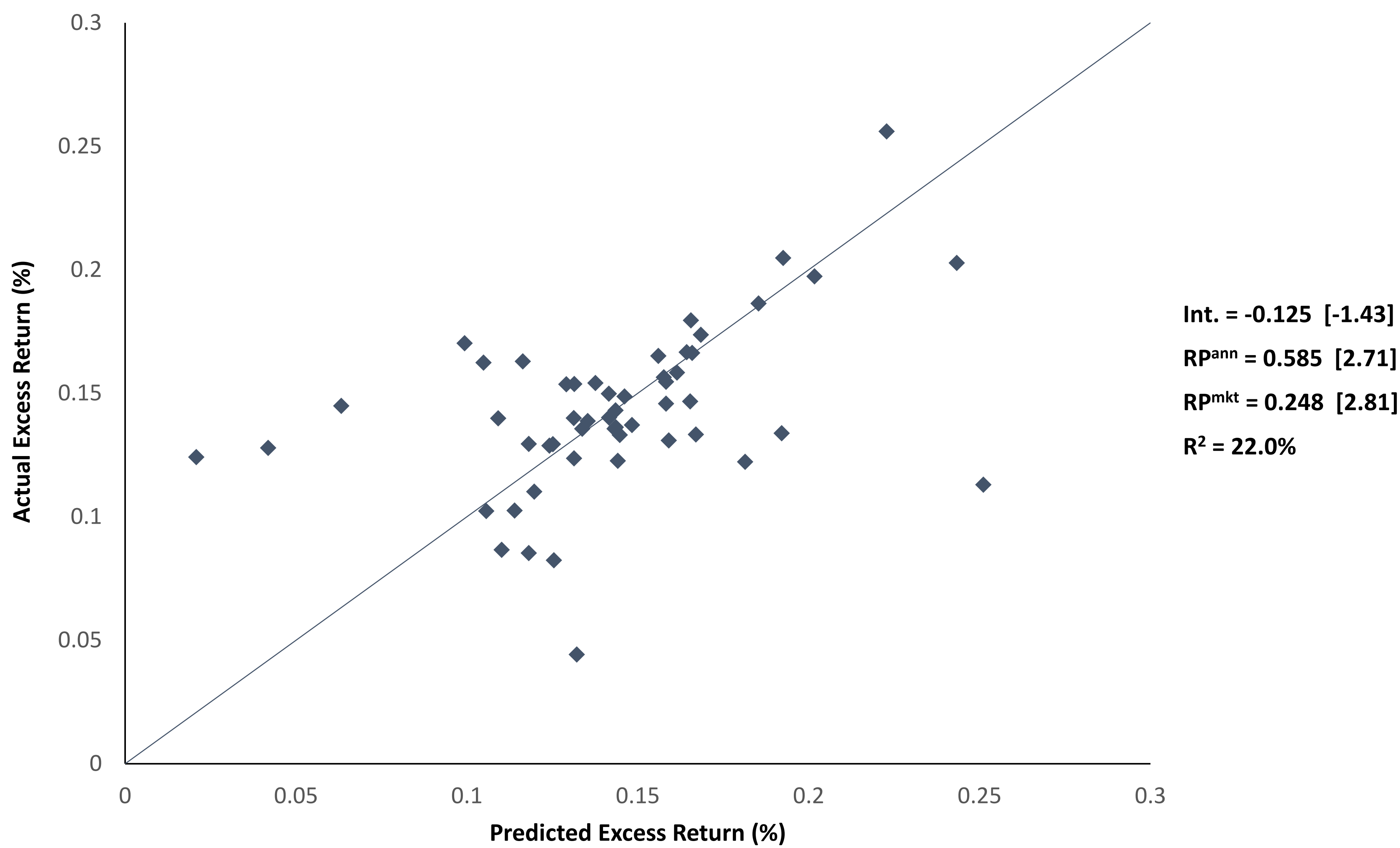

Figure 3. Earnings Announcement Betas and the Cross-Section of Returns. This chart plots the average realized excess return for 55 test portfolios vs. their predicted excess returns for the entire sample (1974-2012). The portfolios include ten each sorted on book-to-market, size, past short-run return, and past long-run return; ten industry portfolios; and five announcement-beta-sorted portfolios. Predicted returns are computed from regression: $r_i = Int. + RP^{ann}\, \beta^{ann}_i + RP^{mkt}\, \beta^{mkt}_i + \varepsilon_i$, where r_i is the average realized excess return for portfolio i, β^{ann}_i is its earnings announcement beta, and β^{mkt}_i 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.

Table I
Summary Statistics with Expected Announcement Dates

This table shows summary statistics for calendar-time announcer and non-announcer 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 the non-announcing firms. *N(Ann)* is the number of firms in the announcer portfolio, and *N(Non)* is the number of firms in the non-announcer 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	St. Dev.	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

Table II

Earnings Announcement Premium

This table shows calendar-time abnormal returns for the long-short earnings announcement factor portfolio. Every week all stocks are divided into those that are announcing earnings and those that are not, based on their expected announcement dates. Portfolio returns equal those of a strategy that buys all announcing stocks and sells short non-announcing 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 Announcer Portfolio Returns (%)							
1974-12	0.19	0.19	0.02				0.12
	[5.27]	[5.18]	[1.54]				
1974-12	0.19	0.19	0.01	0.06	-0.10		0.90
	[5.27]	[5.40]	[0.52]	[1.93]	[-3.27]		
1974-12	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 Announcer Portfolio Returns (%)							
1974-12	0.13	0.12	0.10				5.25
	[6.06]	[5.66]	[10.61]				
1974-12	0.13	0.12	0.10	0.00	0.03		5.36
	[6.06]	[5.49]	[10.61]	[0.21]	[1.55]		
1974-12	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 Announcer Portfolio Returns (subsamples) (%)							
1974-86	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]	
1987-99	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]	
2000-12	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]	

Table III

Persistence in Earnings Announcement Premia

This table shows excess returns for five earnings announcement portfolios. Every 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 MM). *BM* is the average book-to-market ratio, and *Mom* is the average past one-year return. Returns are expressed in percentage points. T-statistics are given in brackets.

	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 5 Years														
EW	0.22	0.29	0.34	0.39	0.59	**0.37**	**0.34**	0.27	0.41	0.30	0.36	0.52	**0.25**	**0.24**
	[2.48]	[4.24]	[5.07]	[5.86]	[7.62]	**[4.60]**	**[4.12]**	[3.25]	[5.71]	[4.38]	[5.35]	[6.66]	**[3.40]**	**[3.25]**
VW	0.06	0.12	0.14	0.18	0.27	**0.21**	**0.20**	0.10	0.13	0.14	0.17	0.23	**0.13**	**0.14**
	[1.20]	[2.59]	[3.02]	[3.81]	[4.92]	**[6.23]**	**[6.19]**	[1.94]	[2.96]	[2.98]	[3.60]	[4.18]	**[3.95]**	**[4.22]**
Panel B: Sorts Based on Average Announcement Return Over Previous 10 Years														
EW	0.20	0.22	0.37	0.46	0.57	**0.35**	**0.32**	0.25	0.32	0.33	0.44	0.53	**0.28**	**0.29**
	[2.46]	[3.20]	[5.29]	[6.83]	[7.36]	**[4.71]**	**[4.18]**	[3.06]	[4.44]	[4.94]	[6.43]	[6.73]	**[3.82]**	**[3.87]**
VW	0.06	0.11	0.13	0.20	0.27	**0.21**	**0.22**	0.10	0.13	0.13	0.20	0.22	**0.13**	**0.15**
	[1.09]	[2.49]	[2.84]	[4.15]	[4.87]	**[6.54]**	**[6.58]**	[1.79]	[2.81]	[2.84]	[4.14]	[4.11]	**[4.07]**	**[4.67]**
N	47.5	47.5	47.5	47.5	47.5			47.5	47.5	47.5	47.5	47.5		
ME	586	2,479	3,423	3,090	1,398			615	2,494	3,422	3,091	1,354		
BM	0.94	0.87	0.81	0.79	0.77			0.87	0.87	0.83	0.80	0.80		
Mom	7.8	13.0	16.1	20.0	29.9			19.6	16.4	15.7	17.1	18.0		
Panel C: Sorts Based on Average Announcement Return Over Previous 20 Years														
EW	0.19	0.29	0.37	0.47	0.54	**0.35**	**0.31**	0.26	0.33	0.36	0.47	0.48	**0.23**	**0.22**
	[2.25]	[4.11]	[5.30]	[6.99]	[6.93]	**[4.45]**	**[3.92]**	[3.16]	[4.66]	[5.10]	[6.85]	[6.34]	**[3.01]**	**[2.90]**
VW	0.04	0.12	0.13	0.21	0.23	**0.19**	**0.20**	0.08	0.14	0.16	0.18	0.20	**0.13**	**0.15**
	[0.75]	[2.69]	[2.81]	[4.38]	[4.11]	**[5.61]**	**[5.70]**	[1.43]	[3.08]	[3.42]	[3.71]	[3.63]	**[3.83]**	**[4.33]**

Table IV

Earnings Announcement Timing and Announcement Returns

This table presents the results of OLS regressions of abnormal announcement returns (in percentage points) on dummy variables for early and late announcers and various other controls. 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 a firm's expected announcement date falls in the latest quartile in a given quarter. Time is the amount of time elapsing between the beginning of a quarter and a firm's expected announcement date (measured in days). BE/ME is a firm's book-to-market ratio (set to zero if negative). Neg-BM dummy is a dummy variable set to one if a firm's book-to-market ratio is negative. Debt/Assets is the ratio of a firm's debt level to its total assets. ME is the market value of a firm's equity. Lagged return (1Y) is a firm's return over the previous year. Lagged return (1M) is a firm's return over the previous month. Ann. return (Q4) is a firm's abnormal announcement return in same quarter of the previous year. Ann. return (Q1-Q3) is a firm's average abnormal announcement return over the previous three quarters. Long-term average ann. return is a firm's average abnormal announcement return over the previous 10 years, skipping the last year. Ann. return volatility is the volatility of the firm's abnormal announcement return 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 different 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.

Continued from previous page.

	(1)	(2)	(3)	1st Half	2nd Half	FYR = 3,6,9,12
Early	0.284	0.212		0.233	0.191	0.247
	[4.44]	[2.46]		[2.61]	[1.63]	[2.54]
Late	-0.270	-0.271		-0.143	-0.333	-0.210
	[-4.09]	[-3.32]		[-1.20]	[-3.12]	[-2.20]
Log(time)			-0.385			
			[-4.15]			
BE/ME	0.108	0.116	0.116	0.121	0.118	0.216
	[3.80]	[3.40]	[3.40]	[2.02]	[3.17]	[2.99]
neg-BM dummy	0.474	0.384	0.381	0.895	0.236	0.383
	[2.54]	[1.71]	[1.70]	[2.96]	[0.85]	[1.46]
Debt/Assets	0.003	0.005	0.005	0.002	0.008	0.004
	[2.74]	[1.89]	[1.90]	[1.55]	[2.50]	[1.76]
log(ME)	-0.137	-0.072	-0.071	-0.032	-0.090	-0.057
	[-7.58]	[-2.94]	[-2.90]	[-0.92]	[-3.08]	[-2.11]
Lagged return (1Y)	0.074	-0.040	-0.040	0.173	-0.100	-0.049
	[1.15]	[-0.51]	[-0.51]	[1.32]	[-1.06]	[-0.59]
Lagged return (1M)	-0.082	0.290	0.285	-0.097	0.375	0.383
	[-0.24]	[0.72]	[0.71]	[-0.25]	[0.71]	[0.84]
Av. Ann. Ret. (Q 1-3)		4.515	4.522	5.499	4.089	4.779
		[7.91]	[7.93]	[7.41]	[5.75]	[7.45]
Ann. Ret. (Q 4)		0.252	0.257	-1.637	0.835	0.165
		[0.83]	[0.84]	[-3.07]	[2.47]	[0.53]
LT Av. Ann. Ret.		10.869	10.889	5.825	12.520	11.131
		[8.52]	[8.54]	[3.30]	[7.92]	[8.64]
Ann. Ret. Volatility		-3.697	-3.702	-2.133	-4.019	-4.593
		[-3.42]	[-3.42]	[-1.14]	[-3.24]	[-4.20]
Trading Volume		-9.620	-9.518	14.807	-13.458	-8.986
		[-1.58]	[-1.56]	[1.08]	[-2.17]	[-1.30]
Bid-ask Spread		8.441	8.446	10.157	6.667	8.262
		[4.99]	[4.95]	[4.01]	[2.82]	[4.50]
Fiscal Year-End		0.264	0.430	0.445	0.182	0.202
		[2.35]	[3.52]	[3.41]	[1.19]	[1.56]
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (%)	0.3	0.5	0.5	0.7	0.5	0.5

Table V
Early vs. Late Announcers

This table shows calendar-time abnormal returns for two earnings announcement portfolios, which we construct based on the timing of firms' earnings announcements. We divide all announcers into two groups: early announcers (Panel A), which are those firms for which the difference between their expected announcement date and the beginning of their fiscal quarter is below the median (for the current quarter), and late announcers (Panel B), which are all the other firms. Portfolio excess returns are computed weekly and are value-weighted. 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.

	Alpha	Mktrf	SMB	HML	UMD	R^2
			Panel A: Early Announcers			
Excess Ret	0.26	1.06				0.51
	[4.97]	[47.01]				
Excess Ret	0.26	1.04	0.10	-0.10		0.51
	[5.10]	[44.47]	[2.34]	[-2.44]		
Excess Ret	0.26	1.05	0.10	-0.10	0.01	0.51
	[5.02]	[43.64]	[2.33]	[-2.21]	[0.47]	
			Panel B: Late Announcers			
Excess Ret	0.08	0.99				0.48
	[1.61]	[44.23]				
Excess Ret	0.07	0.99	0.26	-0.01		0.49
	[1.44]	[42.69]	[6.28]	[-0.20]		
Excess Ret	0.08	0.98	0.26	-0.02	-0.04	0.49
	[1.56]	[41.56]	[6.31]	[-0.54]	[-1.29]	
			Panel C: Early - Late			
Ret Diff.	0.17	0.07				0.00
	[2.35]	[2.24]				
Ret Diff.	0.19	0.06	-0.16	-0.10		0.01
	[2.57]	[1.72]	[-2.67]	[-1.56]		
Ret Diff.	0.18	0.07	-0.17	-0.07	0.05	0.01
	[2.43]	[1.93]	[-2.70]	[-1.17]	[1.21]	

Table VI
Market and Non-Announcer Response to Announcement Returns

The table reports the results of the following OLS regression:

Ret = Int. + b(1) * Ann. Ret + b(2) * Weight + b(3) * (Weight*Announced) + b(4) * Announced + b(5) * (Ann. Ret*Announced) + ε,

where *Ret* is the market/non-announcer 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 and ending at one after the last week). Portfolio returns are computed weekly and are value-weighted. T-statistics are given in brackets.

	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]					
Market Ret	-0.10	0.52	0.30	2.27			71.6
	[-2.49]	[39.61]	[0.74]	[15.80]			
Market Ret	-0.06	0.78			-0.04	-0.20	69.3
	[-1.25]	[46.46]			[-0.55]	[-8.27]	
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]	
Non-Ann. Ret	-0.08	0.66					66.6
	[-2.80]	[64.98]					
Non-Ann. Ret	-0.09	0.52	0.23	2.21			69.8
	[-2.14]	[38.10]	[0.54]	[14.81]			
Non-Ann. Ret	-0.06	0.76			-0.04	-0.18	67.4
	[-1.16]	[43.80]			[-0.47]	[-7.02]	
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]	

Table VII

Market and Non-Announcer Response to Announcement Returns across Different Portfolios

The table reports the results of the following OLS regressions:

$$Ret = Int. + b(1) * Ann.\ Ret(i) + b(2) * Ann.\ Ret(j) + \varepsilon,$$

and

$$Ret = Int. + b(3) * [Ann.\ Ret(i) - Ann.\ Ret(j)] + b(4) * [Ann.\ Ret(i) + Ann.\ Ret(j)] + \varepsilon,$$

where *Ret* is the market/non-announcer portfolio excess return; *Ann. Ret(i)* is the excess return of the large firm/high-vol./high-premium announcement portfolio in Panels A, B, and C, respectively; and *Ann. Ret(j)* is the excess return of the small firm/low-vol./low-premium announcement portfolio in Panels A, B, and C, respectively. Large/high-vol./high-premium firms are those in the top quintile by size/historical idiosyncratic announcement return volatility/earnings announcement beta in a given year-quarter, and small/low-vol./low-premium firms are those in the bottom quintile by the same metric. Portfolio returns are computed weekly and are value-weighted. T-statistics are given in brackets.

Panel A: Large vs. Small Announcers

	Intercept	Large Ann. Ret	Small Ann. Ret	Large - Small	Large + Small	Adj. R^2 (%)
Market Ret	-0.001	0.550	0.154			68.0
	[-4.45]	[53.44]	[17.66]			
Market Ret	-0.001			0.198	0.352	68.0
	[-4.45]			[25.24]	[64.77]	
Non-Ann. Ret	-0.001	0.540	0.164			66.6
	[-4.25]	[51.09]	[18.33]			
Non-Ann. Ret	-0.001			0.188	0.352	66.6
	[-4.25]			[23.32]	[63.08]	

Panel B: High- vs. Low-Volatility Announcers

	Intercept	High A. Ret	Low A. Ret	High - Low	High + Low	Adj. R^2 (%)
Market Ret	0.000	0.168	0.428			59.8
	[-0.67]	[27.20]	[35.65]			
Market Ret	0.000			-0.130	0.298	59.8
	[-0.67]			[-17.25]	[50.79]	
Non-Ann. Ret	0.000	0.175	0.419			58.8
	[-0.46]	[27.61]	[34.10]			
Non-Ann. Ret	0.000			-0.122	0.297	58.8
	[-0.46]			[-15.84]	[49.42]	

Panel C: High- vs. Low-Premium Announcers

	Intercept	High A. Ret	Low A. Ret	High - Low	High + Low	Adj. R^2 (%)
Market Ret	0.000	0.303	0.233			53.8
	[-0.11]	[26.96]	[19.42]			
Market Ret	0.000			0.035	0.268	53.8
	[-0.11]			[3.46]	[48.53]	
Non-Ann. Ret	0.000	0.299	0.248			54.9
	[-0.11]	[26.69]	[20.80]			
Non-Ann. Ret	0.000			0.025	0.273	54.9
	[-0.11]			[2.50]	[49.75]	

Table VIII

Non-Announcer Response to Announcement Returns: Distance to Next Report

The table reports the results of the following OLS regression:

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

where *Non. Ret* is the non-announcer 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. Non-announcers are divided into two groups: "near non-announcers," which are those firms expected to announce in the next six weeks, and "far non-announcers," which are all the other non-announcers. Portfolio returns are computed weekly and are value-weighted. T-statistics are given in brackets.

	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]**	

Table IX

Aggregate Earnings Growth and Earnings Announcement Returns

This table presents the 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 the small-minus-big, high-minus-low, and up-minus-down quarterly factor returns, respectively. Earnings to price ratio (*E/P*) is the sum of 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 4 lags) and are given in brackets.

	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

Table X

Aggregate Earnings Growth and Earnings Announcement Returns

This table presents the 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 the small-minus-big, high-minus-low, and up-minus-down quarterly factor returns, respectively. Earnings to price ratio (*E/P*) is the sum of 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 4 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.

	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

Table XI

Earnings Announcement Beta-sorted Portfolios

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

$$Ret(i) = Int. + beta_{ann} * Ann. Ret + \varepsilon,$$

where *Ret(i)* is firm *i* 's excess return and *Ann. Ret* is the (long-short) announcement portfolio return (weighted by the proportion of all announcers reporting in that particular week). 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	H-L (α)
			Panel A: All Firms				
Excess Ret	0.09	0.13	0.14	0.13	0.15	**0.06**	**0.09**
	[1.48]	[2.65]	[2.94]	[2.50]	[2.27]	**[1.78]**	**[3.06]**
Alpha	-0.05	0.01	0.01	0.02	0.04	**0.09**	**0.09**
	[-2.48]	[0.75]	[1.04]	[2.07]	[1.89]	**[2.74]**	**[3.06]**
			Panel B: Announcing Firms				
Excess Ret	0.15	0.24	0.29	0.36	0.39	**0.23**	**0.24**
	[1.67]	[3.31]	[4.32]	[4.68]	[3.73]	**[2.11]**	**[2.21]**
Alpha	0.00	0.11	0.17	0.24	0.26	**0.26**	**0.24**
	[0.05]	[1.98]	[3.50]	[4.21]	[3.17]	**[2.38]**	**[2.21]**
			Panel C: Non-Announcing Firms				
Excess Ret	0.08	0.12	0.13	0.13	0.13	**0.05**	**0.08**
	[1.38]	[2.45]	[2.89]	[2.42]	[2.01]	**[1.49]**	**[2.71]**
Alpha	-0.06	0.00	0.01	0.02	0.02	**0.08**	**0.08**
	[-2.70]	[-0.13]	[0.84]	[1.55]	[1.05]	**[2.42]**	**[2.71]**

Table XII
Earnings Announcement Betas for Different Portfolios

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

$$r^i_t = \alpha + \beta^{ann}_t * r^{ann}_t + \beta^{mkt}_t * r^{mkt}_t + \varepsilon_t,$$

where r^i is the portfolio *i*'s excess return, r^{ann} is the (weighted) 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 a 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
$Alpha_{two\text{-}factor}$	-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]
$Beta_{ann}$	-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
$Alpha_{two\text{-}factor}$	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]
$Beta_{ann}$	-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
$Alpha_{two\text{-}factor}$	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]
$Beta_{ann}$	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

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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
$Alpha_{two\text{-}factor}$	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
$Alpha_{two\text{-}factor}$	-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
$Alpha_{two\text{-}factor}$	-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

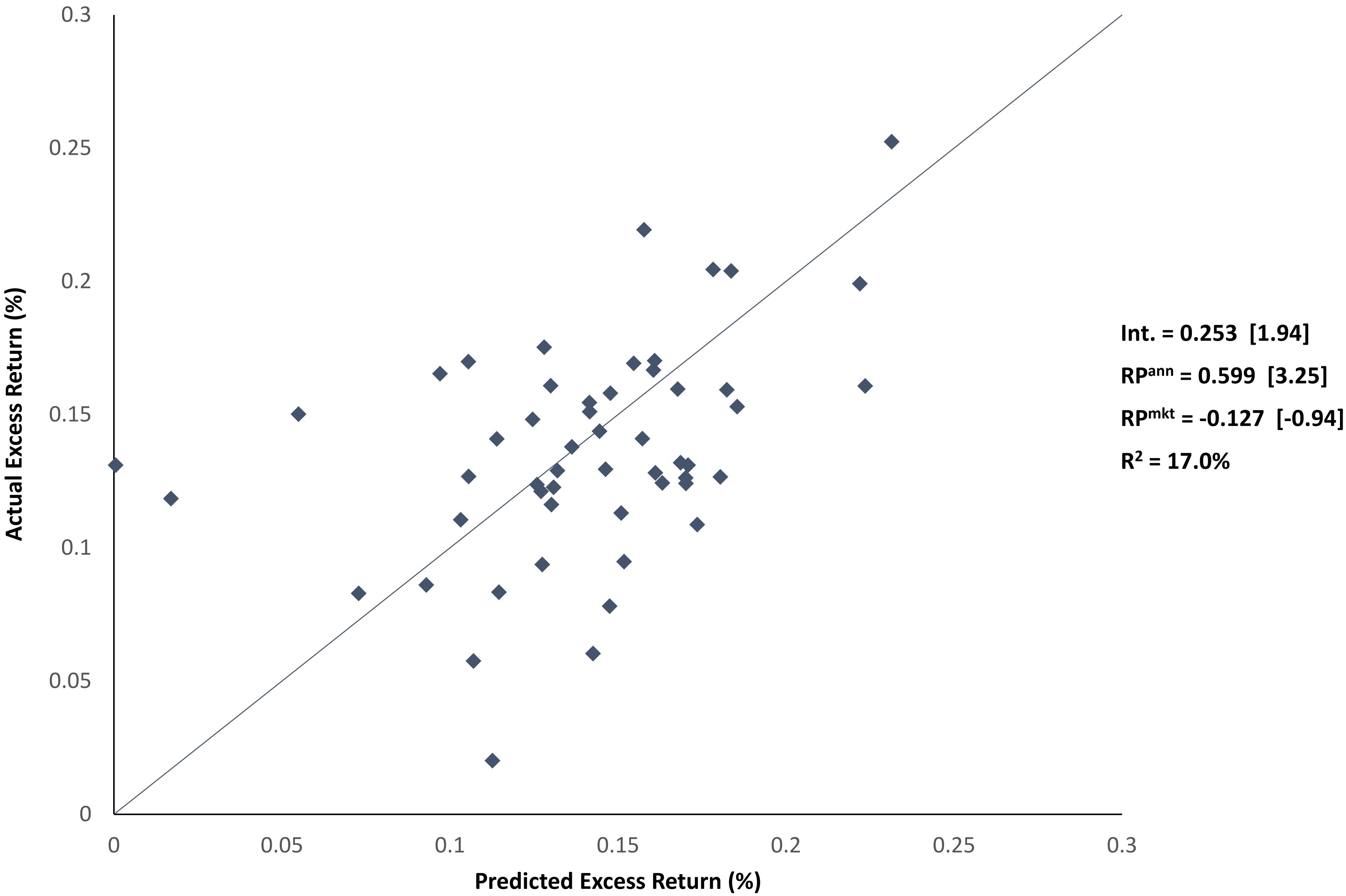

Figure A1. Earnings Announcement Betas and the Cross-Section of Returns. This chart plots the average realized excess return for 55 test portfolios vs. their predicted excess returns for the first sample half (1974-1993). Predicted returns are computed from regression: $r_i = Int. + RP^{ann}\,\beta^{ann}_i + RP^{mkt}\,\beta^{mkt}_i + \varepsilon_i$, where r_i is the average realized excess return for portfolio i, β^{ann}_i is its earnings announcement beta, and β^{mkt}_i 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.

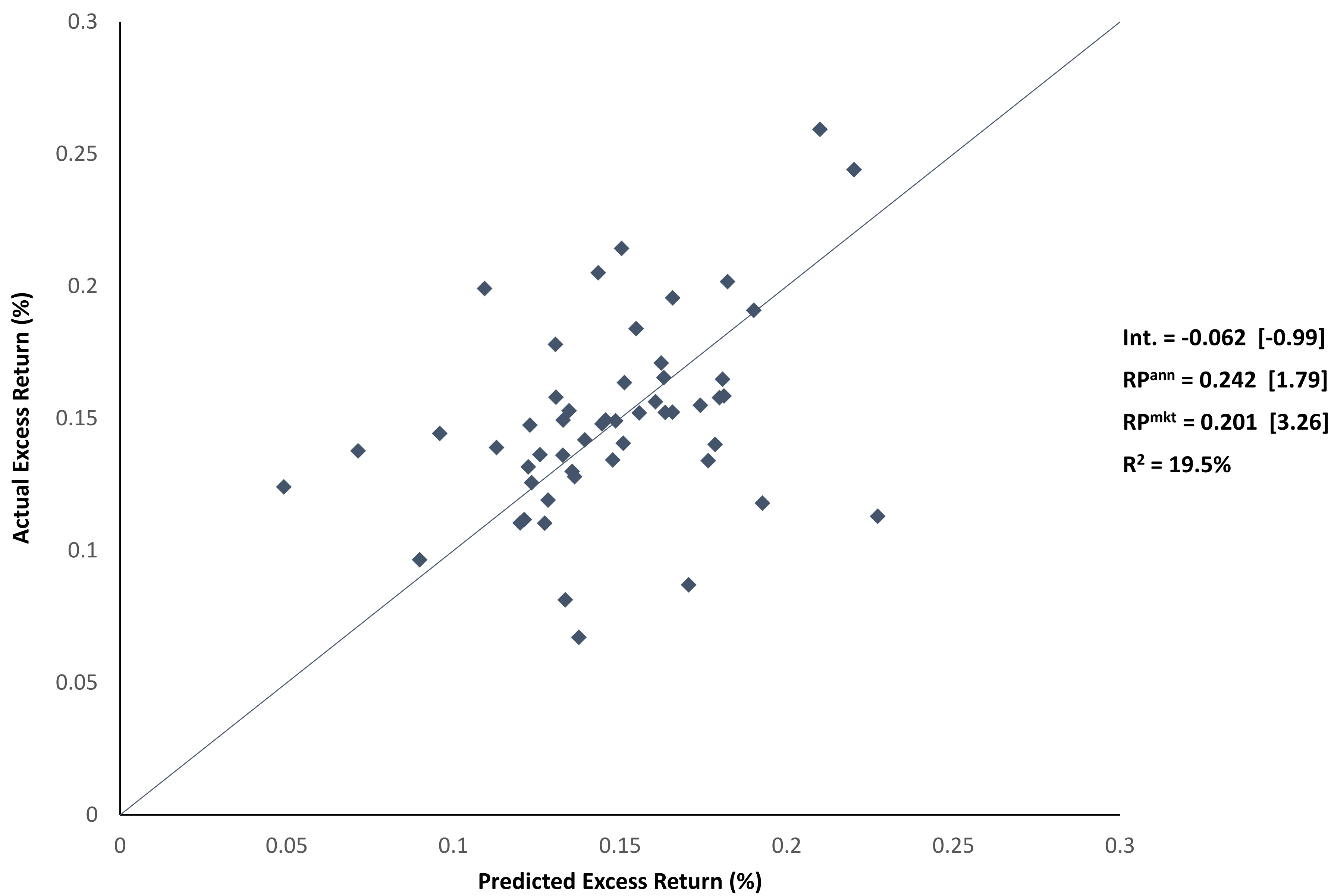

Figure A2. Earnings Announcement Betas and the Cross-Section of Returns. This chart plots the average realized excess return for 55 test portfolios vs. their predicted excess returns for the second sample half (1994-2012). Predicted returns are computed from regression: $r_i = Int. + RP^{ann}\,\beta^{ann}_i + RP^{mkt}\,\beta^{mkt}_i + \varepsilon_i$, where r_i is the average realized excess return for portfolio i, β^{ann}_i is its earnings announcement beta, and β^{mkt}_i 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.

Appendix Table I
Summary Statistics with Actual Announcement Dates

This table shows summary statistics for calendar-time announcer and non-announcer 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 actual announcement dates. *Ret Non* is the weekly excess return (value- or equal-weighted) of a portfolio consisting of all the non-announcing firms. *N(Ann)* is the number of firms in the announcer portfolio, and *N(Non)* is the number of firms in the non-announcer 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	St. Dev.	Skew.	Kurt.
Panel A: Calendar Time (N = 2,035)										
Ret Ann (vw)	0.31	0.47	-20.67	-3.02	3.43	17.32	4.69	2.95	-0.44	4.96
Ret Non (vw)	0.11	0.27	-18.49	-2.44	2.50	12.98	2.20	2.30	-0.53	5.84
Ann - Non (vw)	0.19	0.17	-16.10	-1.38	1.86	9.90	5.13	1.71	-0.53	10.56
Ret Ann (ew)	0.55	0.47	-19.08	-2.49	3.44	17.77	8.85	2.80	-0.43	5.72
Ret Non (ew)	0.21	0.31	-19.05	-2.12	2.42	15.79	4.24	2.24	-0.84	8.79
Ann - Non (ew)	0.34	0.28	-5.67	-0.87	1.56	9.90	13.09	1.16	0.58	3.50
N(Ann)	355	208	0	73	858	1,821		345	1.6	2.1
N(Non)	6,325	6,418	4,215	4,760	7,994	9,074		1,124	0.2	-0.5
Panel B: Event Time (N = 714,534)										
Excess Ret	0.36	-0.10	-98.02	-9.71	10.40	509.88	28.55	10.76	2.99	62.91
Ab. Ret	0.26	-0.16	-99.72	-9.47	9.89	510.93	20.80	10.50	3.15	67.97

Appendix Table II

Earnings Announcement Premium with Actual Ann. Dates

This table shows calendar-time abnormal returns for the long-short earnings announcement factor portfolio. Every week all stocks are divided into those that are announcing earnings and those that are not, based on their actual announcement dates. Portfolio returns equal those of a strategy that buys all announcing stocks and sells short non-announcing 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 Announcer Portfolio Returns (%)							
1974-12	0.19	0.19	0.06				0.70
	[5.13]	[4.94]	[3.80]				
1974-12	0.19	0.20	0.04	0.08	-0.11		1.66
	[5.13]	[5.16]	[2.65]	[2.46]	[-3.40]		
1974-12	0.19	0.20	0.04	0.08	-0.12	-0.02	1.72
	[5.13]	[5.25]	[2.37]	[2.49]	[-3.58]	[-1.13]	
Panel B: Equal-Weighted Earnings Announcer Portfolio Returns (%)							
1974-12	0.34	0.32	0.13				6.60
	[13.09]	[12.89]	[11.98]				
1974-12	0.34	0.32	0.13	0.10	0.03		7.74
	[13.09]	[12.63]	[11.86]	[4.96]	[1.31]		
1974-12	0.34	0.32	0.13	0.10	0.02	-0.02	7.81
	[13.09]	[12.69]	[11.37]	[4.99]	[0.93]	[-1.24]	
Panel C: Value-Weighted Earnings Announcer Portfolio Returns (subsamples) (%)							
1974-86	0.15	0.11	0.13	0.08	0.10	0.01	4.71
	[3.41]	[2.51]	[5.57]	[1.94]	[2.19]	[0.28]	
1987-99	0.27	0.26	0.04	0.11	-0.12	0.06	2.89
	[4.88]	[4.51]	[1.16]	[2.22]	[-1.72]	[1.35]	
2000-12	0.16	0.18	0.00	0.09	-0.19	-0.08	2.18
	[1.79]	[2.05]	[-0.02]	[1.27]	[-3.11]	[-2.17]	