Earnings Announcements and Systematic Risk

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Abstract

Firms enjoy high returns at times when they are scheduled to report earnings. We find that this earnings announcement premium is extremely persistent across stocks over horizons going up to 20 years. We propose a risk-based explanation for the phenomenon, which is based on the observation that investors use announcements to revise their expectations for non-announcing firms, but can only do so imperfectly. In support of our hypothesis, we find that a portfolio tracking the performance of earnings announcers predicts aggregate earnings growth, while the overall stock market does not. Earnings announcement risk also appears to be priced. Earnings announcement betas explain 37% of the cross-sectional variation in average returns of portfolios sorted on book-to-market, size, and short-run and long-run returns, and the implied announcement risk premium is consistent with the observed one. Furthermore, none of the 40 test portfolios exhibit abnormal performance when we include the announcement portfolio return as a factor.

JEL Classification: G12

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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 Lamont and Frazzini (2007). Kalay and Loewenstein (1985) obtain the same finding for firms announcing dividends. None of these papers find that the high excess returns around announcement days can be explained in the conventional manner by increases in systematic risk. Cohen et al. (2007) argue that limits to arbitrage allow the survival of the earnings announcement premium, while Lamont and Frazzini (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. Earnings reports provide valuable information not only about the prospects of the individual firms making them but also about those of their peers and more generally the entire economy. However, investors face a signal extraction problem: they must infer the news relevant to expected market cash flows, the common component of an announcing firm's earnings news. We show that if investors are only partially able to distinguish the common component from the firm-specific one, then the announcing firm has higher fundamental risk than the market.

Savor and Wilson (2010) study macroeconomic announcements and show that the stock market enjoys much higher average returns on days when these announcements are made. While volatility is also higher on these days, the magnitude of the difference is much lower than for the difference in returns, so that the market's realized Sharpe ratio is about ten times higher on announcement days. Savor and Wilson (2010) develop a model that reconciles the large increase in the risk premium with the small increase in conditional volatility. Their model relies on the dependence of stock market returns on state variables such as

expected long-run economic growth and inflation. Intuitively, the market tends to perform particularly poorly on those macroeconomic announcement days when news about the state of the economy is negative, making it a much riskier investment than just its volatility would suggest.

Our explanation for the high returns of earnings announcers relies on very similar logic. If earnings announcements indeed inform investors about the state of the economy, then the risk of holding shares of announcing firms (and also of firms whose returns are highly correlated with those of announcers) is higher both because of higher volatility of their stock returns and because of the positive covariance between returns and state variables. Such risk should result in high excess returns.

Although non-announcing stocks also respond to the news in announcements, they should respond by less, since investors learn less about these firms. Consequently, the risk premium compensating for exposure to announcement news about future (aggregate) earnings will be lower for non-announcers.[1] At any point in time, the market itself is made up of both non-announcers and announcers, but the latter have a relatively small weight in the market portfolio, so that the market will also have a lower risk premium. Provided realized returns also contain a component unrelated to news about earnings (e.g., discount rate news), then the market itself will be a poor predictor of future earnings, and the announcer risk premium will not be explained by its market beta. (We provide a formal model behind our intuition in the next section.)

We start our analysis by establishing that the earnings announcement premium is a significant and robust phenomenon. A portfolio strategy that buys all announcing firms in a given week and sells short all the non-announcing firms earns an annualized abnormal return of

[1]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. If investors learn nothing about non-announcers through announcements, then these represent a mostly idiosyncratic risk that should not be priced in equilibrium. At the other extreme, if investors learn as much about non-announcers as about announcers, then both set of firms would earn the same risk premium for exposure to this risk. In either case, the difference between expected returns for announcing and non-announcing firms should be zero (assuming equal exposure to non-earnings risks).

20%. 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 earnings announcement portfolio is 0.131 (0.330), compared to 0.049 for the market, 0.076 for a value portfolio, and 0.072 for a momentum portfolio. Assuming i.i.d. returns, the corresponding annual Sharpe ratios are 0.94 (2.38) for the announcement portfolio versus 0.35 for the market.

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. This effect exists for horizons as long as 20 years, and is distinct from the earnings momentum first documented by Bernard and Thomas (1990), 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 0.40% (t-statistic=4.35). As we move to the highest quintile, the excess returns grow monotonically to 0.79% (t-statistic=8.57). The abnormal return of the corresponding long-short portfolio (highest minus lowest) is 0.41% (t-statistic=4.18), or about 21% 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 are indeed a compensation for such a risk, we would then expect them to be persistently different across stocks, which is exactly what we document.

Next we test 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. Earnings are observed only at a quarterly frequency, so we use quarterly returns in our regressions, which we calculate by cumulating weekly returns of the long-short announcement portfolio. Given that earnings announcements are not evenly distributed throughout a quarter, we weigh each

weekly return by the number of earnings announcements occurring in that week relative to the total number of announcements in a quarter.

The R^2 of a univariate regression with this announcement portfolio return as the independent variable is 8%, which compares very favorably with other potential predictors. If earnings announcers outperform non-announcers by 10% in a quarter (which approximately equals a one-standard deviation increase), next quarter's aggregate earnings will grow at a rate that is 76% higher than the mean. Given that this rate is strongly persistent over short horizons, aggregate earnings would grow at a pace that is on average 26% above the long-run 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.

In contrast, market returns have little predictive power for aggregate earnings growth, with much lower and statistically insignificant point estimates and marginal 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 relationship between returns and aggregate earnings.[2]

Changes in aggregate earnings growth represent a systematic risk, which should be priced in equilibrium. Having established that a portfolio tracking the performance of earnings announcers covaries with future earnings, we therefore next explore whether it represents a priced risk factor and find strong support for this hypothesis. The announcement portfolio 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 returns, and past long-run returns. Size and book-to-market portfolios are commonly used in the literature, since these two characteristics are associated with considerable cross-sectional differences in average returns (Fama and French (1992), Fama and French (1993)). Lewellen, Nagel and Shanken (2010) suggest that the set of test assets should be expanded beyond just these portfolios to create a higher hurdle for a given model. We follow this advice by adding

[2]Portfolios based on book-to-market, size, or past momentum also have no explanatory power for future aggregate earnings.

short- and long-run reversal portfolios.[3] Furthermore, 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.

We estimate earnings announcement betas for these portfolios by regressing their quarterly returns on those of the earnings announcement factor. Announcement betas are always positive and exhibit substantial cross-sectional variation. They are higher for value stocks, small-cap stocks, and stocks with poor short-run or long-run performance. These stocks are plausibly more vulnerable to a deterioration in economic conditions and consequently riskier. Strikingly, estimated alphas are not significantly different from zero for any of our test assets. We also cannot reject the hypothesis that they jointly equal zero. This last test follows Gibbons, Ross and Shanken (1989) (GRS), and constitutes important additional support for the hypothesis that earnings announcement risk is priced.[4]

Earnings announcement betas explain 37% of the cross-sectional variation in returns of the 40 test portfolios. The implied risk premium associated with the earnings announcement factor is positive and significant, equalling 2.1%, which is quite close to the observed risk premium of 3.3%. If we control for market betas in our cross-sectional regressions, the implied announcement risk premium is 3.6%, while that of the market is insignificant. Higher average return portfolios generally have significantly higher earnings announcement betas, indicating that their high expected returns stem from their exposure to aggregate earnings growth risk. Together these results strongly suggest that our earnings announcement factor helps explain cross-sectional variation in returns and represents a priced risk.

All of these findings continue to hold if we use expected announcement dates instead

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[3]

of actual ones. They are also robust to the inclusion of other factors (such as the market excess return), hold in different subperiods, and are not sensitive to the exact methodology for computing the earnings announcement portfolio return. If we restrict our analysis to a smaller set of test assets (such as just size and book-to-market portfolios), our results become even stronger.

Our results are consistent with the conjecture of Campbell (1993) and Campbell and Vuolteenaho (2004) that cash flow risk should earn higher compensation than discount rate risk.[5] 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).[6]

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

[5] See also Brennan, Wang and Xia (2004).

[6] 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.

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 aggregate earnings growth, but can be explained by differences in samples. Their sample ends in 2000, while ours goes through 2009. When they perform their analysis on a sample ending in 2005, their results are very similar to our own, 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 (to the extent that such comovement is consistent with the cross-section of average returns).

The paper proceeds as follows: Section I provides our explanation; Section II describes the data used in our analysis; Section III documents the earnings announcement premium; Section IV presents evidence about the persistence in the announcement premium across stocks; Section V relates the returns of announcing firms to future aggregate earnings; Section

VI tests whether the announcement portfolio represents a priced risk factor; and Section VII concludes.

I. Why Should Earnings Announcers Earn High Average Returns

In this section we provide more detail about our explanation for the earnings announcement premium. Our basic intuition is quite straightforward. Firms report their earnings each quarter, and the timing of these announcements is known in advance and differs across firms. Earnings news conveyed by these reports has a common component and a firm-specific component. Investors directly observe just total earnings (i.e., they do not observe the common and firm-specific components separately). Consequently, they face a signal extraction problem in attempting to infer the impact of announcement news on the earnings of non-announcing firms.

Provided that the common component cannot be perfectly extracted, the revision to aggregate earnings expectations based on a single firm's announcement is then correlated with its earnings news. In fact, the announcing firm's earnings news has a factor loading with aggregate earnings news greater than one. As a result, announcing firms have high cash flow betas, and therefore command high risk premia. Finally, firm and market-level returns must not reflect just cash flow news. Otherwise, announcer and market returns would be perfectly correlated, so that announcers' high average returns would be perfectly explained by their market (as opposed to cash flow) betas. Our model thus also requires the existence of other shocks (e.g., discount rate news) that affect returns.

We now make this idea more precise through a simple model.

I.A. Individual Earnings Announcements as Signals About Aggregate Earnings

Assume there are N firms that together make up the market portfolio. For simplicity, we assume all firms are equal in size. Only firm 1 announces its earnings in period $t + 1$. Firm

1's $t+1$ return then is given by

$$R_{1,t+1} = E_t[R_{1,t+1}] + \varepsilon_{1,t+1} + \omega_{1,t+1}, \tag{1}$$

where $\varepsilon_{1,t+1}$ is the revision to expected future cash flows on firm 1's stock (firm 1's 'earnings news') associated with the announcement, and $\omega_{1,t+1}$ is an additional shock to firm 1's return (e.g., 'discount rate news'), also observed at date $t+1$. ε_1 is assumed to be independently and identically distributed with variance $\sigma^2_{\varepsilon_1}$.

The returns for the other firms $j = 2...N$ are given by

$$R_{j,t+1} = E_t[R_{j,t+1}] + E[\varepsilon_{j,t+1}|\varepsilon_{1,t+1}, \omega_{1,t+1}, ..., \omega_{N,t+1}] + \omega_{j,t+1}. \tag{2}$$

The shocks $\omega_{j,t+1}$ are all observed by investors at date $t+1$. We assume that the discount rate news terms $\omega_{j,t+1}$ are independently and identically distributed, with variance σ^2_ω and correlation ρ between all pairs of firms. Although in reality ω_j may contain common shocks that affect cash flow expectations, such as macroeconomic announcements, for the purposes of this example we ignore this possibility. Thus, we will think of ε_1 as firm 1's cash flow news and ω_1 as its discount rate news (and so on for other firms).

Unlike discount rate news, the earnings news for non-announcing firms, $\varepsilon_{j,t+1}$, is not observed at date $t+1$. However, it may be partially inferred from observed shocks. In particular, we assume that firm 1's earnings news contains some information relevant to the inference of non-announcers' earnings news.

For simplicity of exposition, we assume that the shocks ω_j are uncorrelated with earnings news for all firms, as well as being perfectly observed by investors. The inference problem for investors in non-announcing firms then becomes

$$E[\varepsilon_{j,t+1}|\varepsilon_{1,t+1}, \omega_{1,t+1}, ..., \omega_{N,t+1}] = E[\varepsilon_{j,t+1}|\varepsilon_{1,t+1}]. \tag{3}$$

Firm 1's announcement news $\varepsilon_{1,t+1}$ consists of a common component η_{t+1} and a firm-specific component $\upsilon_{1,t+1}$, which is uncorrelated both with η_{t+1} and with the other (unobserved) firm-specific innovations $\upsilon_{j,t+1}$. We assume that investors directly observe only $\varepsilon_{1,t+1}$, and are unable to distinguish the common component from the firm-specific component. Therefore

$$\begin{aligned} E[\varepsilon_{j,t+1}|\varepsilon_{1,t+1}] &= E[\eta_{t+1}+\upsilon_{j,t+1}|\eta_{t+1}+\upsilon_{1,t+1}] \\ &= E[\eta_{t+1}|\eta_{t+1}+\upsilon_{1,t+1}] \\ &= \frac{Cov[\eta_{t+1},\eta_{t+1}+\upsilon_{1,t+1}]}{Var[\eta_{t+1}+\upsilon_{1,t+1}]}\varepsilon_{1,t+1} \\ &= \frac{Var[\eta_{t+1}]}{Var[\eta_{t+1}]+Var[\upsilon_{1,t+1}]}\varepsilon_{1,t+1} \\ &= \phi\varepsilon_{1,t+1} \end{aligned} \tag{4}$$

The inferred value of firm j's earnings news from firm 1's earnings news is the projection of firm j's news on firm 1's news, given by $\phi\varepsilon_{1,t+1}$. The parameter ϕ determines the salience of firm 1's earnings news for the wider market and lies strictly between zero and one provided that the variance of the firm-specific component is positive.

Since the market portfolio is equally-weighted (all firms are of equal size), the return on the market portfolio is then

$$\begin{aligned} R_{MKT,t+1} &= E_t[R_{MKT,t+1}]+\frac{1}{N}\sum_{j=1}^{N}E[\varepsilon_{j,t+1}|\varepsilon_{1,t+1}]+\frac{1}{N}\sum_{j=1}^{N}\omega_{j,t+1} \\ &= E_t[R_{MKT,t+1}]+(\frac{1}{N}+\frac{N-1}{N}\phi)\varepsilon_{1,t+1}+\frac{1}{N}\sum_{j=1}^{N}\omega_{j,t+1}. \end{aligned} \tag{5}$$

I.B. Covariance With News About Aggregate Earnings

The common component of firm 1's earnings news is therefore $(\frac{1}{N}+\frac{N-1}{N}\phi)\varepsilon_{1,t+1}$, which we write as $\phi_N\varepsilon_{1,t+1}$. As N becomes large, ϕ_N converges to ϕ from above.

$\phi_N\varepsilon_{1,t+1}$ is the revision to expected cash flows of the market portfolio, and represents a

systematic risk to diversified investors. Covariance with this term should consequently carry a positive risk premium in equilibrium. The covariance of the market portfolio and $\phi_N \varepsilon_{1,t+1}$ in this example is

$$Cov_t \left[R_{MKT,t+1}, \phi_N \varepsilon_{t+1} \right] = \phi_N^2 \sigma_{\varepsilon_1}^2. \tag{6}$$

However, the covariance of the announcing firm will be

$$Cov_t \left[R_{1,t+1}, \phi_N \varepsilon_{1,t+1} \right] = Cov_t[\varepsilon_{1,t+1}, \phi_N \varepsilon_{1,t+1}] = \phi_N \sigma_{\varepsilon_1}^2. \tag{7}$$

The systematic cash flow risk of the announcing firm is greater than that of the market provided ϕ_N lies strictly between zero and one. If ϕ_N were one (which happens if ϕ equals one), firm 1's news provides as much information about non-announcing firms as it does about firm 1, which means there is nothing special about firm 1 relative to other firms. Provided ϕ is less than one, firm 1's news does not perfectly reveal the news for all the other firms, and so firm 1's news has a higher loading than one on market cash flow news. As ϕ declines towards zero, this 'superloading' ratio actually increases. However, the quantity of systematic risk declines at the same time, eventually at a faster rate, until at ϕ close to zero there is little systematic risk from firm 1's announcement. When ϕ is zero, we learn nothing about other firms from firm 1's earnings news, making this a purely idiosyncratic risk.

If investors did not face a signal extraction problem and could separate the common from the specific component, there would be no such high loading on market cash flow news. That happens because

$$E[\varepsilon_{j,t+1} | \eta_{t+1}] = \eta_{t+1} \tag{8}$$

and then the covariance with aggregate earnings news becomes (for all firms)

$$Cov[E[\varepsilon_{j,t+1} | \eta_{t+1}], \eta_{t+1}] = Cov[E[\varepsilon_{1,t+1} | \eta_{t+1}], \eta_{t+1}] = Var[\eta_{t+1}]. \tag{9}$$

In our empirical work, we use a long-short portfolio that buys announcers and sells short

non-announcers. We term this portfolio 'portfolio A' or 'the announcement portfolio' (in contrast to the announcing firm). The return on portfolio A is

$$\begin{aligned} R_{A,t+1} &= R_{1,t+1} - \frac{1}{N-1}\sum_{j=2}^{N} R_{j,t+1} \\ &= E_t[R_{A,t+1}] + (1-\phi)\varepsilon_{1,t+1} + \left(\omega_{1,t+1} - \frac{1}{N-1}\sum_{j=2}^{N}\omega_{j,t+1}\right). \end{aligned} \tag{10}$$

Covariance of this portfolio's return with the common component $\phi_N \varepsilon_{1,t+1}$ is

$$Cov_t\left[R_{A,t+1}, \phi_N \varepsilon_{t+1}\right] = Cov_t[(1-\phi)\varepsilon_{1,t+1}, \phi_N \varepsilon_{1,t+1}] = (1-\phi)\phi_N \sigma^2_{\varepsilon_1}. \tag{11}$$

One useful property of this portfolio is that, given our assumptions, it has zero covariance with market discount rate news and therefore represents pure cash flow risk. For values of ϕ below one half (for large N) or lower (for small N), the announcement portfolio can have higher cash flow risk than the market, because it acts as a sort of signal booster for market cash flow news. The announcement portfolio is thus particularly risky for long-term risk-averse investors. In equilibrium, such investors must hold all firms at market weights, so the risk premium for announcing firms should be higher than those of other firms.

Why should long-term investors care about earnings announcement risk? Since all firms announce once a quarter, surely such risk cannot matter? The answer is given by assuming the counterfactual. Suppose earnings announcers earn the same expected returns as other firms and that all investors rebalance their portfolios once a quarter. Then a particular investor, by rebalancing weekly, can avoid holding the stocks of announcers in his portfolio, taking less systematic cash flow risk than other investors, but earning the same expected return. Therefore, a zero announcement premium is not consistent with equilibrium.

I.C. Announcement Portfolio Market Beta

The beta of the announcement portfolio with the market return is given by

$$\frac{Cov_t[R_{A,t+1}, R_{MKT,t+1}]}{Var[R_{MKT,t+1}]} = \frac{(1-\phi)\phi_N \sigma^2_{\varepsilon_1}}{\phi_N{}^2 \sigma^2_{\varepsilon_1} + \left(\frac{1}{N} + \frac{(N-1)}{N}\rho\right)\sigma^2_\omega}. \tag{12}$$

This beta is zero when either ϕ_N equals zero or ϕ equals one (provided there is some discount rate news). In the former case, firm 1's earnings news represents a purely idiosyncratic risk, while in the latter the news affects other stocks as much as it does firm 1.

In all other cases, provided that the variance of aggregate discount rate news $\rho\sigma^2_\omega$ is larger than the variance of aggregate cash flow news $\phi^2_N \sigma^2_{\varepsilon_1}$, the market beta of the announcement portfolio will be small but positive, which is what we document in the data.

I.D. Earnings Announcement Risk Premium

Campbell (1993) shows that a representative investor with Epstein-Zin preferences who holds only financial wealth should, in terms of our model, demand the following risk premium (we ignore the differences in second moments between logs and levels in Campbell's equation because the time intervals are short):

$$E_t\left[R_{t+1} - R_{f,t+1}\right] = \gamma Cov_t\left[R_{t+1}, \phi_N \varepsilon_{1,t+1}\right] + Cov_t\left[R_{t+1}, \frac{1}{N}\sum_{j=1}^{N} \omega_{j,t+1}\right]. \tag{13}$$

The higher covariance of announcers with cash flow news can thus potentially explain their high average returns.

I.E. Predictions

In addition to earnings announcers experiencing high average returns, our explanation produces three testable hypotheses.

First, ϕ and σ^2_ε can obviously vary across firms. Earnings announcements differ across firms in terms of how informative they are about about aggregate earnings (i.e., firms have

different ϕ's). The ex-ante uncertainty about these announcements also is not the same for different firms (i.e., they have different σ_ε^2's). Firms with higher values for either of these parameters should enjoy higher expected announcement returns. To test this hypothesis directly, we would need estimates for ϕ and σ_ε^2, which in practice are hard to obtain. However, provided these parameters are fairly stable over time, we can perform an indirect test. Firms with high past announcement returns should be the ones that were more exposed to aggregate cash flow risk (through different ϕ and/or σ_ε^2). If these parameters are persistent across firms, then earnings announcement returns should be persistent as well.

Second, earnings announcement returns should predict aggregate earnings growth. Equations (6) and (7) show that returns of announcing firms are more highly correlated with aggregate cash flow news than the market return. Moreover, the long-short announcement portfolio in our model has zero covariance with discount rate news but a positive covariance with cash flow news (Equation 11). This property should make it a less noisy predictor of future earnings than the market, which is influenced by both cash flow and discount rate news.

Finally, covariance with the announcement portfolio return should be priced in the cross-section. If this portfolio is indeed especially exposed to aggregate cash flow risk, then other assets with the same exposure should command a similar premium.

II. Data

II.A. Sample Construction

Our sample covers all NYSE, AMEX and NASDAQ stocks on the COMPUSTAT quarterly file from 1973 to 2009.[7] 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 598,469 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

[7] 1973 is the first year when quarterly earnings data becomes fully available in COMPUSTAT. It is also the first year when NASDAQ firms are comprehensively covered by COMPUSTAT.

then did not include many smaller firms, and later on tracks the total number of listings.

[**FIGURE 1 ABOUT HERE**]

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)).

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 return of a portfolio containing all firms announcing earnings in that week minus the return of a portfolio containing all non-announcing firms.

We choose a weekly horizon to 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 much higher than usual volatility, such problems may be especially severe in our analysis.[8] Moreover, earnings dates in COMPUSTAT 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 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. A weekly horizon is also a compromise between various approaches in the literature. Many papers employ a very tight (typically 2- or 3-day) window centered around the announcement date, while Lamont and Frazzini (2007) study monthly returns, arguing that much of the premium is realized outside this window. The exact choice does not seem to be too important, as our results do not change if we use daily returns with either shorter or longer holding periods than a week.

[8] Dubinsky and Johannes (2005) document a decline in implied volatility for individual stock options after earnings announcements.

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.

II.B. Announcement Dates

Earnings announcement dates we rely on are the ones 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 et al. (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.

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 pos-

sibly 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).

The choice between the two should depend on the goal of a study. If it is to establish that investors would realize abnormal profits by buying stocks shortly before announcements, the expected date approach is probably better, since it is more conservative. The focus of this paper though is not on this premium, but rather on the information conveyed by earnings announcements and whether the risk associated with the announcements is priced. For this objective, actual announcement dates are more appropriate, as they reduce problems with incorrect announcement dates. Furthermore, pre-announcements, which according to Cohen et al. (2007) have much more impact than delays, may not be tradeable, but they still provide news about future earnings and are known to investors after they happen.

When we use expected instead of actual dates in our analysis, the only impact is on the predictive power of the earnings announcement portfolio for aggregate earnings, which is somewhat reduced. This is unsurprising given that many of the expected dates are not accurate. It is important to emphasize again here that COMPUSTAT dates are definitely known to investors immediately after announcements, so that our exercise of forecasting earnings does not depend on any information to which investors would not be privy. The persistence of announcement returns across stocks is as pronounced as it is under the actual date approach. And cross-sectional and time-series tests with the announcement portfolio return as a factor actually yield even stronger results. The risk associated with earnings announcements is thus priced irrespective of the exact method for dating them.

III. Earnings Announcement Premium

Table I explores returns associated with the earnings announcement portfolio. Panel A reports results for an equal-weighted portfolio of announcers minus non-announcers. Between 1974 and 2009, the average weekly return for this portfolio was a highly significant

0.39% (t-statistic=14.31). The alpha with respect to the CAPM is very similar: 0.38% (t-statistic=14.17), which translates into an annualized abnormal return of 20%. The stock market beta of the earnings announcement portfolio, although greater than zero, is quite small at 0.12, which is exactly what our model predicts.

Adding the two size and book-to-market factors changes nothing, and neither does adding the momentum factor.[9] Not surprisingly, the equal-weighted announcement portfolio has a small but significant beta with the size factor. The announcement portfolio also has a mildly positive covariance with the value factor and an insignificant (economically and statistically) negative loading on the momentum factor.

[**TABLE I ABOUT HERE**]

As shown in Panel B, the value-weighted portfolio also has a highly economically and statistically significant positive return of 0.23% per week (t-statistic=5.67). The smaller premium for the value-weighted portfolio was noted by Chari et al. (1988), who found that the premium was larger for small-cap stocks. The alphas against all asset pricing models are greater than 0.20 % per week, and the pattern of loadings on size and momentum factors are the same as for the equal-weighted portfolio. The value-weighted portfolio has a small but statistically negative beta with the value factor, suggesting that announcement returns for small-cap firms are positively related to the value factor, while those for large-cap firms are negatively related. However, the magnitudes are both small.

The announcement portfolio delivers extraordinary returns per unit of risk. Assuming i.i.d. returns, the annualized Sharpe ratio for the value-weighted (equal-weighted) portfolio is 0.94 (2.38), which is considerably higher than the market's (0.35), the value factor's (0.55), or the momentum factor's (0.52).

When we divide the data into different subsamples, these patterns remain remarkably consistent. Panel C shows that the four-factor alpha was 0.35% in the period between 1974 and 1985, 0.43% between 1986 and 1997, and 0.32% between 1998 and 2009. Market betas and

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

loadings on the small-cap factor are positive throughout, whereas the loadings on the value and momentum factors are unstable and close to zero, both economically and statistically (except between 1974 and 1985).

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 the strategy earned significantly negative returns was towards the end of 2008 (not reported). This observation is consistent with our hypothesis, since 2008 was a period in which market participants must have sharply revised down their forecasts of future earnings.

In a calibration of our model from the previous section, 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 et al. (2003), but that the correlation of cash flow news across firms is much lower than the correlation of discount rate shocks. Aggregating to the market level then implies that market discount rate news is several times as volatile as market cash flow news, and accounts for the vast majority of the variance of quarterly market returns on the market portfolio. These magnitudes are consistent with the estimates in Campbell and Ammer (1993).

Because market discount rate news is 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 document in the data.

IV. Persistence in Announcement Premia

So far, our analysis 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 in terms of 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 relationship between firm-level and aggregate earnings shocks may present an especially hard problem.

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 measure announcement returns as a three-day abnormal return (AR) relative to the Fama-French plus momentum model:

$$AR_{t-1,t+1} = R_{t-1,t+1} - (\beta^{m} MKTRF_{t-1,t+1} + \beta^{smb} SMB_{t-1,t+1} + \beta^{hml} HML_{t-1,t+1} + \beta^{umd} UMD_{t-1,t+1}), \quad (14)$$

where R is a firm's raw return, $MKTRF$ is the market excess return, SMB is the return of a portfolio of small stocks minus the return of a portfolio of big stocks, HML is the return of a portfolio of high book-to-market stocks minus the return of a portfolio of low book-to-

market stocks, and UMD is the return of a portfolio of winner stocks minus the return of a portfolio of loser stocks.[10] The corresponding betas are estimated using OLS regressions over a 255 trading day-period ending 30 days before each announcement.

Table II presents excess returns for the portfolios based on sorts over horizons ranging from 5 to 20 years.[11] E.g., Panel B shows that the average excess return for the portfolio containing announcing stocks with the lowest historical announcement returns over the previous 10 years is 0.33% per week (0.08% value-weighted). This is extraordinary performance, but the number then monotonically increases to 0.95% (0.48% value-weighted) for the portfolio containing stocks with the best past announcement returns. The corresponding long-short (High-Low) portfolio has an average excess return of 0.62% per week (0.40% value-weighted). This dispersal in returns, 32% on annual basis, is very large, suggesting earnings announcement premia are very persistent. 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 0.63% per week (0.42% value-weighted).

[TABLE II 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 are unaffected by this change, with magnitudes becoming slightly smaller for equal-weighted returns and slightly larger for value-weighted returns. For a 10-year horizon, the top quintile outperforms the bottom one by 0.41% (0.50% value-weighted), which represents a greater difference than that between announcing and non-announcing stocks.

[10] These factor portfolio returns are obtained from Kenneth French's website.

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

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 predicted instead of actual 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 less 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.[12] 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).[13]

V. Earnings Announcement Returns and Aggregate Earnings Growth

We next investigate the information contained in the earnings announcement return about future aggregate earnings. Our idea is that announced earnings are informative both about future earnings prospects for announcing firms and also for those of other firms.

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

[12] Heston and Sadka (n.d.) obtain the same result for various international markets.
[13] We do not tabulate those findings, but they are available on request.

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 first month in the other quarters. The distribution is even less uniform at the weekly level (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 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.

[**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 (Panel A of Table III) or total book equity (Panel B of Table III). Our method for calculating aggregate earnings growth is identical to that of Kothari et al. (2006).[14] This aggregate earnings growth (for quarter $t+1$) is the dependant variable in Table III. Coefficients are computed using OLS regressions, while t-statistics are calculated using Newey-West standard errors with 4 lags.[15]

Column (1) in each panel shows that stock market returns do not correlate in a statistically significant way with next quarter's earnings growth. Although the coefficients in each panel

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

[15] Our results are even stronger if we use Hodrick standard errors, which explicitly correct for any correlation induced by overlap in the dependent variable due to our seasonal earnings adjustment.

are positive, they are not statistically significant. By contrast, the earnings announcement return is highly economically and statistically significant. Column (2) reveals that a 1% increase in the quarterly announcement return results in a 0.034% (0.069% for book equity) increase in aggregate earnings growth over the following quarter, with a t-statistic of 2.48 (2.78). The mean quarterly earnings growth over the entire 1974-2009 period is 0.16%, so this is a very substantial effect. The explanatory power is also considerable, with an R^2 of 8.2% (8.0%).

[TABLE III ABOUT HERE]

When both the earnings announcement return and the market return are included in column (3), the market return's t-statistic is reduced (from an already insignificant level) and that of the earnings announcement portfolio is increased, confirming that the latter is a more important determinant of earnings growth. Controlling for the market return, the coefficient on the announcement portfolio return is 0.031 (0.057 in Panel B), with a t-statistic of 2.90 (3.25). The increase in R^2 relative to column (2) is small, so we can conclude that the market portfolio return contains little information incremental to that in the earnings announcement portfolio return.

Stock market valuations may contain information pertinent to future earnings, although existing studies indicate, if anything, the opposite. In Column (4), we add the aggregate earnings yield (E/P), defined as the sum of the last four quarterly earnings scaled by total market capitalization, as a control variable. This addition has no effect on our results. The coefficient on the E/P is positive, which is consistent with previous studies.

In the last column, 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 term earnings growth. The coefficients on the first two lags of earnings growth are highly significant and positive, while later lags are not significant. This is similar to results in previous work

(e.g., see Kothari et al. (2006)) The magnitude of the announcement portfolio coefficient decreases, but it is still economically and statistically significant. As before, market returns are not significant.

The persistence in aggregate earnings growth means that earnings announcement returns impact earnings growth for more than just a quarter. E.g., if earnings announcers outperform non-announcers by 10% in a quarter (approximately a one-standard deviation increase), next quarter's aggregate earnings will grow at a rate that is 76% higher than the mean. Over the following four quarters, aggregate earnings will still grow at a pace that is on average 26% above the long-run mean.

VI. Earnings Announcement Betas

We have shown that the return of a portfolio tracking the performance of earnings announcers covaries with future aggregate earnings growth, which indicates that its performance provides relevant information about the state of the economy. 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.

We have 40 test portfolios: 10 each sorted on book-to-market, size, past short-run return (one month), and past long-run return (years -5 through -1). Each of those variables is associated with substantial cross-sectional variation in returns. 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 et al. (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 do so by introducing portfolios based on short- and long-run returns. Stock returns exhibit reversals both at short horizons of up to a month (Lo and MacKinlay (1990), Lehmann (1990), Jegadeesh (1990)) and at long horizons between three and five years (Bondt and Thaler (1985)), and so average returns also

differ strongly across portfolios of stocks sorted on past returns at these horizons. All the portfolio returns are downloaded from Kenneth French's website.

As our measure of exposure to earnings announcement risk, we use earnings announcement betas (β^e), which are estimated for each portfolio using the following OLS regression:

$$r_t^i = \alpha + \beta^e r_t^{earn} + \varepsilon_t, \tag{15}$$

where r is the quarterly excess return of a portfolio and r^{earn} is the quarterly return of the earnings announcement portfolio, computed as described in the previous section.

VI.A. Betas and Pricing Errors

Table IV presents earnings announcement betas for each of the 40 test portfolios. The first thing to notice is that the betas are positive and significant for all 40 test portfolios. This suggests that earnings announcement returns are indeed a proxy for risk that is not fully captured by the market portfolio, since the announcement portfolio is a long-short portfolio that only marginally covaries with overall market returns. The pattern of announcement betas offers additional support for the risk hypothesis: value stocks, small stocks, and stocks with poor recent or long-run performance have higher betas than growth stocks, large stocks, and stocks with good short-run or long-run performance. 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.

When we study alphas for our one-factor model, we get a remarkable result that none of the 40 are statistically different from zero. The largest (in absolute terms) are those for the two extreme short-run reversal portfolios, equaling -1.6% and -1.42% per quarter. This is perhaps not surprising given that microstructure effects may play a role here. The pricing errors are less than 1% for all the other portfolios.

[TABLE IV ABOUT HERE]

In Panel E, we test the hypothesis that alphas are jointly different from zero. Our

approach follows Gibbons et al. (1989) (GRS). We show the GRS F-statistics, which test whether time-series intercepts are zero, and find that the hypothesis cannot be rejected, either in the full 1974-2009 sample (p-value=0.307) or in the two subsamples (p-values=0.183 and 0.276). This last result is an important additional support for the hypothesis that earnings announcement risk is priced, since recent critiques of asset-pricing tests (Lewellen et al. (2010)) encourage the use of generalized least squares regressions and the inclusion of the factor itself as one of the tests assets, which is equivalent to the GRS test (see Chapter 12 in Cochrane (2001)).

VI.B. Betas and Cross-Sectional Return Variation

The results so far suggest that the earnings announcement factor can price all of our test assets, strongly supporting the hypothesis that it reflects systematic risks. Another way to explore this hypothesis is to look at the relationship between betas estimated in Equation (15) and the average returns for the test portfolios. We do so by running this regression:

$$r_i = Int + \beta_i^e RP + \varepsilon_i, \tag{16}$$

where r_i is the average realized return for portfolio i and β_i^e is its earnings announcement beta estimated in Equation (151). 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)). (Without this correction, our t-statistics are typically 2-3 times higher.)

The findings are shown in Figure 3, which plots the realized average return versus its predicted value from Equation (16). The R^2 is 36.8%, indicating that announcement betas explain a considerable portion of the return variation across the 40 portfolios. The implied risk premium (RP) is positive and statistically significant, equaling 2.1% (t-statistic=2.27). This is quite close to (and statistically insignificantly different from) the observed risk premium for the quarterly announcement portfolio, which is 3.3%. Moreover, the intercept is not statistically different from zero, confirming an additional implication of the model. These

last two results further address the critique by Lewellen et al. (2010), who suggest that asset pricing tests focus on the implied risk premium and intercepts in cross-sectional regressions and not just on R^2s. The portfolios furthest away from the 45 degree line (where predicted and realized returns would coincide) are again the extreme short-run reversal ones, which seem to be the hardest ones to price.

[**FIGURE 3 ABOUT HERE**]

Figures 4 and 5 repeat the same analysis for the two subsamples (1974-1991 and 1992-2009) and obtain the same results. The risk premium is positive and significant in both subsamples, while the intercept is not different from zero. The premium is almost the same across the two periods: 2.0% in the early one and 2.1% in the latter one. This stability of the risk premium suggests it is not a chance result and is the product of real exposure to risk. The R^2s in the subsamples are a bit lower than for the full sample, but are still reasonably high.

[**FIGURES 4 AND 5 ABOUT HERE**]

VI.C. Robustness Tests

All our results are significantly stronger if we take out the short-run reversal portfolios.[16] We still choose to present findings with the portfolios included, since we want to push our model as much as possible. Moreover, it is impressive that the earnings announcement portfolio helps price these portfolios, as short-run reversals are mostly viewed as an anomaly that cannot be explained by traditional asset pricing models. We have tried adding momentum portfolios as well, but earnings announcement betas do not help explain the return pattern there. We are not overly worried by this, as it is probably unrealistic to expect one factor to explain all the different anomalies documented in the literature.[17]

If we add the stock market's excess return as a second factor, all of our results remain unchanged. Figure 6 charts the cross-sectional results under this specification, where betas

[16] Those results are available on request.

[17] Furthermore, momentum has disappeared in the last decade, which may raise questions about its ultimate cause and persistence.

are estimated with the following equation:

$$r_t^i = \alpha + \beta^e r_t^{earn} + \beta^m r_t^{mar} + \varepsilon_t, \tag{17}$$

where r is the quarterly excess return a portfolio, r^{earn} is the quarterly return of the earnings announcement portfolio, and r^{mar} is the quarterly CRSP value-weighted stock market return.

The R^2 for the second-stage regression of average returns on estimated earnings announcement betas is 54.0% and the implied price of announcement risk is 3.6% (t-statistic=3.35), which is almost equal to the actual risk premium. In contrast, the implied market risk premium is not significantly different from zero (the coefficient is actually negative).

[FIGURE 6 ABOUT HERE]

In conclusion, covariance with a portfolio whose return forecasts aggregate earnings is a priced risk factor, and leaves no alphas on the 40 test portfolios to be explained (either severally or jointly). Since all of these portfolios are plausibly exposed to recession or disaster risk, as has been argued in many studies, the resulting pattern of betas and average returns is quite consistent with a systematic risk-based explanation of their respective average returns. Furthermore, the implied price of earnings announcement risk is consistent with the remarkably high average return on the announcement portfolio itself. The earnings announcement premium thus seems to indeed represent compensation for systematic risk.

VII. 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. Lamont and Frazzini (2007) offer a behavioral explanation based on limited investor attention, while Cohen et al. (2007) argue that the premium persists due to limits to arbitrage.

In this paper we 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.[18]

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. Stocks in the highest quintile based on their average announcement returns over the last 10 years (excluding the previous year to distinguish from earnings momentum) outperform those in the lowest quintile by 0.41% per week (21% annualized). This difference is actually higher than that between announcers and non-announcers, which equals 0.37% per week.

Second, we document that the performance of earnings announcers helps forecast future aggregate earnings, while the market return does not. 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 76% higher than the average.

Third, we find that covariance with the announcement return is priced in the cross section, and that the implied price of such covariance risk is very close in magnitude to the announcement premium itself. In fact, earnings announcement betas explain the high average returns of value stocks, small-cap stocks, and stocks with poor short- or long-run returns (and the low returns of stocks with opposite characteristics). A one-factor model with the earnings announcement portfolio as its factor results in pricing errors that are not different from zero for any of our test portfolios.

We believe that these results offer compelling evidence 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 (2010) that fundamental

[18] Campbell (1993), Campbell and Vuolteenaho (2004), and Brennan et al. (2004) argue that investors should demand a higher risk premium for such fundamental, cash flow risk than for discount rate risk.

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.

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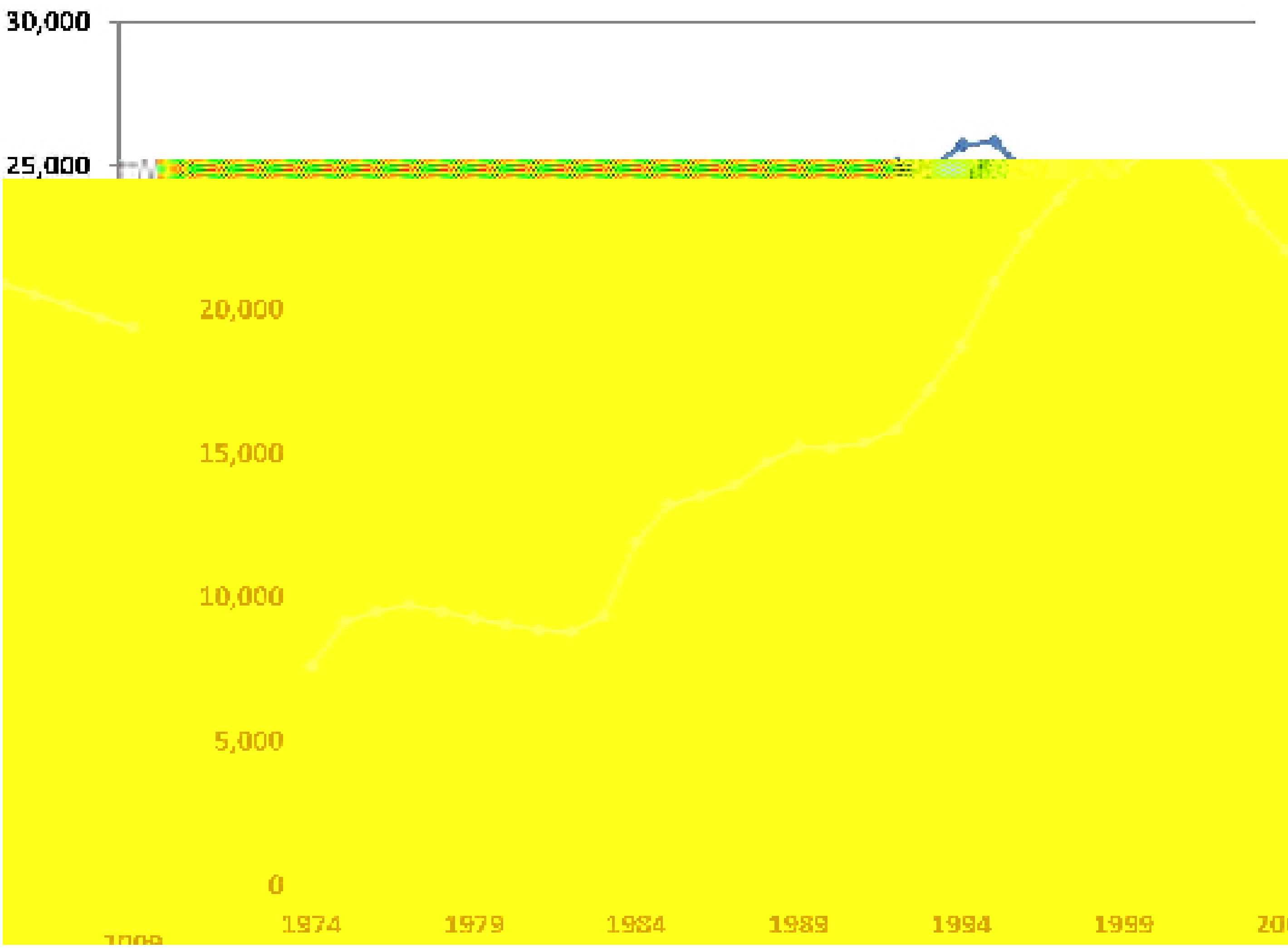

Figure 1. Time-Series Distribution of Earnings Announcements. This chart plots the total number of quarterly earnings announcements over time. It covers all NYSE, AMEX, and NASDAQ firms available from COMPUSTAT quarterly file with non-missing earnings and at least four prior earnings reports.

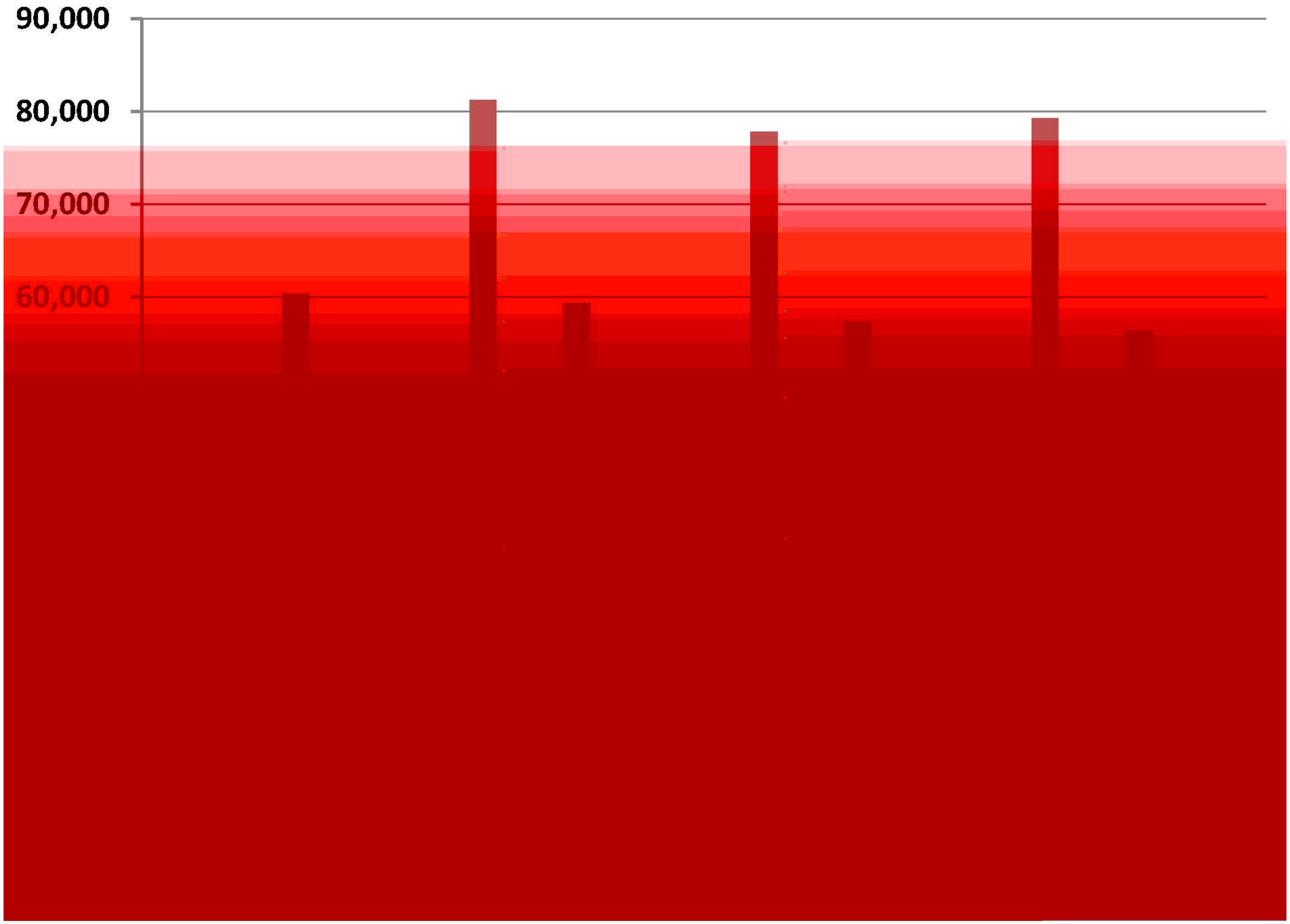

Figure 2. Monthly Distribution of Earnings Announcements. This chart plots the total number of quarterly earnings announcements occurring in different months of the year. It covers all NYSE, AMEX, and NASDAQ firms available from COMPUSTAT quarterly file with non-missing earnings and at least four prior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

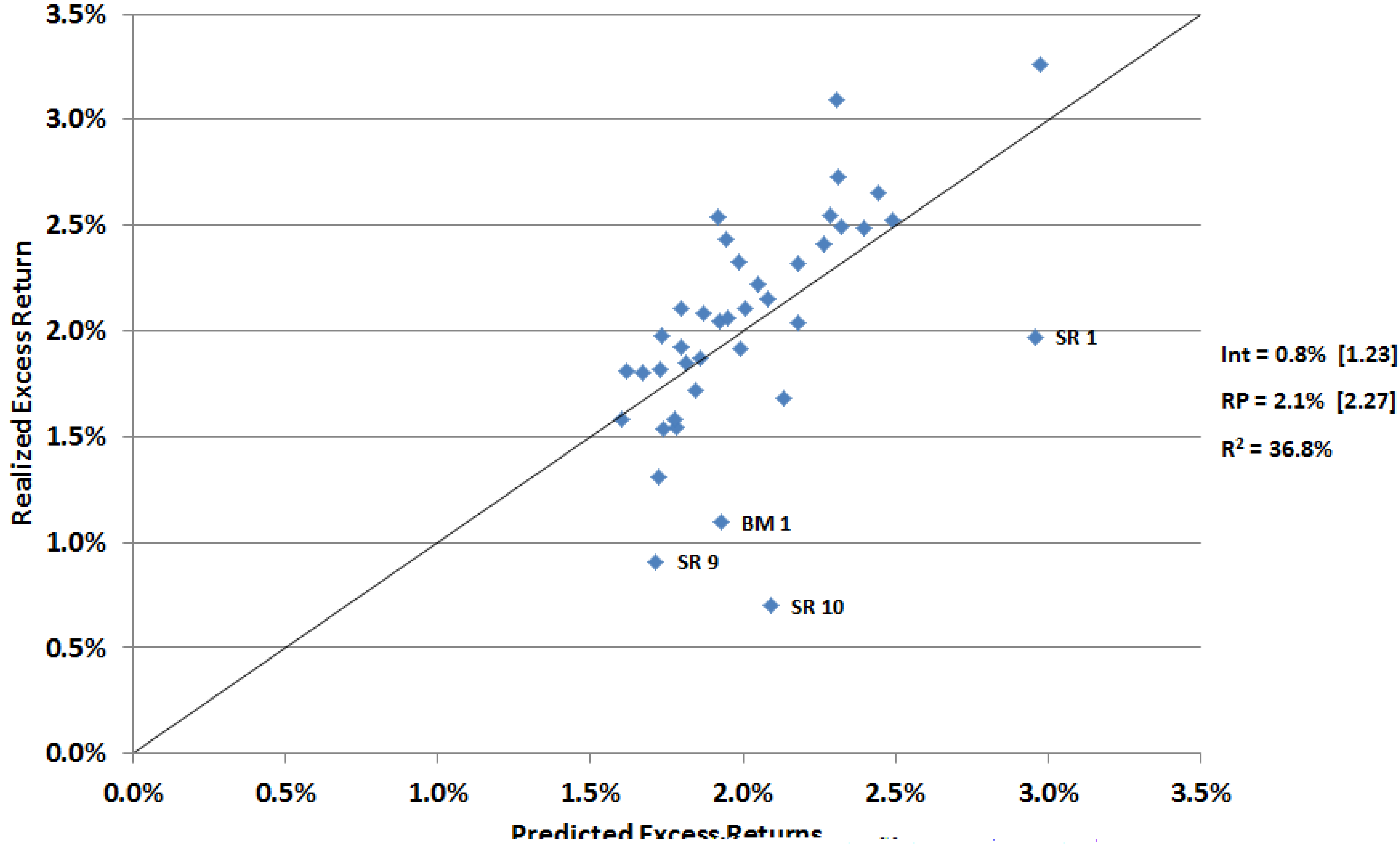

Figure 3. Earnings Announcement Betas and the Cross-Section of Returns. This graph plots the realized a
for the 40 test portfolios vs. their predicted return for the entire sample (1974-09). Predicted returns are calcula
regression: $r_i = Int + RP^e * \beta^e_i + \varepsilon_i$, where r_i is the average realized return for portfolio i and β^e_i is its covarian
earnings announcement portfolio return, estimated using Eq. (1). Estimates for the intercept (*Int*) and the risk p
are given above, together with t-statistics in brackets, which reflect estimation error for earnings announcemen

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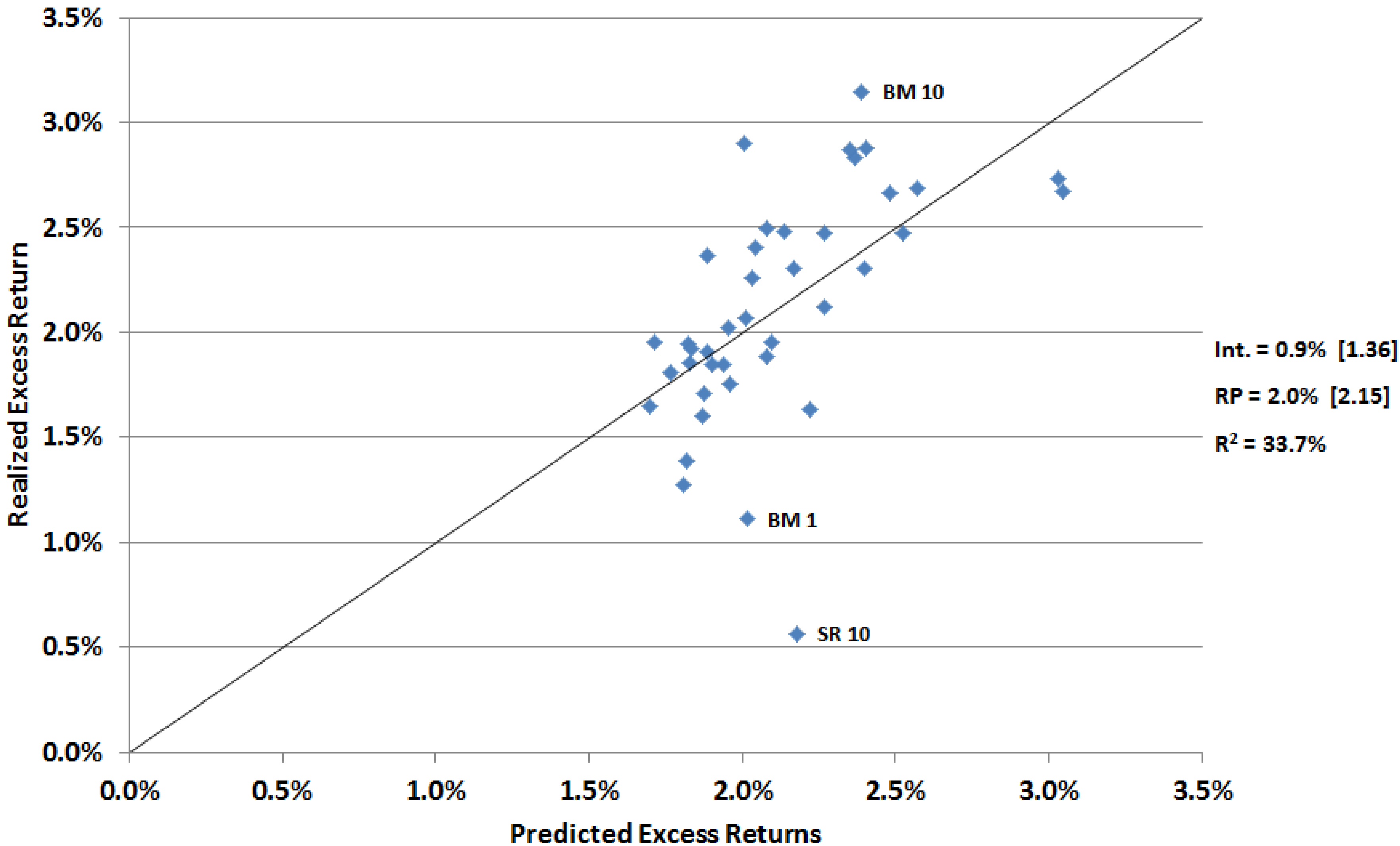

Figure 4. Earnings Announcement Betas and the Cross-Section of Returns. This graph plots the realized average return for the 40 test portfolios vs. their predicted return for the first half of the sample (1974-91). Predicted returns are calculated from regression: $r_i = Int + RP^e * \beta^e_i + \varepsilon_i$, where r_i is the average realized return for portfolio i and β^e_i is its covariance with the earnings announcement portfolio return, estimated using Eq. (1). Estimates for the intercept (*Int*) and the risk premium [illegible]

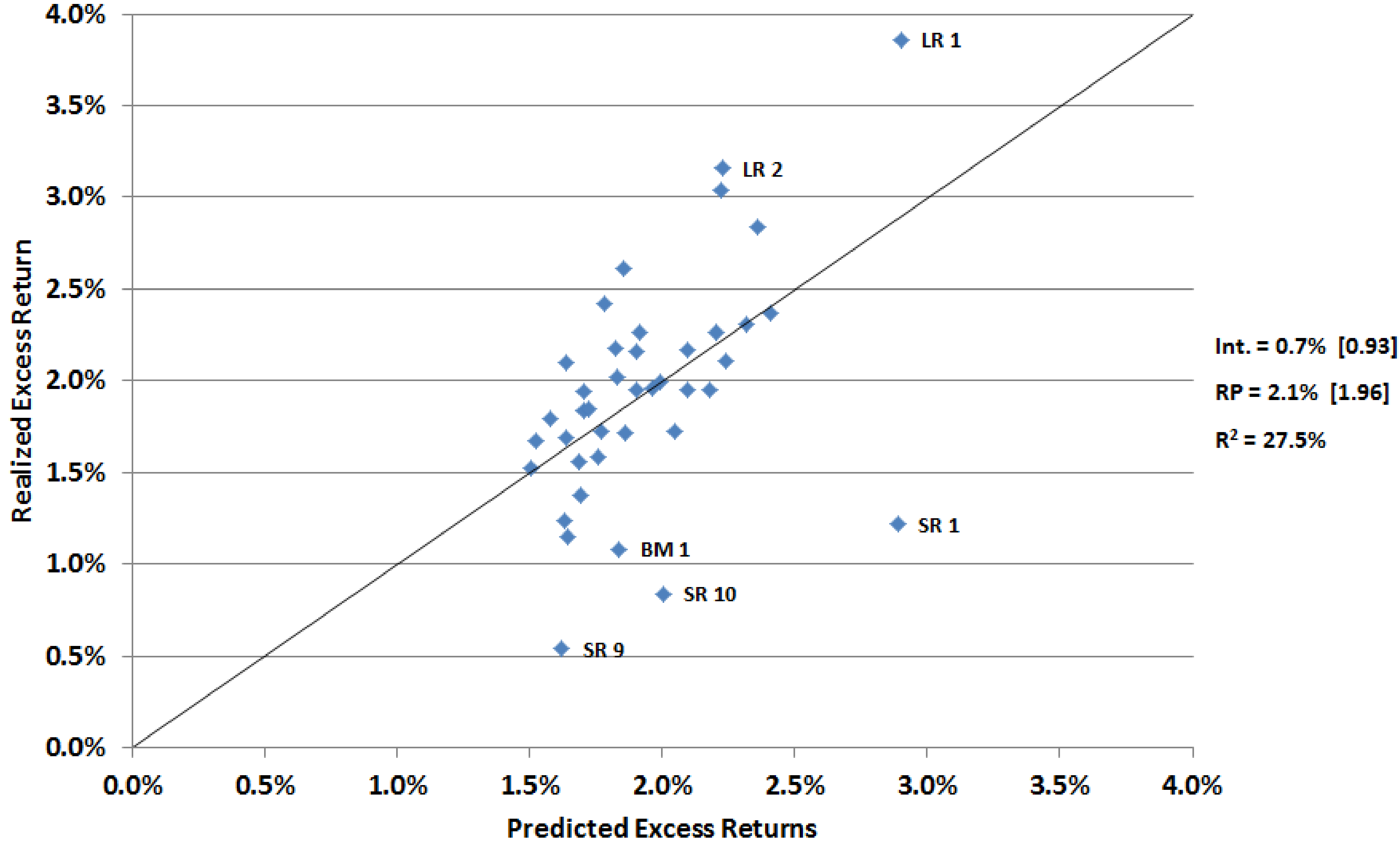

Figure 5. Earnings Announcement Betas and the Cross-Section of Returns. This graph plots the realized average return for the 40 test portfolios vs. their predicted return for the second half of the sample (1992-09). Predicted returns are calculated from regression: $r_i = Int + RP^e * \beta^e_i + \varepsilon_i$, where r_i is the average realized return for portfolio i and β^e_i is its covariance with the earnings announcement portfolio return, estimated using Eq. (1). Estimates for the intercept (*Int*) and the risk premium (*RP*) are given above, together with t-statistics in brackets, which reflect estimation error for earnings announcement betas.

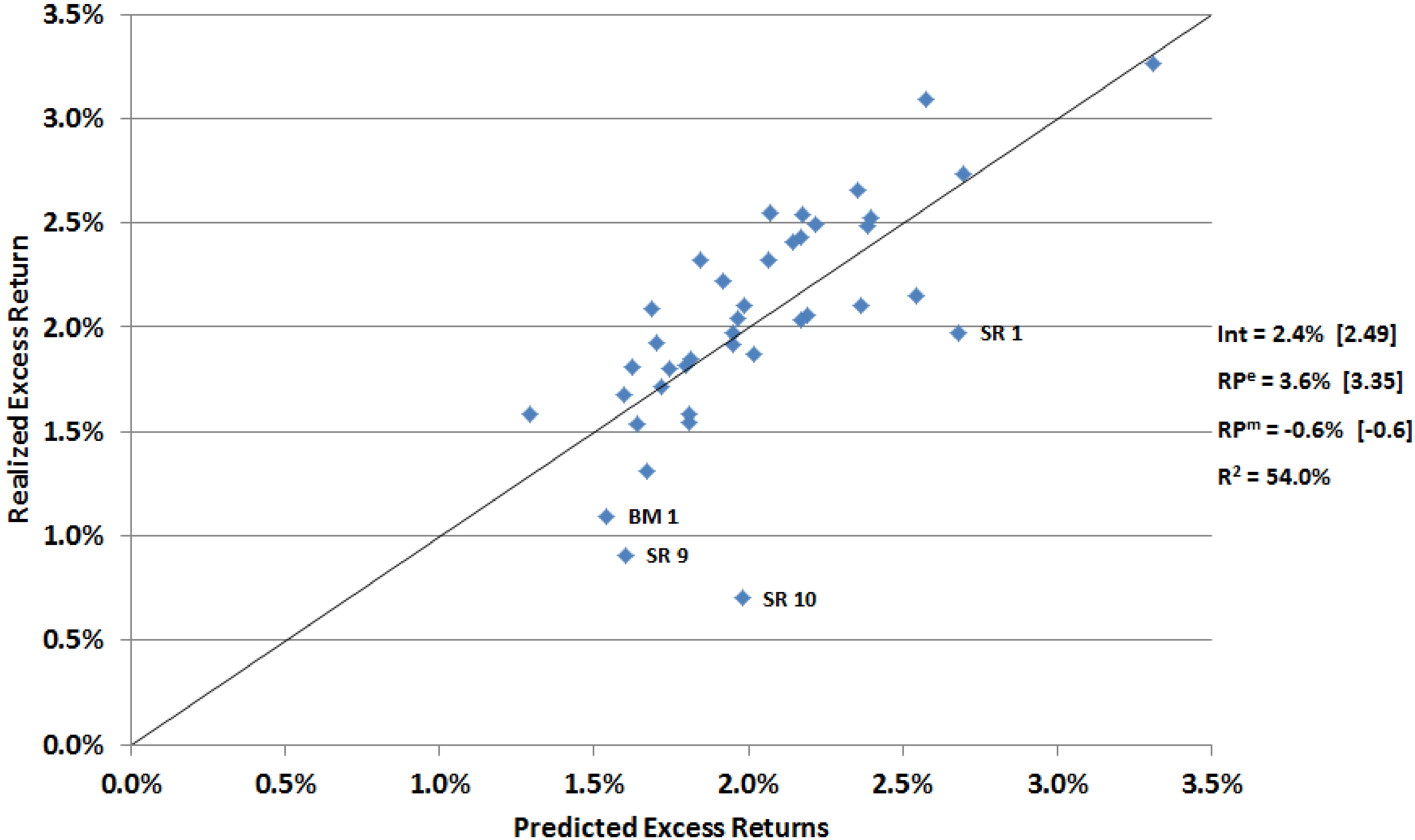

Figure 6. Earnings Announcement and Market Betas and the Cross-Section of Returns. This graph plots the realized average return for the 40 test portfolios vs. their predicted return for the entire sample (1974-09). Predicted returns are calculated from regression: $r_i = Int + RP^e * \beta^e_i + RP^m * \beta^m_i + \varepsilon_i$, where r_i is the average realized return for portfolio i, β^e_i is its covariance with the earnings announcement portfolio return, and β^m_i is its covariance with the stock market return, both estimated using Eq. (3). Estimates for the intercept (*Int*) and the two risk premia (*RP*) are given above, together with t-statistics in brackets, which reflect estimation error for the two betas.

Table I
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. 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.

	Mean Return	α	Mktrf	SMB	HML	UMD	R^2
Panel A: Equal-Weighted Earnings Announcement Portfolio Returns							
1974-09	0.39	0.38	0.12				5.08
	[14.31]	[14.17]	[10.03]				
1974-09	0.39	0.37	0.12	0.09	0.05		6.09
	[14.31]	[13.80]	[10.37]	[4.09]	[2.35]		
1974-09	0.39	0.37	0.12	0.09	0.04	-0.02	6.24
	[14.31]	[13.91]	[9.69]	[4.09]	[1.75]	[-1.73]	
Panel B: Value-Weighted Earnings Announcement Portfolio Returns							
1974-09	0.23	0.22	0.08				1.07
	[5.67]	[5.47]	[4.50]				
1974-09	0.23	0.22	0.07	0.05	-0.07		1.48
	[5.67]	[5.60]	[3.63]	[1.50]	[-2.14]		
1974-09	0.23	0.23	0.06	0.05	-0.08	-0.02	1.53
	[5.67]	[5.68]	[3.29]	[1.50]	[-2.35]	[-1.02]	
Panel C: Equal-Weighted Earnings Announcement Portfolio Returns (subsamples)							
1974-85	0.38	0.35	0.20	0.06	0.12	-0.09	15.07
	[9.43]	[9.11]	[9.58]	[1.56]	[3.13]	[-3.48]	
1986-97	0.46	0.43	0.17	0.14	0.02	0.03	10.07
	[11.55]	[11.07]	[6.68]	[3.86]	[0.34]	[0.79]	
1998-09	0.33	0.32	0.06	0.12	0.06	-0.03	4.02
	[5.61]	[5.49]	[2.57]	[3.04]	[1.64]	[-1.45]	

Table II
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 abnormal announcement returns (estimated using the Fama-French + momentum model), 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. 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	0.41	0.40	0.49	0.57	0.96	0.55	0.55	0.50	0.42	0.55	0.60	0.75	0.24	0.28
	[4.25]	[5.48]	[6.63]	[7.85]	[10.76]	[5.74]	[5.70]	[5.39]	[5.24]	[7.32]	[7.53]	[8.35]	[2.61]	[2.93]
VW	0.08	0.32	0.39	0.39	0.54	0.46	0.49	0.14	0.27	0.49	0.42	0.52	0.38	0.41
	[0.76]	[3.63]	[4.39]	[4.23]	[4.77]	[3.52]	[3.68]	[1.31]	[2.82]	[5.41]	[4.34]	[4.90]	[3.08]	[3.23]
Panel B: Sorts Based on Average Announcement Return Over Previous 10 Years														
EW	0.33	0.42	0.56	0.58	0.95	0.62	0.63	0.40	0.47	0.51	0.67	0.79	0.39	0.41
	[3.51]	[5.59]	[7.32]	[7.63]	[10.72]	[6.52]	[6.47]	[4.35]	[6.22]	[6.47]	[8.31]	[8.57]	[4.04]	[4.18]
VW	0.08	0.20	0.46	0.36	0.48	0.40	0.42	0.03	0.31	0.30	0.48	0.50	0.47	0.50
	[0.76]	[2.26]	[5.34]	[3.75]	[4.19]	[3.05]	[3.14]	[0.31]	[3.69]	[3.32]	[4.70]	[4.67]	[3.83]	[4.00]
Panel C: Sorts Based on Average Announcement Return Over Previous 20 Years														
EW	0.33	0.44	0.51	0.68	0.88	0.55	0.54	0.42	0.49	0.56	0.57	0.80	0.38	0.40
	[3.55]	[5.95]	[6.84]	[8.61]	[9.98]	[5.80]	[5.70]	[4.58]	[6.09]	[7.19]	[7.06]	[8.54]	[3.91]	[4.09]
VW	0.07	0.31	0.40	0.38	0.52	0.45	0.47	0.09	0.31	0.35	0.42	0.57	0.48	0.50
	[0.65]	[3.68]	[4.52]	[3.85]	[4.64]	[3.61]	[3.65]	[0.84]	[3.47]	[3.94]	[4.17]	[5.17]	[3.88]	[4.04]

Table III
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 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 Market excess return (Mktrf) is the difference between the CRSP value-weighted market return and the risk-free rate. 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. T-statistics are calculated using Newey-West standard errors (with 5 lags) and are given in brackets.

	(1)	(2)	(3)	(4)	(5)
Panel A: Agg. Earnings Growth Scaled by Market Equity					
Intercept	0.135	0.038	0.040	-0.125	-0.052
	[1.61]	[0.37]	[0.41]	[-0.69]	[-0.59]
Mktrf	0.014		0.008	0.009	0.005
	[1.15]		[0.90]	[0.95]	[1.06]
Ann. Ret.		**0.036**	**0.031**	**0.035**	**0.024**
		[2.48]	**[2.90]**	**[3.39]**	**[2.24]**
E/P				2.163	1.097
				[1.22]	[0.88]
E. growth$_t$					**0.425**
					[3.14]
E. growth$_{t-1}$					**0.221**
					[2.22]
E. growth$_{t-2}$					-0.002
					[-0.02]
E. growth$_{t-3}$					-0.326
					[-1.41]
R^2 (%)	3.8	8.2	9.4	11.2	42.2
N	144	144	144	144	144

Table III
Aggregate Earnings Growth and Earnings Announcement Returns

Continued from previous page.

	(1)	(2)	(3)	(4)	(5)
Panel B: Agg. Earnings Growth Scaled by Book Equity					
Intercept	0.205	0.027	0.033	-0.077	0.028
	[1.28]	[0.14]	[0.19]	[-0.20]	[0.16]
Mktrf	0.032		0.022	0.022	0.012
	[1.46]		[1.26]	[1.28]	[1.32]
Ann. Ret.		**0.069**	**0.057**	**0.059**	**0.039**
		[2.78]	**[3.25]**	**[3.39]**	**[2.07]**
E/P				1.44	0.12
				[0.44]	[0.07]
E. growth$_t$					**0.408**
					[3.16]
E. growth$_{t-1}$					**0.255**
					[2.27]
E. growth$_{t-2}$					0.041
					[0.37]
E. growth$_{t-3}$					-0.368
					[-1.79]
R^2 (%)	5.3	8.0	10.2	10.4	43.5
N	144	144	144	144	144

Table IV
Earnings Announcement Betas

This table presents the earnings announcement betas of book-to-market, size, short-run return, and long-run return sorted portfolios. The betas are estimated using the following model: $r_t^i = \alpha + \beta^e r_t^{earn} + \varepsilon_t$, where r^i is the quarterly excess return of portfolio i and r^{earn} is the quarterly earnings announcement portfolio return. r^{earn} is 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. Column 1 refers to the portfolio associated with the smallest values and 10 to the portfolio associated with the highest values. T-statistics are in brackets.

	1	2	3	4	5	6	7	8	9	10
Panel A: Book-to-Market Sorted Portfolios										
α	-0.75	0.00	0.30	0.21	0.39	0.13	0.48	0.04	0.71	0.61
	[-0.73]	[0.01]	[0.34]	[0.23]	[0.48]	[0.16]	[0.56]	[0.05]	[0.80]	[0.56]
β^e	0.53	0.50	0.47	0.53	0.41	0.50	0.47	0.61	0.53	0.72
	[3.36]	[3.57]	[3.45]	[3.87]	[3.25]	[3.94]	[3.60]	[4.62]	[3.86]	[4.22]
R^2 (%)	7.4	8.2	7.8	9.5	6.9	9.9	8.4	13.1	9.5	11.1
Panel B: Size Sorted Portfolios										
α	-0.05	-0.26	0.11	0.00	-0.01	0.17	0.05	-0.23	-0.04	-0.20
	[-0.04]	[-0.22]	[0.10]	[-0.00]	[-0.01]	[0.18]	[0.05]	[-0.25]	[-0.04]	[-0.25]
β^e	0.78	0.81	0.71	0.70	0.73	0.59	0.66	0.66	0.57	0.44
	[4.01]	[4.37]	[4.06]	[4.19]	[4.46]	[3.93]	[4.31]	[4.51]	[4.16]	[3.47]
R^2 (%)	10.2	11.9	10.4	11.0	12.3	9.8	11.5	12.5	10.9	7.8

Table IV
Earnings Announcement Betas

Continued from previous page.

	1	2	3	4	5	6	7	8	9	10
Panel C: Short-Run Return Sorted Portfolios										
α	-1.60	-0.14	0.38	0.34	0.19	-0.06	-0.01	0.00	-0.58	-1.42
	[-1.17]	[-0.14]	[0.38]	[0.37]	[0.23]	[-0.08]	[-0.02]	[0.00]	[-0.67]	[-1.38]
β^e	1.03	0.76	0.56	0.51	0.48	0.46	0.46	0.44	0.43	0.61
	[4.86]	[4.61]	[3.72]	[3.56]	[3.67]	[3.65]	[3.64]	[3.30]	[3.20]	[3.83]
R^2 (%)	14.3	13.0	8.9	8.2	8.6	8.6	8.5	7.1	6.7	9.4
Panel D: Long-Run Return Sorted Portfolios										
α	-0.33	0.24	0.56	0.17	0.13	0.45	0.48	0.30	0.28	-0.51
	[-0.25]	[0.25]	[0.63]	[0.20]	[0.16]	[0.59]	[0.59]	[0.37]	[0.30]	[-0.44]
β^e	1.04	0.72	0.54	0.55	0.57	0.44	0.39	0.44	0.38	0.63
	[5.07]	[4.76]	[3.88]	[4.13]	[4.59]	[3.67]	[3.08]	[3.46]	[2.64]	[3.54]
R^2 (%)	15.3	13.7	9.6	10.7	12.9	8.7	6.2	7.8	4.7	8.1

Panel E: Pricing Errors

	1974 -2009	1974 - 1991	1992 - 2009
GRS	1.13	1.37	1.23
p-value	0.307	0.183	0.276