Journal of Accounting Research

DOI: 10.1111/j.1475-679X.2010.00368.x
Journal of Accounting Research
Vol. 48 No. 2 May 2010
Printed in U.S.A.

CHICAGO BOOTH

Aggregate Market Reaction to Earnings Announcements

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Received 4 January 2009; accepted 15 January 2010

ABSTRACT

This analysis identifies a distinct immediate announcement period negative relation between earnings announcement surprises and aggregate market returns. Such a relation implies that market participants use earnings information in forming expectations about expected aggregate discount rates and, specifically, that good earnings news is associated with a positive shock to required returns. Consistent with this interpretation we find that Treasury bond rates and implied future inflation expectations respond directly to earnings news. We also find some evidence that the negative relation between earnings news and market return persists beyond the immediate announcement period, suggesting that market participants do not immediately fully impound these future market return implications of aggregate earnings news.

1. *Introduction*

The literature on earnings informativeness about firm-specific prospects is long established and extensive beginning with the seminal works by Ball and Brown [1968] and Beaver [1968]. However, from the standpoint of an investor holding the classic well-diversified portfolio the importance of such firm-specific information is unclear. Specifically, to the extent that earnings

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surprises reflect idiosyncratic firm outcomes their effects are diversified away over the entire portfolio holding. Such investors are vastly more concerned with earnings implications for the direction the market is taking as a whole than with its idiosyncratic valuation implications. One might, for instance, expect these investors to make important consumption and investment allocation choices or choices of how to weight their investment portfolio across diverse financial instruments (e.g., stocks, bonds, cash) based on changes in their beliefs about expected market returns. Developing an understanding of whether and how accounting information plays a role in this sort of investor decision-making is an important fundamental question for both researchers and policy makers.

One of the more commonplace assertions of equity market commentators/analysts is the attribution of market movement, or lack thereof, to just released or pending firm earnings data. Indeed, time periods where calendar fiscal year firms tend to release preliminary quarterly earnings information (i.e., the months of April, July, October, and mid-January to mid-February) are passionately identified as "earnings seasons" because of their supposed importance to determining the direction of the market as a whole. Presumably the basis for thinking that earnings possess such importance is that the disclosure of past performance conveys information to market participants about future cash flows or discount rates. The basic question we address in this paper is whether there is any identifiable empirical evidence of earnings playing such a market-moving informational role.

Our study is related to work by Kothari, Lewellen, and Warner [2006] and Cready and Gurun [2008], referenced as KLW and CG henceforth. KLW document that the relation between seasonal change in aggregate earnings changes and market returns is negative where returns are measured over the quarter in which earnings are released.[1] They suggest that this relation reflects an earnings-associated relation with discount rate movements.[2] Their analysis, however, provides no direct connection between market returns and actual aggregate earnings disclosure events. That is, the negative association they document may arise from the earnings disclosures or reflect market response to contemporaneous macroeconomic news such as GNP, housing starts, and unemployment rates. It could also reflect predictable comovement between earnings changes and expected market returns as proposed by Ball, Sadka, and Sadka [2009], Sadka [2007], and

[1] Lamont [1998] documents some evidence of a negative relation between earnings changes and quarter ahead market returns while Hirshleifer, Kewei, and Teoh [2009] report evidence of negative contemporaneous relationships between earnings changes and market returns. The Hirschleifer et al. analysis also links much of the annual window-based negative relation to the accrual component of annual aggregate earnings.

[2] Such an interpretation is consistent with recent evidence in Chen and Zhao [2008] that, in general, discount rate news (measured as a negative transformation of discount rate movement) and cash flow news are negatively correlated. That is, discount rates tend to move up when cash flow news is favorable and down when it is unfavorable.

Sadka and Sadka [2009].[3] Hence, the KLW analysis does not necessarily imply (nor does it conclude) that earnings news is the source of this negative association.

Relative to KLW, CG provide a tighter focus on the timing of the market return movement relative to the earnings disclosure event by focusing on monthly returns. Using less restrictive approaches to isolating the relation between earnings surprise and market return, they find a much less pronounced negative relation. Moreover, CG also find evidence of strong positive aggregate earnings surprise effects in time periods following the earnings disclosure quarter. Their analysis suggests that both the existence and expected immediate announcement period directional relation between earnings surprises and aggregate market return remains unclear.

Unlike KLW or CG our analysis focuses on short-window time periods (i.e., days) surrounding the release of the earnings information. In much the same way that Beaver [1968] can be distinguished from Ball and Brown [1968], our analysis is much more clearly targeted at examining the market's response to the surprise content of earnings than with documenting longer window comovements between earnings and market returns. Hence, we can directly evaluate whether: (1) there is a distinguishable aggregate market response to earnings information releases; and, (2) whether this response is positively or negatively related to the direction of this earnings news.

While we find no evidence of a positive relation between earnings surprises and announcement period market movements along the lines commonly alluded to in the financial press, we do find evidence consistent with earnings announcements impacting market return. Specifically, we find strong evidence of a general negative earnings surprise effect that is most concentrated in the days immediately surrounding earnings releases. Such a relation is consistent with earnings disclosures providing the market with information about the discount rates applicable to future period dividends/cash flows and, more importantly, that the market is using this earnings information to set aggregate market price. That is, positive (negative) aggregate earnings surprises engender negative (positive) movements in aggregate market value. Our evidence also indicates that these impacts persist well beyond the initial announcement period (albeit at lower magnitudes). Such persistence suggests that the market is not immediately fully impounding the discount rate implications of earnings news.

2. *Conceptual Perspectives*

Campbell [1991], among others, demonstrates that observed market return ($RMKT_t$) in a given period t is the sum of three separable components:

[3] KLW also consider the possibility that the negative association reflects an association between earnings movements and expected discount rate levels and conclude that the evidence is inconsistent with such a relation being the primary source of the relation (pp. 565–566).

(1) beginning-of-period expected market return ($ERMKT_t$), present value of changes in current and future cash flow expectations (CF_t) occurring in period t, and (3) present value of period t–based changes in future discount rate expectations (DR_t). It follows that the covariance between earnings (X_t) and market returns can be decomposed as[4]

$$\text{cov}(RMKT_t, X_t) = \text{cov}(ERMKT_t, X_t) + \text{cov}(CF_t, X_t) + \text{cov}(DR_t, X_t). \quad (1)$$

This equation makes clear that the observed relation between earnings and market returns can be thought of as a sum of underlying correlations between earnings and $ERMKT_t$, CF_t, or DR_t.

Studies such as Brown and Ball [1967] and Gonedes [1973] demonstrate that aggregate earnings measures reflect cross-firm commonalities (i.e., macrolevel effects). In the aggregate market return literature aggregate earnings is widely recognized as a plausible measure of aggregate cash flow (e.g., Fama and French [1989], Campbell and Shiller [1988], Hecht and Vuolteenaho [2006], KLW). However, consistent with equation (1), it is also likely that systematic earnings properties are related to expected return and possess discount rate implications. In the remainder of this section we discuss these sources of earnings announcement-driven aggregate market return relations.[5]

2.1 EARNINGS AND EXPECTED MARKET RETURNS

A relation between earnings revenue and $ERMKT_t$ is, by definition, determined by events and information available in periods prior to period t. It necessarily reflects a correlation between *expected* earnings and returns, rather than a reaction to new information released in period t. Since *ERMKT* relations are predictable, earnings-related *ERMKT* associations are not precisely tied to earnings disclosure events. An advantage of a short-window event study analysis such as the one we conduct is that it provides a platform for distinguishing predictable *ERMKT* return-earnings associations from earnings discount rate and cash flow "shock" effects.

Ball, Sadka, and Sadka [2009] and Sadka and Sadka [2009] argue that earnings-related *ERMKT* effects are the primary explanation for observed negative relations between aggregate earnings movements and market returns such as those documented in KLW. They show that earnings changes, a traditional measure of firm-level earnings surprise, are highly predictable at the aggregate level. They further propose that periods of earnings decline are high-risk relative to periods in which earnings are increasing. If

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[4] This approach of relating Campbell [1991] to empirical cash flow constructs is based on Hecht and Vuolteenaho [2006], who incorporate empirical measures of cash flows (the vector $\boldsymbol{X}_t(C_t)$) into Campbell's linear decomposition framework yielding: $RMKT_t = \boldsymbol{X}_t(C_t) \times (B_E + B_C + B_r) + \varepsilon_t$, where B_E, B_C, and B_r are cash flow metric coefficient vectors relating the empirical cash flow measures to $ERMKT_t$, CF_t, and DR_t, respectively, while ε_t is an error term vector.

[5] Shivakumar [2010] notes that it is also plausible that earnings news may give rise to return effects when it impacts macroeconomic policy decisions or influences investor sentiment.

so, then investors demanding compensation for bearing risk will demand higher risk premiums for holding the market portfolio in periods of declining earnings relative to periods of increasing earnings. Under this predicted earnings change perspective we should expect to observe a general negative relation between earnings changes and returns in the time periods where the earnings occur.

Other *ERMKT*-driven explanations for the observed negative relation between aggregate earnings changes and market return focus on interrelationships between aggregate earnings and economic fundamentals. In these explanations earnings-correlated fundamentals rather than earnings drive market return effects. Ball, Sadka, and Sadka [2009] suggest the possibility that corporate demand for external capital may move inversely with earnings-related internal capital availability. KLW examine how a number of economy-wide factors including short-term interest rates, yield spread between short- and long-term treasury rates, and yield spread between short- and long-term corporate debt are related to aggregate earnings changes and market returns. Interestingly, while KLW do find some evidence of correlations between aggregate earnings changes and some of these factors, the negative disclosure period relation between market return and aggregate earnings they document persists after controlling for them. Moreover, KLW ultimately conclude that most of the evidence they document is inconsistent with a predictable discount rate explanation.[6]

Identifying the appropriate aggregate earnings "surprise" metric is of particular importance in distinguishing between the earnings as news (cash flow or discount rate shock) and nonnews *ERMKT* perspectives. Earnings surprise, if correctly measured, is necessarily unpredictable and therefore $\text{cov}(ERMKT_t, X_t)$ in equation (1) is necessarily 0. That is, *ERMKT predictable earnings* perspectives can be ruled out as explanations for observed associations with aggregate market return.

2.2 EARNINGS AS AGGREGATE CASH FLOW NEWS

At the firm level a vast literature on the relation between earnings and firm returns initiated with the seminal studies by Beaver [1968] and Ball and Brown [1968] support the notion that earnings conveys cash flow information about firms to investors. Time-series evidence reported in KLW suggests that aggregate earnings innovations are highly persistent. In fact,

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[6] Yan [2007, p. 13] presents a model in which contemporaneous aggregate returns "are negatively correlated with aggregate earnings surprise" even though surprise is positively related to future market return. A positive (negative) surprise signals an increase (decrease) in the growth rate of the aggregate economy, which raises (lowers) expected future returns. This change in future return expectations in turn engenders what Yan identifies as a contemporaneous "hedging effect." Specifically, current period aggregate market value may move in a direction opposite that of the future return expectations because future cash flows are now discounted at this new rate. Ceteris paribus, an increase (decrease) in discount rate decreases (increases) present value.

they seem to be much more persistent at the aggregate level than at the firm level. Existing evidence in the realm of intraindustry earnings information transfers suggests that cash flow effects hold in an aggregate sense at the industry level. Foster [1981] finds strong evidence that prices of nonannouncing firms within an announcing firm's industry move in the same direction as the returns of the nonannouncing firms while Baginski [1987] finds a similar relation in terms of future earnings expectations based on management and analyst forecasts. Extension of these firm- and industry-level cash flow associations to the market as a whole implies that aggregate earnings surprises contain directionally consistent cash flow news.

The dominance of a direct cash flow perspective is also implicit in the widely encountered popular press notion that corporate earnings numbers move the market. Recent *Wall Street Journal* (WSJ) columns, for instance, are illustrative of the broad nature of this belief. One states that "Disappointing earnings from Amazon.com and Electronic Arts could rattle the technology sector and add to broad pressure following yesterday stock-market skid" (WSJ, February 3, 2006). Another states, "stock prices slid late last week, partly because investors and analysts started worrying that the string of better-than-expected earnings reports might be over" (McDonald, January 17, 2006).

Evidence of this cash flow view is found among investment professionals as well. The Associated Press quotes Keith Keenan, vice president of institutional trading at Wall Street Access, "Short-term, the market does appear to be somewhat oversold, so there's probably not too much more to expect on the downside, unless earnings are disappointing" (Martinez, March 27, 2004). WSJ cites James Paulson, chief investment strategist at Wells Capital Management as stating that "stocks could rally later in the quarter... and investors start to latch on to uplifting earnings numbers" (Patterson, October 11, 2005).

Empirical support for an overall positive disclosure period relation between earnings news and market return is quite limited, however. Penman [1987] documents that market returns tend to be higher in the early weeks of calendar quarters, a relation he attributes to the prevalence of earlier disclosure of positive earnings surprises relative to negative earnings surprises. This timing pattern implicitly supports the presence of a positive relation between earnings surprises and market returns. Anilowski, Feng, and Skinner [2007] evaluates the relation between management earnings forecasts/guidance and market returns and finds that guidance is generally positively related to other measures of aggregate earnings surprise such as seasonal change in earnings and mean forecast error. They also find some limited evidence of a direct association between guidance and monthly market returns, but this evidence is most supportive of market return leading guidance (see Shivakumar [2007]). In a related short-window (three-day) evaluation of the association between guidance and market return they document a positive association between qualitative earnings guidance

provided by larger "bell weather" firms and market return in the three days surrounding the guidance release date.

2.3 EARNINGS AS DISCOUNT RATE NEWS

The immediate market impact of a discount rate movement is an opposite direction return effect. For instance, if a news event increases discount rates, then market value (and hence market return) will drop in the event period. Unlike the clear directional implications of earnings news for cash flows, however, the expected directional implication of earnings news for discount rates is ambiguous. Campbell and Cochrane [1999] and Chan and Kogan [2002] evaluate how discount rates vary with business cycle conditions and show that under the assumptions of their models discount rates should be high in troughs and low at peaks. Cochrane [2006], however, illustrates that an opposite pattern is conceptually possible when, for instance, risk-averse investors seek to consume more in growth periods and consequently must be offered higher rates of return. Ball, Sadka, and Sadka [2009] implicitly argue that discount rates should decline when earnings unexpectedly improve as periods of increasing earnings are less risky than periods of declining earnings. Similarly, Shivakumar [2007], consistent with countercyclical behavior in market returns documented in Fama and French [1989], proposes that discount rates could move inversely with earnings news to the extent such news is informative about real output levels.

Empirically, KLW document that a negative relation exists between aggregate earnings changes and market returns over the quarter in which that earnings are disclosed. This relation is consistent with aggregate earnings news signaling an upward movement in future discount rates in the disclosure quarter (see also Chen and Zhao [2008]). Using a similar earnings measure, CG also find evidence of such a negative relation. However, they are unable to clearly link it to the month in which the earnings disclosure occurs. In particular, the negative relation is present in months beyond the initial disclosure month. This lingering nature of the relation is consistent with the predictable earnings change perspective (e.g., Ball, Sadka, and Sadka [2009]) of the KLW evidence. Market returns are low (high) in time periods when earnings are increasing (decreasing). It is also consistent with the notion that the market is failing to fully recognize the discount rate implications of aggregate earnings news. That is, KLW and CG are observing a delayed market response to the discount rate news originally inferable from aggregate earnings numbers.

2.4 AGGREGATE EARNINGS AND INFLATION

Shivakumar [2007] identifies a particularly germane explanation for the perplexing negative relation between aggregate-level earnings news and market returns. Specifically, he proposes that aggregate earnings surprises could signal unexpected inflation that can be directly linked to discount rate movements (Fisher [1907]). Empirically, he documents a

significant positive relation between earnings movements and future inflation rates. Flannery and Protopapadakis [2002] evaluate short-window market responses to a variety of macrolevel variable surprise measures including real GNP, housing starts, industrial production, and leading indicators. The only three variables that have significant directional market impacts are: (1) the consumer price index, (2) the producer price index, and (3) the money supply (M1). The first two of these directly measures inflation while the third is frequently linked with inflation. All three have inverse (negative) disclosure period effects.

Inflation is typically not modeled as an explicit component of market return in the aggregate return prediction literature. Indeed, studies in this area are frequently couched in nominal terms. Achieving direct insights about inflation effects requires evaluation of real effects and measures. If, as is consistent with the evidence in Shivakumar, earnings shocks signal directionally consistent unexpected movements in inflation rates, then the real cash flow implications of a current period earnings shock become ambiguous. The inflation rate effect on future cash real flows is opposite that of the nominal cash flow effect. In the unlikely event that the inflation effect is the larger of the two, then the overall real cash flow effect will also be opposite that of the nominal cash flow effect. However, irrespective of what the real cash flow effect is, any inflation signal has straightforward discount rate news implications. Specifically, inflation increases should drive increases in future market return expectations in order to hold real rates of return constant.

While our primary analysis concerns the relation between equity aggregate market return and earnings news as an extension, we also investigate the relation between earnings news and changes in returns on government debt securities. To the extent that such return changes reflect inflation effects, this extension provides insights about the inflation component of aggregate earnings news.[7]

3. Research Question

Distinct from other empirical efforts aimed at understanding the relation between aggregate market returns and earnings information, our central interest is on what, if any, impact the surprise content of earnings releases has on market returns. That is, does earnings news move the market and, if so, in what direction does it move it? By answering this question we achieve

[7] A particular limitation of directly trying to address real cash flow implications in our analysis is that most inflation data are monthly while we are working at the daily level. Undertaking inflation corrections would introduce systematic correction-driven effects within months into the time series of observations, thereby greatly compromising its integrity. A second and related challenge is that GAAP earnings commonly involve matching current period revenue dollars with historical expense dollars. That is, dividing reported earnings by a price index does not yield a particularly clean or even interpretable measure of real earnings (cash flows).

two important objectives beyond the obvious one of identifying whether or not earnings possess information content at the aggregate level. First, we evaluate whether anything beyond expected market return–driven associations underlies observed relations between earnings measures and market returns such as those documented in KLW, CG, and Sadka and Sadka [2009]. Second, we unambiguously identify whether or not any earnings news effect is negative, as suggested by the evidence in KLW, or positive, as is consistent with popular press narratives as well as the idea that earnings news primarily reflects cash flows.[8]

Our analysis incorporates three important innovations over prior studies. First, we focus on explaining daily market returns. This restriction of the return period greatly insulates our analysis from the confounding influences of any broader associations between earnings measures and market returns that may be present. Second, following CG, we employ a very general approach to deriving earnings surprise that, in particular, conditions on aggregate earnings realizations occurring in days immediately preceding announcement dates of interest. That is, aggregate earnings surprise at day t is measured conditional on realized aggregate earnings numbers from time periods as near as day $t - 2$. Hence, we employ a very timely measure of earnings surprise that takes into account preexisting levels of aggregate earnings and systematic macrolevel influences on earnings in a very general unrestricted fashion. Third, we evaluate the uniqueness of the announcement period response. A broad expectation-driven earnings/return association that is unrelated to specific announcement events should be more or less equally present in the general time period in which the announcement happens to occur. It is not tied to the exact point in time when the announcement is disclosed. An association that is only present or most strongly present at the immediate announcement event period, however, is compelling evidence of a cause-and-effect relation between the announcement event (earnings disclosure) and market return movement.

4. *Research Design*

Our research design builds upon the levels-based aggregate earnings expectation model introduced in CG. It uses multiple past aggregate earnings

[8] Some return prediction analyses following Campbell and Shiller [1988] and Campbell [1991] partition market return into cash flow and discount news components based on the time-series properties of the aggregate returns in conjunction with candidate news variables. Hecht and Vuolteenaho [2006] and Chen and Zhao [2009], among others, question the reliability of these news partitions, especially when news effects are not fully priced within the return accumulation period. Given that we use one-day return periods, this efficient pricing concern is particularly germane for our analysis. And, since our primary objective is to simply assess whether earnings conveys news per se, we do not attempt to formally decompose daily market returns into news components.

observations to estimate the impact of the association between unexpected aggregate earnings in period t and market returns in any t-relative time period as follows:

$$MR_{t+k} = b_0 + b_{1,k}E_t + \boldsymbol{b_g}\boldsymbol{E_{-g}} + e_{t+k}, \tag{2}$$

where:

MR_{t+k} is a measure of market return in period $t + k$,
E_t is aggregate earnings measured across all earnings announced in month t,
$\boldsymbol{E}_{-g}$ is a vector of lagged (relative to E_t) monthly aggregate earnings realizations.[9]

CG show that the E_t coefficient $b_{1,k}$ in (2) directly reflects the relation between aggregate earnings surprise (measured relative to past aggregate earnings realizations) and market return in period $t + k$, where the contemporaneous relation (of primary interest in this study) occurs when $k = 0$. Moreover, the lagged earnings terms also control for any future return implications associated with past earnings realizations. That is, $b_{1,k}$ reflects the impact of E_t on market return above and beyond any return impact associated with the vector of past earnings levels/surprises.[10]

A particular advantage of the equation (2) approach to estimating aggregate surprise effects is that it places minimal constraints on the underlying earnings expectation process. Earnings change–based models, for example, constrain surprise to be a linear outcome of same firm earnings changes. In equation (2) the implicit period t earnings expectation is estimated as a best linear combination of the set of lagged aggregate earnings values included in the set of explanatory variables. Consequently, it allows for the possibility that earnings surprise is best measured as same firm–based earnings changes, but it does not impose this constraint on the data. Equation (2) also incorporates earnings outcomes from non–period-t announcing firms (e.g., firms that announced earnings in period $t - 1$) in deriving the implicit period t earnings expectation.

Aggregate earnings metrics are averages and idiosyncratic firm-specific earnings properties disappear when such averages are calculated over a large number of observations in much the same way that idiosyncratic return variations disappear within the average of a large diversified portfolio. Equation (2) allows for the possibility that market participants use more recent aggregate earnings information from prior periods in forming current period aggregate earnings expectations.

A second advantage of the equation (2) specification arises when earnings surprise is associated with postsurprise market returns. Such

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[9]Vector format in all equations is denoted by **bolding**.

[10] In CG and our analyses the set of reporting firms in the index are taken as a nonrandom sampling of the underlying population of firms. Hence, their earnings reflect (with error) earnings properties of all firms in the economy.

associations occur when earnings surprise induces discount rate shocks because the underlying discount rate realizations arise in postsurprise periods. They can also occur when measured earnings "surprise" is correlated with various other underlying drivers of expected market returns (e.g., Ball, Sadka, and Sadka [2009], Sadka and Sadka [2009]). Hence, unlike the individual firm setting, it is highly plausible (and consistent with postannouncement quarter findings reported in CG) that earnings surprise–related discount rate shocks in period t impact market returns in subsequent time periods. Equation (2) is robust to such lingering "surprise" realization effects as they are captured by the estimated coefficients on the lagged aggregate earnings–level terms.[11] By using this approach the earnings surprise effects detected are robust to any linear earnings expectation and market return implications inherent in the included set of lagged explanatory aggregate earnings levels.

Distinct from CG, our interest is in immediate short-window relations between market returns and earnings disclosures. We adapt (2) to this setting as follows:

$$R_t = \boldsymbol{c_d}\, \boldsymbol{D_t} + c_1 IX_t + c_2 IX_{q-1} + c_3 IX_{q-4} + c_4 IX_{q-5} + \boldsymbol{cc_g}\, \boldsymbol{AX}_{-g} + e_t, \quad (3)$$

where:

- R_t is (value- or equal-weighted) market return on day t;[12]
- $\boldsymbol{D}_t$ is a vector of day of the week indicator variables;
- IX_t is the (value- or equal-weighted) average of earnings announced over trading days $t-1$ through $t+1$ relative to day t;[13]
- IX_{q-k} is the value-weighted (*VIX*) or equal-weighted (*EIX*) average of lagged quarter $-k$ earnings for the set of firms announcing current earnings over days $t-1$ to $t+1$;
- $\boldsymbol{AX}_{-g}$ is a vector of aggregate earnings levels where each element is measured as the value-weighted (***VAX***) or equal-weighted (***EAX***) average of all available earnings announced over trading days $(-2-g\times 21)$ through days $(-22-g\times 21)$ relative to day t; g varies from 0 to 16 in unitary increments.

While IX_t in equation (3) is necessarily specific to a comparatively small group of announcing firms, it is also representative of economy-wide commonalities in earnings. Idiosyncratic earnings shocks are diversified in the

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[11] Associations between predictable (based on lagged aggregate earnings) earnings changes and market returns as proposed by Ball, Sadka, and Sadka [2009] are also controlled by the lagged earnings terms in this model.

[12] All results are robust to the use of excess market return (i.e., market return less the risk-free rate) rather than total market return.

[13] We value-weight based on the rank of market values within the index. Otherwise, one or two large cap firm earnings commonly end up dominating the index (e.g., their weight within the index exceeds 50%). We also value-weight the associated *AX* indices based on rank in order to be consistent with the three-day index weighting.

average (per the law of large numbers) while systematic (or common) shocks are not.

Earnings are measured as net income before extraordinary items per share (Quarterly CRSP–*Compustat Merged Database* Item 19) and are standardized by share price four months prior to the end of fiscal quarter date. In order to fix the lagged aggregate earnings averages in relative time, we employ 21 trading day accumulation periods to derive them. These accumulations are recalculated for each trading day of interest. The 21-day accumulation periods roughly correspond to the average number of trading days in a month (CG calculate these values by calendar month).[14] Hence, our vector of lagged earnings values should capture any monthly or quarterly seasonality in the aggregate earnings data. We supplement the CG model with additional lagged announcing firm-specific earnings averages in order to explicitly account for firm-specific components in IX_t. As a given IX_t metric encompasses only three days, it is based on a comparatively small number of earnings announcements and so may still retain influential firm-specific attributes. Inclusion of lagged same-firm earnings terms controls for these residual firm-specific impacts.[15]

In further analyses, some of which are reported in the tables that follow, we supplement equation (3) with additional independent variables to control for expected market return, including the risk-free rate, lagged return on the market, and bond yield spreads. In general, the introduction of such variables has little impact on empirical results beyond increasing overall model R^2. Such robustness to the inclusion of additional control variables for expected market returns is supportive of the notion that our lagged earnings levels–based estimated c_1 coefficients are accurately capturing aggregate earnings surprise effects on market return since, by definition, correctly measured earnings surprise in period t should be orthogonal to all determinants of expected market return in period t.

5. *Empirical Analysis*

5.1 SAMPLE

Our sample consists of all quarterly earnings announcements from January 3, 1973 through June 21, 2006, subject to the following screens: (1) earnings, earnings announcement date, and beginning of year stock price

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[14] Our $g = -12$ lag, for instance, covers roughly the same 21-day calendar period (but one year earlier) as our $g = 0$ lag. Hence, if there is some form of annual seasonality in the aggregate data, they will be picked up by the coefficients on these two lags. The general structure of equations (2) and (3) allows for the possibility that various pairs of earnings levels have coefficients of equal magnitude and opposite sign but, unlike conventional earnings differences-based designs, does not impose this restriction on the expectation metric.

[15] Lagged same firm indices earnings numbers are scaled by the same prices used to scale the earnings values in IX_t. Results (not reported) are inferentially indistinguishable from those reported when we adjust each index based on prices four months prior to each index date.

are available on Compustat; (2) stock price exceeds $5 and is less than $10,000; (3) absolute seasonal random walk forecast error is less than 100%. After application of these screens 413,687 firm-announcement observations remain.[16]

5.2 RETURN AND EARNINGS INDICES

Consistent with Anilowski, Feng, and Skinner [2007], we employ a three-day earnings accumulation period to allow for the possibility that actual initial disclosure days sometimes differ from Compustat earnings days. We accumulate earnings rather than market return because three-day averages: (1) encompass more earnings announcements than one-day averages, thereby enhancing their stability; and, (2) do not introduce additional serial dependency into the dependent variable from overlapping return accumulation windows.[17]

Panel A of table 1 provides descriptive information on the market return indices and the two earnings indices employed in the analysis. We use the combined NYSE and AMEX daily CRSP value-weighted and equal-weighted return indices. We chose these indices rather than the more comprehensive NYSE/AMEX/NASDAQ combinations for two reasons. First, the NASDAQ listings are particularly sensitive to the tech stock bubble of the mid to late 1990s, which could introduce spurious bubble-driven effects into our analysis. Second, Shumway and Warther [1999] note that delisting bias is a particular concern for NASDAQ stocks and it seems likely that this bias will also manifest itself in aggregate NASDAQ return data.[18]

Data for the three-day value-weighted and equal-weighted earnings indices, *VIX* and *EIX,* are available for 8,312 days (out of 8,450 possible days) over the time period beginning on January 3, 1973 and ending on June 20, 2006. Consistent with the size effect, particularly at the daily return level, the equal-weighted return average of 0.068% is considerably larger than the value-weighted return average of 0.044%. In constructing the value-weighted three-day index, *VIX*, we value-weight based on the ranks of the

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[16] All findings reported here are robust to the exclusion of the three market "crashes" in our sample time period (i.e., October 19, 1987; October 27, 1997; September 11, 2001).

[17] The results we report are robust to using sequences of three independent contiguous daily indices rather than their average. Since the number of announcement-specific indices needed for a daily-based analysis amounts to as many as 24 in some portions of the analysis, succinctly interpreting their collective meaning can be challenging. The three-day indices largely reflect our best effort interpretations of one-day index-based findings and hence we report our findings using them. Results are also robust to correction of standard errors for first-order serial correlation in market return (correction is based on Newey-West [1987] standard errors).

[18] Consistent with these concerns, there is a modest decline in significance across most of our analyses when aggregate return is expanded to include NASDAQ listed companies. When NASDAQ firm earnings are excluded from our earnings measures, results are similar to those reported when the earnings index windows are expanded to five days (to compensate for the loss of NASDAQ earnings observations in the index).

TABLE 1

Descriptive Data on Earnings and Market Return Indices and Earnings Predictability Statistics

Panel A: Basic descriptive statistics

	One-Day Market Return Indices		Three-Day Earnings Indices		Number of Announcements in Index
	Value-Weighted Market Return	Equal-Weighted Market Return	*VIX*[a]	*EIX*[b]	
Mean	0.044%	0.068%	1.54%	1.51%	146
Median	0.058%	0.105%	1.29%	1.24%	80
Standard deviation	0.916%	0.738%	1.24%	1.42%	154
Maximum	8.865%	9.830%	8.07%	7.74%	1,032
95th percentile	1.441%	1.095%	3.77%	4.09%	462
75th percentile	0.517%	0.444%	2.39%	2.37%	198
25th percentile	−0.419%	−0.265%	0.74%	0.63%	43
5th percentile	−1.397%	−1.073%	−0.23%	−0.45%	24
Minimum	−18.095%	−14.189%	−8.07%	−5.71%	6
Number of observations	8,312	8,312	8,312	8,312	8,312

Panel B: Earnings prediction statistics[c]

	Model Fit Statistics		Same Firm Lag Coefficients (*t* values in parentheses[d])			General Lags	
Dependent Variable	Residual Std. Dev.	R^2	VIX_{-1} *or* EIX_{-1}	VIX_{-4} *or* EIX_{-4}	VIX_{-5} *or* EIX_{-5}	(VAX_0 *or* EAX_0)	Overall *F*-Statistic
VIX_0	0.512%	79.21%	0.38	0.35	−0.13	0.33	12.15
			(10.97)	(9.15)	(−4.15)	(7.62)	
EIX_0	0.617%	76.68%	0.39	0.32	−0.11	0.30	12.48
			(10.90)	(9.12)	(−3.67)	(6.30)	

[a] *VIX* is the mean value–weighted earnings as a percentage of market value for earnings released over three-day rolling time periods, beginning on January 2, 1973 and ending on June 20, 2006.

[b] *EIX* is the mean value of earnings as a percentage of market value for earnings released over three-day rolling time periods, beginning on January 2, 1973 and ending on June 20, 2006.

[c] Statistics are for regressions of VIX_0 and EIX_0 on same firm aggregate earnings lags for quarter-ago, year-ago, and five quarters ago earnings and a series of general 21-day aggregate earnings lags. The coefficients for the same firm lags and the first general lag are reported.

[d] Due to the overlapping nature of the dependent variable, standard errors for purposes of deriving *t*-statistics pertaining to reported coefficients are adjusted for serial correlation using Newey-West [1987] standard errors (with three lags).

market values within the three-day index. If, for example, an index contains 25 announcements, the largest announcing firm's earnings are assigned a weight of 25 while the smallest is assigned a weight of 1. *VIX* averages 1.54% while *EIX*, the equal-weighted three-day index, averages 1.51%. The time series–based standard deviation in the *VIX* index is 1.24%, while the *EIX* standard deviation is 1.42%. In contrast, daily cross-sectional variation in individual announcing firm earnings/price ratios averages 4.36% (not tabulated). As the indexes are averages idiosyncratic error is purged from them per the law of large numbers. Hence, these reductions suggest that averaging purges a sizable amount of idiosyncratic variation in these earnings indices. The number of earnings values used in the construction of the

earnings indices averages 146.[19] The median number, 80, is somewhat smaller, reflecting the fact that earnings typically occur in clusters (i.e., "earnings seasons") that fall between two and five weeks after calendar year annual and quarterly fiscal period ends. Indices based on fewer than six announcements are dropped from the analysis.[20]

Panel B of table 1 provides information on equation (3)'s implicit earnings prediction ability. It reports selected statistics for regressions of VIX_0 and EIX_0 on the remaining right-hand side earnings indices in equation (3). Consistent with the predictable nature of aggregate earnings, the *VIX* model has an R^2 of 79.21%, while the *EIX* model has an R^2 of 76.68%. The mean residual standard deviation of 0.512% associated with the *VIX* model is substantially smaller than the 0.617% value achieved with the *EIX* model, which suggests that size-weighting improves predictive performance. In both models the coefficients on the one quarter and four quarter lags are positive and significant while the fifth lag is negative and significant, but considerably smaller in absolute magnitude than the one-quarter lag coefficient. The first general lag is also positive and significant with coefficient magnitudes similar to those for the one- and four-quarter lags. The coefficients for the remaining lags are not reported as they generally lack significance on an individual basis. Collectively, the general lags are also highly significant as reflected by the *F*-statistics of 12.15 and 12.48.[21]

5.3 CORRELATIONS

Table 2 reports bivariate correlations among selected value-weighted earnings indices along with correlations of these indices with market returns and selected macroeconomic variables of interest. Table 3 reports a similar set of correlations for selected equal-weighted earnings indices. These two tables indicate that the day 0 earnings indices of interest, VIX_0 and EIX_0, are uncorrelated with contemporaneous market returns, positively correlated with contemporaneous short-term treasury bill rates (rf_t and rf_{t-1}), but negatively correlated with the term and yield spreads. They are also highly positively correlated with both lagged same firm and lagged

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[19] The percentage of announcements from a single industry (industry classifications based on Fama and French [1997]) exceeds 35% for fewer than 5% of the daily announcement indices. Results are unchanged when these industry-dominated index days are excluded from the analysis.

[20] When earnings are weighted by market values per se, results are directionally consistent with but weaker statistically than those based on rank-weights. With the exception of the S&P 500 analysis (table 8), reported results are substantively unchanged when earnings indices based on fewer than six earnings announcements are included in the analysis. The estimated S&P coefficients fall in absolute magnitude by around 50% and generally lack significance when the fewer-than-six announcement constraint is dropped.

[21] Because of the overlapping nature of the three-day earnings index, the residuals in the panel B estimations exhibit pronounced positive first-order autocorrelations. Earnings change–based specifications such as differences with quarter ago earnings or year ago earnings do not alter these autocorrelations. They also perform less well in terms of overall prediction error minimization than do the reported levels specifications.

TABLE 2

Value-Weighted Earnings Index (VIX & VAX) Correlations[a]

	$VW\text{-}Mkt_t$	$VW\text{-}Mkt_{t-1}$	$EW\text{-}Mkt_t$	$EW\text{-}Mkt_{t-1}$	rf_t	rf_{t-1}	Term Spread	Yield Spread	VIX_0	VIX_{-1}	VIX_{-4}	VIX_{-5}	VAX_0	VAX_{-1}
$VW\text{-}Mkt_{t-1}$	0.109													
	0.000													
$EW\text{-}Mkt_t$	0.875	0.275												
	0.000	0.000												
$EW\text{-}Mkt_{t-1}$	0.079	0.877	0.283											
	0.000	0.000	0.000											
rf_t	−0.007	−0.009	−0.023	−0.025										
	0.501	0.424	0.034	0.024										
rf_{t-1}	−0.006	−0.009	−0.021	−0.024	0.997									
	0.601	0.412	0.055	0.026	0.000									
Term spread	0.018	0.019	0.041	0.042	−0.508	−0.505								
	0.105	0.084	0.000	0.000	0.000	0.000								
Yield spread	0.013	−0.018	−0.010	−0.045	−0.193	−0.195	0.190							
	0.245	0.104	0.369	0.000	0.000	0.000	0.000							
VIX_0	−0.007	−0.002	0.007	0.009	0.454	0.454	−0.218	−0.005						
	0.531	0.836	0.536	0.421	0.000	0.000	0.000	0.638						
VIX_{-1}	0.017	0.011	0.039	0.029	0.491	0.492	−0.234	−0.043	0.834					
	0.123	0.301	0.000	0.008	0.000	0.000	0.000	0.000	0.000					
VIX_{-4}	0.008	0.006	0.025	0.023	0.558	0.558	−0.220	−0.030	0.812	0.796				
	0.481	0.611	0.023	0.043	0.000	0.000	0.000	0.007	0.000	0.000				
VIX_{-5}	0.012	0.009	0.037	0.030	0.567	0.568	−0.198	−0.071	0.724	0.806	0.826			
	0.279	0.424	0.001	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
VAX_0	0.007	0.005	0.026	0.024	0.530	0.530	−0.263	−0.020	0.809	0.815	0.768	0.748		
	0.530	0.653	0.019	0.026	0.000	0.000	0.000	0.066	0.000	0.000	0.000	0.000		
VAX_{-1}	0.004	0.003	0.021	0.019	0.539	0.539	−0.267	−0.017	0.746	0.780	0.722	0.723	0.867	
	0.699	0.777	0.058	0.086	0.000	0.000	0.000	0.119	0.000	0.000	0.000	0.000	0.000	
VAX_{-16}	0.001	0.002	0.013	0.013	0.616	0.616	−0.204	−0.054	0.660	0.688	0.689	0.709	0.773	0.856
	0.898	0.833	0.248	0.243	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[a]Tabulated values are Pearson correlations [two-tailed *p*-values] between the indicated variables. Variable definitions are provided in appendix A.

TABLE 3

Equal-Weighted Earnings Index (EIX & EAX) Correlations[a]

	$VW\text{-}Mkt_t$	$VW\text{-}Mkt_{t-1}$	$EW\text{-}Mkt_t$	$EW\text{-}Mkt_{t-1}$	rf_t	rf_{t-1}	Term Spread	Yield Spread	EIX_0	EIX_{-1}	EIX_{-4}	EIX_{-5}	EAX_0	EAX_{-1}
$VW\text{-}Mkt_{t-1}$	0.109													
	0.000													
$EW\text{-}Mkt_t$	0.875	0.275												
	0.000	0.000												
$EW\text{-}Mkt_{t-1}$	0.079	0.877	0.283											
	0.000	0.000	0.000											
rf_t	−0.007	−0.009	−0.023	−0.025										
	0.501	0.424	0.034	0.024										
rf_{t-1}	−0.006	−0.009	−0.021	−0.024	0.997									
	0.601	0.412	0.055	0.026	0.000									
Term spread	0.018	0.019	0.041	0.042	−0.508	−0.505								
	0.105	0.084	0.000	0.000	0.000	0.000								
Yield spread	0.013	−0.018	−0.010	−0.045	−0.193	−0.195	0.190							
	0.245	0.104	0.369	0.000	0.000	0.000	0.000							
EIX_0	−0.006	−0.005	0.008	0.008	0.412	0.412	−0.222	0.000						
	0.588	0.658	0.450	0.442	0.000	0.000	0.000	0.995						
EIX_{-1}	0.016	0.005	0.035	0.024	0.445	0.446	−0.240	−0.046	0.819					
	0.145	0.637	0.001	0.028	0.000	0.000	0.000	0.000	0.000					
EIX_{-4}	0.009	0.003	0.026	0.023	0.495	0.495	−0.231	−0.022	0.785	0.764				
	0.445	0.777	0.020	0.042	0.000	0.000	0.000	0.054	0.000	0.000				
EIX_{-5}	0.015	0.008	0.041	0.032	0.514	0.515	−0.208	−0.066	0.709	0.796	0.792			
	0.182	0.455	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
EAX_0	0.005	0.003	0.026	0.025	0.484	0.484	−0.263	−0.017	0.798	0.805	0.749	0.743		
	0.682	0.789	0.018	0.023	0.000	0.000	0.000	0.117	0.000	0.000	0.000	0.000		
EAX_{-1}	0.000	−0.001	0.016	0.014	0.494	0.493	−0.266	−0.012	0.744	0.782	0.707	0.726	0.875	
	0.989	0.908	0.145	0.202	0.000	0.000	0.000	0.297	0.000	0.000	0.000	0.000	0.000	
EAX_{-16}	0.002	0.002	0.018	0.017	0.555	0.555	−0.190	−0.038	0.663	0.692	0.656	0.690	0.780	0.854
	0.852	0.861	0.108	0.122	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000

[a]Tabulated values are Pearson correlations [two-tailed *p*-values] between the indicated variables. Variable definitions are provided in appendix A.

aggregate earnings metrics. With respect to VIX_0 the correlations range between 0.834 for the one-quarter same-firm earnings lag (VIX_0) and 0.660 for the final aggregate earnings lag (VAX_{-16}).[22] With respect to EIX_0 they range between 0.819 for EIX_{-1} and 0.663 for EAX_{-16}.

All of the earnings indices, both 3-day and 21-day, are highly correlated with each other. These strong positive correlations underscore the highly predictable and systematic nature of aggregate earnings. That is, they are consistent with these averages, capturing systematic temporally persistent comovements in the earnings cross-section.

There is also widespread evidence of positive correlations between past earnings indices, particularly announcement-firm-specific indices, and announcement period equal-weighted market returns. The correlations between *EW-Mkt*$_t$ and the lagged *VIX* indices are all significant at the 0.05 level and range between 0.025 (−4 index) and 0.039 (−1 index). The correlations between *EW-Mkt*$_t$ and the lagged *EIX* indices are also all positive and significant at the 0.05 level. They range between 0.026 (−4 index) and 0.041 (−5 index). The correlations between *EW-Mkt*$_t$ and the first general earnings lags, VAX_0 in table 2 and EAX_0 in table 3, are also positive and significant at the 0.05 level. There is no evidence, however, of similar relations between earnings levels and value-weighted market returns.

5.4 MARKET RETURN AND CONTEMPORANEOUS EARNINGS SURPRISE

Table 4 presents estimations of various forms of equation (3) for the entire sample period, using value-weighted earnings indices. The first model (model 1) consists of the three-day index, VIX_0, as the sole explanatory earnings variable for market return. In these estimations this index is unrelated to either equal-weighted or value-weighted market return. Hence, there is no evidence of any sort of unconditional immediate announcement period relation between earnings levels and market returns. The absence of relation between earnings level and market return is consistent with recent evidence reported in Bali, Demirtas, and Tehranian [2008] that aggregate earnings levels are unrelated to contemporaneous market returns.

Model 2 supplements VIX_0 with the one-quarter, four-quarter, and five-quarter earnings lags for the same set of firms whose earnings are used to construct VIX_0. The addition of these variables converts the model from a simple levels analysis to a "surprise" analysis. For both equal-weighted and value-weighted market returns the estimated coefficient for VIX_0 is negative and highly significant (0.01 level or better). VIX_{-1} is positive and significant in both model 2 estimations as well, indicating that the one-quarter lag is an important benchmark for the market in assessing the surprise content

[22] The table omits the −15 to −2 *VAX* lags in order to keep the correlation matrix to a manageable size. In general, the magnitudes of the correlations between the announcement period earnings index (VIX_0 or EIX_0) and each of these omitted lags decline gradually as the number of time periods between the two indices increases. Hence, the reported period 0 correlation is the largest in the series while the reported period −16 coefficient is the smallest.

TABLE 4

Value-Weighted Announcement Period Earnings and Market Returns (1973 to 2006)[a]

	Equal-Weighted Market Return on Day t				Value-Weighted Market Return on Day t			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Surprise:								
VIX_0	0.357	**−5.437**	**−5.718**	**−5.463**	−0.566	**−5.770**	**−5.789**	**−5.970**
t-value	0.51	−3.76	−3.73	−3.76	−0.69	−3.35	−3.18	−3.28
Quarterly Lags:								
VIX_{-1}		**6.136**	**5.764**	**4.673**		**5.809**	**5.758**	**5.412**
VIX_{-4}		0.843	0.090	1.125		1.480	1.021	1.556
VIX_{-5}		0.817	1.112	0.998		−0.574	−0.453	−0.218
General Lags:								
VAX_0			−2.615	−2.416			−2.530	−3.331
VAX_{-1}			−1.568	−0.950			−1.848	−1.667
VAX_{-2}			−2.201	−1.914			0.877	0.571
VAX_{-3}			4.130	2.590			2.790	2.166
VAX_{-4}			4.424	3.630			1.439	1.650
VAX_{-5}			0.491	1.395			−2.380	−1.804
VAX_{-6}			**5.892**	**5.915**			5.568	**6.863**
VAX_{-7}			−3.297	−2.786			−0.672	−1.282
VAX_{-8}			0.643	−0.245			−0.543	−0.921
VAX_{-9}			**−8.539**	**−6.518**			−5.065	−4.711
VAX_{-10}			1.576	0.915			0.800	0.395
VAX_{-11}			−0.110	−0.121			0.601	0.271
VAX_{-12}			**5.236**	4.034			4.129	3.770
VAX_{-13}			3.967	3.271			3.671	4.150
VAX_{-14}			1.066	1.668			−0.689	0.388
VAX_{-15}			0.541	−0.653			−0.530	−1.784
VAX_{-16}			**−8.707**	**−5.373**			−5.371	−4.193

(*Continued*)

TABLE 4—*Continued*

	Equal-Weighted Market Return on Day t				Value-Weighted Market Return on Day t			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Macrovariables:								
rf_t				**−0.203**				−0.192
rf_{t-1}				0.175				0.182
Mkt_{t-1}				**0.262**				**0.098**
Term spread				0.983				0.482
Yield spread				−1.814				1.703
I(Day of week)[b]	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
F-Quarterly lags[c]		**6.79**	**6.13**	**5.14**		**3.50**	**3.48**	**3.54**
F-General lags[d]			**2.25**	1.35			0.75	0.66
R^2	0.013	0.017	0.021	0.094	0.001	0.003	0.004	0.015
N	8,312	8,108	8,091	7,990	8,312	8,108	8,091	7,990

[a]Tabulated values are coefficient estimates for regressions of equal-weighted or value-weighted day t NYSE and AMEX market return on subsets of the independent variables indicated in the first column of the table. Heteroskedasticity-robust standard errors are used for statistical inference. Coefficient estimates and F-statistics significant at the 0.05 level are denoted in **bold**. Variable definitions are in appendix A. Daily market return observations begin on January 1, 1973 and end on June 20, 2006.

[b]I(Day of week) is a vector of four indicator variables for each day of the trading week.

[c]F-statistic is for the hypothesis that VIX_{-1}, VIX_{-4}, and VIX_{-5} taken collectively lack incremental explanatory power.

[d]F-statistic is for the hypothesis that VAX_0 through VAX_{-16} collectively lack incremental explanatory power.

of newly announced earnings numbers. The annual lag, VIX_{-4}, lacks significance in these regressions and, in fact, it lacks significance throughout our analysis. This absence of significance is inconsistent with a seasonal random walk specification, which implies that the VIX_{-4} and VIX_0 coefficients should have opposite signs but be roughly equal in absolute magnitude.

Model 3 supplements the three announcing firm-specific lags with the set of 17 21-day value-weighted aggregate earnings lags. Collectively these lags are significant (0.05 level) for the equal-weighted market return analysis but lack significance in the value-weighted market return analysis. The two VIX_0 coefficients remain negative and highly significant in the presence of these lagged aggregate earnings-level terms. Finally, model 4 includes the macrolevel variables: rf_t and rf_{t-1}, 90-day treasury bill rate on day t and day $t-1$; *VW-Mkt*$_t$ or *EW-Mkt*$_t$, the return on the market on day $t-1$; *Term spread*, the difference between the yield on a 10-year maturity treasury bond and a three-month maturity treasury bill; and *Yield spread*, the difference between the Federal Funds rate and the yield on a three-month maturity treasury bill. In choosing the macrovariables, we considered the list of return predictors investigated by Cremers [2002] that are available on a daily basis over the 1973 to 2006 time period. Inclusion of these variables results in a substantial increase in the equal-weighted market return model R^2 (to 9.4%) and a more modest increase in the value-weighted market return model R^2 (to 1.5%). Relative to models 2 and 3, estimated VIX_0 coefficients are little changed in terms of either magnitudes or significance levels in either of these modes.

The estimated VIX_0 coefficients in models 2 through 4 in table 4 all fall in the neighborhood of -5.50. If we convert the earnings index measures into a basis point scale, then these coefficient magnitudes imply that a 100-basis point earnings surprise has a 5.5-basis point impact on aggregate return. And, if we incorporate normal underlying variation in surprise as well, the unpredictable portion of the VIX_0 index has a standard deviation of 0.512% (per panel B of table 1). So, a one–standard deviation surprise movement in VIX_0 is associated with a 2.8–basis point movement in one-day market return. At contemporary aggregate market valuations in the neighborhood of 10 trillion dollars, a one–standard deviation surprise movement in VIX_0 is associated with a 2.8–billion dollar movement in aggregate market value. In the model 4 estimations the incremental explanatory power provided by the addition of the VIX coefficients also increases explanatory power far more (3 to 10 times as much) than does the addition of any of the macro variables except lagged market return (which is not in any sense an exogenous determinant of market return). Hence, there is ample basis for concluding that these daily market return impacts of aggregate earnings possess economic significance.

Table 5 repeats the table 4 analysis using equal-weighted rather than value-weighted earnings indices. The results are broadly similar to those reported in table 4. The EIX_0 coefficients are insignificant in the index-only model 1 estimations, but negative and highly significant (0.01 level

TABLE 5

Equal-Weighted Announcement Period Earnings and Market Returns (1973 to 2006)[a]

	Equal -Weighted Market Return on Day t				Value-Weighted Market Return on Day t			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Surprise:								
EIX_0	0.384	**−3.632**	**−3.926**	**−3.694**	−0.443	**−4.219**	**−3.974**	**−4.062**
t-value	0.63	−3.44	−3.50	−3.38	−0.62	−3.24	−2.85	−2.90
Quarterly Lags:								
EIX_{-1}		**3.807**	**3.859**	**3.181**		**3.998**	**4.543**	**4.437**
EIX_{-4}		0.473	−0.170	0.593		0.942	0.697	1.071
EIX_{-5}		1.627	1.784	1.642		0.283	0.515	0.674
General Lags:								
EAX_0			0.176	−0.339			−1.844	−2.245
EAX_{-1}			−2.599	−1.791			−1.182	−1.547
EAX_{-2}			−2.524	−1.935			0.114	−0.377
EAX_{-3}			3.130	2.190			1.805	1.557
EAX_{-4}			4.259	3.248			3.084	3.070
EAX_{-5}			1.704	2.030			−3.772	−2.994
EAX_{-6}			3.963	**4.336**			3.399	4.782
EAX_{-7}			**−5.170**	**−4.336**			−2.218	−2.509
EAX_{-8}			−3.773	−3.333			−2.434	−2.655
EAX_{-9}			**−4.143**	−3.180			−0.888	−1.201
EAX_{-10}			3.031	1.915			1.019	0.804
EAX_{-11}			1.875	1.053			0.559	0.247
EAX_{-12}			2.556	2.101			3.123	2.828
EAX_{-13}			0.408	1.100			−0.127	0.856
EAX_{-14}			2.396	2.522			2.666	3.350
EAX_{-15}			−0.587	−2.090			−1.189	−2.839
EAX_{-16}			**−4.074**	−1.982			−3.118	−2.137

(*Continued*)

TABLE 5—*Continued*

	Equal -Weighted Market Return on Day t				Value-Weighted Market Return on Day t			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Macrovariables:								
rf_t				−0.196				−0.185
rf_{t-1}				0.172				0.177
Mkt_{t-1}				**0.263**				**0.099**
Term spread				1.017				0.442
Yield spread				−1.804				1.835
I(Day of week)[b]	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
F-Quarterly lags[c]		**6.31**	**5.46**	**4.60**		**3.28**	**3.33**	**3.50**
F-General lags[d]			**2.05**	1.28			0.67	0.62
R^2	0.013	0.016	0.019	0.093	0.001	0.003	0.004	0.014
N	8,312	8,108	8,091	7,990	8,312	8,108	8,091	7,990

[a]Tabulated values are coefficient estimates for regression of equal-weighted or value-weighted day t NYSE and AMEX market return on subsets of the independent variables indicated in the first column of the table. Heteroskedasticity-robust standard errors are used for statistical inference. Coefficient estimates and F-statistics significant at the 0.05 level are denoted in **bold**. Variable definitions are in appendix A. Daily market return observations begin on January 1, 1973 and end on June 20, 2006.

[b]I(Day of week) is a vector of four indicator variables for each day of the trading week.

[c]F-statistic is for the hypothesis that EIX_{-1}, EIX_{-4}, and EIX_{-5} taken collectively lack incremental explanatory power.

[d]F-statistic is for the hypothesis that EAX_0 through EAX_{-16} collectively lack incremental explanatory power.

or better) once expected earnings estimators (models 2 through 4) are introduced into the estimation procedure. The estimated magnitudes of these EIX_0 coefficients are, however, less negative in table 5 relative to table 4, typically falling in the neighborhood of −4.00. So a 100-basis point aggregate earnings shock drives around a 4-basis point opposite direction return impact. Based on the underlying unexplained variation in *EIX* of 0.617% (per panel B of table 1), a one–standard deviation unexpected shift in EIX_0 is associated with around a 2.4-basis point movement in aggregate market returns.[23]

In further untabulated analyses, we replaced the dependent market index return variables with the equal-weighted return for only those firms in the announcement period index and re-estimated the table 4 and 5 models. The announcement period earnings index is uniformly positive and significant (0.10 level in one instance and 0.05 or better in all others) in the model 2 through 4 "surprise" estimations. Announcement index coefficient estimates range between +3.50 and +7.80. These positive coefficients are consistent with the underlying aggregate announcements conveying, on balance, predominantly cash flow news for the subset of announcing firms.

5.5 INFLATION ANALYSES

5.5.1. Aggregate Earnings and Bond Returns. Shivakumar [2007] proposes that a negative relation between earnings changes and aggregate market return such as that documented in tables 4 and 5 reflects a direct relation between earnings changes and changes in future inflation rates. Consistent with this hypothesis, he reports strong evidence of positive relations between quarterly earnings changes and subsequent changes in the consumer price index.[24] We directly evaluate the connection between short-window earnings news and inflation by examining inflation-related bond market price effects. Specifically, we replace market return in equation (3) with measures of announcement period bond price movements as follows:

$$BR_t = \boldsymbol{c_d}\, \boldsymbol{D_t} + c_1 IX_t + c_2 IX_{q-1} + c_3 IX_{q-4} + c_4 IX_{q-5} + \boldsymbol{cc_g AX_{-g}} + e_t, \tag{4}$$

[23] Variance inflation factors for the three-day *IX* indices are less than 5 in all estimations. In a further untabulated analysis, we employ the difference between the announcement period three-day index and the one-quarter same firm–based lag of this index as the sole explanatory earnings variable. Results from this differenced earnings specification are similar to those reported in tables 4 and 5. Collectively, this evidence suggests that the findings are robust to multicollinearity concerns.

[24] In a supplemental untabulated analysis, we confirm the presence of a similar relation in our data between average (monthly) earnings surprises and subsequent changes in consumer price index levels. Monthly surprise averages are based on average residuals from earnings prediction equations along the lines of those presented in panel B of table 1 in which announcement period earnings indices are regressed on their same firm–based announcement index lags.

where BR_t is a measure of bond price changes at time t. Bond price measures employed are: (1) changes in yield differences between conventional treasury securities and treasury inflation-protected securities (TIPS);[25] changes in three-month, six-month, 1-year, and 10-year treasury bill rates (see Fama [1975]); and changes in the term spread (the difference between the yield on a 10-year maturity treasury bond and a three-month maturity treasury bill). All changes are for five-day windows starting at day t. A negative (positive) change means that rates decreased (increased) over this window. Positive relation between IX_t and any of these measures is consistent with earnings announcements conveying inflation news to the debt market.

Table 6 reports IX_t coefficient estimates and associated t-statistics for inflation changes based on the 5-year, 10-year, and 20-year TIPS; changes in 1-year treasury bill rates; changes in 10-year treasury bill rates; and changes in the term spread. For both value-weighted (panel A) and equal-weighted (panel B) earnings, the IX_t coefficients are positive and directionally significant at the 0.05 level or better for all of the measures except the change in the term spread. These results provide broad support for the position that aggregate earnings surprises convey inflation news to the bond market.

In further untabulated analysis, we include changes in the various treasury bill rates as additional explanatory variables in estimating equation (3).[26] While the IX_t coefficients in these analyses decline slightly in absolute magnitude (by at most 10%) from those reported in tables 4 and 5, they all remain highly significant. Changes in short-term treasury bill rates (1-year and under) are generally positive, but insignificant, in these analyses while the change in the 10-year rate is consistently positive and significant (0.05 level) in the value-weighted market return regressions. It is also positive and marginally significant in the model 4 specification equal-weighted return regressions. Hence, while earnings do seem to convey inflation news, such news is not the sole driver of the announcement period negative relation between earnings news and aggregate market return.

5.5.2. Post-1984 Analysis. CG note that high inflation and high inflation change periods both distort historical cost earnings numbers and impact aggregate market returns. Based on this reasoning, they find that excluding the high inflation 1973-to-1983 time period yields substantive improvements in the explanatory abilities of their aggregate earnings models for

[25] Treasury inflation-protected securities are debt securities for which the principal and the coupon payments are indexed to the Consumer Price Index (CPI). The principal of a TIPS increases (decreases) with inflation (deflation). Yield difference between conventional treasury securities and TIPS provides a useful measure of the market's expectation of future CPI inflation, which is also known as the breakeven inflation rate. We followed Gurkaynak, Sack, and Wright [2008] in calculating daily TIPS–implied inflation expectation. The data for TIPS analysis start from January 5, 1999.

[26] Due to the comparatively few observations available, we do not run this analysis for the TIPS variables.

TABLE 6

Earnings Surprise and Government Debt Return Movements (1973–2006)[a]

Panel A: Value-weighted earnings (VIX_0)

	Change in TIPS Implied Inflation			Change in Treasury Bill/Bond Yield				Change in Term Spread
	5 Year (1)	10 Year (2)	20 Year (3)	3 Month (4)	6 Month (5)	1 Year (6)	10 Year (7)	(8)
VIX_0	**1.353**	**1.077**	**0.933**	**2.628**	**2.754**	**3.274**	**1.871**	0.757
t-value	(2.60)	(2.08)	(1.79)	(4.17)	(5.00)	(5.54)	(4.56)	(0.50)
Other Model 3 variables	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
OLS R^2	0.081	0.060	0.041	0.013	0.019	0.022	0.018	0.013
N	1,747	1,747	1,747	7,805	7,805	7,805	7,805	7,805

Panel B: Equal-weighted earnings (EIX_0)

	Change in TIPS Implied Inflation			Change in Treasury Bill/Bond Yield				Change in Term Spread
	5 Year (1)	10 Year (2)	20 Year (3)	3 Month (4)	6 Month (5)	1 Year (6)	10 Year (7)	(8)
EIX_0	**1.063**	**0.852**	**0.778**	**2.057**	**1.995**	**2.370**	**1.569**	0.488
t-value	(2.47)	(1.89)	(1.81)	(3.75)	(4.26)	(4.65)	(4.76)	(0.43)
Other Model 3 variables	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
OLS R^2	0.073	0.048	0.033	0.009	0.012	0.014	0.011	0.008
N	1,747	1,747	1,747	7,805	7,805	7,805	7,805	7,805

[a]Statistics and estimates are for regressions of change in inflation expectation or interest rate change on contemporaneous and lagged value-weighted (panel A) and equal-weighted (panel B) earnings indices. The independent variables in these regressions follow the form of model 3 in tables 4 and 5 (and equation (3) in the text). The first three columns in both panels use TIPS–implied inflation as the dependent variable and span January 5, 1999 to June 20, 2006. Columns (4) to (7) use the change in treasury bill/bond interest rate indicated in the column heading as dependent variable and span January 1, 1973 to June 20, 2006. Column (8) uses the change in term spread as the dependent variable. Changes are for five-day windows beginning on day t . VIX_0 and EIX_0 are value-weighted and equal-weighted day 0 earnings indices (see appendix A for details on their construction). Due to the overlapping nature of the dependent variable, standard errors for purposes of deriving *t*-statistics pertaining to reported coefficients are adjusted for serial correlation using Newey-West [1987] standard errors (with five lags).

Coefficients that are directionally significant at the 0.05 level are **bolded**.

future monthly and quarterly market returns. We investigate the sensitivity of the short-window findings reported in tables 4 and 5 to the exclusion of this inflationary period by restricting the sample to post-1984 market return observations. Table 7 reports the results for this restricted sample for models 3 and 4. In the case of model 4, we also supplement the set of macrovariables included with Df_t, the difference in interest rates between AAA bonds and BAA bonds. Df_t data are available starting from January 2, 1986. KLW find evidence that this difference, a measure of default rate risk, is related to both aggregate market return and earnings change indices.

The estimated announcement period surprise effects (i.e., the VIX_0 and EIX_0 coefficients) on earnings are negative across all of the table 7 estimations. Estimated coefficient magnitudes are slightly smaller than their table 4 and 5 corollaries and, in the equal-weighted earnings case, possess only marginal significance (directionally significant at the 0.10 level) for the value-weighted market return estimations. Quarterly and general earnings lags are each collectively significant at the 0.05 level in all of the equal market return regressions. Df_t is also significant (negative coefficient estimates) at the 0.05 level in these regressions.

5.6 SUPPLEMENTAL ASSOCIATION ANALYSES

5.6.1. S&P 500–Based Indices. Anilowski, Feng, and Skinner [2007] report evidence that (nonquantitative) earnings guidance provided by large market-mover firms is associated with same-direction immediate market return movements in a management earnings guidance context. We investigate the impact of S&P membership on the aggregate return impact of earnings news provided by S&P and non–S&P 500 firms by estimating equation (3) based on: (1) indices constructed entirely from non–S&P 500 firm earnings numbers, and, (2) indices constructed entirely from S&P 500 firm earnings numbers.[27] Panels A and B of table 8 report the VIX_0 and EIX_0 coefficients from these estimations for models 3 and 4 together with selected estimates for other variables in these models. These coefficient estimates are uniformly negative in both panels. The S&P 500 coefficients are more negative than the non–S&P 500 coefficient estimates in all cases, except the equal-weighted market return on value-weighted earnings model 4's estimation. This increase in absolute magnitude suggests a stronger negative impact for S&P 500 earnings announcements. However, the differences between the S&P 500 and non–S&P 500 coefficients are not statistically distinguishable in any of these analyses. Moreover, in an additional untabulated analysis we further restricted the analysis to indexes based on earnings by the 100 highest capitalization firms in firms at the start of each year. The VIX_0 and EIX_0 coefficients in this analysis generally lacked significance and were considerably less negative than the panel A non–S&P coefficients.

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[27] There are far fewer S&P 500 firms than there are non–S&P 500 firms. Consequently, S&P 500–based index observations are not available on many days when non–S&P 500 indices are available. Consequently, relative to the panel B S&P 500 analysis, the panel A non–S&P 500 analysis is based on over twice as many index observations.

TABLE 7

Announcement Period Earnings and Market Returns (1985 to 2006)[a]

	Value-Weighted Earnings Indices				Equal-Weighted Earnings Indices			
	Equal-Weighted Market Return on Day t		Value-Weighted Market Return on Day t		Equal-Weighted Market Return on Day t		Value-Weighted Market Return on Day t	
	Model 3	Model 4	Model 3	Model 4	Model 3	Model 4	Model 3	Model 4
Surprise:								
VIX_0 or EIX_0	**−5.489**	**−4.932**	**−4.659**	**−4.795**	**−3.535**	**−3.235**	−2.424	−2.679
t-value	−3.03	−2.85	−2.00	−2.06	−2.57	−2.42	−1.35	−1.48
Quarterly Lags:								
VIX_{-1} or EIX_{-1}	**5.700**	**4.452**	4.463	4.176	**4.727**	**3.606**	3.917	3.742
VIX_{-4} or EIX_{-4}	0.668	1.482	2.056	2.464	0.397	1.254	1.084	1.703
VIX_{-5} or EIX_{-5}	0.416	1.315	−1.221	0.200	0.794	1.677	−0.140	0.962
General Lags:								
VAX_0 or EAX_0	−1.751	−2.602	−2.854	−3.679	2.350	2.554	−1.129	−0.208
VAX_{-1} or EAX_{-1}	−10.463	**−9.100**	−4.211	−5.341	**−6.736**	−5.709	−2.170	−3.274
VAX_{-2} or EAX_{-2}	−0.419	−0.545	2.044	2.119	−1.181	−0.270	1.096	1.397
VAX_{-3} or EAX_{-3}	10.363	8.468	8.072	8.224	5.018	5.002	4.866	5.604
VAX_{-4} or EAX_{-4}	12.311	**11.175**	9.219	9.157	**11.856**	**10.812**	**9.631**	**10.187**
VAX_{-5} or EAX_{-5}	−7.025	−4.866	−5.965	−5.770	−3.990	−2.649	−7.285	−6.392
VAX_{-6} or EAX_{-6}	**12.346**	**13.126**	7.120	**10.043**	**7.598**	**8.257**	5.221	**7.536**
VAX_{-7} or EAX_{-7}	−4.174	−1.331	−4.290	−2.101	**−5.849**	−2.886	−4.380	−2.055
VAX_{-8} or EAX_{-8}	**7.364**	5.752	4.258	3.625	0.891	0.405	1.531	0.863
VAX_{-9} or EAX_{-9}	**14.146**	**−10.373**	−7.558	−6.636	−4.153	−2.561	−0.305	−0.077
VAX_{-10} or EAX_{-10}	4.154	4.705	4.840	5.142	2.058	1.946	1.758	1.574
VAX_{-11} or EAX_{-11}	−2.166	−1.384	−0.675	0.233	0.336	0.657	−0.253	0.518
VAX_{-12} or EAX_{-12}	1.640	2.209	3.471	4.385	1.417	1.521	3.102	3.596
VAX_{-13} or EAX_{-13}	2.186	3.464	0.269	2.323	−0.565	1.744	−1.637	0.690
VAX_{-14} or EAX_{-14}	−1.798	−1.650	−3.543	−3.506	0.288	0.920	0.892	1.901
VAX_{-15} or EAX_{-15}	−2.827	−6.044	−0.811	−5.148	−5.060	**−7.669**	−3.378	−6.962
VAX_{-16} or EAX_{-16}	−5.801	**−6.831**	−3.446	−4.130	−2.455	−2.940	−1.092	−1.273

(*Continued*)

TABLE 7—*Continued*

	Value-Weighted Earnings Indices				Equal-Weighted Earnings Indices			
	Equal-Weighted Market Return on Day t		Value-Weighted Market Return on Day t		Equal-Weighted Market Return on Day t		Value-Weighted Market Return on Day t	
	Model 3	Model 4	Model 3	Model 4	Model 3	Model 4	Model 3	Model 4
Macrovariables:								
rf_t		−0.110		−0.089		−0.131		−0.103
rf_{t-1}		0.063		0.044		0.068		0.041
Mkt_{t-1}		**0.192**		0.051		**0.194**		0.051
Dft_t		**−9.040**		−7.371		**−7.482**		−5.862
Term spread		−0.680		−2.456		−1.444		−3.244
Yield spread		−6.676		−2.125		−6.640		−1.486
I(Day of week)[b]	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
F-Quarterly lags[c]	**3.07**	**2.78**	1.25	1.40	**2.57**	**2.47**	0.89	1.19
F-General lags[d]	**3.72**	**2.87**	1.20	1.21	**3.39**	**2.78**	1.30	1.39
R^2	0.022	0.065	0.006	0.010	0.019	0.063	0.005	0.009
N	5,342	5,033	5,342	5,033	5,342	5,033	5,342	5,033

[a]Tabulated values are coefficient estimates for regressions of equal-weighted or value-weighted day t NYSE and AMEX market return on subsets of the independent variables indicated in the first column of the table. The value-weighted earnings columns use value-weighted versions of the independent earnings indices while the equal-weighted earnings columns use equal-weighted versions of the independent earnings indices. Heteroskedasticity-robust standard errors are used for statistical inference. Coefficient estimates and F-statistics significant at the 0.05 level are denoted in **bold**. Variable definitions are in appendix A. Daily market return observations for this analysis begin on January 1, 1985 and end on June 20, 2006.

[b]I(Day of week) is a vector of four indicator variables for each day of the trading week.

[c]F-statistic is for the hypothesis that VIX_{-1}, VIX_{-4}, and VIX_{-5} in the case of value-weighted earnings models or EIX_{-1}, EIX_{-4}, and EIX_{-5} in the case of equal-weighted earnings models taken collectively lack incremental explanatory power.

[d]F-statistic is for the hypothesis that VAX_0 through VAX_{-16} in the case of value-weighted earnings models or EAX_0 through EAX_{-16} in the case of equal-weighted earnings models taken collectively lack incremental explanatory power.

TABLE 8

S&P and Non–S&P 500 Announcement Period Earnings and Market Returns[a] *1973 to 2006*

Panel A: Non–S&P 500 firms

	Value-Weighted Earnings Indices				Equal-Weighted Earnings Indices			
	Equal-Weighted Market Return on Day t		Value-Weighted Market Return on Day t		Equal-Weighted Market Return on Day t		Value-Weighted Market Return on Day t	
	Model 3	Model 4	Model 3	Model 4	Model 3	Model 4	Model 3	Model 4
Surprise:								
VIX_0 or EIX_0	**−4.335**	**−4.295**	**−4.765**	**−5.071**	**−3.178**	**−3.051**	**−3.361**	**−3.477**
t-value	−3.07	−3.13	−2.70	−2.87	−3.05	−2.97	−2.53	−2.61
Macrovariables:								
rf_t		−0.188		−0.182		−0.180		−0.174
rf_{t-1}		0.163		0.172		0.157		0.165
Term spread		1.002		0.473		1.051		0.465
Yield spread		−1.432		1.868		−1.471		1.930
Mkt_{t-1}		**0.259**		**0.098**		**0.260**		**0.098**
Other Model 3 variables	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
F-Quarterly lags[b]	**4.10**	**3.59**	**2.57**	**2.72**	**4.44**	**3.98**	**2.93**	**3.16**
F-General lags[c]	**2.32**	1.37	0.80	0.68	**2.14**	1.29	0.77	0.70
R^2	0.02	0.091	0.004	0.014	0.019	0.09	0.004	0.014
N	8,066	7,965	8,066	7,965	8,066	7,965	8,066	7,965

(*Continued*)

TABLE 8—*Continued*

Panel B: S&P 500 firms

	Value-Weighted Earnings Indices				Equal-Weighted Earnings Indices			
	Equal-Weighted Market Return on Day t		Value-Weighted Market Return on Day t		Equal-Weighted Market Return on Day t		Value-Weighted Market Return on Day t	
	Model 3	Model 4	Model 3	Model 4	Model 3	Model 4	Model 3	Model 4
Surprise:								
VIX_0 or EIX_0	**−4.722**	−3.665	**−5.873**	**−5.437**	**−5.017**	**−4.086**	**−6.728**	**−6.594**
t-value	−1.87	−1.52	−1.82	−1.68	−2.19	−1.93	−2.31	−2.29
Macrovariables:								
rf_t		−0.159		−0.248		−0.154		−0.238
rf_{t-1}		0.112		0.209		0.112		0.210
Term spread		−0.013		−1.019		0.503		−0.424
Yield spread		**−6.956**		−4.469		−7.139		−4.632
Mkt_{t-1}		**0.240**		**0.079**		**0.240**		**0.079**
Other Model 3 variables	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**	**Included**
F-Quarterly lags[b]	**2.75**	**2.72**	**2.32**	**2.31**	**3.75**	**3.38**	**3.56**	**3.26**
F-General lags[c]	1.49	0.95	0.55	0.47	1.13	0.87	0.63	0.50
R^2	0.019	0.082	0.006	0.014	0.018	0.082	0.008	0.015
N	3,943	3,868	3,943	3,868	3,943	3,868	3,943	3,868

[a]Tabulated values are coefficient estimates for regressions of equal-weighted or value-weighted day t NYSE and AMEX market return on contemporaneous value-weighted (VIX_0) or equal-weighted (EIX_0) announced earnings by non–S&P 500 (panel A) or S&P 500 (panel B) firms. Model 3 estimations include lagged equal- or value-weighted quarterly and general earnings indices based on non–S&P 500 firm earnings (panel A) and S&P 500 firm earnings (panel B) and day of the week indicator variables (I(Day of week)). Consistent with prior tables, these lags consist of one-, four-, and five-quarter lags of earnings for firms comprising the reported contemporaneous (VIX_0 or EIX_0) earnings index and a series of 21-day general lags based on all earnings reported by either non–S&P 500 firms (panel A) or S&P 500 firms (panel B) in each 21-day interval. Model 4 supplements model 3 with the listed set of macrolevel variables. Variable definitions are provided in appendix A. Daily market return observations begin on January 1, 1973 and end on June 20, 2006. Heteroskedasticity-robust standard errors are used for statistical inference. Coefficient estimates and F-statistics significant at the 0.05 level are denoted in **bold**.

[b]F-statistic is for the hypothesis that VIX_{-1}, VIX_{-4}, and VIX_{-5} in the case of value-weighted earnings models or EIX_{-1}, EIX_{-4}, and EIX_{-5} in the case of equal-weighted earnings models taken collectively lack incremental explanatory power.

[c]F-statistic is for the hypothesis that VAX_0 through VAX_{-16} in the case of value-weighted earnings models or EAX_0 through EAX_{-16} in the case of equal-weighted earnings models taken collectively lack incremental explanatory power.

However, the estimated standard errors in this analysis are quite large since it is based on a rather small number of index observations, where the indices themselves consist of comparatively few earnings numbers. Consequently, we find no evidence in the data supportive of a positive market mover impact along the lines identified in Anilowski, Feng, and Skinner [2007].

5.6.2. Other Analyses. We also conducted a number of supplemental analyses of the data. These untabulated analyses are mostly preliminary and follow from interesting possibilities raised by *Conference* participants.

Two plausible sources of time-series variation in the impacts of aggregate earnings news on market returns are: (1) index timeliness and (2) macroeconomic environment. We investigated the impact of index timeliness, first defining each announcement's timeliness as the number of trading days between the announcement date and the end date of the fiscal period for which earnings are being announced. We then divided the sample into two groups based on whether the announcements within them are, on average, later or earlier than is normal ("normal" being based on yearly medians) in terms of number of trading days between fiscal year end and the announcement date. Early indices coefficients are uniformly negative and larger in absolute magnitude than companion later-than-average indices. For early VIX_0 indices the model 3 $EW\text{-}Mk_t$ and $VW\text{-}Mk_t$ coefficient estimates are -6.921 ($t = -2.65$) and -9.356 ($t = -3.07$). For early EIX_0 indices these coefficient estimates are -4.797 ($t = -2.85$) and -5.652 ($t = -2.68$).[28] The later-than-average index coefficients are also uniformly negative but they sometimes lack clear statistical significance. For late VIX_0 indices the $EW\text{-}Mk_t$ and $VW\text{-}Mk_t$ coefficient estimates are -4.968 (-2.60) and -3.792 ($t = -1.63$). For late EIX_0 indices these coefficients are -3.125 ($t = -2.03$) and -2.663 ($t = -1.37$). Consistent with informativeness increasing with timeliness, the early index coefficients are generally considerably more negative than the late index coefficients. However, tests for differences in early and late coefficients yield mostly inconclusive results.

Boyd, Jagannathan, and Hu [2005] find that unemployment news impacts differ markedly based on economic climate. We evaluated whether the table 4 and 5 results vary with economic conditions by subdividing the overall sample of earnings indices into one of two groups based on whether the index date corresponds with an expansionary or recessionary (period of economic contraction) time period as identified by the National Bureau of Economic Research (http://www.nber.org/cycles). In this analysis model 3 recessionary VIX_0 $EW\text{-}Mk_t$ and $VW\text{-}Mk_t$ coeffficient estimates are -9.884 ($t = -1.86$) and -7.149 ($t = -1.22$) as compared with expansionary period estimates of -5.638 ($t = -3.705$) and $-.6.229$ ($t = -3.29$). In recessionary time periods, model 3 EIX_0 coefficients are -4.935 ($t = -1.13$) and $-.4.036$ ($t = -0.81$) as compared to -4.145 ($t = -3.64$) and -4.214 ($t = -2.89$) in

[28] We only discuss model 3 results since they are representative and follow the precise form of equation (3).

expansionary time periods.[29] While recessionary coefficients are generally more negative than expansionary coefficients, pairwise differences between them lack statistical significance.

In other supplemental analyses, we evaluated whether the number of firms in the announcement index or the absolute amount of index surprise had any direct impacts for market return. For the number of firms analysis, we include a control variable constructed as the number of observations in the earnings index for day t divided by the total number of earnings announcements in all indices for year y (where day t is in year y) in the table 4 and 5 models. While this variable seems to have some explanatory power for equal-weighted market returns (its effect is negative), its inclusion had no substantive impact on any of our findings. For the absolute surprise analysis, we included the absolute value of the residual from the implicit earnings surprise model (reported in panel B of table 1) as an additional explanatory variable in the table 4 and 5 analyses. There is some evidence of a positive relation. That is, large surprises tend to increase market return per se. However, as we do not have a full-fledged earnings variation expectation model in place here, this relation could also reflect an underlying positive relation between market return and the level of variation present in earnings.[30]

5.7 EVENT ANALYSIS

The preceding analyses support the presence of a negative announcement period relation between market return and aggregate earnings surprise as we measure it. If our earnings surprise metric is either correct or uncorrelated with the predictable component of market return (but correlated with true aggregate earnings surprise) then this relation is appropriately interpreted as reflecting the immediate market reaction to earnings disclosures. Alternatively, if we allow for the likelihood that we are imperfectly measuring surprise, then it is possible that this negative relation arises from an underlying negative correlation between earnings movements and either expected market returns, such as those documented by Sadka [2007], Ball, Sadka, and Sadka [2009] and Sadka and Sadka [2009] or broadly contemporaneous aggregate macroinformation disclosures (e.g., GNP, CPI, or unemployment news released in days or weeks around a given day t aggregate earnings news disclosure).[31] A key feature

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[29] Unreported estimates based on models 2 and 4 are similar to those for model 3 except for model 2 recessionary estimates that are considerably larger, in some instances nearly twice as large as those for the other models.

[30] Evaluation of how earnings components such as aggregate net accrual surprise or net cash flow surprise as well as how other earnings announcement disclosures such as aggregate revenues impact market return are also potentially interesting lines of inquiry.

[31] In the case of broadly contemporaneous correlated macroinformation news, an additional caveat applies. Assuming market efficiency, the macronews must precede the earnings news since the market should respond to the aggregate earnings disclosure rather than to earnings news–correlated components of postearnings macrodisclosures. Hence, the

to these alternative explanations is that they are not specific to announcement events. For instance, if the market risk premium is lower in time periods of expected earnings increases, then we would certainly expect to see a negative relation between earnings changes and market returns. However, we would not expect this relation's magnitude to depend on precisely when within these time periods' earnings happen to be announced. Hence, while these alternative expected earnings change perspectives can give rise to relations between earnings "surprise" and market returns such as those observed in tables 4 and 5, they cannot explain a relation that is substantially greater when market returns and surprises are aligned by announcement date.

In the analyses that follow, we evaluate whether the announcement date relation between earnings surprise and aggregate market return is large relative to the relations between day t surprise and nearby (t −20 to +20) market returns and, almost equivalently, between day t market return and nearby (t −20 to +20) earnings surprises. That is, we use these slightly misaligned relations as benchmarks for evaluating immediate announcement period relations (e.g., the day 0 relation). An information content event perspective on the earnings news implies that announcement date–aligned associations should differ from these benchmark associations.

This portion of our analysis closely parallels Beaver [1968]. His analysis focuses on how volume and absolute price movement differed from their levels in nearby nonannouncement periods as a demonstration of the information content of earnings announcements. Our approach differs from Beaver's in that it is necessarily conditioned on a directional earnings response measure. Aggregate marketlevel earnings news arrives in the market almost every day. Consequently, there are insufficient nonannouncement market return days available for purposes of providing a no–earnings news (or less–earnings news) benchmark such as the nonannouncement period levels of price variability and trading volume employed by Beaver. Our approach, however, is conceptually consistent with Beaver provided the earnings surprise measure we use is correlated with the underlying true surprise measure.[32]

Table 9 reports estimates of VIX_0 and EIX_0 from the model 3 (firm-specific quarterly and all aggregate earnings lags) version of equation (2) as the dependent market return variable is shifted from day −20 to day +20 relative to day t.[33] The pattern over time in these estimated coefficients is

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preannouncement period is of particular interest as a benchmark period for evaluating the robustness of the announcement period–specific relations.

[32] Even if it is uncorrelated, our examination will simply lack any power to detect the surprise effect of interest. It is, in particular, highly robust to the existence of correlated omitted variables.

[33] In both tables 9 and 10 results in the postdisclosure period are comparable if model 4 (earnings lags plus macrovariables) is used instead. As foreknowledge of realized macrovariable values is somewhat unreasonable and table 8 encompasses both predisclosure and postdisclosure time periods, we opt to report estimates based on model 3. Results are also unaffected if the −22 to −2 general earnings lag is dropped from the model.

highly supportive of an announcement period–specific earnings impact on market returns. In the preannouncement period the relation, while generally negative across the four earnings-metric/market-return combinations, is rarely significant until day −1 relative to the earnings index dates. For

TABLE 9

Announcement Period Earnings and Market Returns in Time Periods Surrounding Announcement Dates[a] *1973–2006*

	VW Earnings				**EW Earnings**			
Day Relative to Announcement Day	EW Market Return		VW Market Return		EW Market Return		VW Market Return	
	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*
−20	−1.097	−0.79	−0.148	−0.08	−0.876	−0.79	−0.518	−0.36
−19	−0.924	−0.06	0.760	0.43	−0.813	−0.74	−0.585	−0.41
−18	−0.103	−0.07	0.411	0.24	−0.493	−0.44	−0.557	−0.39
−17	−0.738	−0.52	0.012	0.01	−0.893	−0.80	−0.750	−0.53
−16	−0.831	−0.61	−1.316	−0.72	−0.849	−0.77	−1.750	−1.21
−15	−0.738	−0.53	−1.031	−0.55	−1.784	−1.59	−2.544	−1.71
−14	0.900	0.66	1.133	0.64	−1.071	−0.95	−1.455	−0.98
−13	−0.076	−0.06	−0.154	−0.09	−0.934	−0.85	−1.230	−0.86
−12	**−2.740**	**−1.98**	**−3.827**	**−2.16**	**−2.025**	**−1.86**	**−2.602**	**−1.86**
−11	**−3.947**	**−3.06**	**−4.376**	**−2.62**	**−2.607**	**−2.44**	**−2.743**	**−1.98**
−10	−1.989	−1.44	−2.073	−1.17	−1.588	−1.45	−1.630	−1.14
−9	−0.613	−0.45	−0.862	−0.48	−0.694	−0.63	−1.059	−0.74
−8	0.299	0.22	0.399	0.23	0.170	0.16	−0.226	−0.16
−7	0.421	0.32	0.409	0.23	−0.668	−0.63	−1.271	−0.90
−6	0.529	0.40	−0.306	−0.18	0.007	0.01	−0.967	−0.72
−5	0.729	0.50	0.063	0.04	0.137	0.12	−0.668	−0.48
−4	0.711	0.47	0.019	0.01	1.030	0.89	0.554	0.38
−3	0.149	0.10	0.029	0.02	0.531	0.47	0.252	0.17
−2	−1.991	−1.22	−1.906	−1.02	−0.850	−0.72	−0.615	−0.42
−1	**−2.744**	**−1.81**	−2.477	−1.40	**−1.868**	**−1.67**	−1.743	−1.24
0	***−5.718***	**−3.73**	***−5.784***	**−3.18**	***−3.926***	**−3.50**	***−3.974***	**−2.85**
1	***−4.909***	**−3.09**	**−3.936**	**−2.04**	***−3.684***	**−3.12**	***−3.261***	**−2.23**
2	***−6.196***	**−3.84**	***−5.602***	**−2.70**	***−4.371***	**−3.60**	***−4.180***	**−2.71**
3	***−5.855***	**−3.56**	***−5.742***	**−2.60**	***−3.379***	**−2.74**	***−3.025***	**−1.91**
4	**−3.269**	**−1.90**	−3.241	−1.54	−0.510	−0.40	0.018	0.01
5	−1.184	−0.77	−0.728	−0.36	0.646	0.55	1.080	0.73
6	−1.053	−0.69	−0.251	−0.12	0.647	0.54	1.220	0.78
7	−2.089	−1.42	−1.522	−0.85	−1.279	−1.09	−1.440	−1.00
8	−2.432	−1.57	−0.904	−0.48	−1.562	−1.35	−0.985	−0.69
9	−1.887	−1.20	−0.455	−0.24	−1.476	−1.25	−0.919	−0.62
10	−1.503	−1.02	−0.651	−0.35	−0.127	−0.11	0.356	0.24
11	−1.290	−0.87	−0.538	−0.29	0.055	0.05	0.480	0.32
12	−0.102	−0.07	−0.037	−0.02	0.524	0.45	0.441	0.30
13	0.137	0.09	0.318	0.17	−0.760	−0.64	−1.513	−1.01
14	0.105	0.07	−0.412	−0.21	−0.572	−0.49	−1.180	−0.79
15	0.373	0.23	−0.128	−0.07	0.187	0.15	−0.461	−0.31
16	1.078	0.74	0.548	0.28	0.914	0.80	0.656	0.44

(*Continued*)

TABLE 9—*Continued*

Day Relative to Announcement Day	VW Earnings				EW Earnings			
	EW Market Return		VW Market Return		EW Market Return		VW Market Return	
	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*	Coefficient	*t*
17	**2.857**	**1.98**	2.326	1.26	**2.549**	**2.22**	1.971	1.37
18	1.287	0.99	0.692	0.42	1.053	0.93	0.195	0.14
19	−0.890	−0.62	−1.848	−1.03	−1.138	−1.00	−2.353	−1.67
20	**−2.994**	**−2.10**	**−4.162**	**−2.27**	**−2.068**	**−1.87**	**−3.036**	**−2.18**

[a]Tabulated values are coefficient estimates for regressions of equal-weighted or value-weighted daily NYSE and AMEX market return on day 0 value-weighted (VIX_0) or equal-weighted (EIX_0) announced earnings. These (model 3) estimations include lagged equal- or value-weighted quarterly and general earnings indices. Consistent with prior tables, these lags consist of one-, four-, and five-quarter lags of earnings for firms comprising the contemporaneous (VIX_0 or EIX_0) earnings index and a series of 21-day general lags based on all earnings in each 21-day interval. Heteroskedasticity-robust standard errors are used for statistical inference. Coefficient estimates directionally significant at the 0.05 level are denoted in **bold**. *Italicized* coefficients are less than or equal to any other daily coefficients estimated from day −20 through day +20 (excluding the day −2 to +3 disclosure window). Variable definitions are provided in appendix A. Daily market return observations begin on January 1, 1973 and end on June 20, 2006.

day −1 market returns the relation is negative in all four estimations, significantly so (0.05 level or better) when equal-weighted market return is the dependent variable. Beginning on day 0 and ending on day +3, the VIX_0 and EIX_0 coefficients in all four estimations are uniformly negative and directionally significant at the 0.05 level or better. By day +5 this sustained pattern of negative significant coefficients disappears.[34] While not tabulated, as a definitive test of whether the announcement period relation truly differs from any general time period relation, we compared the day 0 index coefficient to the means of the day −20 to −3 and day +4 to +20 coefficients. In all cases the day 0 coefficients are significantly smaller (0.05 level or better) than either the associated predisclosure (day −20 to −3) or the associated postdisclosure (day +4 to +20) mean coefficient.

Figure 1 reports the table 9 coefficient estimates graphically. It portrays an inverted "spike" in the relation that is unique to the immediate day −1 to day +3 announcement period. Figure 2 presents a complementary analysis for estimates of the VIX_0 and EIX_0 coefficients where the dependent variable consists of cumulative market returns beginning on day −20 relative to the announcement index date. The graph ends with the values of these coefficients across specifications for cumulative return over days −20 through +100 relative to day 0. Interestingly, figure 2 reveals the presence of a considerable degree of drift in the postdisclosure time

[34] In a further unreported analysis, we extend the table 9 examination to day +100 relative to day 0. For all four market return/earnings weighting pairings the day −2 to +2 cumulative coefficient is smaller than any other five contiguous day accumulation falling entirely outside of the −2 to +2 time period. The smallest one-day coefficients occur on day +2 in the two value-weighted market return analyses, day +42 in the value-weighted earnings with equal-weighted market return and day +40 in the equal-weighted earnings with equal-weighted market return analyses (coefficients are −6.02 and −4.19).

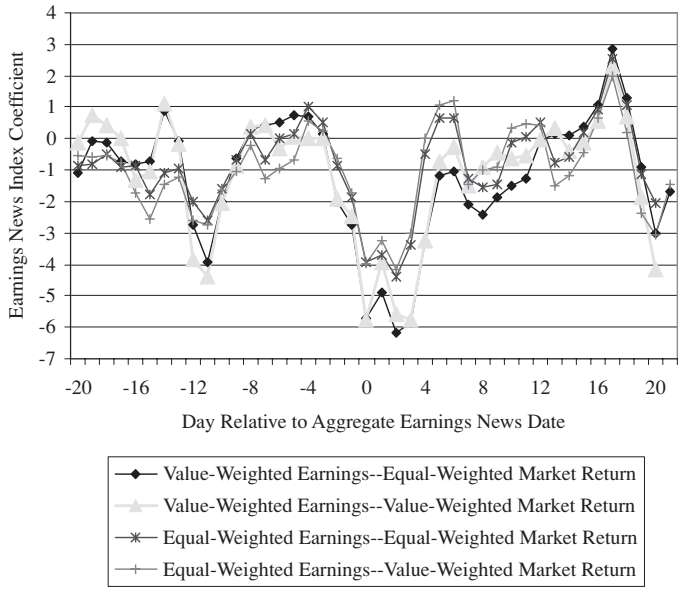

FIG. 1.—Earnings surprise and aggregate market return: Days −20 through +20 relative to earnings index release date 1973–2006. This figure graphs earnings surprise coefficient estimates by day for regressions of equal-weighted or value-weighted daily NYSE and AMEX market return in days −20 through +20 on day 0 value-weighted (VIX_0) or equal-weighted (EIX_0) announced earnings. These (model 3) estimations include lagged equal- or value-weighted quarterly and general earnings indices. Consistent with tables 4 and 5, included lags are of one-, four-, and five-quarter lags of earnings for firms comprising the contemporaneous (VIX_0 or EIX_0) earnings index and a series of 21-day general lags based on all earnings in each 21-day interval.

period. For return accumulation periods starting at day −2 only 42% (value-weighted earnings and value-weighted market return), 32% (value-weighted earnings and equal-weighted market return), 23% (equal-weighted earnings and equal-weighted market return), and 29% (equal-weighted earnings and value-weighted market return) of the respective day −2 to day +100 cumulative return impact occurs by day +4. Hence, the bulk of the cumulative negative response occurs postdisclosure.

In untabulated analyses, we also assessed statistical significance levels for various figure 2–based return accumulation windows. In these analyses, we estimate the same model 3 regressions used in the figure.[35] Not surprisingly, the VIX_0 and EIX_0 coefficients for any window that starts before the announcement window and ends anytime after it (up to day +100) are directionally significant at conventional levels (0.05 level or better). In

[35] We control for the serial correlation in the return dependent variable in evaluating statistical significance by means of Newey-West [1987] serial correlation–adjusted standard errors (number of lags is double the number of return days in the accumulation window).

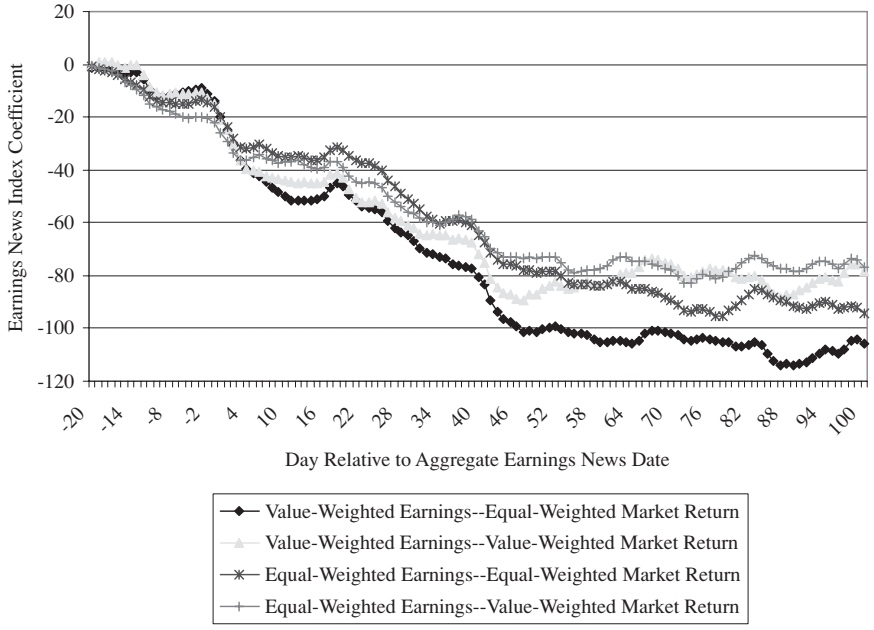

FIG. 2.—Relation between earnings surprise and cumulative aggregate market return 1973–2006.This figure graphs earnings surprise coefficient estimates by announcement relative day. They are for regressions of cumulative equal-weighted or value-weighted daily NYSE and AMEX market return starting from day −20 on day 0 value-weighted (VIX_0) or equal-weighted (EIX_0) announced earnings. These (model 3) estimations include lagged equal- or value-weighted quarterly and general earnings indices. Consistent with tables 4 and 5, included lags are one-, four-, and five-quarter lags of earnings for firms comprising the contemporaneous (VIX_0 or EIX_0) earnings index and a series of 21-day general lags based on all earnings in each 21-day interval.

terms of pure postannouncement return accumulation windows beginning at day +5, VIX_0 and EIX_0 coefficients are negative and directionally significant when the window ends at day +50, +60, +70, +80, or +90 for the equal-weighted market return indices. For value-weighted market return the estimated *t*-values for these same accumulation periods are uniformly negative and directionally significant at the 0.10 level or better using the equal-weighted earnings index. The coefficient *t*-values for the windows ending at days +50, +60, and +90 are also significant at the 0.10 level for the value-weighted earnings index.[36]

One explanation for this negative drift is that market participants do not immediately fully impound the discount rate implications of the aggregate earnings news. That is, we are observing the outcomes of a series of predictable postearnings news discount rate shocks. Or, in other words, the

[36] If a day +20 start point is used instead of day +5, then the results become more significant in most cases.

market is inefficient with respect to its incorporation of aggregate earnings discount rate news. Another explanation is that some portion of our earnings "surprise" is predictable and we are observing an underlying relation between predictable earnings movements and expected discount rates (i.e., expected market return is lower when earnings is increasing).

Figure 1 and table 9 provide unambiguous evidence of a relatively large negative announcement period relation between aggregate earnings surprise at earnings announcement dates and aggregate market return. We supplement this analysis with a further set of statistical tests aimed at establishing the extent to which these associations are, in a statistically significant sense, more negative in the immediate announcement period relative to other nearby periods on a by-period basis. We do this by including nearby earnings indices (e.g., VIX_{t-5}) along with their corresponding quarterly lags in equation (3) as follows:

$$R_t = \boldsymbol{c_d D_t} + d_0 + d_1 IX_t + d_2 IX_{t,q-1} + d_3 IX_{t,q-4} + d_4 IX_{t,q-5} + d_5 IX_{t-k} + d_6 IX_{t-k,q-1} + d_7 IX_{t-k,q-4} + d_8 IX_{t-k,q-5} + \boldsymbol{dd}_{-g} \boldsymbol{AX}_{-g} + e_t, \tag{5}$$

where k ranges between -20 and $+20$, excluding -2 to $+2$ (the immediate announcement period). We then test whether the day t index coefficient (d_1) is smaller than the inserted day $t - k$ index coefficient (d_{t-k}). If these coefficients do differ in magnitude from one another, then it supports our position that the announcement date negative relations we observe reflect market response to earnings news.

Table 10 reports day t and day $t - k$ earnings index coefficients (i.e., d_1 and d_5) for equation (5) for $t - k$ indices that follow (the -20 to -3 entries) and precede (the $+3$ to $+20$ entries) the market return day. The -20 to -3 entries in this table correspond to $t - k$ earnings indices disclosed after the market return day and so reflect the possibility that market returns lead earnings movements. The $+3$ to $+20$ entries correspond to $t - k$ earnings indices disclosed prior to the market return day and consequently reflect postannouncement persistence in the relation between market returns and earnings movements. Consistent with the results reported in table 9, the day t index coefficients are uniformly negative and significant at the 0.05 level for all indices and k values examined. Hence, the announcement period earnings index always possesses incremental explanatory power for contemporaneous market returns relative to nearby (in event time) earnings indices. The day $t - k$ coefficients, however, have mixed signs and are only occasionally significant at a conventional 0.05 level. The $t - k$ coefficients are also frequently significantly less negative (0.05 level or better) than the day t index relation. These results support the proposition that the announcement period earnings news relation documented in this paper is uniquely large in absolute magnitude in the immediate announcement period.

TABLE 10

Incremental Performance of Nearby(Day t−k) Earnings Index Values for Market Return at Day t[a] (1973–2006)

Market Return Day Relative to $t-k$ Index Day	VW Earnings				EW Earnings			
	EW Market Return		VW Market Return		EW Market Return		VW Market Return	
	Day t Coefficient	Day $t-k$ Coefficient	Day t Coefficient	Day $t-k$ Coefficient	Day t Coefficient	Day $t-k$ Coefficient	Day t Coefficient	Day $t-k$ Coefficient
−20	**−5.775**^	−1.412	**−5.975**^	−0.423	**−3.941**^	−1.011	**−4.136**^	−0.550
−19	**−5.814**^^	−0.406	**−6.037**^^	0.505	**−4.064**^	−0.856	**−4.341**^	−0.460
−18	**−6.091**^^	−0.580	**−6.139**^^	−0.198	**−4.133**^	−0.619	**−4.222**^	−0.690
−17	**−5.682**^	−1.003	**−5.636**^	−0.730	**−3.737**^	−0.773	**−3.791**	−0.938
−16	**−5.258**^	−0.992	**−5.243**	−1.607	**−3.341**	−0.676	**−3.330**	−1.701
−15	**−4.832**^	−0.849	**−5.070**	−1.243	**−3.088**	−1.550	**−3.329**	−2.393
−14	**−5.074**^^	0.542	**−5.544**^^	0.805	**−3.373**	−1.169	**−3.788**	−1.446
−13	**−5.445**^	−0.546	**−5.858**^	−0.700	**−3.696**	−1.225	**−4.108**	−1.472
−12	**−5.525**	**−3.148**	**−5.746**	**−4.426**	**−3.752**	**−2.240**	**−4.036**	**−2.941**
−11	**−5.615**	**−4.379**	**−5.850**	**−4.853**	**−3.825**	**−2.827**	**−4.024**	**−2.962**
−10	**−5.686**	−2.467	**−6.041**	−2.529	**−4.010**	**−1.848**	**−4.347**	−1.857
−9	**−5.698**^	−1.037	**−5.885**^	−1.118	**−4.048**^	−0.995	**−4.186**	−1.231
−8	**−5.518**^^	−0.118	**−5.566**^	0.145	**−3.917**^^	−0.141	**−3.993**^	−0.425
−7	**−5.440**^^	−0.030	**−5.449**^	−0.069	**−3.766**^	−0.972	**−3.796**	−1.613
−6	**−5.437**^^	0.034	**−5.471**^	−0.693	**−3.627**^	−0.303	**−3.756**	−1.242
−5	**−5.582**^^	0.588	**−5.701**^	−0.057	**−3.790**^	0.048	**−3.982**	−0.788
−4	**−5.447**^^	0.773	**−5.672**^	0.074	**−3.706**^^	1.116	**−4.022**^	0.646
−3	**−5.561**^^	0.620	**−6.059**^^	4.382	**−3.942**^^	0.933	**−4.317**^	0.580

(*Continued*)

TABLE 10—*Continued*

Market Return Day Relative to $t-k$ Index Day	VW Earnings				EW Earnings			
	EW Market Return		VW Market Return		EW Market Return		VW Market Return	
	Day t Coefficient	Day $t-k$ Coefficient	Day t Coefficient	Day $t-k$ Coefficient	Day t Coefficient	Day $t-k$ Coefficient	Day t Coefficient	Day $t-k$ Coefficient
3	**−4.454**	**−4.167**	**−4.490**	**−4.350**	**−2.752**	**−2.631**	**−2.764**	−2.427
4	**−4.65**	−1.114	**−5.372**	−1.298	**−3.252**^	0.603	**−3.695**^	1.119
5	**−5.058**^^	0.682	**−5.657**^	0.884	**−3.659**^^	1.560	**−4.019**^^	1.943
6	**−5.212**^^	0.493	**−6.036**^^	1.150	**−3.873**^^	1.392	**−4.310**^^	2.073
7	**−5.509**^	−1.180	**−5.711**^	−0.763	**−3.859**	−1.372	**−3.910**	−1.397
8	**−5.478**	−2.081	**−5.588**^	−0.357	**−3.842**	**−2.228**	**−3.898**	−1.040
9	**−5.623**^	−0.928	**−5.542**^	0.809	**−3.854**	−1.880	**−3.854**	−0.616
10	**−5.614**^^	−0.509	**−5.632**^	0.474	**−3.833**^	−0.281	**−3.923**^^	0.925
11	**−5.391**^	−0.417	**−5.329**^	0.225	**−3.737**^	0.068	**−3.718**^	0.965
12	**−5.193**^^	0.328	**−5.235**^	0.290	**−3.577**^	0.342	**−3.624**^	0.795
13	**−5.176**^^	0.623	**−5.210**^	0.895	**−3.539**	−1.120	**−3.588**	−1.380
14	**−5.177**^	0.099	**−5.188**^	−0.269	**−3.522**	−1.218	**−3.573**	−1.219
15	**−5.462**^^	0.636	**−5.524**^	0.372	**−3.669**^	−0.048	**−3.744**^	−0.116
16	**−5.565**^^	1.083	**−5.610**^	0.845	**−3.702**^^	0.791	**−3.733**^	1.128
17	**−5.390**^^	**2.760**	**−5.482**^^	2.523	**−3.715**^^	**2.343**	**−3.774**^^	2.278
18	**−5.505**^^	1.074	**−5.555**^^	0.996	**−3.735**^^	0.602	**−3.766**^	0.369
19	**−5.637**^	−1.079	**−5.811**	−1.571	**−3.879**	−1.700	**−4.055**	−2.328
20	**−5.657**	**−2.970**	**−5.850**	**−3.740**	**−3.776**	**−2.296**	**−4.012**	**−2.600**

Bolded coefficients directionally significant at the 0.05 level or better.

^^Day t coefficient is significantly smaller than the day $t-k$ coefficient at the 0.01 level (two-tailed test).

^Day t coefficient is significantly smaller than the day $t-k$ coefficient at the 0.05 level (two-tailed test).

[a]Tabulated values are contemporaneous earnings index coefficient estimates from regressions of equal-weighted or value-weighted day t NYSE and AMEX market return on value-weighted (VIX_0) or equal-weighted (EIX_0) announced earnings. Tabulated day $t-k$ values are earnings index coefficients for earnings (similarly weighted) announced in the day $t-k$ accumulation period relative to day t from these same regressions. These estimations include lagged equal- or value-weighted quarterly and general earnings indices. Consistent with prior tables, these lags consist of one-, four-, and five-quarter lags of earnings for firms comprising the contemporaneous (VIX_0 or EIX_0) earnings index and a series of 21-day general lags based on all earnings in each 21-day interval. They also include the one-, four-, and five-quarter lags of earnings for firms comprising the $t-$k earnings index. Each market return day t less day $t-k$ index day entry in the table reflects a separate set of regression estimations. Variable definitions are provided in appendix A. Heteroskedasticity-robust standard errors are used for statistical inference. Daily market return observations begin on January 1, 1973 and end on June 20, 2006.

6. *Conclusion*

In this paper, we document that firm earnings information directly impacts aggregate market returns. In its immediate form this impact moves market values in a direction opposite earnings surprise. That is, unexpectedly high earnings move market values lower while unexpectedly low earnings move market values higher. This sort of impact is most consistent with earnings conveying aggregate-level discount rates news. Specifically, positive earnings surprises cause discount rates applied to future cash flows to rise while negative earnings surprises cause discount rates to fall. The immediate announcement period impacts of these discount rate movements apparently swamp any contemporaneous earnings news regarding nominal aggregate-level future cash flows.

We also find that earnings news is associated with directionally consistent movement in short- and long-term bond returns. These associations are broadly consistent with earnings surprises conveying discount rate news. They are also consistent with earnings conveying inflation news since bond returns tend to respond directly to future inflation expectations. This inflation connection is also supported by evidence of a direct relation between earnings news and inflation expectation–sensitive changes in TIPS-based bond returns. As the primary focus of our analysis is the identification of immediate earnings news impacts on aggregate equity returns, these explorations of the debt market implications of earnings news are of a limited nature. Nevertheless, this evidence raises interesting possibilities about the role of earnings news as a general driver of rates of return (on both debt and equity) in the macroeconomy.

While a prior study by KLW reports evidence of a negative relation between earnings changes and market returns, their analysis employs lengthy return accumulation periods and restrictive earnings "surprise" measures that make it difficult to reliably assess whether this relation is a product of earnings disclosures or simply reflects a correlation between earnings movements and other macrolevel market return drivers. Our analysis is the first, to our knowledge, that clearly demonstrates how the arrival of earnings news impacts aggregate market valuation. This impact is sizable: A one standard deviation unexpected increment in aggregate value-weighted earnings moves market returns by around 12-basis points, or by around $12 billion given an aggregate market capitalization of 10 trillion, in the immediate announcement time period (days −1 to +3 relative to the earnings disclosure date).

Our analysis also suggests, consistent with some evidence reported in CG, that the negative aggregate earnings surprise impact continues beyond the initial disclosure period. Depending on the earnings and market return measures used, between 60% and 75% of the cumulative negative return association between day −2 and day +100 relative to the announcement date occurs after day +3. Hence, to the extent the earnings news reflects discount rate shocks, the market impounds less than half of such impacts

in the immediate earnings disclosure period. As is true with the notion that earnings conveys inflation news, this indication that there may be a considerable degree of inefficiency in the market's processing of aggregate earnings information (i.e., the market is "macroinefficient" [Samuelson, 1998]) merits further targeted attention.

The short window relation between aggregate earnings news and market returns we document also has implications for some research designs. Zhang [2007], for instance, considers the possibility that contemporaneous earnings news may account for negative aggregate market SOX (Sarbanes-Oxley Act) adoption period effects. She evaluates this possibility by examining aggregate earnings behavior and concludes that such earnings news could not account for her findings since announcements in the SOX-impacted time period tended to contain positive earnings surprises. Such a conclusion has merit only if positive surprises have positive aggregate market impacts. The findings presented here, however, contradict this premise, and suggest that aggregate market return implications of contemporaneous earnings news pose an alternative explanation for such findings.

Our analysis also calls into question the assumption, implicit in the literature relating earnings information to stock returns at the individual firm level, that return on the market impacts firm-level returns entirely apart from earnings news. That is, typical firm-level examinations of relations between earnings and returns estimate abnormal return based on overall market returns in a first-stage regression or differencing exercise and then examine the relation between the residual unexpected returns from this exercise and some earnings or earnings-related metric in a second-stage regression.[37] If the firm-level earnings surprise impacts market return (as our study suggests), it is also impacting such "exogenous" expected return measures and, consequently, distorting overall estimated effects of interest in such analyses.

APPENDIX A

Variable Definitions

Market Return Variables:

$EW\text{-}Mkt_t$	is the CRSP equal-weighted market index return (in percentage points) for NYSE and AMEX firms on day t.
$VW\text{-}Mkt_t$	is the CRSP value-weighted market index return (in percentage points) for NYSE and AMEX firms on day t.

Macrovariables:

rf_t	Risk-free rate (90-day treasury bill return on day t).

[37] Techniques employed range from CAPM and multifactor-based time-series regressions to size-portfolio adjusted returns. In all cases the expected return is, in part, determined by aggregate market return.

Term spread The difference between the yield on a 10-year maturity treasury bond and a three-month maturity treasury bill on day t. (Source: http://research.stlouisfed.org/fred2/categories/22)

Yield spread The difference between the Federal Funds rate and the yield on a three-month maturity treasury bill on day t. (Source: http://research. stlouisfed. org/fred2/categories/22)

Dft_t The difference in interest rates between AAA bonds and BAA bonds on day t. (Source: http://research.stlouisfed.org/fred2/categories/119)

Value-Weighted Earnings (Net Income Before Extraordinary Items) Indices:

VIX_0 is the value-weighted (based on rank of market value within the index) average of earnings announced over trading days $t-1$ through $t+1$ relative to day t.

VIX_{-1} is the value-weighted average of lagged quarter -1 earnings for the set of firms announcing current earnings over days $t-1$ to $t+1$.

VIX_{-4} is the value-weighted average of lagged quarter -4 earnings for the set of firms announcing current earnings over days $t-1$ to $t+1$.

VIX_{-5} is the value-weighted average of lagged quarter -5 earnings for the set of firms announcing current earnings over days $t-1$ to $t+1$.

VAX_{-g} is the value-weighted average of all available earnings/price ratios for earnings announced over trading days $(-2-\mathrm{g}\times 21)$ through days $(-22-\mathrm{g}\times 21)$ relative to market return day t; g varies from 0 to 16 in unitary increments.

Equal-Weighted Earnings (Net Income Before Extraordinary Items) Indices:

EIX_0 is the equal-weighted average of earnings announced over trading days $t-1$ through $t+1$ relative to day t.

EIX_{-1} is the equal-weighted average of lagged quarter -1 earnings for the set of firms announcing current earnings over days $t-1$ to $t+1$.

EIX_{-4} is the equal-weighted average of lagged quarter -4 earnings for the set of firms announcing current earnings over days $t-1$ to $t+1$.

EIX_{-5} is the equal-weighted average of lagged quarter -5 earnings for the set of firms announcing current earnings over days $t-1$ to $t+1$.

EAX_{-g} is the equal-weighted average of all available earnings/price ratios for earnings announced over trading days $(-2-\mathrm{g}\times$

21) through days ($-22 - g\times 21$) relative to market return day t; g varies from 0 to 16 in unitary increments.

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