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Revenue Benchmark Beating and the Sector-Level Investor Pricing of Revenue and Earnings

Synopsis: Prior research examines financial reporting of revenue in the context of how the incentives to achieve the earnings goal affect revenue reporting. In contrast, this study investigates how firms respond to sector-level incentives related to both revenue and earnings when evaluating the importance of revenue benchmarks. Results show that the importance of revenue benchmarks varies over time and across industry sectors. Regression analyses show that the sector-level incentives related to revenue and earnings affect revenue benchmark beating in opposite ways. Firms are more (less) likely to meet or just beat revenue benchmarks when the sector-level investor pricing of revenue (earnings) is high. Cross-sectional tests reveal that the association between revenue benchmark beating and the sector-level investor pricing of revenue (earnings) is stronger (weaker) among relatively young firms.

Keywords: Revenue benchmark beating; Sector-level incentives; Life cycle

INTRODUCTION

In a comprehensive survey conducted by Graham, Harvey and Rajgopal (2005), financial executives convey that they consider revenue as one of the three most important performance measures for external constituents, next to earnings and operating cash flows. Based on this finding, these executives are likely to care about how they perform on the revenue dimension relative to market expectations. Given the attention paid to revenue by the executives, relatively little research has been conducted in the area of revenue benchmark beating and how it varies over time.

Prior literature examines financial reporting of revenue in the context of how incentives to achieve the earnings goal affect revenue reporting (Plummer and Mest 2001; Caylor 2010; Stubben 2010). However, achieving the revenue goal is not always congruent with achieving the earnings goal. Firms sometimes take actions such as cutting advertising to improve earnings even through these actions could affect current or future revenue adversely (Roychowdhury 2006; Cohen, Mashruwala, and Zach 2010). Alternatively, firms may sacrifice earnings to pursue a sales growth strategy (Darrough and Ye 2007). The potential conflict between the revenue target and the earnings target suggests that managers need to consider the incentives related to revenue rather than just earnings when they evaluate the importance of revenue benchmarks. This is an aspect that has not been investigated before.

This study fills the void and investigates the relations between revenue benchmark beating and the sector-level incentives related to revenue and earnings, as well as the changing nature of these relations across firms where revenue benchmarks carry different degrees of importance. Specifically, this study investigates the following questions: (1) Is the tendency of firms to meet or just beat market expectations of revenue associated with the sector-level

investor pricing of revenue or earnings? (2) Do firms' relative life cycles (relative to the average life cycle of firms in the same sector) affect these associations?

Aghion and Stein (2008) propose that investors shift the emphasis they place on top line revenue and bottom line profitability over time. Firm managers, on the other hand, face resource constraints and thus have to shift their effort and attention between revenue and earnings. Aghion and Stein's (2008) theoretical model suggests that if firm managers care about current stock prices, they will devote more (less) effort to increasing sales at times when investors deem revenue (earnings) to be more important for assessing firm value.

Anecdotal evidence alludes to the validity of Aghion and Stein's (2008) theory at the industry sector level. An article by Gregory Zuckerman published in the *Wall Street Journal* on September 25, 2000 describes the shift in market dynamics as follows - "The top line is the bottom line for investors lately" and "lately there has been a single-minded focus on revenue growth rather than a company's profits, especially in critical industries such as technology."

Aside from anecdotal evidence, existing research also suggests that Aghion and Stein's (2008) theory has implications for how the sector-level investor pricing of revenue and earnings could influence the amount of managerial effort and attention allocated to meeting or beating revenue expectations. The investor pricing of various performance measures, including earnings and revenue, varies across industry sectors and reflects aggregate investor perceptions about the superiority of some performance metrics over others for certain industries (Biddle, Seow, and Siegel 1995; Francis, Schipper, and Vincent 2003). As industry sectors emerge and evolve over time, existing GAAP reporting rules on how to account for many of the innovative activities in the form of investments in R&D, branding or human capital do not keep up with the rate of business changes, which in turn affects the weights that investors place on earnings and revenue

in valuation (Lev and Zarowin 1999; Trueman, Wong, and Zhang 2000). Since managers have been shown to package firms with certain characteristics for which investors appear to be paying a premium at a given point in time (Baker and Wurgler 2004a, 2004b; Baker, Greenwood, and Wurgler 2009), the shift over time in the sector-level investor pricing of revenue and earnings would likely induce firms to pay more or less attention to revenue benchmarks.

While the sector-level investor pricing of revenue and earnings aggregates across how investors value firms in a given sector as the sector evolves over time, an industry sector at any given point in time consists of individual firms at various life cycle stages that do not necessarily correspond to the life cycle stage of the sector. Compared to relatively mature firms in the sector, investing in building clientele and growing revenue is more critical for relatively young and still growing firms who are less susceptible to higher pricing pressure on earnings (Darrough and Ye 2007). Thus, the effect that the sector-level investor pricing of revenue (earnings) has on revenue benchmark beating is likely to be stronger (weaker) among relatively young firms.

My sample consists of firms covered by COMPUSTAT, CRSP and I/B/E/S from the third quarter of 1997 to the fourth quarter of 2013. The sector-level investor pricing of revenue is measured as the coefficient on revenue surprises from the quarterly cross-sectional regressions of earnings announcement abnormal stock returns on earnings and revenue surprises (also referred to as the revenue response coefficient or *RRC*). The sector-level investor pricing of earnings is measured as the coefficient on earnings surprises (also referred to as the earnings response coefficient or *ERC*). Consistent with the extant literature, I use I/B/E/S consensus analyst forecasts of quarterly earnings per share (EPS) and revenue as proxies for the market expectations of EPS and revenue. The quarterly *RRC* and *ERC* are estimated for each of the five Fama-French sectors (consumer, manufacturing, high-technology, health, and a sector consisting

of miscellaneous industries) separately to allow the *RRC* and *ERC* to vary over time for different industry sectors.

I find significant time-series and cross-sector variations in the *RRC*, the *ERC* and in the revenue benchmark beating behavior. A cross-sector comparison reveals that the *RRC* for high-tech and health sectors is almost twice of that for the consumer, manufacturing and miscellaneous other sectors. The trend in *RRC* for the high-tech sector also coincides with the peak and burst of the tech bubble. The *ERC* for the health sector is much lower than the *ERC* for the remaining four sectors. In addition, the percentage of firms that meet or just beat revenue benchmarks exhibits a wide range over time from an average of almost 20 percent for the high-tech and health sectors to an average of less than ten percent for the other three sectors. These results are consistent with both investors and firm managers placing a greater emphasis on revenue in the high-tech and health sectors.

Sector-level regression results show that the percentage of firms that meet or just beat revenue benchmarks increases (decreases) as the beginning-of-the-quarter *RRC* (*ERC*) rises, regardless of whether the GDP growth, investor sentiment and the time trend are included as control variables. These results suggest that firms respond to the sector-level incentives tied to both revenue and earnings (rather than just earnings) when evaluating the importance of revenue benchmarks. Higher pricing weight on revenue for firms in a given sector induces more revenue benchmark beating in that sector. In contrast, firms shift their attention away from revenue benchmarks as investors put more weight on earnings, consistent with Aghion and Stein's (2008) conjecture that for managers who face resource constraints, paying more attention to earnings implies paying less attention to revenue.

Following the methodology in Anthony and Ramesh (1992) to classify five firm life cycle stages including Growth, Growth/Mature, Mature, Mature/Stagnant, and Stagnant, I identify relatively young firms as firms whose life cycle stage is below the average life cycle stage of firms in the same sector. Firm-level regression results show that the positive (negative) association between the *RRC* (*ERC*) and revenue benchmark beating is stronger (weaker) among relatively young firms compared to relatively mature firms. These results provide evidence that firms' relative life cycles influence the degree to which the sector-level investor pricing of revenue and earnings affects revenue benchmark beating.

This study makes the following contributions to the literature. First, prior research focuses on earnings benchmarks and considers beating revenue benchmarks simply as a means to achieve an earnings objective (for example, Plummer and Mest 2001). This study explores the importance of achieving a revenue objective as an independent benchmark. It documents the variation in the tendency of firms to meet or just beat revenue benchmarks across industry sectors over an extended period of time.

Second, this study shows that firms consider the trade-off between incentives that are tied to both revenue and earnings (rather than just earnings) when evaluating the importance of revenue. Results in this study indicate that the sector-level incentives tied to revenue and earnings affect firms' revenue benchmark beating in opposite ways. Thus, future research should take into account incentives related to both revenue and earnings when examining financial reporting on revenue.

Finally, studies such as Hirshleifer, Hou, and Teoh (2009) and Kothari, Lewellen, and Warner (2006) show that firm-level behavior does not always extend to the aggregate-level or to the sector-level, thus it is important to broaden the scope of the existing literature which focuses

on firm-specific or event-specific incentives for financial reporting. This study enhances our understanding of how the incentives at the sector-level affect financial reporting. It also contributes to the literature on firm life cycle by showing how firms' responses to the sector-level incentives vary depending on their life cycle stages relative to the average life cycle stage of firms in the same sector.

The remainder of this paper is organized as follows. The next section reviews prior literature and develops the hypotheses. The two sections after that describe the sample and research design, and present the empirical results. The final section concludes the paper.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Lynn Turner, while serving as the Chief Accountant of the U.S. Securities and Exchange Commission, made the following remarks during a speech in 2001:

> Revenue is typically the single largest item reported in a company's financial statements. As with the all important bottom line and cash flows, companies' reported revenues are not only significant to these companies' financial statements in dollar terms, but also in the weight and importance that investors place on them in making investment decisions. Trends and growth in the top line of a company's income statement are barometers investors use when assessing the company's past performance and future prospects.

The key message Mr. Turner conveys in these remarks is that investors place a significant weight on revenue information when valuing a firm. Given the importance of revenue, little is known about the importance of revenue benchmarks even though prior literature provides ample evidence that earnings benchmarks are important for managers (see for example, Burgstahler and Dichev 1997; Degeorge, Patel, and Zeckhauser 1999). Plummer and Mest (2001) examine the tendency of firms to report revenue slightly above analyst forecast of revenue for a sample of firms that meet or just beat earnings forecasts. They view their test on revenue benchmark

beating as a test of managing earnings by increasing sales. In contrast to prior studies that focus on earnings benchmarks, this study focuses on revenue benchmarks. Specifically, this study investigates how the importance of revenue benchmarks varies over time and how the sector-level stock price premium on revenue or earnings affects this time-series variation.

Revenue Benchmark Beating and the Sector-level Stock Price-Based Incentives

The accounting literature provides evidence that reporting and disclosure of earnings are affected by the attributes of market-level stock returns. Rajgopal, Shivakumar, and Simpson (2007) show that reporting of accruals is associated with time-varying aggregate stock price reaction to good earnings news relative to bad earnings news. Cohen and Zarowin (2007) find that the percentage of firms that meet or just beat earnings benchmarks is higher when the aggregate market P/E ratio is higher. Kim, Pandit, and Wasley (2016) show that macroeconomic uncertainty (measured by the volatility in aggregate stock returns) has an impact on managers' decisions to issue earnings guidance over and above the effect of firm-level uncertainty.

However, results on earnings benchmark beating cannot be easily extended to revenue benchmark beating since achieving the revenue goal is not always congruent with achieving the earnings goal. Prior research has documented changes in managerial behavior on financial reporting when there are multiple benchmarks such as earnings and cash flows (McInnis and Collins 2011). The empirical predictions of this study on how the investor pricing of revenue or earnings aggregated at the sector-level affects revenue benchmark beating over time originate from Aghion and Stein (2008).

Aghion and Stein (2008) propose a theory under which investors pay attention to performance measures such as revenue and profit margin rather than just earnings. More

importantly, investors shift the emphasis placed on top line revenue and bottom line profitability over time. At the same time, managers shift their strategic orientation between improving the top line revenue and improving the bottom line profitability depending on the prevailing investor demand for high revenue or high profitability. As Aghion and Stein (2008) argue, given limits on managerial time and other resources, doing more on one dimension implies doing less on the other. The argument of managerial resource constraint has some empirical support. On the one hand, firms sometimes take actions such as cutting advertising or research and development to improve earnings even through these actions could affect current or future revenue adversely (Roychowdhury 2006; Cohen et al. 2010). On the other hand, firms may sacrifice earnings to pursue a sales growth strategy (Darrough and Ye 2007), indicating that the incentive tied to revenue sometimes outweighs the incentive related to just earnings. Taken together, the implication is that if the manager cares about current stock price, she is better off devoting her effort to increasing sales when the market puts a premium on revenue. In contrast, the manager is better off allocating her effort to cost reduction when the market puts more weight on profitability.

Even though Aghion and Stein's (2008) model does not specifically refer to the changing stock price premium on revenue or earnings over time in the aggregate, anecdotal evidence alludes to the validity of their theory at the industry sector level. As Gregory Zuckerman writes in an article published in the *Wall Street Journal* on September 25, 2000, "The top line is the bottom line for investors lately." He points out that "revenue figures always have been seen as the lifeblood of a company" but "lately there has been a single-minded focus on revenue growth rather than a company's profits, especially in critical industries such as technology." He continues to explain that a big reason for this single-minded focus is "a growing view that

earnings in recent years have been boosted by cost-cutting and productivity gains that may no longer be sustainable. Furthermore, "many Internet and other companies with little in the way of earnings have tirelessly pushed Wall Street to focus on revenue, rather than profits, when analyzing their companies. Now that many Wall Street bulls have embraced this approach, it is coming back to haunt many tech companies that boast growing earnings but have suspect sales."

A similar sentiment is expressed years later by Associated Press reporter Tim Paradis in a July 11, 2009 article. He writes that "the stock market is looking for signs that business improved in the second quarter or at least will in the coming months. And investors will measure that by the revenue figures companies put up as they issue earnings reports during the next four weeks". He later writes in an October 10, 2009 article that "as earnings reports start to flow in for the July-September quarter, investors are likely to be more exacting than they were a few months ago, when they were pleased by companies' better-than-expected profits for the second quarter. Those results largely came from heavy cost-cutting. This time, investors want signs that companies are finding ways to bring in more money."

Aside from anecdotal evidence, there are theoretical reasons to expect that revenue benchmark beating would be associated with how the sector-level investor pricing of revenue and earnings changes over time. The sector-level investor pricing of revenue and earnings could reflect average investor beliefs of the changing importance of revenue or earnings as a given industry sector evolves. Since sectors develop and change at different times and at different rates, these beliefs are unlikely to be uniform across sectors during a given time period. Standard and Poor Industry Surveys have long provided industry coverage including industry trends, key macroeconomic measures as well as industry-specific measures that are preferred performance metrics for specific industries. Although market-wide stock returns may convey forward-looking

information about the macroeconomic conditions that firm managers can rely on in making future investment decisions (Fama 1981), the associations between stock returns and various performance measures including earnings, cash flows and revenue differ across industries, and there is some evidence that these associations reflect aggregate investor perceptions about the superiority of some performance metrics over the others for certain industries (Biddle et al. 1995; Francis et al. 2003).

As industry sectors emerge and evolve, the valuation model for firms in a given sector also evolves over time. Using data from the U.S. automobile tire industry, Jovanovic and MacDonald (1994) show that the time-series variation in the increase and decline of average firm value in this industry is aligned with how technological advances affect the product pricing and firm profitability over time. However, existing GAAP reporting rules often have severe limitations in how benefits from inventive or innovative activities can be recognized in earnings appropriately, which in turn affects the weights that investors place on various accounting numbers in valuation. Aboody and Lev (1998) provide an example of how trade groups in the software industry shift their attitudes towards the accounting treatment of software development costs as the industry evolves. Lev and Zarowin (1999) show that business changes driven by innovation, competition or deregulation over time affect how investors use accounting numbers in valuation. Their contention is that GAAP rules on how to account for many of the innovative activities in the form of investments in R&D, branding or human capital do not keep up with the rate of business changes. In fact, expensing of restructuring costs, R&D and other intangible assets results in current earnings being less informative to investors, especially in fast-changing and technology-based industries such as telecommunications and biotechnology (Amir and Lev 1996; Lev and Zarowin 1999). Trueman et al. (2000) find that for a certain segment of Internet

firms in the late 1990s, stock prices are associated with gross profits (revenue minus cost of revenue) but not with the bottom-line net income, consistent with top line revenue as a better firm performance measure for these firms during a period when this industry is evolving rapidly. Davis (2002) discovers a decline in the pricing multiple on revenue for Internet firms with grossed-up or barter revenue after the crash of Internet stocks in April 2000.[1]

This line of research suggests that time-varying investor pricing of revenue and earnings at the sector level reveals the aggregate investor beliefs about the importance of revenue or earnings as a performance measure for the sector during a given time period. Thus the empirical implications extended from Aghion and Stein (2008) suggest that managers would pay more attention to meeting or beating revenue benchmarks during periods when the sector-level investor pricing of revenue is high. In contrast, as managers face resource constraints, they would allocate less effort and attention to revenue benchmark beating during periods of high sector-level investor pricing of earnings.[2]

In addition, another line of research accepts that the stock market is subject to investor sentiment and managers tilt their decisions to cater to investor demand as reflected in the stock price premium that investors place on certain types of firms. For example, Baker and Wurgler (2004a, 2004b) find that the percentage of firms that initiate (omit) dividends is positively associated with the aggregate stock price premium on payers (nonpayers), consistent with managers responding to the implied investor demand in order to capture the "dividend premium". Li and Lie (2006) draw similar conclusions from increases and decreases in existing

[1] There are other studies that mostly examine the investor valuation of revenue in the context of how revenue performance affects the cross-sectional variation in the investor valuation of earnings (Ertimur, Livnat and Martikainen 2003; Ghosh, Gu, and Jain 2005; Rees and Sivaramakrishnan 2007).

[2] Glushkov and Bardos (2012) provide large sample empirical evidence that managers pursue the strategy to grow revenue and capital investments when investors favor growth. However, Glushkov and Bardos (2012) do not allow the investor pricing of revenue to vary across different industries nor do they investigate the importance of revenue benchmarks and how revenue benchmark beating varies over time. They also do not consider the trade-off between the incentives tied to revenue and earnings.

dividends. Other studies also find that corporate policies including stock splits and corporate name changes are influenced by the aggregate-level investor preferences (Baker et al. 2009; Cooper, Dimitrov, and Rau 2001). Again, investor preferences may not be uniform across sectors during a given time period.[3] Following this line of reasoning, high premium on revenue (earnings) at the sector-level signals prevailing investor preference for firms in a given sector to focus more on revenue (cost reduction). Given the resource constraint, managers choose to allocate more (less) effort to meeting or beating revenue benchmarks when the sector-level premium on revenue (earnings) is high.[4]

Overall, whether the sector-level investor pricing of revenue and earnings reflects investors' rational assessment of performance measures, or to some extent sentiment-related valuation premium, does not alter the empirical predictions of how the sector-level pricing affects revenue benchmark beating over time. However, two countervailing factors may offset the influences predicted by Aghion and Stein (2008). First, Aghion and Stein (2008) assume that managers consider the stock price incentive directly related to revenue. If the investor pricing of earnings is the dominant incentive, there may not be a discernable link between revenue benchmark beating and the investor pricing of revenue. Second, Aghion and Stein (2008) assume that managers face resource constraints and paying more attention to cost reduction implies paying less attention to revenue. Findings from Roychowdhury (2006) and Cohen et al. (2010) suggest that this assumption has some empirical support. However, it is still possible that revenue benchmarks are achieved as a byproduct of firm effort to improve earnings when the

[3] Empirically, I control for the market-wide investor sentiment (see equation (2) in the research design section).
[4] Alternatively, "leaning against the wind" may also lead to a negative relation between revenue benchmark beating and the sector-level investor pricing of earnings. Hirshleifer et al. (2009) propose "leaning against the wind" as one possible explanation for why firms are more likely to report higher earnings (by increasing accruals) when there is aggregate-level undervaluation. Their explanation can be extended to a setting where a firm can emphasize its performance on either the revenue or the earnings dimension. When the sector-level investor pricing of earnings is low, a firm can differentiate itself by emphasizing its performance on revenue benchmark beating over its performance on the undervalued earnings metric.

premium on earnings is high, which would manifest as a positive association between revenue benchmark beating and the investor pricing of earnings. A comparison of how the sector-level investor pricing of revenue and the investor pricing of earnings affect revenue benchmark beating differently should provide some insights on these countervailing factors.

Following prior studies' focus on firms' behavior to meet or beat earnings benchmarks by a small margin, this study examines the tendency of firms to report revenue at or slightly above revenue benchmarks. As the importance of revenue benchmarks increases, there will be more firms that report revenue at or slightly above revenue benchmarks. Accordingly, my first set of hypotheses is (stated in null form):

> ***H1a:*** *The tendency of firms to meet or just beat market expectations of revenue is not associated with the sector-level investor pricing of revenue.*
>
> ***H1b:*** *The tendency of firms to meet or just beat market expectations of revenue is not associated with the sector-level investor pricing of earnings.*
>
> ***H1c:*** *The association between revenue benchmark beating and the sector-level investor pricing of revenue is not different from the association between revenue benchmark beating and the sector-level investor pricing of earnings.*

Cross-Sectional Variation in How the Sector-level Investor Pricing Affects Revenue Benchmark Beating

As discussed in the earlier section, the sector-level pricing of revenue and earnings aggregates across how investors value firms in a given sector as the sector evolves over time. The pricing implications of revenue and earnings then induce emulation and converging revenue benchmark beating behavior from firms in the same sector. At the same time, an industry sector at any given point in time consists of individual firms at life cycle stages that do not necessarily correspond to the life cycle stage of the sector.

In one of its practical guides for management accountants, the National Association of Accountants states that "At each stage of growth in an entity's life cycle, different measures of financial performance take on varying degrees of importance". Classifying firm-years into five life cycle stages including Growth, Growth/Mature, Mature, Mature/Stagnant and Stagnant, Anthony and Ramesh (1992) find that stock return response to unexpected sales growth and unexpected capital expenditure monotonically declines from the Growth stage to the Stagnant stage, indicating that revenue growth becomes less important for the investors as firms progress through their life cycle. On the other hand, Black (1998) shows that the value relevance of earnings increases as firms move from the start-up stage to the mature stage. Similarly, Jenkins et al. (2004) find that the importance of top-line sales relative to bottom-line earnings varies across different life cycle stages. Specifically, they find that the stock market reacts more to changes in sales than to changes in profitability for firms in the earlier life cycle stages, and this pattern reverses for firms in the later life cycle stages. Management literature suggests that management's view on the importance of revenue over the firms' life cycle is consistent with the investor valuation. Firms adopt business strategies that maximize revenue growth early in their life cycle. As firms mature, efficiency and profit generating ability become more important and management's emphasis moves away from the top line revenue (Porter 1980).

The deviation from the average life cycle of firms in a given sector induces divergence and cross-sectional variations in how the sector-level investor pricing of revenue and earnings affects an individual firm's revenue benchmark beating behavior. The effect that the sector pricing on revenue has on revenue benchmark beating is likely to be stronger among relatively young firms in a given sector. Compared to relatively mature firms in the sector, investing in building clientele and growing revenue is more critical for relatively young firms. This suggests

that high sector pricing of revenue likely induces higher propensity to meet or just beat revenue benchmarks among relatively young firms. Earnings of relatively young and growing firms, on the contrary, may be overlooked by investors who recognize that GAAP rules typically require expensing of investments in branding, human capital or other intangibles. Thus, relatively young firms may still be better off focusing on meeting revenue expectations even when high sector pricing of earnings induces less revenue benchmark beating on average. In other words, the effect that the sector pricing of earnings has on revenue benchmark beating is likely to be weaker among relatively younger firms. Accordingly, my second set of hypotheses is (stated in alternative form):

> ***H2a:*** *The association between revenue benchmark beating and the sector-level investor pricing of revenue is stronger among relatively young firms.*
>
> ***H2b:*** *The association between revenue benchmark beating and the sector-level investor pricing of earnings is weaker among relatively young firms.*

SAMPLE SELECTION AND RESEARCH DESIGN

Sample Selection

My sample starts with firms covered by the Institutional Brokers Estimate System (I/B/E/S), COMPUSTAT and the Center for Research in Security Prices (CRSP) from the third quarter of 1997 to the fourth quarter of 2013.[5] I first require firms to have historical Standard Industrial Classification (SIC) codes from COMPUSTAT Fundamentals Quarterly data and analyst forecasts of earnings per share (EPS) from I/B/E/S Summary History data. Following Fama and French (2001), financial firms (SIC code 6000-6999) and utilities (SIC code 4900-

[5] Revenue forecasts in I/B/E/S are mostly available from 1995 onwards. The I/B/E/S data file contains a limited number of quarterly revenue forecasts from 1995 to the second quarter of 1997. To maintain a continuous time series of revenue forecasts for meaningful statistical analyses, my sample starts in the third quarter of 1997.

4949**)** are excluded from the sample because they are subject to unique regulatory requirements. This step yields an initial sample of 192,634 firm-quarters for 8,231 individual firms. Next, I require firms to have analyst forecasts of revenue from I/B/E/S Summary History data and retain 152,327 observations (or 79.1 percent of the initial sample) for 6,982 individual firms. Finally, I require firms to have sufficient CRSP data to compute abnormal stock returns over the three-day window centered on the COMPUSTAT quarterly earnings announcement dates as well as sufficient data to compute earnings and revenue surprises. My primary sample consists of 146,668 firm-quarters for 6,836 individual firms.[6]

Table 1 shows the distribution of my sample across Fama-French five industry sectors. Sector 1 contains consumer-related industries, including consumer durable, nondurables, wholesale, retail and some services such as laundries and repair shops. Sector 2 includes manufacturing and energy industries. Sector 3 includes high-technology industries such as business equipment, computer-related services, R&D labs, telephone, and television transmission. Sector 4 comprises industries involved in health care, medical equipment and drugs. All miscellaneous other industries are grouped into Sector 5. Consistent with Rees and Sivaramakrishnan (2007) that analysts issue revenue forecasts for a higher proportion of firms in the computer and pharmaceuticals industries, Panel A shows that between 72.7 to 76.5 percent of firms in the consumer, manufacturing and miscellaneous other sectors have analyst forecasts of revenue in addition to analyst forecasts of earnings, compared to 85.1 percent in the high-tech sector and 83 percent in the health sector.

[Insert Table 1 here]

[6] The samples used for specific analyses vary due to additional data requirements.

Sector-Level Investor Pricing of Revenue and Earnings over Time – Empirical Measure

I measure the sector-level investor pricing of revenue or earnings from quarterly regressions of earnings announcement period abnormal stock returns on revenue and earnings surprises. Following Ertimur and Livnat (2002), all firms with a fiscal quarter ending within one month of a calendar quarter end are classified into that calendar quarter to ensure the comparability of economic conditions for all firms in each calendar quarter. For example, firms with fiscal quarters ending in February, March and April are included in the regression for calendar quarter one. The quarterly regression is specified in equation (1).

$$BHAR_{it} = \alpha + \beta_1 ES\_DECILE_{it} + \beta_2 RS\_DECILE_{it} + \varepsilon_{it} \quad (1)$$

Abnormal return (*BHAR)* is the buy-and-hold abnormal return over a three-day window from trading day -1 to +1 where day 0 is the COMPUSTAT quarterly earnings announcement date. The daily abnormal return is calculated using Fama-French three-factor model to control for risk premiums associated with market returns, size, and book-to-market risk factors, and to minimize the possibility that the market premium on revenue reflects cross-sectional variation in the stock price response to earnings. Earnings surprise (*ES*) for quarter t is defined as unadjusted actual EPS reported by I/B/E/S minus the most recent unadjusted I/B/E/S consensus forecast of EPS issued prior to the earnings announcement date for quarter t. Revenue surprise (*RS*) for quarter t is defined as actual sales for quarter t minus the most recent I/B/E/S consensus forecast of sales prior to the earnings announcement date for quarter t. To mitigate measurement errors in earnings surprises and revenue surprises, I sort scaled *ES* and scaled *RS* for a given calendar quarter into deciles, where *ES* is scaled by beginning-of-the-quarter stock price and *RS* is scaled by beginning-of-the-quarter market value of equity. Using decile rankings of earnings and revenue surprises also minimizes the effect of inherent difference in the accuracy of consensus

earnings and revenue forecasts and allows a comparison of the coefficient on earnings surprises to the coefficient on revenue surprises. Each observation is then assigned a decile rank from zero for the bottom decile to one for the top decile (*ES_DECILE* and *RS_DECILE*). Coefficient β_1 measures the sector-level investor pricing of earnings or the earnings response coefficient (*ERC*); and β_2 measures the sector-level investor pricing of revenue or the revenue response coefficient (*RRC*).

I measure both *ERC* and *RRC* at the Fama-French five sector level. Measuring *ERC* and *RRC* at the sector level allows variation across sectors in how investors price earnings and revenue information. As Rees and Sivaramakrishnan (2007) argue, assuming that certain firm characteristics such as growth opportunities result in revenue forecasts being more useful and that these characteristics are common within industries, analysts will issue more revenue forecasts for certain industries. The sample distribution in Table 1 shows that analysts issue revenue forecasts for a higher percentage of firms in high-tech and health sectors, consistent with the conventional wisdom that high-technology industries or industries with high R&D are considered high-growth industries. Thus, I expect the *RRC* to be higher for high-tech and health sectors.

Firms' Tendency to Meet or Just Beat Market Expectations of Revenue – Empirical Measure

The importance of revenue from a firm's perspective is measured by the firm's tendency to meet or just beat market expectations of revenue. The following regression examines how the sector-level investor pricing of revenue or earnings influences the tendency of firms to meet or just beat market expectations of revenue (H1).

$$\%SMBR_t = \beta_0 + \beta_1 RRC_{t-1} + \beta_2 ERC_{t-1} + \beta_3 GDPCHG_t + \beta_4 SENTIMENT_t + \beta_4 TREND_t + \varepsilon_t$$

(2)

The percentage of firms that meet or just beat revenue targets in a given sector (*%SMBR*) is the number of firms with small positive revenue surprises divided by the total number of firms in a given calendar quarter. Small positive revenue surprises are defined as those between zero (inclusive) and 0.15 percent of market value of equity.[7] Both revenue response coefficient (*RRC*) and earnings response coefficient (*ERC*) are lagged by one quarter to mitigate the endogeneity problem and are intended to capture the managers' perception of the investor pricing of revenue or earnings. A positive and significant β_1 would be consistent with firms responding to the sector-level incentive directly related to revenue rather than just earnings. A negative and significant β_2 would be consistent with firms shifting their attention away from revenue benchmarks as investors put more weight on earnings.

Control variables include *GDPCHG*, *SENTIMENT* and *TREND*. I control for two aggregate-level measures that could affect the tendency of firms to meet or just beat revenue benchmarks – *GDPCHG* and *SENTIMENT*. When the overall economy is growing or when consumers are optimistic, it would be easier for firms to achieve their revenue targets. *GDPCHG* is the contemporaneous real gross domestic product growth over the same quarter of the prior year provided by the FRED (Federal Reserve Economic Data) database from the Federal Reserve Bank of St. Louis. *SENTIMENT* is the average monthly Consumer Confidence Index for the three months of a given calendar quarter. This index is constructed by the Survey Research Center at the University of Michigan and measures how optimistic consumers are about their own financial situation, about the general economy over the near and the long term, and about the buying conditions for durable goods. It is used in Bergman and Roychowdhury (2008) and

[7] Because it is unclear whether investors view revenue surprises on a per share basis (same as earnings) or on any other basis, the choice of scaling revenue surprises by market value of equity follows prior research by Plummer and Mest (2001). The cutoff of 0.15 percent is chosen based on the distribution of revenue surprises in Figure 2.

Simpson (2013) as the proxy of investor sentiment. Finally, I include a linear time trend (*TREND*) to control for the possibility that the association between revenue benchmark beating and the investor pricing of revenue or earnings represents a common trend caused by other forces unrelated to how managers respond to the sector-level stock price-based incentives.

Firms' Relative Life Cycles

Following the methodology in Anthony and Ramesh (1992), firms are assigned into life cycle stages of one for the Growth stage, two for the Growth/Mature stage, three for the Mature stage, four for the Mature/Stagnant stage, and five for the Stagnant stage. Specifically, the firm's median dividend payout and sales growth from the prior five years and firm's current age are used as life cycle descriptors. Dividend payout (*DP*) is common dividends (*DVC*) divided by income before extraordinary items (*IB*). Sales growth (*SG*) is current year net sales (*SALE*) minus prior year net sales, divided by prior year net sales. Firm *AGE* is the number of months since the firm's first return record appeared on CRSP. Each firm-quarter receives a composite score based on these three descriptors and the composite score determines the firm's life cycle stage.[8]

To test the cross-sectional variation in how the sector-level investor pricing of revenue and earnings affects revenue benchmark beating (H2), I estimate the following logistic regression using firm-quarter observations and cluster the standard errors by firm and time period following Petersen (2009).

[8] Each firm-year is given a score of one, two or three based on the tercile rankings of each of these three descriptors separately. A score of one is given to low dividend payout tercile, high sales growth tercile and young firms. A score of three is given to high dividend payout tercile, low sales growth tercile and old firms. A score of two is given to firms ranked in the middle tercile for each of the three dimensions. Each firm-year then receives a composite score that is the sum of the three descriptor scores and all quarters within a given year are assigned the same composite score which ranges from three to nine. Finally, firm-quarters with composite scores less than or equal to four are assigned to the Growth group, those with scores greater than or equal to eight are assigned to the Stagnant group, and those with scores five, six, or seven are assigned to three intermediate groups referred to as the Growth/Mature, Mature, Mature/Stagnant groups.

$$\ln\left(\frac{P_{SMBR}}{1-P_{SMBR}}\right)_{i,t} = \beta_0 + \beta_1 RRC_{t-1} + \beta_2 ERC_{t-1} + \beta_3 REL\_YOUNG_{i,t}$$
$$+\beta_4 RRC_{t-1} \times REL\_YOUNG_{i,t} + \beta_5 ERC_{t-1} \times REL\_YOUNG_{i,t} + \sum_6^{11} \beta_j Controls + \varepsilon_{i,t} \quad (3)$$

SMBR is an indicator variable that equals one for firms that meet or just beat revenue benchmarks. *RRC* and *ERC* are as previously defined. *REL_YOUNG* is an indicator variable that equals one if the firm is relatively young compared to the average life cycle of all firms in the same sector. A significant coefficient β_4 or β_5 would provide evidence of cross-sectional variation in the effect that the sector-level investor pricing of revenue or earnings has on revenue benchmark beating.

Control variables include *LOSS*, *SIZE*, *Q4*, *GDPCHG*, *SENTIMENT* and *TREND*. I control for the percentage of quarters that a firm reports losses in the previous five years (*LOSS*), since firms with more frequent losses are likely to view revenue targets differently. I control for firm *SIZE* (natural log of market value of equity) as it may be easier for larger firms to beat revenue targets. I also include an indicator variable for fiscal quarter four (*Q4*) because in the fourth quarter, firms may be more likely to meet or beat revenue targets which are essentially annual targets. *GDPCHG*, *SENTIMENT* and *TREND* are as previously defined.

EMPIRICAL RESULTS

Sector-Level Investor Pricing of Revenue and Earnings over Time

Table 2 presents descriptive statistics for the primary sample. The three-day earnings announcement period abnormal return (*BHAR*) has a mean and median of -0.1% and an inter-quartile range of 9.3% (with the first quartile of -4.7% and the third quartile of +4.6%). Mean earnings surprise (*ES*) is half a cent and the median is one cent, while the mean (median) revenue surprise as a percentage of the market value of equity is 0.003% (0.072%). The "average" firm

reports quarterly sales of $913 million, $5.975 million higher than forecasted by analysts. Untabulated results show that the Spearman correlation between earnings announcement period abnormal return (*BHAR*) and earnings surprise is 0.30, higher than that between *BHAR* and revenue surprise (0.18). The Spearman correlation between revenue surprise and earnings surprise is rather modest at 0.31.

[Insert Table 2 here]

Table 3 reports the average of coefficient estimates, the average number of observations and the average adjusted R^2 from 66 quarterly regressions in equation (1) for each of the Fama-French five sectors. T-statistics are calculated based on standard errors from the time-series variation in the coefficient estimates. A few patterns emerge from Table 3. First, the *ERC* (β_1) and the *RRC* (β_2) are positive on average. For example, the mean coefficient estimate of 0.084 for β_1 in Sector 1 implies that abnormal returns increase by 8.4% when earnings surprises move from the bottom decile to the top decile; the mean coefficient estimate of 0.021 for β_2 implies that, holding earnings surprises constant, firms with revenue surprises in the top decile earn 2.1% more abnormal returns than those with revenue surprises in the bottom decile. Second, the *ERC* and the *RRC* are comparable across the consumer, manufacturing and miscellaneous other sectors. Third, the *RRC* for high-tech and health sectors is almost twice that of the other three sectors. However, the *ERC* for the health sector ($\beta_1 = 0.046$) is much lower than the *ERC* for the high-tech sector ($\beta_1 = 0.071$) which in turn is closer to the *ERC* for the consumer, manufacturing and miscellaneous other sectors (β_1 ranges from 0.064 to 0.084). As a result of these similarities and differences in the *ERC* and the *RRC* across five sectors, and for brevity, I plot the time-series *ERC* and *RRC* in Figure 1 for the high-tech sector and the health sector separately and group the consumer, manufacturing and miscellaneous other sectors together.

[Insert Table 3 here]

Figure 1 plots the percentage of firms that meet or just beat revenue benchmarks (*%SMBR*), beginning-of-the-quarter (one-quarter lagged) *ERC* and *RRC* over time for the consumer, manufacturing and miscellaneous other sectors in Panel A, for the high-tech sector in Panel B and for the health sector in Panel C. The right vertical axis is for the *ERC* and the *RRC* while the left vertical axis is for *%SMBR*. Panel A shows that for the consumer, manufacturing and miscellaneous other sectors, the *ERC* exceeds the *RRC* for the entire sample period with both series exhibiting a slight upward trend. *%SMBR* fluctuates mostly between five and 15 percent, with a peak of 16 percent in the second quarter of 2002 and a trough of four percent in the first quarter of 2009. In addition, the trends in *RRC* and *%SMBR* appear to go hand in hand especially in the earlier sample period.

[Insert Figure 1 here]

Panel B and Panel C show a different picture for the high-tech and health sectors. Panel B shows that for the high-tech sector, although the *ERC* is still larger than the *RRC* throughout most of the sample period, the difference between the two is much smaller compared to Panel A. *%SMBR* starts to climb in 1999 and reaches a peak of 32 percent in the second quarter of 2000, then drops in the following few quarters, a pattern that coincides with the peak and burst of the information technology bubble. The trough of 10 percent in *%SMBR* in the first quarter of 2009 corresponds with the end of the Great Recession. Overall, the general trend in *%SMBR* tracks the trend in *RRC* for most of the sample period. Panel C shows that for the health sector, the *ERC* and the *RRC* are often similar in magnitudes except around year 2000. *%SMBR* ranges from 9 percent in the fourth quarter of 1998 to 31 percent in the third quarter of 2013 with a trough also

in the first quarter of 2009. The co-movement of *%SMBR* and the *RRC* is most visible in the late 1990s and around the Great Recession.

Figure 2 presents the relative frequency distributions of revenue surprises (scaled by market value of equity) conditional on whether the *RRC* (Panel A) or the *ERC* (Panel B) is high (above median) or low (below median). Scaled revenue surprises are sorted into 62 bins with an increment of 0.0015, where bin 0 includes surprises in the range [0, 0.0015), bin 1 includes surprises in the range [0.0015, 0.003), and so on.[9] Relative frequency is measured as the number of surprise observations that fall into a specific bin, divided by the total number of surprise observations in the conditional sample. The vertical bar graph presents the frequency distribution when either the *RRC* or the *ERC* is high while the line graph presents the frequency distribution when either the *RRC* or the *ERC* is low. Examining each of the four distributions separately, both Panel A and Panel B show that scaled revenue surprises occur more frequently than expected in bin 0.[10] Most importantly, a comparison of the vertical bar graph and the line graph in Panel A shows that almost 16 percent of firms report small positive revenue surprises (bin 0) when the *RRC* is high, much higher than when the *RRC* is low (less than 10 percent). In contrast, Panel B shows that a lower percentage of firms report small positive revenue surprises when the *ERC* is high than when the *ERC* is low, a pattern that is the exact opposite of Panel A.

[Insert Figure 2 here]

[9] The ad hoc interval width of 0.0015 is chosen so that the distribution of revenue surprises resembles a normal distribution.

[10] Burgstahler and Dichev (1997) use the standardized difference to test whether the actual number of observations in a given bin is significantly different from the expected number of observations. Following their method, the expected number of observations in bin 0 is defined as the average of the number of observations in bin -1 and bin +1. In Panel A, the standardized difference for bin 0 is 34.25 when the *RRC* is high and 13.29 when the *RRC* is low. In Panel B, the standardized difference for bin 0 is 24.61 when the *ERC* is high and 22.08 when the *ERC* is low. These tests show that the actual number of observations in bin 0 is higher than expected for each distribution. See footnote 6 in Burgstahler and Dichev (1997) for details on how to construct this standardized difference.

In summary, the key message from Table 3 and Figure 1 is that there are significant time-series as well as cross-sector variations in the investor pricing of revenue and earnings. The variation in *RRC* across sectors reflects the higher importance of revenue for firms in high-growth sectors. The unusually high frequency of small positive revenue surprises in Figure 2 suggests that firms attempt to cross the thresholds of revenue forecasted by analysts. More importantly, the propensity to meet or just beat revenue benchmarks is higher (lower) when the investor pricing of revenue (earnings) is high.

Regression Results on the Tendency to Meet or Just Beat Market Expectations of Revenue

Table 4 reports the results on the link between the tendency of firms to meet or just beat revenue benchmarks and the sector-level investor pricing of revenue or earnings. Panel A shows the summary statistics for the percentage of firms that meet or just beat revenue benchmarks. Since the sector-level incentives are lagged by one period, this sample includes 65 quarters from each of the Fama-French five sectors with a total number of 325 sector-quarter observations. On average, less than ten percent of firms report small positive revenue surprises in the consumer, manufacturing and miscellaneous industry sectors, whereas almost 20 percent of firms in high-tech and health sectors report small positive revenue surprises.

[Insert Table 4 here]

Panel B presents the results of estimating equation (2) where standard errors are based on Newey-West's (1987) correction for serial correlation using four lags. Column (1) shows that the coefficient on *RRC* is positive and significant without any control variables (coefficient estimate = 1.510 and t-stat = 9.38), indicating that firms are more likely to meet or just beat revenue benchmarks when the sector pricing of revenue is high. In contrast, column (2) shows that the coefficient on *ERC* is negative and significant (coefficient estimate = -0.703 and t-stat = -3.70).

The negative association between revenue benchmark beating and the *ERC* is consistent with firms "leaning against the wind" as suggested in Hirshleifer et al. (2009). During periods when the sector-level investor pricing of earnings is low, firms are more likely to emphasize their revenue performance over their performance on the undervalued earnings dimension. It also supports Aghion and Stein's (2008) conjecture that given limited time and resources, firms have to prioritize either cost reduction or revenue improvement. Higher sector pricing of earnings tilts the focus of firms away from revenue targets and more towards cost reduction as the means to report better earnings. This result is also congruent with prior evidence that firms sometimes cut R&D or advertising expenditures to meet or beat earnings expectations (Roychowdhury 2006 and Cohen et al. 2010) while sacrificing revenue growth.

Columns (3) to (5) show that these results hold after control variables are included in the regression, suggesting that the *RRC* and the *ERC* do not simply reflect changes in economic environments over time. Column (5) shows that when both the *RRC* and the *ERC* are included, the positive coefficient on the *RRC* is significantly different from the negative coefficient on the *ERC* (*F*-test significant at the 1% level), suggesting that the sector pricing of revenue provides an incentive distinct from the sector pricing of earnings. Column (5) also shows that coefficients on *SENTIMENT* and *TREND* are positive and significantly different from zero whereas the coefficient on *GDPCHG* is not significantly different from zero. GDP growth does not explain variation in the sector-level revenue benchmark beating; however, firms are more likely to meet or just beat revenue benchmarks when investor sentiment is high. Finally, there is an increasing trend in revenue benchmark beating over time.

Results on the Cross-Sectional Variation and Firms' Relative Life Cycles

Table 5 presents results on the cross-sectional variation in how the sector-level investor pricing of revenue or earnings affects revenue benchmark beating. Panel A reports the descriptive statistics for the full sample as well two subsamples of relatively young and relatively mature firms.[11] Relatively young (mature) firms are firms whose life cycle stages are below (above) the average life cycle stage of all firms in the same sector. The mean of *SMBR* declines slightly from 12.7% for relatively young firms to 11% for relatively mature firms, suggesting that firms are more likely to meet or just beat revenue benchmarks if they are younger compared to other firms in the sector. Relatively young firms are also smaller and report more frequent losses.

[Insert Table 5 here]

Panel B presents the logistic regression results from estimating equation (3). Columns (1) and (2) estimate the regression for the subsamples of relatively young and relatively mature firms separately without the interactions between *REL_YOUNG* and the *RRC* or the *ERC* while Column (3) estimates the regression with the interaction. Columns (1) and (2) confirm that the coefficient on the *RRC* is positive and the coefficient on the *ERC* is negative using firm-level data, consistent with results in Table 4. Column (3) shows that the interaction between *REL_YOUNG* and the *RRC* as well as the interaction between *REL_YOUNG* and the *ERC* are both positive and significantly different from zero. Collectively, these results show that the positive (negative) association between the *RRC* (*ERC*) and revenue benchmark beating is stronger (weaker) among relatively young firms, consistent with H2.

[11] Since the methodology in Anthony and Ramesh (1992) requires data from the previous five years to classify a given firm-year into a life cycle stage, the total number of observations drops to 111,874. Untabulated results show that 11 percent of observations are in the Growth stage and between 22 to 23 percent are in each of the remaining four stages.

Because the interaction effect is conditional on the independent variables in a nonlinear model such as logit (Ai and Norton, 2003; Norton, Wang and Ai, 2004), I also graph the predicted probability of revenue benchmark beating for relatively young and relatively mature firms at ten equally-spaced points on the respective distribution of the *RRC* or the *ERC*, holding all other variables at their mean values. The graphs in Figure 3 show that the effect of the *RRC* on revenue benchmark beating among relatively young firms is substantially different from its effect among relatively mature firms, especially when the *RRC* is high. The differential effects of the *ERC* on revenue benchmark beating among relatively young versus relatively mature firms are still evident albeit less prominent.[12]

[Insert Figure 3 here]

Results on the control variables show that larger firms are more likely to meet or just beat revenue benchmarks regardless of whether they are relatively young or mature. Relatively young firms are also more likely to meet or just beat revenue benchmarks in the first three fiscal quarters compared to fiscal quarter four, perhaps as a result of their focus on revenue during the first three quarters of the year when there is less year-end earnings pressure. Results on *SENTIMENT* and *TREND* largely confirm those from Table 4.

Additional Analyses

I conduct several additional analyses to determine the robustness of the results. First, I re-estimate equation (2) using an alternative definition of meeting or just beating revenue benchmarks. Untabulated results show that when meeting or just beating revenue benchmarks is

[12] For relatively mature firms, the predicted probability of *SMBR* increases from 4.8% to 21.3% (decreases from 15.3% to 6.6%) as the *RRC* (*ERC*) moves from the first to the last point. In comparison, for relatively young firms, the predicted probability of *SMBR* increases from 4.7% to 29.6% (decreases from 16.1% to 9.3%) as the *RRC* (*ERC*) moves from the first to the last point.

defined as reporting revenue surprises between zero and 0.25 percent of the market value of equity, findings are very similar to those in Table 4. Results (untabulated) using Tobit models are also strongly consistent with the OLS models with the Newey-West corrections.

Second, I re-estimate equation (3) within two subsamples – one subsample includes firms that meet or just beat earnings benchmarks (i.e., firms that report zero or one cent earnings surprises) and the other subsample includes the remaining firms. Untabulated results show that in both subsamples, the coefficients on *RRC* are positive and significant while the coefficients on *ERC* are negative and significant. These results show that the associations between revenue benchmark beating and the sector-level incentives are robust regardless of whether firms meet or just beat their earnings benchmarks.

Third, I consider the possibility that the *RRC* or the *ERC* is simply a noisy measure of firm-specific (rather than the sector-level) *RRC* or *ERC*. To examine this possibility, I estimate a regression of earnings announcement period abnormal returns on earnings and revenue surprises for each firm over rolling 20-quarter windows, and I require at least eight quarters of data for each regression. This procedure yields firm and quarter-specific estimates of *RRC* and *ERC*. I include firm-quarter-specific *RRC* and *ERC* as two additional control variables in the firm-level logistic regression of equation (3). Untabulated results show that the coefficient on the sector-level *RRC* is still positive and significant (coefficient estimate = 10.274, z-statistics = 9.86) while the coefficient on the sector-level *ERC* is still negative and significant (coefficient estimate = -6.294, z-statistics = -5.46). These results suggest that the effect of the sector-level *RRC* or *ERC* on the tendency of firms to meet or just beat revenue benchmarks is incremental to firm-specific *RRC* or the *ERC* that vary depending on individual company context.

Fourth, I explore whether changes in the composition of firms along with changes in the attributes of firms explain the variation in the *RRC* or the *ERC*. I construct three primary firm attributes at the sector-level – *AVGSIZE*, *AVGAGE*, and *AVGMTB* – to capture changes in the composition of firms and/or changes in firm attributes. *AVGSIZE*, *AVGAGE*, and *AVGMTB* are the average values of firm size (natural log of market value of equity), age and market-to-book ratio calculated for each sector in each quarter. I then regress the *RRC* or the *ERC* on *AVGSIZE*, *AVGAGE*, and *AVGMTB*. Untabulated results show that among the three independent variables, only *AVGMTB* is marginally associated with the *RRC* (coefficient estimate = 0.061, t-statistics = 1.71), proving weak evidence that the *RRC* is higher when there are more high growth firms in the capital markets. Together, *AVGSIZE*, *AVGAGE*, and *AVGMTB* explain only about 5 percent of the variation in the *RRC*, suggesting the difficulty in identifying the exact forces that drive the variation in the *RRC*. In comparison, only *AVGSIZE* is significantly associated with the *ERC* (coefficient estimate = 0.460, t-statistics = 3.85). *AVGSIZE*, *AVGAGE*, and *AVGMTB* explain 12.67 percent of the variation in the *ERC*. These results suggest that the variation in the composition of firms and changes in firm attributes cannot fully explain the variation in the *RRC* and the *ERC*.

Finally, changes in the tendency of firms to meet or just beat revenue benchmarks may reflect changes in the composition of firms or changes in firm attributes that are unrelated to how firms respond to the sector-level stock price-based incentives. Thus, I test the robustness of my primary results by including *AVGSIZE*, *AVGAGE*, and *AVGMTB* as additional control variables in equation (2). Untabulated results show that consistent with Table 4 Panel B, the coefficient on *RRC* is still positive and significant (coefficient estimate = 0.564, t-statistics = 4.73) and the

coefficient on *ERC* is still negative and significant (coefficient estimate = -0.221, t-statistics = -2.12).

CONCLUSION

In this paper, I first document the variation in firms' revenue benchmark beating behavior across Fama-French five industry sectors from 1997 to 2013. The percentage of firms that meet or just beat revenue benchmarks exhibits a wide range over time from an average of almost 20 percent for high-tech and health sectors to an average of less than ten percent for the consumer, manufacturing and miscellaneous other sectors. I also find considerable time-series and cross-sector variation in the sector-level investor pricing of revenue and earnings, reflecting how investors change their view of different performance measures in a given sector as industry sectors emerge and evolve over time.

Next, I investigate whether the variation in revenue benchmark beating is associated with the sector-level investor pricing of revenue or earnings and whether firms' relative life cycles (relative to the average life cycle of firms in the same sector) influence these associations. The sector-level investor pricing of revenue (earnings) is measured as the coefficient on revenue (earnings) surprises from the quarterly cross-sectional regressions of earnings announcement period abnormal stock returns on earnings and revenue surprises.

Sector-level regression analyses show that after controlling for GDP growth, investor sentiment and the time trend, firms' propensity to meet or just beat revenue benchmarks increases (decreases) when the sector-level investor pricing of revenue (earnings) rises. These results suggest that firms consider the sector-level incentives tied to both revenue and earnings (rather than just earnings) when evaluating the importance of revenue benchmarks. More importantly, the sector-level incentives related to revenue and earnings affect revenue benchmark

beating in opposite ways, an aspect that has not been documented in prior literature. Cross-sectional tests reveal that the positive (negative) association between revenue benchmark beating and the sector-level investor pricing of revenue (earnings) is stronger (weaker) among relatively young and still growing firms. These results help advance our understanding of how firms respond to sector-level incentives and how these responses vary depending on the firms' relative life cycles.

Additional analyses show that changing firm attributes and composition can only explain a small percentage of the variation in the sector-level investor pricing of revenue or earnings, suggesting that the forces driving these sector-level incentives are complex. The sector-level investor pricing of revenue and earnings could reflect investors' rational assessment of performance measures or to some extent sentiment-related valuation premium. Since the current study focuses on a supply response to shifts in demand, I leave it to future work to investigate the exact mechanism that drives the demand shifts as reflected in the sector-level incentives, such as investor pricing of revenue or earnings. As a starting point, a systematic content analysis of financial press articles may help generate insights on why the sector-level investor demand changes over time.

Appendix I: Variable Definitions

%SMBR	Percentage of firms with small positive revenue surprises (SMBR) divided by the total number of firms in a given calendar quarter. This variable is calculated for each of the Fama-French five industry sectors separately.
AGE	Number of months since the firm's first return record appeared on CRSP.
AVGAGE	Average age of firms in each of the Fama-French five industry sectors in a given calendar quarter.
AVGMTB	Average market-to-book ratio of firms in each of the Fama-French five industry sectors in a given calendar quarter, where market-to-book ratio is measured as market value of equity (MVE) divided by book value of equity (COMPUSTAT item SEQQ).
AVGSIZE	Average size of firms in each of the Fama-French five industry sectors in a given calendar quarter, where size is measured as the natural log of market value of equity (MVE).
BHAR	Buy-and-hold abnormal return over a three-day window (day -1 to +1) where trading day 0 is the COMPUSTAT quarterly earnings announcement date. The daily abnormal return is calculated using Fama-French three-factor model to control for risk premiums associated with market returns, size, and book-to-market risk factors. Fama-French three-factor model is estimated using a minimum of 30 daily return observations for the 250-trading-day period that ends five trading days prior to the event window.
ERC	Coefficient on ES_DECILE from quarterly cross-sectional regressions of BHAR on ES_DECILE and RS_DECILE.
ES	Unadjusted actual quarterly EPS from I/B/E/S minus the most recent unadjusted I/B/E/S consensus quarterly EPS forecast issued between the prior-quarter's earnings announcement date and the current quarter's earnings announcement date.
ES_DECILE	Decile assignment of scaled ES that ranges from zero for the bottom decile to one for the top decile, where ES is scaled by beginning-of-the-quarter share price (COMPUSTAT item PRCCQ) and sorted into deciles every calendar quarter.
DP	Dividend payout, calculated as common dividends (COMPUSTAT item DVC) divided by income before extraordinary items (COMPUSTAT item IB).
GDPCHG	Quarterly percent change from a year ago in real gross domestic product (GDP) provided by the FRED (Federal Reserve Economic Data) database from the Federal Reserve Bank of St. Louis.
LOSS	Percentage of quarters in which a firm reports losses in the previous five years.
MVE	Market value of equity, computed as common shares outstanding (COMPUSTAT item CSHOQ) multiplied by closing price (COMPUSTAT item PRCCQ).

PRICE	COMPUSTAT item PRCCQ.
Q4	An indicator variable that equals one for fiscal quarter four; zero otherwise.
REL_YOUNG	An indicator variable that equals one if the firm is relatively young compared to the average life cycle of firms in the same sector. Firms are assigned into life cycle stages of one for the Growth stage, two for the Growth/Mature stage, three for the Mature stage, four for the Mature/Stagnant stage, and five for the Stagnant stage following Anthony and Ramesh (1992).
RS	Actual quarterly sales minus the most recent I/B/E/S consensus quarterly sales forecast issued between the prior quarter's earnings announcement date and the current quarter's earnings announcement date.
RS_DECILE	Decile assignment of scaled RS that ranges from zero for the bottom decile to one for the top decile, where RS is scaled by beginning-of-the-quarter MVE and sorted into deciles every calendar quarter.
RRC	Coefficient on RS_DECILE from quarterly cross-sectional regressions of BHAR on ES_DECILE and RS_DECILE.
SENTIMENT	The average of the Consumer Confidence Index constructed by the Survey Research Center at the University of Michigan. The average for a calendar quarter is calculated using the monthly index for the three months in that given quarter.
SG	Sales growth, calculated as current year net sales (COMPUSTAT item SALE) minus prior year net sales, divided by prior year net sales.
SMBR	An indicator variable that equals one if a firm reports small positive revenue surprise (RS), where small positive revenue surprises are defined as those between zero (inclusive) and 0.15% of market value of equity.
SIZE	Natural log of market value of equity (MV).
TREND	A linear time trend variable ranging from one for the fourth quarter of 1997 to 65 for the fourth quarter of 2013.

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Figure 1. Percentage of Firms that Meet or Just Beat Revenue Benchmarks (*%SMBR*), Beginning-of-the-quarter Earnings Response Coefficient (*ERC*) and Revenue Response Coefficient (*RRC*) over Time

Panel A: Consumer (Sector 1), manufacturing (Sector 2) and miscellaneous other (Sector 5) sectors

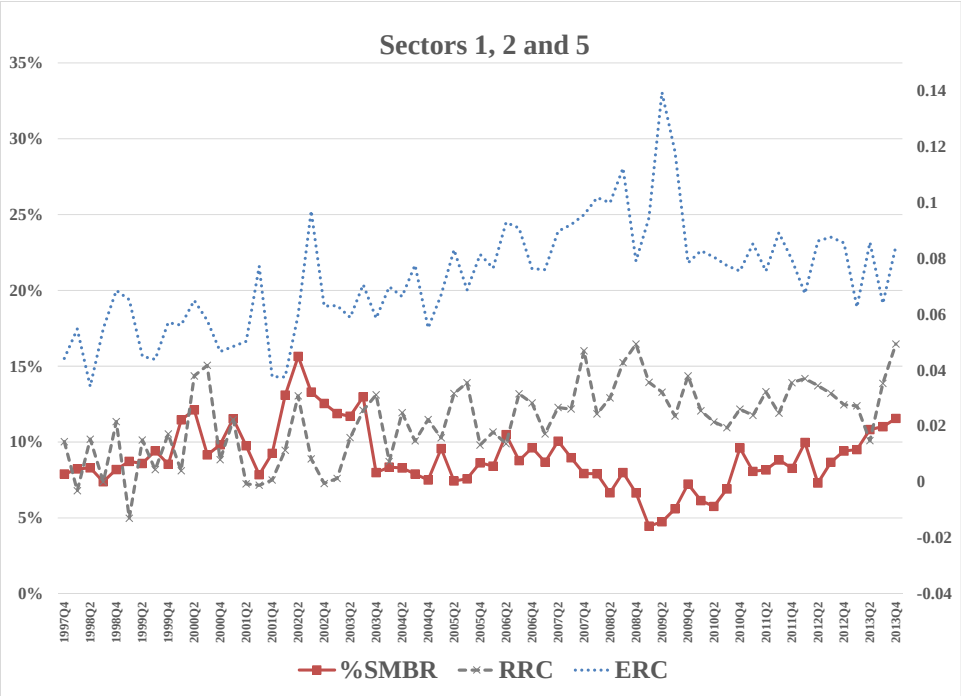
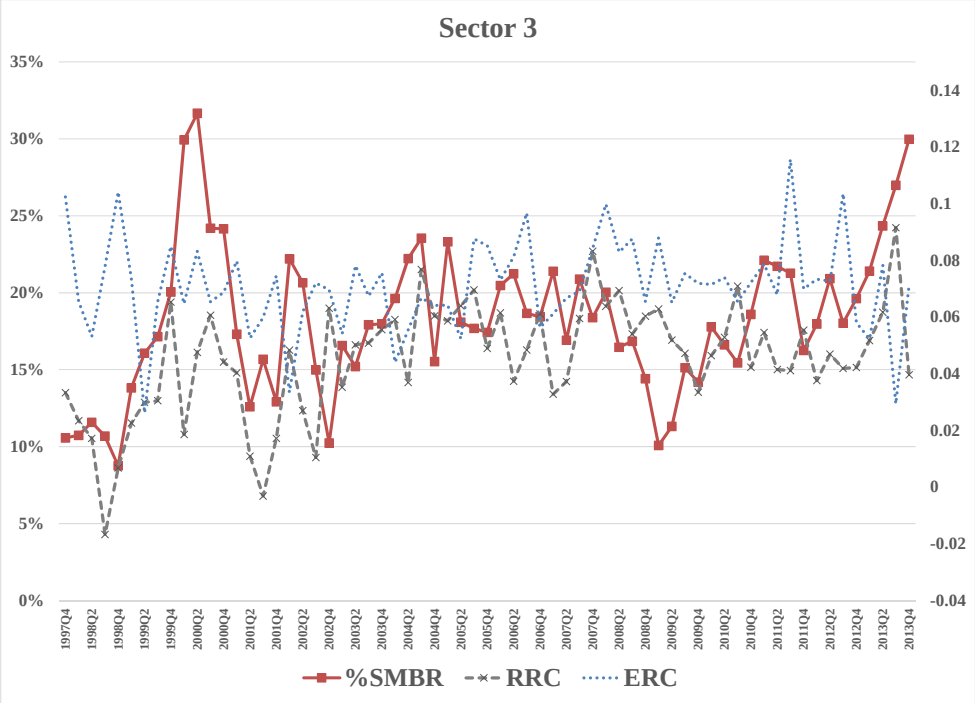
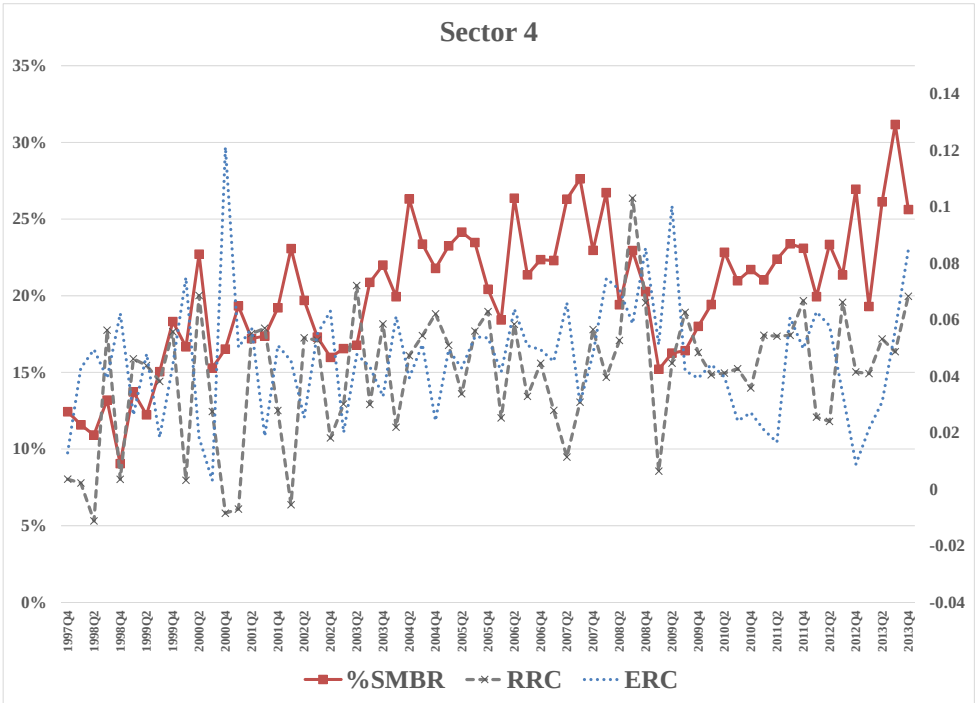


Figure 1. Cont'd

Panel B: High-technology sector (Sector 3)



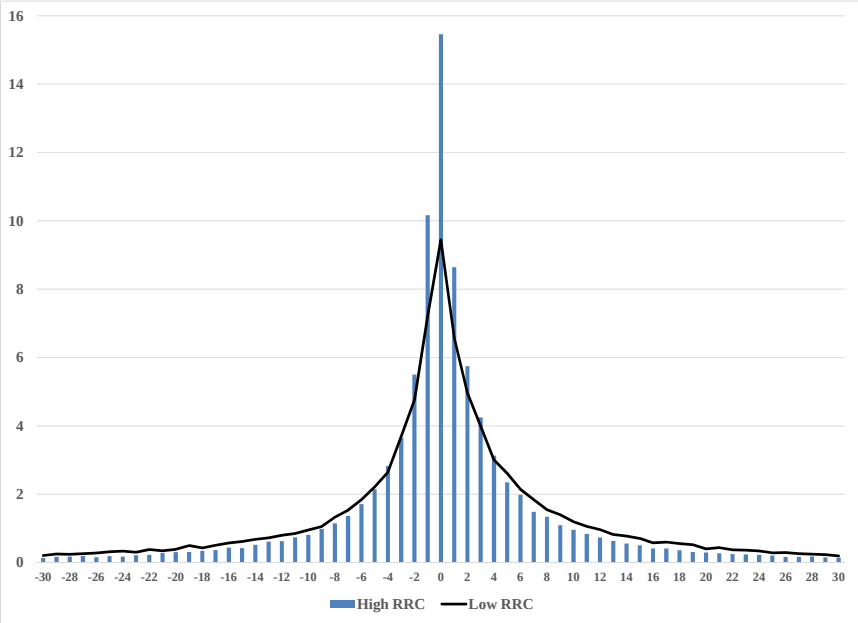
Panel C: Health sector (Sector 4)



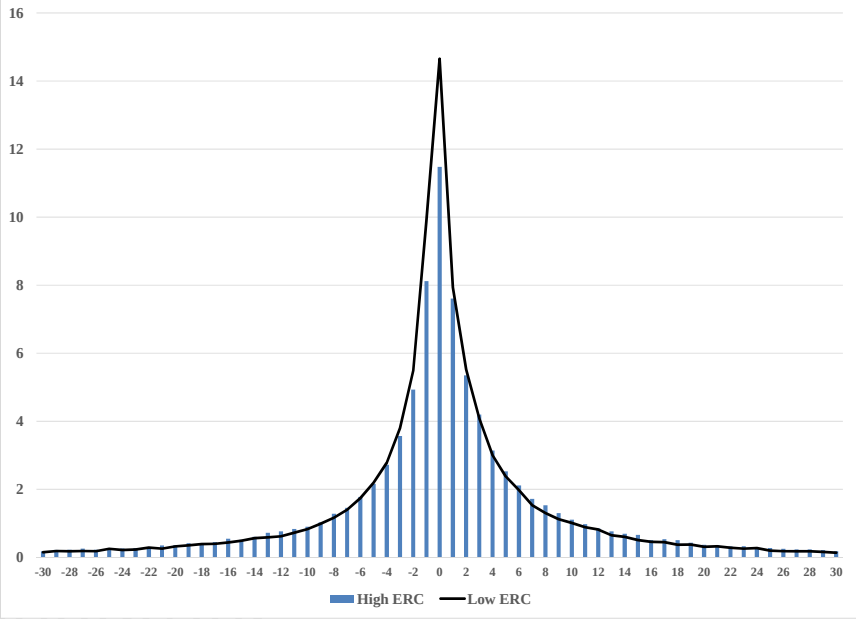
The scale on the right side of the panel is for the *ERC* and the *RRC* while the scale on the left side of the panel is for *%SMBR*. Sector 1 includes consumer-related industries - consumer durable, nondurables, wholesale, retail and some services such as laundries and repair shops. Sector 2 refers to manufacturing and energy. Sector 3 refers to high-tech industries such as business equipment, computer-related services, R&D labs, telephone, and television transmission. Sector 4 includes industries involved in health care, medical equipment and drugs. All other industries are grouped into Sector 5. *%SMBR* is the number of firms with small positive revenue surprises divided by the total number of firms in a given calendar quarter, where small positive revenue surprises are defined as those between zero (inclusive) and 0.15% of market value of equity. *ERC* is the coefficient on *ES_DECILE* from quarterly cross-sectional regressions of earnings announcement period abnormal returns (*BHAR*) on decile assignments of earnings surprises (*ES_DECILE*) and decile assignments of revenue surprises (*RS_DECILE*). *RRC* is the coefficient on *RS_DECILE* from quarterly cross-sectional regressions of earnings announcement period abnormal returns (*BHAR*) on decile assignments of earnings surprises (*ES_DECILE*) and decile assignments of revenue surprises (*RS_DECILE*). See Appendix I for details on variable measurement.

Figure 2. Relative Frequency Distributions of Revenue Surprises

Panel A: Conditional on Revenue Response Coefficient (*RRC*)



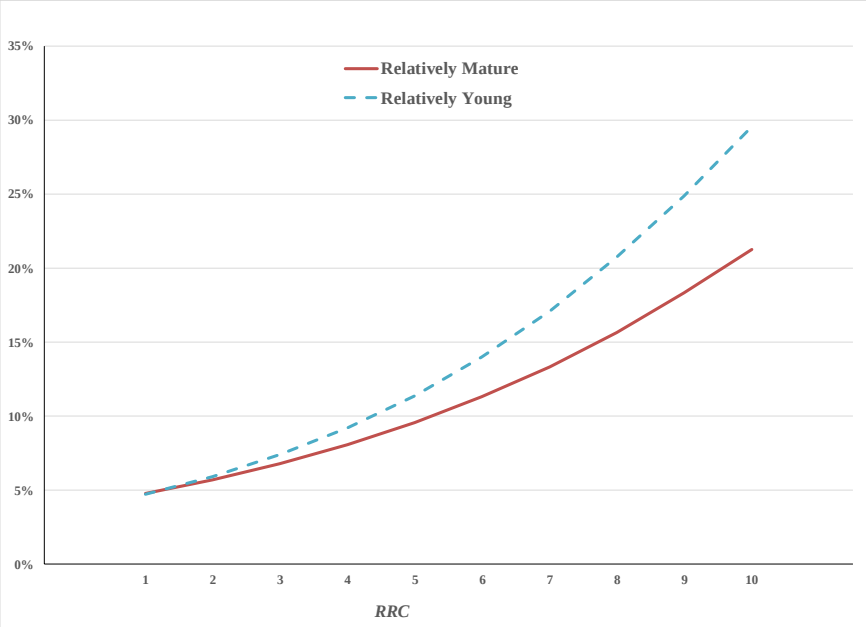
Panel B: Conditional on Earnings Response Coefficient (*ERC*)



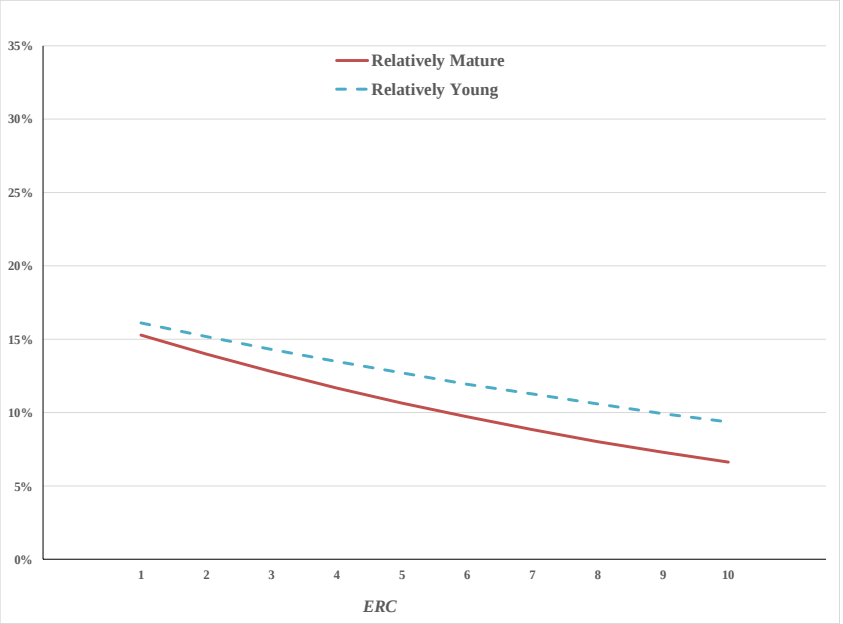
Y-axis indicates the relative frequency, measured as the number of revenue surprise observations that fall into a specific bin, divided by the total number of surprise observations in the subsample conditional on whether the *RRC* or the *ERC* is high (above median) or low (below median). Revenue surprises scaled by market value of equity are sorted into bins with an increment of 0.0015, where bin 0 includes surprises in the range [0, 0.0015), bin 1 includes surprises in the range [0.0015, 0.003), and so on. Figures are truncated at bin -30 and bin +30. *RRC* is the coefficient on *RS_DECILE* from quarterly cross-sectional regressions of earnings announcement period abnormal returns (*BHAR*) on decile assignments of earnings surprises (*ES_DECILE*) and decile assignments of revenue surprises (*RS_DECILE*). *ERC* is the coefficient on *ES_DECILE* from quarterly cross-sectional regressions of earnings announcement period abnormal returns (*BHAR*) on decile assignments of earnings surprises (*ES_DECILE*) and decile assignments of revenue surprises (*RS_DECILE*). See Appendix I for details on variable measurement.

Figure 3. Predicted Probability of Meeting or Just Beating Revenue Benchmarks

Panel A: Based on the distribution of the *RRC*



Panel B: Based on the distribution of the *ERC*



Y-axis indicates the predicted probability of meeting or just beating revenue benchmarks. X-axis indicates ten equally-spaced points on the respective distribution of the *RRC* (Panel A) or the *ERC* (Panel B). *RRC* is the coefficient on *RS_DECILE* from quarterly cross-sectional regressions of earnings announcement period abnormal returns (*BHAR*) on decile assignments of earnings surprises (*ES_DECILE*) and decile assignments of revenue surprises (*RS_DECILE*). *ERC* is the coefficient on *ES_DECILE* from quarterly cross-sectional regressions of earnings announcement period abnormal returns (*BHAR*) on decile assignments of earnings surprises (*ES_DECILE*) and decile assignments of revenue surprises (*RS_DECILE*). Firms are assigned into life cycle stages of one for the Growth stage, two for the Growth/Mature stage, three for the Mature stage, four for the Mature/Stagnant stage, and five for the Stagnant stage. Firms are considered relatively young (mature) if their life cycle stages are below (above) the average life cycle of firms in the same sector. See Appendix I for details on variable measurement.

Table 1. Sample Selection

	Fama-French Five Industry Sectors					
	All Five Sectors	Sector 1 Consumer	Sector 2 Manufacturing	Sector 3 High-tech	Sector 4 Health	Sector 5 Miscellaneous Other
Firm-quarters with earnings forecasts from I/B/E/S and historical SIC codes from COMPUSTAT	192,634	39,544	38,357	58,729	26,507	29,497
Less observations where:						
Revenue forecasts not available on I/B/E/S	40,307	9,310	10,485	8,763	4,509	7,240
Firm-quarters with earnings and revenue forecasts	152,327	30,234	27,872	49,966	21,998	22,257
% of firm-quarters with earnings and revenue forecasts	79.1%	76.5%	72.7%	85.1%	83.0%	75.5%
Less observations where:						
Data not available to compute earnings announcement period abnormal returns, earnings surprises and revenue surprises	5,659	736	850	2,456	796	821
Primary sample	146,668	29,498	27,022	47,510	21,202	21,436

Sector 1 includes consumer-related industries - consumer durable, nondurables, wholesale, retail and some services such as laundries and repair shops. Sector 2 refers to manufacturing and energy. Sector 3 refers to high-tech industries such as business equipment, computer-related services, R&D labs, telephone, and television transmission. Sector 4 includes industries involved in health care, medical equipment and drugs. All other industries are grouped into Sector 5.

Table 2. Sample Descriptive Statistics

Variable	N	Mean	Std Dev	1st Quartile	Median	3rd Quartile
BHAR	146,668	-0.001	0.092	-0.047	-0.001	0.046
ES	146,668	0.005	0.121	-0.020	0.010	0.040
ES/PRICE	146,668	-0.080%	1.621%	-0.107%	0.041%	0.238%
RS	146,668	5.975	67.763	-2.400	0.401	5.969
RS/MVE	146,668	0.003%	4.081%	-0.435%	0.072%	0.674%
PRICE	146,668	30.209	818.163	7.920	17.570	32.900
MVE	146,668	4793.610	19143.540	216.241	654.556	2266.020
EPS	146,668	0.413	17.189	-0.010	0.180	0.430
SALES	146,668	912.960	3874.870	31.600	124.808	477.505
SENTIMENT	66	85.985	14.259	74.967	87.083	94.1
GDPCHG	66	2.317	1.987	1.600	2.350	3.600

The sample contains data for 66 quarter from the third quarter of 1997 to the fourth quarter of 2013. Continuous variables are winsorized at the 1% and 99% levels. Abnormal return (*BHAR*) is the buy-and-hold abnormal return over the three-day quarterly earnings announcement window after controlling for Fama-French three factors. *ES* is the earnings surprise, defined as unadjusted actual EPS reported by I/B/E/S minus the most recent unadjusted I/B/E/S consensus forecast of EPS issued prior to the earnings announcement date. *RS* is the revenue surprise, defined as actual sales for quarter t minus the most recent I/B/E/S consensus forecast of sales prior to the earnings announcement date. *PRICE* and *MVE* are beginning-of-the-quarter price and market value of equity. *EPS* and *SALES* are quarterly earnings per share and net sales, respectively. *GDPCHG* is the quarterly GDP growth. *SENTIMENT* is the average Consumer Confidence Index. See Appendix I for details on variable measurement.

Table 3. Quarterly Cross-Sectional Regressions of Earnings Announcement Period Abnormal Returns on Earnings Surprise and Revenue Surprise Deciles

$$BHAR_{it} = \alpha + \beta_1 ES\_DECILE_{it} + \beta_2 RS\_DECILE_{it} + \varepsilon_{it}$$

	α (Intercept)		β1 (*ERC*)		β2 (*RRC*)		Number of Observations	Adj-R^2
Sector 1 - Consumer	-0.049	***	0.084	***	0.021	***	447	12.3%
	(-21.15)		(26.10)		(9.15)			
Sector 2 - Manufacturing	-0.045	***	0.072	***	0.021	***	409	12.0%
	(-21.64)		(26.81)		(10.22)			
Sector 3 - High-tech	-0.060	***	0.071	***	0.046	***	720	10.1%
	(-33.99)		(34.94)		(18.26)			
Sector 4 - Health	-0.047	***	0.046	***	0.040	***	321	6.8%
	(-23.94)		(17.71)		(14.32)			
Sector 5 - Miscellaneous Other	-0.043	***	0.064	***	0.026	***	325	9.4%
	(-16.05)		(19.15)		(9.43)			

This table reports the average of coefficient estimates α, β_1 (*ERC*), β_2 (*RRC*), the average number of observations, and the average adjusted R^2 from 66 quarterly regressions of earnings announcement period abnormal returns (*BHAR*) on decile assignments of earnings surprises (*ES_DECILE*) and decile assignments of revenue surprises (*RS_DECILE*) from the third quarter of 1997 to the fourth quarter of 2013. T-statistics for α, β_1 and β_2 are in parenthesis and are calculated using standard errors from the time-series variation in these estimates. Sector 1 includes consumer-related industries - consumer durable, nondurables, wholesale, retail and some services such as laundries and repair shops. Sector 2 refers to manufacturing and energy. Sector 3 refers to high-tech industries such as business equipment, computer-related services, R&D labs, telephone, and television transmission. Sector 4 includes industries involved in health care, medical equipment and drugs. All other industries are grouped into Sector 5. *BHAR* is the buy-and-hold abnormal return over the three-day quarterly earnings announcement window after controlling for Fama-French three factors. *ES_DECILE* is the decile assignment of scaled earnings surprise. *RS_DECILE* is the decile assignment of scaled revenue surprise. See Appendix I for details on variable measurement. *, **, and *** denote the significance level of 10%, 5% and 1% (two-sided), respectively.

Table 4. Revenue Benchmark Beating and the Sector-Level Investor Pricing of Revenue and Earnings

Panel A: Descriptive statistics – percentage of firms that meet or just beat revenue benchmarks

Fama-French Five Industry Sectors	N	Mean	Std Dev	1st Quartile	Median	3rd Quartile
Sector 1 - Consumer	65	7.7%	2.3%	6.1%	7.7%	9.7%
Sector 2 - Manufacturing	65	6.5%	1.8%	5.3%	6.6%	7.8%
Sector 3 - High-tech	65	18.2%	4.8%	15.4%	18.0%	21.2%
Sector 4 - Health	65	20.1%	4.5%	16.8%	20.4%	23.1%
Sector 5 - Miscellaneous Other	65	9.6%	2.6%	7.8%	9.8%	10.9%
All sectors	325	12.4%	6.6%	7.0%	10.2%	17.4%

Panel B: Regression results

Variable	Y = *% SMBR*				
	(1)	(2)	(3)	(4)	(5)
Intercept	0.078 ***	0.172 ***	-0.087	0.057	-0.012
	(13.19)	(10.08)	(-1.22)	(0.66)	(-0.17)
RRC	1.510 ***		1.516 ***		1.368 ***
	(9.38)		(10.00)		(8.26)
ERC		-0.703 ***		-0.878 ***	-0.642 ***
		(-3.70)		(-4.76)	(-3.87)
Control Variables:					
GDPCHG			0.001	0.001	0.0003
			(0.32)	(0.29)	(0.11)
SENTIMENT			0.002 **	0.001	0.001 *
			(2.07)	(0.96)	(1.73)
TREND			0.001 **	0.002 ***	0.001 **
			(2.07)	(3.02)	(2.52)
Column (5) Coefficient on *RRC* = Coefficient on *ERC*: *F*-Test statistics = 113.80***					
N	325	325	325	325	325
Adjusted R^2	26.42%	7.41%	29.94%	17.11%	35.08%

T-statistics in Panel B are based on standard errors using Newey-West (1987) correction for serial correlation with four lags. *%SMBR* is the number of firms with small positive revenue surprises divided by the total number of firms in a given calendar quarter, where small positive revenue surprises are defined as those between zero (inclusive) and 0.15% of market value of equity. *RRC* is the coefficient on *RS_DECILE* from quarterly cross-sectional regressions of earnings announcement period abnormal returns (*BHAR*) on decile assignments of earnings surprises (*ES_DECILE*) and decile assignments of revenue surprises (*RS_DECILE*). *ERC* is the coefficient on *ES_DECILE* from quarterly cross-sectional regressions of earnings announcement period abnormal returns (*BHAR*) on decile assignments of earnings surprises (*ES_DECILE*) and decile assignments of revenue surprises (*RS_DECILE*).

GDPCHG is the quarterly GDP growth. *SENTIMENT* is the average Consumer Confidence Index. *TREND* is a linear time trend variable. See Appendix I for details on variable measurement. *, **, and *** denote the significance level of 10%, 5% and 1%, respectively (two-tailed).

Table 5. Cross-Sectional Variation and Firms' Relative Life Cycles

Panel A: Descriptive statistics

Variables	N	Mean	Std Dev	1st Quartile	Median	3rd Quartile
Full Sample						
SMBR	111,874	0.119	0.323	0	0	0
REL_YOUNG	111,874	0.497	0.500	0	1	1
LOSS	111,874	0.259	0.301	0.000	0.150	0.421
SIZE	111,874	6.711	1.839	5.414	6.623	7.899
Q4	111,874	0.262	0.440	0	0	1
Relatively Young Firms						
SMBR	55,597	0.127	0.333	0	0	0
LOSS	55,597	0.298	0.318	0.050	0.158	0.500
SIZE	55,597	6.319	1.641	5.164	6.265	7.420
Q4	55,597	0.260	0.439	0	0	1
Relatively Mature Firms						
SMBR	56,277	0.110	0.313	0	0	0
LOSS	56,277	0.221	0.277	0.000	0.100	0.350
SIZE	56,277	7.098	1.939	5.725	7.040	8.399
Q4	56,277	0.264	0.441	0	0	1

Table 5. Cont'd

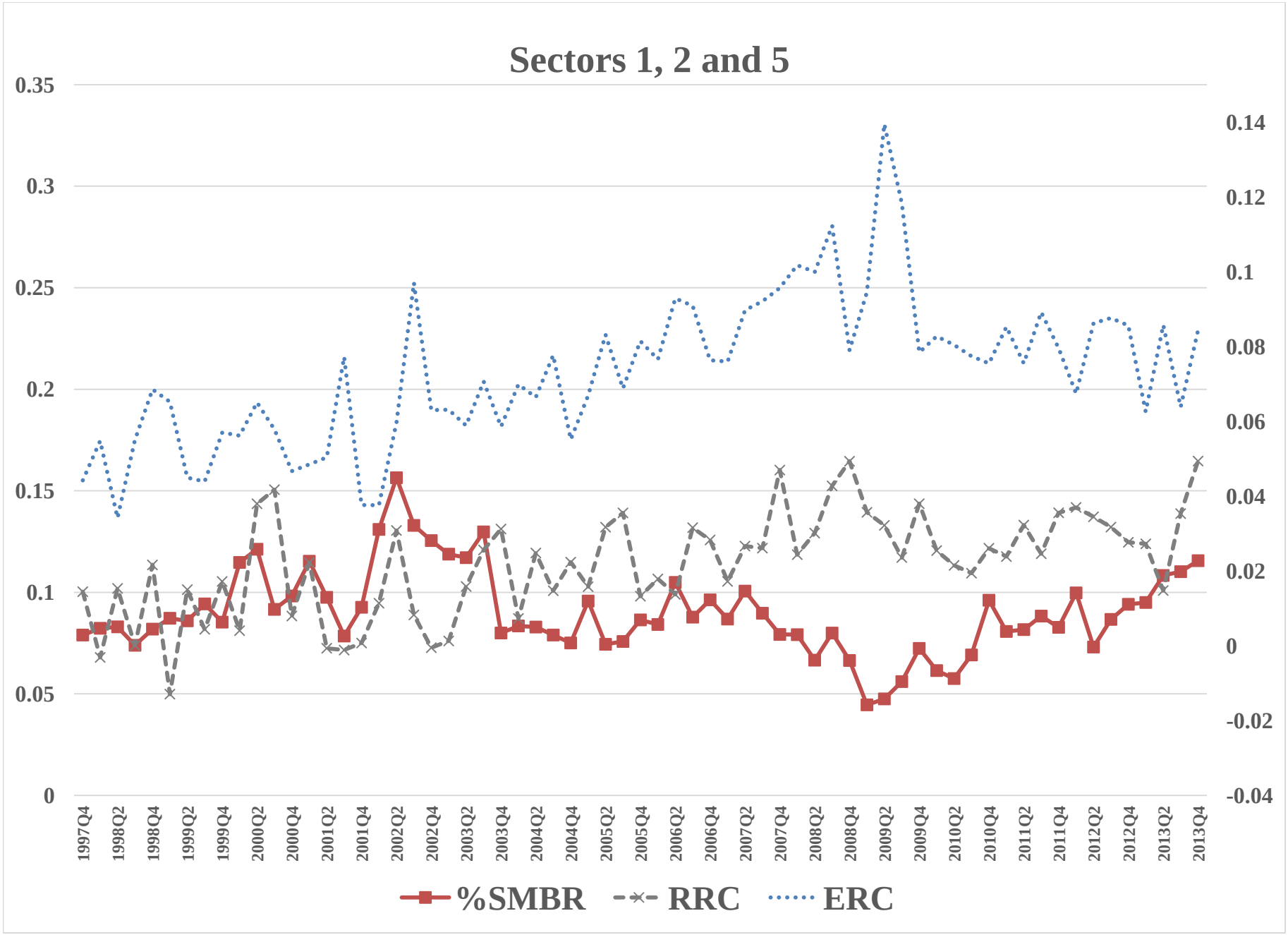
Panel B: Logistic regression results

$$Y = \ln\left(\frac{P_{SMBR}}{1-P_{SMBR}}\right)$$

	(1) Relatively Young Firms		(2) Relatively Mature Firms		(3) Full Sample	
Intercept	-4.257	***	-3.790	***	-4.009	***
	(-9.75)		(-9.50)		(-10.22)	
RRC	15.964	***	12.091	***	12.418	***
	(12.18)		(8.66)		(9.18)	
ERC	-3.894	***	-6.758	***	-6.372	***
	(-2.81)		(-5.01)		(-4.72)	
REL_YOUNG					-0.051	
					(-0.54)	
*RRC * REL_YOUNG*					3.245	***
					(2.68)	
*ERC * REL_YOUNG*					2.137	**
					(2.18)	
Control Variables:						
LOSS	0.0003		-0.127		-0.048	
	(0.00)		(-1.11)		(-0.58)	
SIZE	0.104	***	0.089	***	0.096	***
	(5.79)		(5.92)		(7.46)	
Q4	-0.125	***	-0.015		-0.072	**
	(-3.24)		(-0.37)		(-2.15)	
GDPCHG	0.019		0.017		0.018	
	(0.91)		(0.96)		(1.02)	
SENTIMENT	0.013	***	0.010	***	0.012	***
	(3.18)		(2.77)		(3.20)	
TREND	0.007	**	0.007	***	0.007	***
	(2.24)		(2.76)		(2.65)	
N	55,597		56,277		111,874	
Pseudo R^2	2.3%		1.9%		2.2%	

Table 5. Cont'd

Z-statistics (in parenthesis) in Panel B are based on standard errors clustered by firm and time period. Continuous variables (except the *RRC* and the *ERC*) are winsorized at the 1% and 99% levels. *SMBR* is an indicator variable that equals one if a firm reports a small positive revenue surprise, where a small positive revenue surprise is defined as one between zero (inclusive) and 0.15% of market value of equity. *RRC* is the coefficient on *RS_DECILE* from quarterly cross-sectional regressions of earnings announcement period abnormal returns (*BHAR*) on decile assignments of earnings surprises (*ES_DECILE*) and decile assignments of revenue surprises (*RS_DECILE*). *ERC* is the coefficient on *ES_DECILE* from quarterly cross-sectional regressions of earnings announcement period abnormal returns (*BHAR*) on decile assignments of earnings surprises (*ES_DECILE*) and decile assignments of revenue surprises (*RS_DECILE*). Firms are assigned into life cycle stages of one for the Growth stage, two for the Growth/Mature stage, three for the Mature stage, four for the Mature/Stagnant stage, and five for the Stagnant stage. Firms are considered relatively young (mature) if their life cycle stages are below (above) the average life cycle of firms in the same sector. *REL_YOUNG* is an indicator variable that equals one if the firm is relatively young. *LOSS* is the percentage of quarters that the firm reports losses in the previous five years. *SIZE* is the natural log of market value of equity. *Q4* is an indicator variable that equals one for fiscal quarter four. *GDPCHG* is the quarterly GDP growth. *SENTIMENT* is the average Consumer Confidence Index. *TREND* is a linear time trend variable. See Appendix I for details on variable measurement. *, **, and *** denote the significance level of 10%, 5% and 1% (two-sided), respectively.


Sectors 1, 2 and 5
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
-0.02
-0.04
1997Q4
1998Q2
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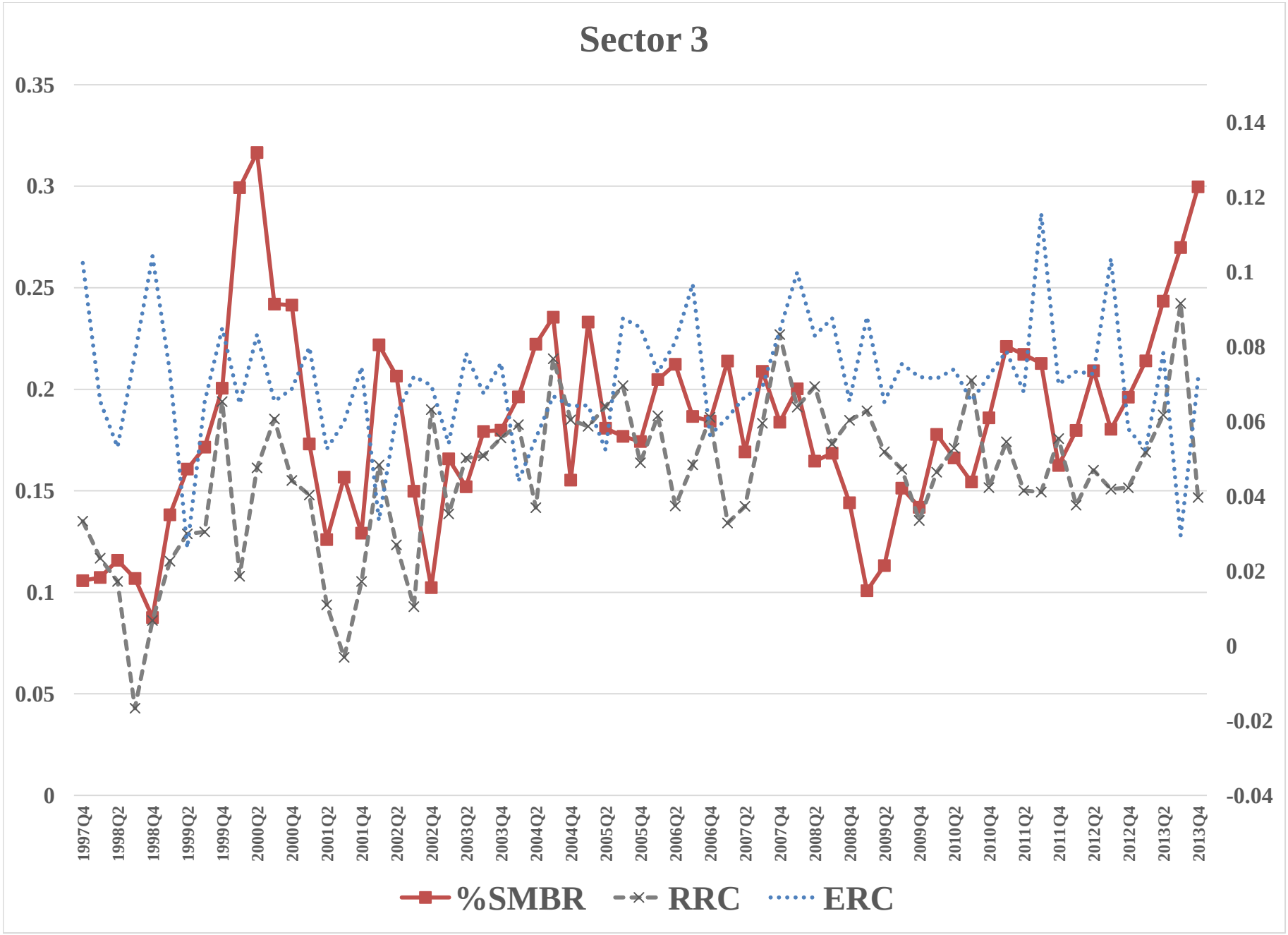
%SMBR
RRC
ERC


Sector 3
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1998Q4
1999Q2
1999Q4
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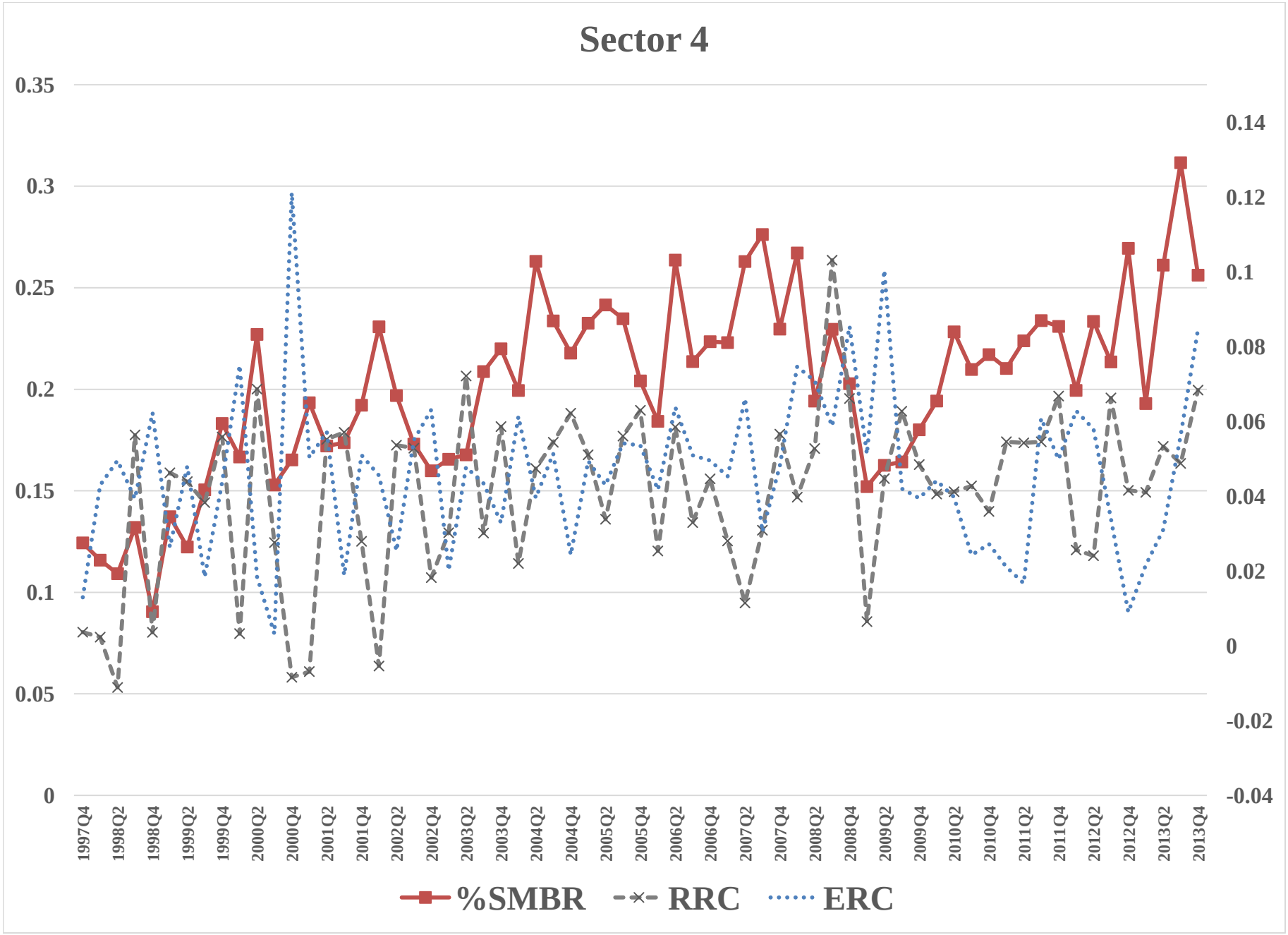
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0.04
0.02
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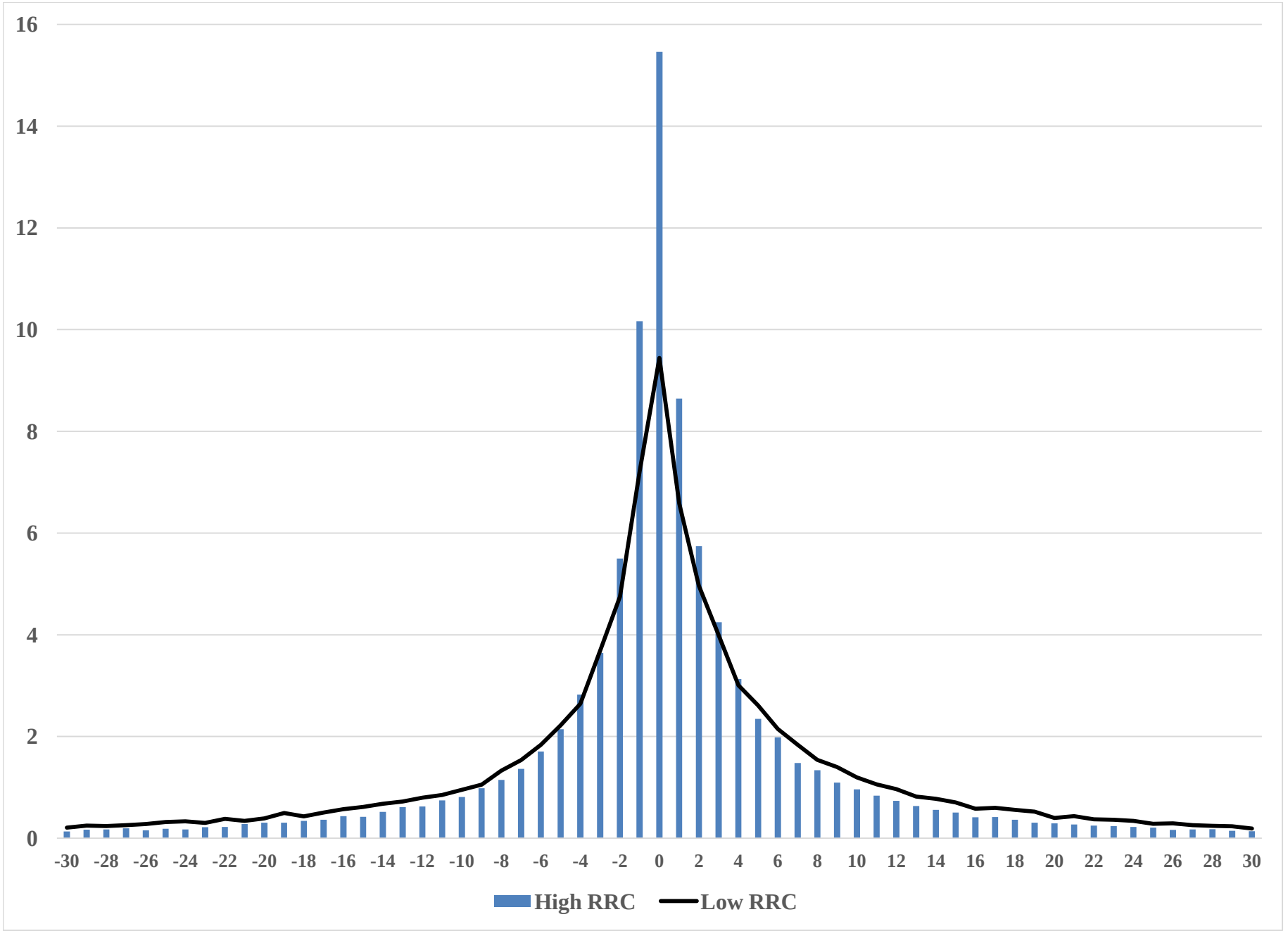
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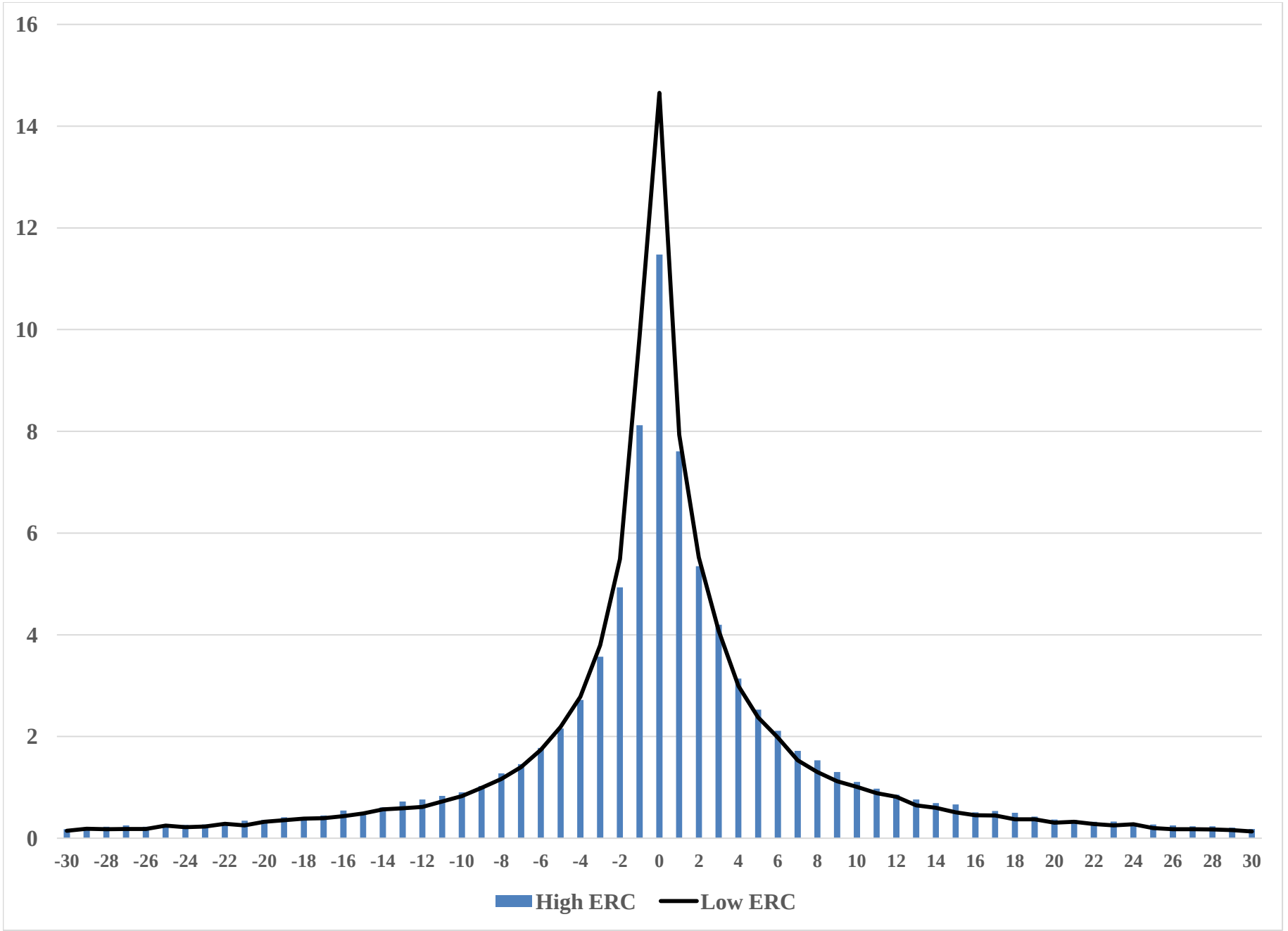
Low RRC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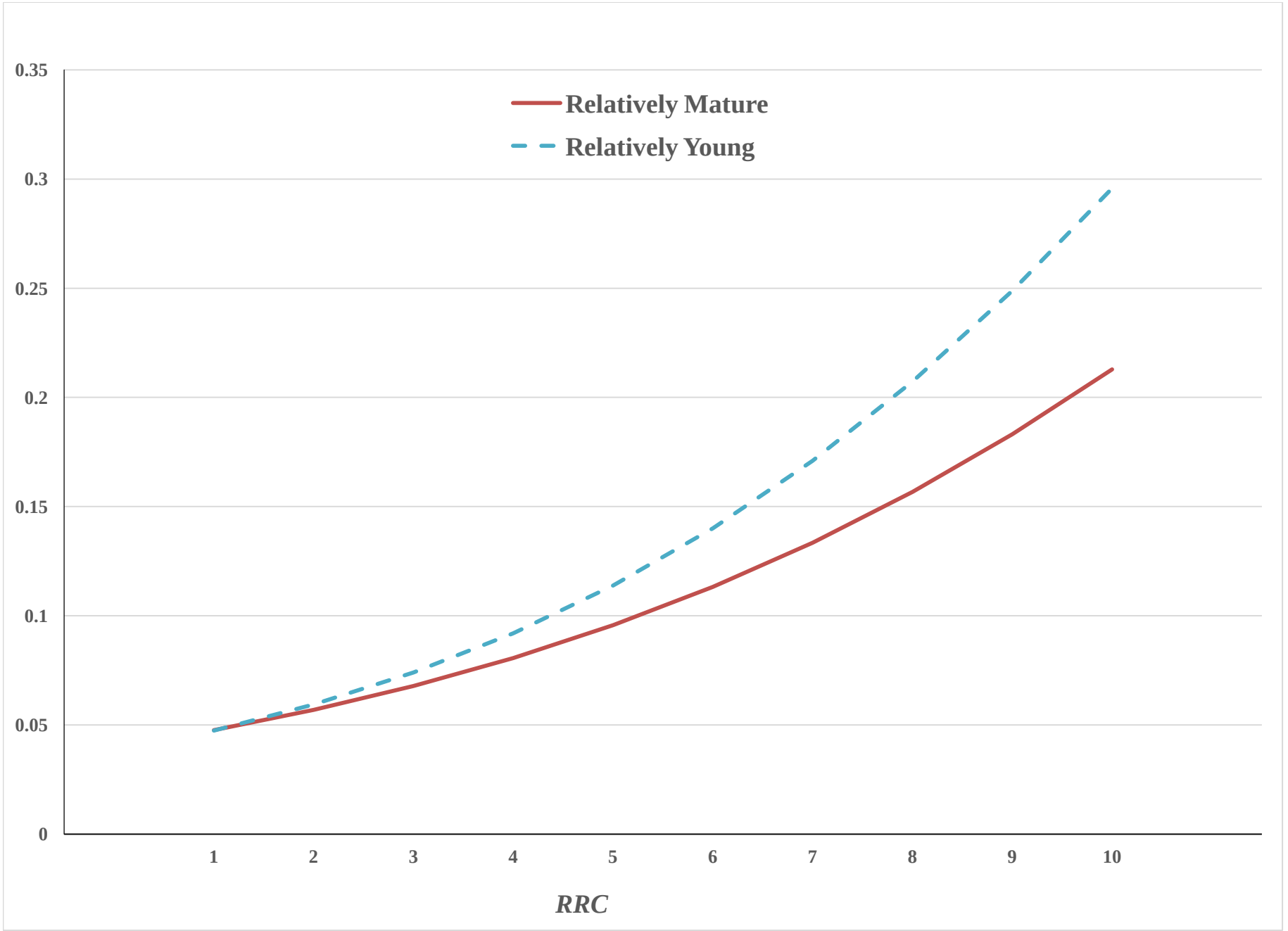
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Relatively Mature
Relatively Young
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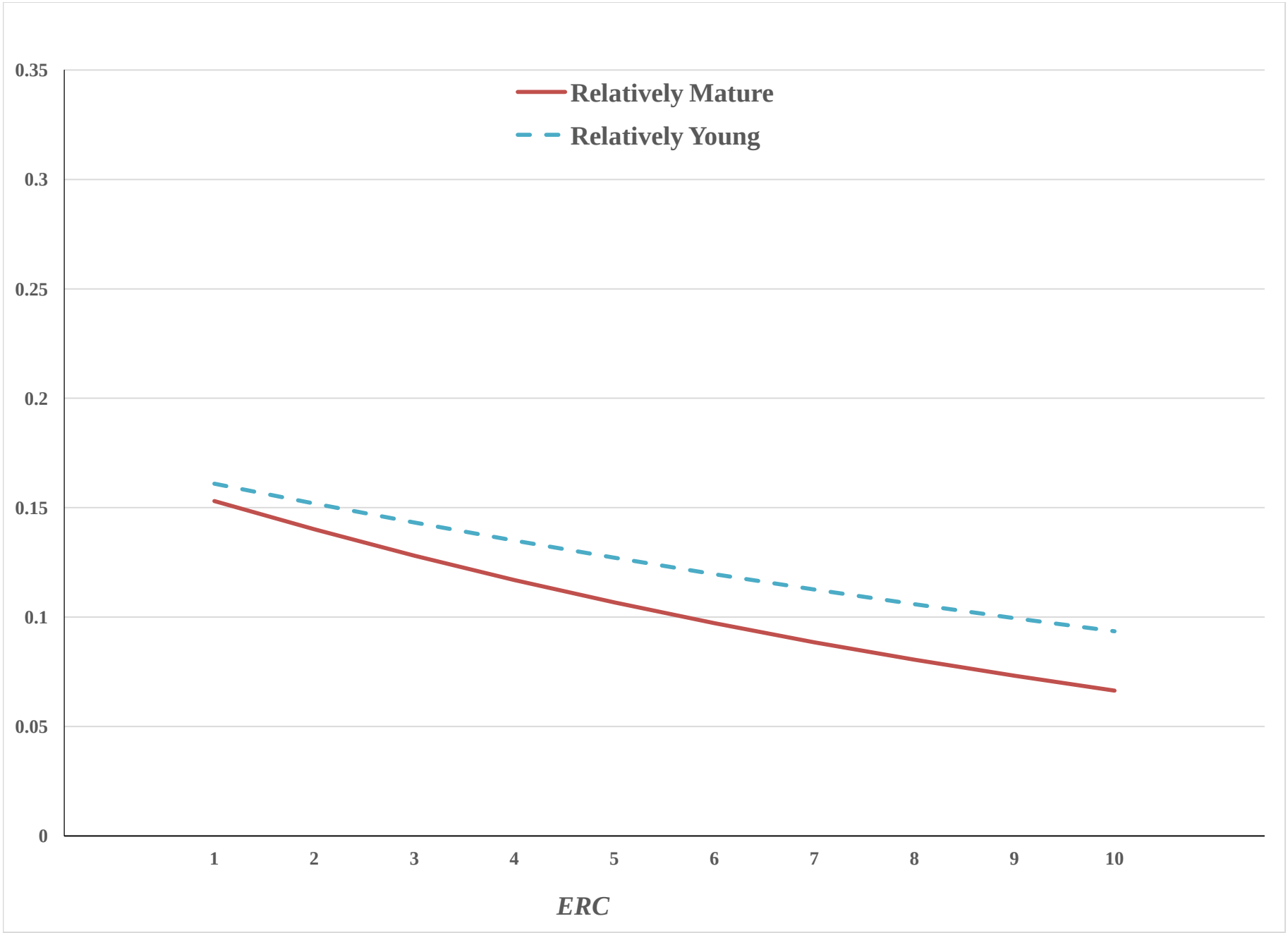
4
5
6
7
8
9
10
RRC


Relatively Mature
Relatively Young
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0.25
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ERC