A String of Earnings Increases, Future Earnings Uncertainty, and Firm Fundamentals*

Sarayut Rueangsuwan[†]
Kasetsart University, Thailand

August 2015

Abstract

Prior literature on meeting or beating earnings benchmarks extensively documents that market rewards firms reporting a string of consecutively earnings increases. To date, it is still unclear what an earnings string really means. This paper empirically provides rational explanations for this phenomenon by investigating whether the incremental pricing effects are determined by future earnings uncertainty and firm fundamentals that are founded on economic grounds. I find that risk in future earnings and firm fundamentals have association with a string of earnings increases. In addition, my results strongly suggest that predictive ability of a string shifts in the direction of risk rather than growth as a string has prolonged. This study provides insights into economic implications of a sequentially increasing earnings string for market prices.

Keywords: Market Rewards, Earnings Strings, Earnings Uncertainty, Fundamentals-based Risk, Firm Fundamentals

JEL classifications: M41, G12

[†] Address: Kasetsart Business School, Kasetsart University, 50 Ngam Wong Wan Rd, Ladyaow, Chatuchak, Bangkok 10900 THAILAND; Tel.: +66 2 942 8777; E-mail: sarayut.r@ku.ac.th

* I have been greatly indebted to Gilad Livne and Joanna Horton for their time and suggestions. I also appreciate helpful comments received from Ole-Kristian Hope, Sonia Konstantinidi, Peter Pope, and seminar participants at the University of Exeter and the University of the West of England.

1. Introduction

The effects of meeting or beating earnings benchmarks (henceforth MBEB) on prices or returns are widely known to be important in capital markets. An extensive number of papers have investigated empirical questions related to three earnings thresholds; zero earnings, prior periods' earnings, and earnings forecasts (e.g. Barth et al., 1999; Bartov et al., 2002; Kasznik and McNichols, 2002; Brown et al., 2009). Their evidence indicates that there are valuation premiums for firms surpassing three benchmarks. Several studies suggest that incremental positive effects on prices or returns, also known as market rewards, are mainly due to better future growth opportunities and lower expected returns. Recent research on the implications of consistently meeting earnings targets still, however, leaves unexplored issues involving future earnings uncertainty and firm fundamentals. In particular, little evidence enlightens how a series of growing earnings affects the second moment of subsequent earnings, and sheds significant light on the valuation role of fundamentals of a firm behind market rewards. In this study I penetrate the "Black Box" of a string of earnings increases and provide the rational explanations, based on future earnings risk and primitive variables, for the implications of an earnings string.[1]

While numerous studies demonstrate the positive relation between future growth and higher prices or returns, my central idea focuses on two alternative arguments – volatility of future earnings and economic fundamentals – determining pricing effects of a sequence of earnings growth. With regard to the risk-based argument, it is theoretically built on valuation perspective suggesting that, ceteris paribus, an increase in an earnings stream or a decrease in discount rate result in higher price. In addition, findings from Nekrasov and Shroff (2009) and Penman and Yehuda (2015) imply that realized growth in earnings resolves fundamentals-based risk which,

[1] Earnings string, earnings series, earnings pattern, and earnings streak are interchangeably used throughout the paper. By these words I mean a string of consecutive increases in quarterly earnings defined in section 4.1.

in turn, leads to a reduction of required rate of return. As for the characteristic-based argument, it is developed from evidence that growth is mean reverting process (Fama and French, 2000), and that the empirical link between fundamentals, earnings persistence, and future earnings (e.g. Lev and Thiagarajan, 1993). More specifically, when investors observe a pattern of increasing earnings, they can infer that a firm has stronger fundamentals which induce higher persistence of earnings and higher future earnings. Accordingly, premiums are given to firms reporting earnings patterns for distinct fundamentals, not growth.

To explore the possibilities of both arguments, I empirically conduct four sets of analyses. All empirical analyse are centered upon the observation that firms report a string of consecutively earnings increases. A firm with a historical string of earnings increases is defined as a firm that reports at least twenty consecutive quarters of increases in seasonally adjusted earnings per share (EPS). An EPS increase is defined compared with EPS from the same quarter of the prior year. The sample utilized firms-quarter observations covering a period from 1971 to 2014 to construct a testing period from 1976 to 2014. Nevertheless, sample size is various across sets of analyses in order to increase the generalizability of results.

In the first set of analyses, I articulate the relation between market rewards associated with a string of increasing earnings and risk in future earnings. Variability of realised future earnings serves as a proxy for future earnings risk because past earnings variance seems to be a poor measure for earnings uncertainty. Assuming that investors are able to calculate variability of future earnings and employ it as an estimation of fundamental risk. They perceive that future earnings variability is lower for firms reporting increasing earnings strings. These firms' discount rates then substantially decrease because of lower risk. Put differently, higher prices are determined by a denominator effect. Therefore, I examine whether incremental price-earnings

multiples are independent from a string of earnings increases after controlling for variability of future earnings.

In the second set of analyses, it is true that firms cannot carry positive earnings growth to infinity. Future growing earnings seem not capable of explaining market rewards related to a longer series of earnings trend. Yet, firm fundamentals likely drive higher prices. Hence, I test whether there is a positive association between a string of increasing earnings and firm fundamentals. This allows me to determine whether fundamentals lead to earnings strings that are, in turn, rewarded higher prices. It also demonstrates a valuation role of fundamentals in an MBEB phenomenon.

Extending the previous set of analyses, the third set of analyses focuses on identifying and understanding the extent to which future growth is related to the duration of an earnings string. The rationale is that the longer earnings strings, the more difficult firms persist in reporting streaks of increasing earnings. As a result, I investigate whether future earnings growth is weakly associated with longer past earnings strings. This test allows me to assess to what extent the valuation premiums are attributed to future earnings growth.

The final set of analyses is related to risk-relevant information of an increasing earnings string. As I argue that longer earnings strings are slightly correlated with future growth, I provide another conjecture about a relation between risk and a string. I expect that a shorter earnings string is equally informative with regard to growth and risk, but as a string prolongs the predictive ability of a string shifts from growth to risk. I therefore examine whether variability of future earnings is strongly associated with a longer earnings string. This allows me to draw

inferences about the predictability of an increasing earnings series for fundamentals-based risk which is relevant to investors' valuation.

My collective results strongly document four conclusions as follows. First, uncertainty of future earnings is capable of explaining incremental positive effects of an earnings string. It implies that market rewards are, at least in part, attributed to lower risk which is a denominator effect in valuation terminology. Second, fundamentals of a firm have a positive association with a string of earnings increases. It suggests that a string reflects stronger economic grounds of a firm and that higher price-earnings multiples are rational reaction because investors really know how strong firms are. Third, the relation between future growth and a past earnings string does not exist in long horizon, i.e. four years ahead onward. It plays down a growth-based explanation for MBEB incidence but raise a vital role of fundamentals in equity valuation. Finally, a string of increasing earnings contains information relevant in assessing future earnings uncertainty. In addition, this information is more relevant when a length of the string is extended. It is worth noting that predictive ability of a string is better for risk than growth in the presence of a longer earnings string.

This study contributes to MBEB literature in a number of ways. Despite the fact that previous research focuses on future profitability, I highlight that future earnings uncertainty is capable of explaining market rewards given to firms having consistently earnings trends. This underlines the importance of attributes of future earnings to prices. Next, I provide evidence that firm fundamentals can justify a string of earnings increases. I also find that growth is less important as strings develop. These findings give a more complete picture of the relation between market premiums, growth, and fundamentals. Last, I reveal that there exists risk relevance of a series of earnings growth. This evidence advances literature on accounting information and risk.

The rest of this paper is structured as follows. Section 2 discusses related previous research. Section 3 describes the development of hypotheses. Section 4 provides research design and methods. Section 5 provides sample selection and descriptive statistics. Section 6 and section 7 report empirical results. Section 8 offers concluding remarks.

2. Related Literature

2.1 Overview

Studies on MBEB largely document that firms prefer reporting small profits to reporting losses, showing increasing earnings over previous periods' earnings, and announcing positive earnings surprises relative to analysts' earnings expectations.[2] In particular, there are a disproportional number of firms that meet or beat three earnings benchmarks: zero earnings, previous period's earnings, and analyst consensus earnings forecasts. Barth et al. (1999), Lopez and Rees (2002), Bartov et al. (2002), Kasznik and McNichols (2002), Francis et al. (2003), Brown and Caylor (2005), Myers et al. (2007), Jiang (2008), Koonce and Lipe (2010), Shanthikumar (2012), Liu (2013), and An et al. (2014) provide compelling evidence that there are significant economic-related benefits to MBEB. Specifically, this evidence suggests that markets assign higher price-earnings multiples, react with positive abnormal returns, or demand lower cost of debt to firms surpassing earnings targets. Complementing this evidence, DeAngelo et al. (1996) find that firms with consistent earnings growth experience stock price declines when such growth terminates. Skinner and Sloan (2002) and Kinney et al. (2002) suggest that firms slightly missing analyst consensus earnings expectations have experienced decreases in stock prices.

[2] Francis et al. (2003) have categorized earnings patterns into three distinct types in their study. Those are earnings consistently meeting or beating last year's earnings, meeting or beating analysts' forecasts, and earnings smoothness. Similarly, Jiang (2008) has classified three earnings types: positive earnings (i.e., profits), positive earnings changes, and positive earnings surprises.

Earnings are shaped by management's motives. Graham et al. (2005) provide survey evidence on management's opinions with respect to reporting earnings and report that over 80% of financial executives or chief finance officers (CFOs) who responded to their survey believe that MBEB helps maintain or increase share prices and enhances their firm's creditability in capital markets. Recently, Dichev et al. (2013, 2014) indicate that approximately 95% of CFOs believe that earnings are used by investors for valuation purposes and that more than 90% of CFOs agree to engage in management of earnings to achieve earnings benchmarks due to both internal and external pressure.[3]

The economic explanations as to why markets reward MBEB are, however, not sufficiently clear.[4]. The literature described next advances two main explanations to these rewards: increasing earnings patterns capture dimensions of growth and/or lower risk.[5] However, this literature has not fully investigated or ruled out the possibility that a consistent pattern of earnings increases is associated with other underlying firm characteristics, for example, fundamentals, or the specific combination of growth, risk, and firm fundamentals.

[3] Extensive studies have established a discontinuity in reported earnings distribution around three earnings benchmarks: zero earnings, previous period's earnings, and analyst consensus earnings forecasts. This phenomenon can also be interpreted as prima facie evidence of earnings management. In other words, if there is no economic incentive for meeting or beating earnings benchmarks, reported earnings distribution is assumed to be even and smooth around presumed benchmarks (Hayn, 1995; Burgstahler and Dichev, 1997; Degeorge et al., 1999; and Burgstahler and Eames, 2006). However, Beaver et al. (2007) argue that the discontinuity in earnings distribution is due to special items and income tax, not management discretion. Durtschi and Easton (2005) posit that the discontinuity is caused by the deflator, the sample selection criteria, the different characteristics among observations, and the combination of these causes.

[4] In addition to equity market benefits, there are compensation-related benefits to MBEB. Ke (2001) argues that CEO's bonus incentives and equity-based incentives encourage management to show a small amount of earnings increases and a series of consistently earnings increases. Ke (2004) documents the association between executive's equity-based compensation and earnings management proxied by earnings series. His results suggest that managers have strong financial incentives to manage earnings upward.

[5] One possible explanation is that the premium is a result of mispricing. Shanthikumar (2012) argues that small and medium investors' trading behaviour based on earnings momentum strategy can account for premiums to a pattern of increasing earnings.

2.2 Growth-Based Explanation to Market Rewards to MBEB

Several studies empirically examine a growth-signalling explanation for market premiums. Bartov et al. (2002) document that firms reporting zero or positive earnings surprises enjoy higher incremental quarterly abnormal returns. They argue that MBEB conveys positive information about future earnings.[6] Consistent with Bartov et al. (2002), but using a different research design, Kasznik and McNichols (2002) investigate whether the premiums to firms having no or positive earnings surprises are attributed to either future earnings or distinct market premiums. They find that MBEB firms report a series of future earnings that is significantly higher than firms not meeting earnings expectations. They conclude that investors rationally anticipate higher earnings outcomes over subsequent periods for MBEB firms once they observe meeting or beating forecasted earnings. This conclusion is supported by experimental findings that consistent earnings patterns convey information about both better future performance and higher management's creditability (Koonce and Lipe, 2010). Although these studies attribute market rewards to MBEB firms to better future performance (a numerator effect in valuation models), market premiums may be due to risk.

2.3 Risk-Based Explanation to Market Rewards to MBEB

A second possible explanation to market rewards to earnings patterns, therefore, is related to perception of underlying risk. Perceptions of lower risk would be associated with a lower discount factor applied to future cash flows (a denominator effect), leading to higher prices. Consistent with this argument, Kasznik and McNichols (2002) find evidence that pricing effects

[6] Bartov et al. (2002) also assess the consequences of expectation management and earnings management. Their findings suggest that earnings surprises resulting from expectation or earnings management are still associated with premium, albeit lower ones. This may be due to failure by market participants to detect earnings management, or alternatively, that earnings management is not perceived to be responsible for the earnings surprises.

of consistently meeting benchmarks cannot be fully explained by future earnings. They suggest that such rewards possibly are attributed to investors' perceptions that these firms are less risky and, in turn, have a lower expected rate of return. Brown et al. (2009) advance an information risk explanation to premiums to meeting or beating earnings forecasts. Specifically, they examine the effects of meeting or beating earnings expectations on information asymmetry. Their results suggest that information asymmetry is reduced after beating earnings expectations because MBEB attracts investors' attention and increase a firm's investment visibility. Xie's (2011) findings suggest that terminating a string of earning increases is associated with higher expected rate of returns – implying higher risk – and downwardly revised expectations of future cash flows. These results imply that market rewards attached to meeting or beating benchmarks may be attributable to lower uncertainty of future payoffs which, in turn, induce investors to lower required rate of return.

2.4 The Interrelation of Growth and Risk

Although growth and risk seem as two distinct inputs, recent research suggests they are inter-related. Penman and Yehuda (2015) argue that, in addition to cash-flow news, accounting measures convey discount rate news. They posit that deferral of earnings continues until uncertainty is resolved implying higher risk. In contrast, earnings realization implies a decrease in expected rate of return due to resolution of uncertainty.[7] Their findings suggest that positive earnings changes imply lower risk as uncertainty is resolved. Nekrasov and Shroff (2009) propose a model in which expected earnings are modified for risk and no further adjustment to the discount rate should be used beyond risk-adjusted expected earnings. Their model specifies

[7] Deferring earnings recognition to the future reflects higher future earnings growth. However, future growth is at risk until it materializes. On the condition that markets discount expected earnings growth as they view it as risk, expected earnings growth is associated with expected returns. Consequently, once earnings are realized, this means that uncertainty is solved and, in turn, implies lower risk or lower discount rate.

that risk residing in economic fundamentals, i.e. earnings, affects firm value. Combining these two papers suggests that realization of increases in earnings may be related not only to future growth but also to lower risk. It can be, therefore, thought that earnings growth resolves fundamental risk which, in turn, reduces expected rate of return. In other words, lower fundamentals-based risk reflected in growing earnings is potentially one of economic determinants of higher price-earnings multiples accruing to firms having consistent earnings growth.

2.5 Other Explanations to Market Rewards to MBEB

Although many studies document that premiums associated with patterns of increasing earnings are driven by growth opportunities and lower underlying risk, it is commonly known that firm fundamentals determine both earnings and hence firm value.[8] If fundamental information is manifested in earnings persistence or reflects earnings growth, it seems logical that a firm with stronger fundamentals would exhibit either higher persistence of earnings or larger subsequent earnings growth or both. To the extent that greater earnings persistence results in a string of earnings increases, we would expect a higher price to be associated with earnings strings.[9] Theoretically, sufficiently high earnings persistence drives a string of earnings in the absence of a strong time trend in earnings. This, therefore, may be the case that the reward to MBEB possibly is a result of sufficiently high persistence of earnings establishing an earnings string. Several studies described below provide results supporting the link between fundamentals, earnings persistence, and future growth.

[8] It can be thought that fundamentals associated with earnings generating process are a result of operating, investing, financing activities of a firm. Therefore, it is related to firm value ultimately.

[9] Dechow et al. (2010) point out that earnings persistence, a proxy for earnings quality, depends on firm fundamentals and accounting system.

Lev and Thiagarajan (1993) report evidence consistent with firm fundamentals being positively associated with both earnings persistence and future earnings growth. Their results suggest that investors infer earnings persistence from fundamental information. Fundamentally-stronger firms tend to have larger earnings response coefficients reflecting higher persistence of earnings. Furthermore, they find some evidence that firms with higher fundamentals are likely to report higher future earnings. Their conclusion is that fundamentals underpin both earnings persistence and earnings growth. Abarbanell and Bushee (1997) articulate a direct link between fundamental information and future earnings growth. Their findings indicate that several fundamental variables are useful to investors and analysts for forecasting short-term and long-term earnings, incremental to earnings surprises. Abarbanell and Bushee (1998) further report that abnormal returns on portfolios formed on fundamental analysis strategy are substantially attributed to one-year-ahead earnings. Fundamentals may drive earnings persistence, which in turn, may lead to earnings strings. Chen (2013) finds that time-varying earnings persistence model based on fundamentals can explain post-earnings announcement drift. Her results suggest a relation between fundamentals-based earnings persistence and investors' reaction. Yao (2014) builds on Chen (2013)'s model to posit that underlying economic performance drives earnings persistence. His findings are consistent with firms with more persistent earnings are fundamentally stronger. Yao (2014) also documents that certain fundamentals – namely the percentage change in sales, unproportioned increased inventory to sales, unproportioned increased receivables to sales, unproportioned increased SG&A to sales, and unproportioned decreased gross margin to sales – predict breaks in earnings strings. He concludes that investors rationally use fundamental information to assess earnings persistence. Tomy (2012) further documents that fundamental performance varying with business cycle influences persistence of earnings. Levels of earnings

persistence are dependent on fundamentals determined by the state of macroeconomic conditions.

Despite the fact that market rewards to earnings patterns are long observed, the related research reviewed above still leaves a substantial number of open questions. First, to the extent that investors employ past earnings patterns to predict future performance reflected in prices, they also predict future risk.[10] I therefore ask if market rewards to increasing earnings patterns are related to *predicted* variability in future earnings. More specifically, I investigate if variability in future earnings (my proxy for investors' estimate of future risk) provides incremental explanatory power over the variability in past earnings. Second, while prior research suggests that increasing earnings patterns are associated with earnings growth, a firm cannot grow forever. Hence, it is unlikely that market rewards to longer patterns of increasing earnings are associated with better future growth opportunities. Instead, market rewards may be related to past strong fundamentals. I therefore examine if longer patterns are positively related to past fundamentals but unrelated to future growth. Finally, because longer patterns of earnings increases are less likely to predict future growth, then longer patterns should be better predictors of lower future risk than shorter patterns. I therefore explore if the association between future risk and the pattern of increasing earnings is moderated by the length of the pattern, conditional on firm fundamentals.

The paper provides contributions in a number of ways. First, the study documents that future earnings uncertainty (the denominator effect in valuation models) is capable of explaining the

[10] The implicit assumption behind the expected relation between future earnings and stock price is that markets possess information about future earnings. Prior research on the price informativeness reveals that markets can access valuation relevant information about a firm's future profitability and such information is incorporated into stock price (Kothari and Sloan, 1992; Collins et al., 1994; Durnev at al., 2003). Specifically, markets incorporate anticipated earnings into stock prices and such information manifests itself in price-earnings relation. Since investors are able to forecast future earnings of a firm, it is likely that they can predict the shape of distribution of earnings.

higher price-earnings multiples accrued to firms reporting patterns of increasing earnings. In particular, investors are able to infer future risk from earnings patterns and positively react to such patterns reflecting lower future risk. It supports the notion that not only the first moment but also the second moment of future earnings distribution affects prices. In addition, future risk is unlikely to be fully captured by past earnings variability which is commonly used in the literature (e.g. Barth et al., 1999; Bartov et al., 2002; Kasznik and McNichols, 2002).

Second, the paper articulates the link between earnings strings, firm fundamentals, and growth opportunities. My findings suggest that firms with earnings strings likely exhibit past stronger underlying economic performance but are not possible to sustain growth as the length of patterns increases. In other words, there is a positive association between patterns of earnings increases and past firm fundamentals. Moreover, growth opportunities are less pronounced for longer earnings patterns than shorter patterns. This evidence plays down the growth signalling explanation, and instead highlights the importance of past fundamentals in driving the MBEB phenomenon. From the perspective of fundamentals, it may be true that fundamentals, not growth per se, underpin the empirical relation between patterns of increasing earnings and market rewards. This study offers a more complete picture of the association between growth opportunities, fundamentals, earnings patterns, and market premiums (Lev and Thiagarajan, 1993).

Third, although prior literature suggests that firms reporting a long string of earnings increases have higher persistent earnings, I derive a mathematical relation between earnings persistence and an earnings string. It implies that earnings persistence is different from an earnings string. On one hand, high persistence of earnings is a necessary condition for strings of increasing earnings as long as there is no a strong time trend in earnings. On the other hand, earnings strings

can be obtained with low earnings persistence as long as a time trend is sufficiently strong. Stated differently, earnings strings can arise even when earnings persistence is weak. Therefore, earning persistence does not necessarily imply the existence of earnings strings (See appendix A for the theoretical development).[11] This theoretical development introduces necessary and sufficient conditions for an earnings string (Yao, 2014).

Lastly, this analysis provides an important insight into how patterns of earnings increases convey information about future risk. Specifically, longer earnings patterns signal lower future risk than shorter patterns. This new evidence adds to recent studies on accounting information and risk (Penman and Yehuda, 2015). It also confirms the objective of financial statements indicating that accounting provides information about uncertainty of future economic benefits.

3. Hypothesis Development

The previous section suggests that it is still unclear whether market premiums for performance consistency are related to growth opportunities, underlying risk, strong fundamentals, or a combination of these factors. My starting point for exploring the determinants of price rewards to patterns of increasing earnings is Ohlson's (1995) valuation model which suggests that price is the sum of current book equity value plus discounted future abnormal earnings. A straightforward interpretation of Ohlson's (1995) model is that, ceteris paribus, an increase in earnings or, a decrease in risk (i.e. discount rate), would lead to a higher stock price.

The analysis of Nekrasov and Shroff (2009) and Penman and Yehuda (2015) seems to support Barth et al.'s (1999) measure of risk that is based on past earnings. Nevertheless, it seems to be an unsatisfactory measure of fundamentals-based risk for two main reasons. First, earning

[11] This algebraic development is restricted to profit-making firms.

increases may, at the same time, resolve past uncertainty, but also mask the origination of new uncertainty (i.e. origination of new deferrals). In addition, evidence form McInnis (2010) suggests that past earnings volatility is not associated with cost of capital, casting doubt on its construct validity as proxy for risk. Konstantinidi and Pope (2014) suggest that a measure of risk in future earnings can be derived from forecasted earnings distribution that is incremental over commonly used risk proxies. Donelson and Resutek (2015) argue that past earnings variability contemporaneously impounds information about time-series earnings variation and earnings uncertainty but only earnings uncertainty information, not time series variation, is predictive of future forecast errors and future returns. Therefore, I expect that measuring risk from future earnings as a proxy for fundamentals-based risk can better capture risk dimensions reflected in prices. Second, price is a forward-looking measure that depends on estimates of future growth. However, past earning may not fully encompass future earnings information. Past earnings risk, hence, is a crude measure of market expectation of a firm's prospects.

The other relevant explanation for higher prices is that both underlying risk and growth opportunity are related to fundamentals. Fundamental information analysis identifies better approach adopted by markets to forecast expected earnings which, in turn, determine prices (Nissim and Penman, 2001). Insofar as fundamentals play a vital role in firm valuation, it stands to reason that firms with stronger economic fundamentals will report better future performance. Markets therefore assign higher prices to firms with a series of increasing earnings because these firms have been, and are expected to remain, fundamentally better. However, since past earnings growth is a mean reverting process, longer patterns of increases in earnings should be associated with weaker growth opportunities (Fama and French, 2000). Hence, any price reward to very

long patterns is likely a reflection of anticipated lower risk than better growth prospects (e.g. in the case of mature large firms).

To summarize: I hypothesize that investors estimate the variability of *future* earnings and use it as a risk measure. I further hypothesize that the variability of future earnings is lower for firms reporting longer strings of increasing earnings. Consequently, the required rate of return is lower for firms with long strings of earnings increases. In addition, future earnings risk measure is expected to be incremental to past earnings risk measure. That is, the risk measure in this study contains information about uncertainty of future performance which cannot be captured by traditional risk measure. Formally:

Hypothesis I: Controlling for the variability of future earnings, the price-earnings multiples of firms reporting an increasing earnings string is not different from the price-earnings multiples of firms that do not report an increasing earnings string.

Prior research indicates that investors expect higher future earnings after they observe a string of earnings increases, because they perceive the fundamentals to be stronger. However, this is true up to a point as earnings growth ultimately has to reverse. I therefore conjecture that firms with stronger fundamentals likely exhibit past strings of earnings increases. However, longer patterns predict weaker growth. These hypotheses are formally stated:

Hypothesis II: Ceteris paribus, a string of increasing earnings is positively related to firm fundamentals.

Hypothesis III: Ceteris paribus, a longer string of earnings increases is more weakly associated with future earnings increases than a shorter string, controlling for firm fundamentals.

Having a relative short string of earnings increases may be related in equal measures to growth and reduced future risk. Yet, because firms cannot continue to grow in perpetuity, the predictive balance of an earnings string may shift in the direction of risk rather than growth as the string has prolonged. I conjecture that longer strings are better signals of future risk than shorter strings. Formally:

Hypothesis IV: Ceteris paribus, a shorter string of earnings increases is more weakly associated with future earnings variability than a longer string, conditional on fundamentals.

4. Research Design

4.1 Defining a string of earnings increases

A firm with a string of earnings increases is defined as a firm that reports at least twenty consecutive quarters of increases in seasonally adjusted earnings per share (EPS). An EPS increase is defined compared with earnings per share (EPS) from the same quarter of the prior year.

The four quarters lagged earnings benchmark is informed by Graham et al.'s (2005) findings.[12] I choose a twenty quarters (or five years) period which is consistent with previous research (Barth

[12] The definition of a string of increasing earnings is consistent with findings of Graham et al. (2005). They find that 85.1% of CFOs agree or strongly agree that earnings number at same quarter last year is the most important earnings benchmark. The reasons why managers care for four quarters lagged earnings are that this benchmark is the first item to be compared with in press release, that this benchmark is relatively difficult to manage after the 10-Q has been submitted to SEC, and that this benchmark is what investors use to assess corporate performance. Hence, a string of earnings increases relative to four quarters lagged numbers is basically intriguing because it reflects the most influential motivation of a firm.

et al., 1999; Myers et al., 2007). By construction, the definition of firms with a string in this study is more restricted than other papers using annual earnings.[13]

4.2 Measuring Market Rewards

I first replicate Barth et al. (1999) although I analyze a different sample to estimate the pricing effects of a string of growing reported earnings. The following price level specification is applied to the replication tests.

$$PRICE_{it} = \beta_0 + \beta_1 EPS_{it} + \beta_2(EPS_{it} \times STRING_{it}) + \beta_3(EPS_{it} \times U\&B_{it})$$
$$+ \beta_4(EPS_{it} \times LTGROWTH_{it}) + \beta_5(EPS_{it} \times EVAR_{it})$$
$$+ \beta_6(EPS_{it} \times DE_{it}) + \beta_7 BVE_{it} + \varepsilon_{it} \quad (1)$$

Where $PRICE_{it}$ is fiscal quarter-end's stock price. EPS_{it} is earnings per share. $STRING_{it}$ is an indicator variable that equals one if a firm reports a string of earnings increases, and zero otherwise. $U\&B_{it}$ is an indicator variable that equals one if a firm is a member of utility or bank sectors, and zero otherwise. $LTGROWTH_{it}$ is twenty-quarter (five-year) compound growth rate of book equity value, a proxy for growth. $EVAR_{it}$ is variance of the past twenty quarters' (five years) percentage changes in quarterly earnings per share, a proxy for past operating risk. DE_{it} is debt-to-equity ratio, a proxy for financial risk. BVE_{it} is book value of equity per share. ε_{it} is a residual term. The subscripts i and t denote firm and time, respectively.[14]

The variables, $STRING$, $LTGROWTH$, $EVAR$, and DE, are interacted with EPS to capture the incremental effects on pricing of earnings owing to earnings strings, growth, past risk and

[13] Although prior research includes non-decreasing earnings firms in increasing earnings firm sample, I limit my increasing earnings firm sample to only increasing earnings firms.
[14] See the definitions of variables in appendix B. Moreover, the subscripts i and t are sometimes suppressed.

leverage. In addition, to allow for a different relation between EPS and prices for utilities and banks, EPS is interacted with the indicator $U\&B$. Growth, past operating risk, and financial risk are introduced due to the reason that growth (risk) is increasing (decreasing) function of price-earnings multiples (Collins and Kothari, 1989). Book value of equity is included as suggested by Ohlson's (1995) model. Year fixed effects and the interaction variables between year and EPS are also performed in this specification. All accounting and pricing variables are winsorized at the 1% top and 1% bottom of tails of the distribution for all analyses in this study.

If earnings of firms with earnings strings are priced higher than other firms, β_2 is expected to be positive, consistent with Barth et al. (1999). It suggests that a price-earnings multiple is substantially higher for firms sustaining sequentially earnings increases.

Technically, equation (1) suffers from several econometric problems. First, it is important to include all variables that appear in the interactions as individual variables. I therefore enter $STRING, U\&B, LTGROWTH, EVAR,$ and DE to equation (1) so as to avoid an omitted correlated variable problem.[15] Second, the exclusion of fixed effects may influence the results. I therefore add industry fixed effects.[16] Third, unlike Barth et al. (1999), I cluster standard errors by firm and year in order to mitigate the effects of cross-sectional and temporal dependence between observations (Petersen, 2009). Fourth, I control for firm life-cycle effect by including firm age as a proxy for business cycle in the models so that it captures a certain aspect of growth induced by

[15] Barth et al. (1999) include the proxies for growth and risk as non-interactive covariates. Nevertheless, it is possible that an earnings pattern not only affects a price as an interactive variable, but also itself may have a direct association with a price as shifting an intercept of the regression line.

[16] According to the identification strategy, industry fixed effects, rather than firm fixed effects, are specified in the model because the implications of earnings patterns may be time invariant effects captured by firm fixed effect variables. Accordingly, all specifications but equation (1) in this study use industry fixed effects to mitigate the potential time invariant effects.

the stage of the business cycle. Accordingly, the following equation is the extended version of price level specification.

$$PRICE_{it} = \beta_0 + \beta_1 EPS_{it} + \beta_2 STRING_{it} + \beta_3 U\&B_{it} + \beta_4 LTGROWTH_{it}$$
$$+ \beta_5 EVAR_{it} + \beta_6 DE_{it} + \beta_7 (EPS_{it} \times STRING_{it}) + \beta_8 (EPS_{it} \times U\&B_{it})$$
$$+ \beta_9 (EPS_{it} \times LTGROWTH_{it}) + \beta_{10} (EPS_{it} \times EVAR_{it})$$
$$+ \beta_{11} (EPS_{it} \times DE_{it}) + \beta_{12} AGE_{it} + \beta_{13} BVE_{it} + \varepsilon_{it} \quad (2)$$

Where AGE_{it} is firm age and all other variables are as previously defined. If earnings strings command a higher price-to-earnings multiple, I expect β_7 to be positive. A coefficient on a string of earnings increases or β_2 is also expected insofar as earnings strings convey positive price-relevant information.

4.3 Measuring the Effects of Future Earnings Uncertainty

To the extent that future earnings distribution is incorporated into investors' valuation and judgment, both expected value and variance of future earnings are expected to influence share prices. One of main interest in this study is to articulate the relation between earnings strings, market rewards, and future earnings uncertainty. I hence investigate whether risk in future economic benefits is associated with both prices and price-earnings multiples. This investigation is consistent with the hypothesis I.

To do so, I empirically construct a simplified measure of risk in future earnings using quarterly earnings per share realization.[17] In particular, variability in future earnings is defined as variance

[17] Other risk measures of future earnings may be able to be derived from predicted earnings distribution (Konstantinidi and Pope, 2014) or obtained from dispersion of analysts' forecasts (Gebhardt et al., 2001; Gode and

of (ex post) future twenty quarters' (five years) percentage changes in quarterly earnings per share. A quarterly EPS percentage change is a difference of current quarterly earnings and four quarters lagged number or same quarter prior year, scaled by the absolute value of four quarters lagged earnings. While I use ex-post realizations not known to investors when earnings are released, I use these as a proxy for their expectations. This should not be mistaken for assuming that investors have full foreknowledge.

The following regression model is the price level specification for testing pricing effects of future earnings uncertainty associated with a streak of earnings increases.

$$\begin{aligned} PRICE_{it} = {} & \beta_0 + \beta_1 EPS_{it} + \beta_2 STRING_{it} + \beta_3 U\&B_{it} + \beta_4 LTGROWTH_{it} + \beta_5 EVAR_{it} \\ & + \beta_6 FEVAR_{it} + \beta_7 DE_{it} + \beta_8 (EPS_{it} \times STRING_{it}) + \beta_9 (EPS_{it} \times U\&B_{it}) \\ & + \beta_{10} (EPS_{it} \times LTGROWTH_{it}) + \beta_{11} (EPS_{it} \times EVAR_{it}) \\ & + \beta_{12} (EPS_{it} \times FEVAR_{it}) + \beta_{13} (EPS_{it} \times STRING_{it} \times EVAR_{it}) \\ & + \beta_{14} (EPS_{it} \times STRING_{it} \times FEVAR_{it}) + \beta_{15} (EPS_{it} \times DE_{it}) \\ & + \beta_{16} AGE_{it} + \beta_{17} BVE_{it} + \varepsilon_{it} \end{aligned} \quad (3)$$

Where $FEVAR_{it}$ is future earnings variability and all other variables are previously defined. To examine the effects of future earnings uncertainty on price, I include the future earnings risk variable ($FEVAR$), the interaction term between earnings per share and risk in future earnings ($EPS \times FEVAR$), and the interaction term between earnings per share, a dummy for a string of earnings increases and risk in future earnings ($EPS \times STRING \times FEVAR$) in equation (3). As

Mohanram, 2003). However, the dispersion of earnings forecasts may be troublesome itself because I cast doubt on the extent to which analysts can assess fundamentals-based risk. Moreover, Donelson and Resutek (2015) argue that the forecast dispersion is not a good proxy for uncertainty of future earnings.

before, I include year fixed effects, industry fixed effects, and I cluster standard errors by year and firm.

As indicated in hypothesis I, the primary interest in equation (3) is the incremental effects of variability in future earnings on price-earnings multiples for firm reporting consecutively increasing earnings, after controlling variability in past earnings. I expect that β_{14} is positive. I conjecture that string firms are given rewards due to lower future earnings risk and that this risk proxy captures other possible effects which variability in past earnings cannot identify. Because risk and price are negatively related, the coefficients β_6 and β_{12} are expected to be negative. After controlling future earnings risk, I expect that β_8 is not statistically different from zero. It suggests that there is no difference in price-earnings multiples between string firms and other firms because future earnings risk fully captures the incrementally positive effects of earnings strings.

4.4 Assessing the Valuation Role of Firm Fundamentals

The next main objective is to test the hypothesis II that rewards to firms reporting consistent earnings trend is related to stronger fundamentals. That is, firms showing stronger fundamentals likely exhibit past increasing earnings patterns.

To test this possibility, I first construct a standardized aggregate fundamental score following Lev and Thiagarajan (1993). This score is based on 12 underlying fundamental signals including inventories, accounts receivable, capital expenditures, research and development expenses, gross margin, selling and administrative expenses, provision for doubtful receivables, effective tax rate, order backlog, labor force, LIFO earnings, and audit qualification. Each fundamental signal

is binary variable. I assign one if an individual signal is a positive signal or good news, zero otherwise. Firms with a larger number of strong fundamentals obtain a higher score.

A standardized aggregate fundamental score is a sum of each fundamental score for each firm and quarter, standardized by the number of available signals. To construct an average standardized aggregate fundamental score, I calculate an average value of standardized aggregate score, by averaging standardized aggregate fundamental scores from period t-20 to period t-1. The rationale for using lag information is that fundamental scores are a signal by construction. Twenty periods average value is consistent with the definition of an earnings string.

I examine the determinants of $STRING$ as a function of the fundamentals score and other factors using the following regression model:

$$STRING_{it} = \delta_0 + \delta_1 FSCORE_{it} + \delta_2 BMRATIO_{it} + \delta_3 CAPEX_{it} + \delta_4 STGROWTH_{it}$$

$$+ \delta_5 SALESGROWTH_{it} + \delta_6 DE_{it} + \delta_7 AGE_{it} + \varepsilon_{it} \quad (4)$$

where $FSCORE_{it}$ is an average value of standardized aggregate score. $BMRATIO_{it}$ is book-to-market ratio. $STGROWTH_{it}$ is four-quarter (one-year) growth rate of book value of equity. $SALESGROWTH_{it}$ is four-quarter (one-year) growth rate of sales revenue. All other variables are as previously defined.

Equation (4) is estimated using the Probit Maximum Likelihood Estimation method. This model controls for growth opportunities, capital structure, and business cycle (Fama and French, 1995: Lang et al., 1996; Fama and French, 2006). This specification also includes year fixed effects, industry fixed effects, and clustered standard errors by firm and year. Consistent with the

hypothesis II, I expect δ_1 to be positive insofar as firm fundamentals are positively related to past strings of increasing earnings.

4.5 Shifting from Growth to Risk Signalling

Although investors may predict better future financial performance when they observe strings of earnings increases, firms cannot sustain growth in perpetuity. As stated in the hypothesis III, I expect that longer earnings strings are more weakly related to earnings growth and more strongly to future risk. I investigate this hypothesis by first adapting equation (4) as follows.

$$FSTRING_{it} = \delta_0 + \delta_1 PSTRING_{it} + \delta_2 FSCORE_{it} + \delta_3 BMRATIO_{it} + \delta_4 CAPEX_{it}$$

$$+ \delta_5 STGROWTH_{it} + \delta_6 SALESGROWTH_{it} + \delta_7 DE_{it} + \delta_8 AGE_{it} + \varepsilon_{it} \quad (5)$$

where $FSTRING_{it}$ is an indicator variables that equals one if a firm reports a future string of earnings increases over a specific length of quarters and zero otherwise. A future string is defined sequentially as four, eight, twelve, sixteen and twenty quarters ahead (one, two, three, four, and five years ahead respectively). $PSTRING_{it}$ is an indicator variables that equals one if a firm reports a past string of earnings increases over a specific length of quarters and zero otherwise. A past string is defined sequentially as previously four, eight, twelve, sixteen and twenty quarters (past one, two, three, four, and five years respectively). I also employ the Probit Maximum Likelihood Estimation method to estimate equation (5).

In equation (5), the lengths of past earnings string variable help examine the extent to which firms can sustain increasing earnings patterns. On one hand, if good performance persists, strings would persist into the future implying δ_1 is expected to be positive and large. On the other hand, if the persistence of earnings strings is low, δ_1 is expected to be positive with low magnitude or

even negative. By varying the lengths of past and future earnings strings, I am able to empirically assess the magnitude of δ_1 as a function of the length of past strings. According to my third hypothesis, I expect that past longer earnings strings weakly related to future growth.

To examine the relation between the lengths of earnings strings and future risk I estimate the following model:

$$FEVAR_{it} = \gamma_0 + \gamma_1 PSTRING_{it} + \gamma_2 FSCORE_{it} + \gamma_3 RD_{it} + \gamma_4 CAPEX_{it} + \gamma_5 ASSET_{it}$$

$$+ \gamma_6 DE_{it} + \gamma_7 AGE_{it} + \gamma_8 SALES_{it} + \gamma_9 SALESVAR_{it} + \varepsilon_{it} \quad (6)$$

where RD_{it} is research and development expense scaled by a lagged market value of equity. $CAPEX_{it}$ is capital expenditure scaled by lagged market value of equity. $ASSET_{it}$ is total assets scaled by a lagged market value of equity. $SALES_{it}$ is sales revenue scaled by a lagged market value of equity. $SALESVAR_{it}$ is variance of the past one year's (four quarters) percentage change in sales revenue. All other variables are as previously defined. Scaling by lagged market value of equity is to control for heterogeneity across firms.[18]

Equation (6) modifies the approach taken by Kothari et al. (2002) and Amir et al. (2007) who investigate the relation between future earnings variability and past R&D expense and CAPEX. The control variables capture other determinants of subsequent earnings volatility including firm fundamentals, growth options, capital structure, business cycle, diversification effects, and real economic shock (Dichev and Tang, 2009). Similar to other regressions, year fixed effects and industry fixed effects are estimated in the model. I also cluster standard errors by firm and year. As per Hypothesis IV, I expect that shorter (longer) earnings strings to be weakly (strongly) and

[18] One can view that scaling by lagged market value of equity is consistent with the denominator of market rate of return which is divided by a lagged market price. It can be thought of investment base of firm value at the beginning period.

possibly positively (inversely) associated with future earnings variability. More specifically, $\gamma_1$on shorter (longer) strings is less (more) negative or possibly positive.

5. Sample and Descriptive Statistics

5.1 Sample Selection

Accounting and market data are collected from both COMPUSTAT and CRSP databases. The data set covers all available US listed firms during the period of 1971 – 2014. The initial set of sample involves 975,526 firm-quarter observations. Having deleted missing CUSIP and duplicates, this yields the sample which is equal to 941,116 firm-quarter observations. Since I require at least five years of earnings history, the sample is substantially reduced to 440,105 firm-quarter observations.[19] To calculate variability of future earnings as a proxy for risk in future earnings, I require five years of future earnings data. As a result, the final sample is 215,532 firm-quarter observations between 1976 and 2009. I label a firm reporting a string of earnings increases as a string firm. Sample formation process is summarized in Panel A of Table 1. Note that the number of samples is allowed to vary across model specifications because doing so would potentially increase the generalizability of empirical results.

The definition of an earnings string may give rise to a potential survivorship bias because many non-string firms drop out of the sample. While it is impossible to overcome this problem, to mitigate this concern, I delete all firms that do not report at least twenty quarters of earnings history. This implies that survivorship rate is similar for both string and non-string firms.

[19] Comparing my sample size with those of previous studies, the number of observations is substantially greater than Barth et al. (1999)'s sample and Liu (2013)'s sample which is 21,173 and 83,443 firm-year observations respectively. In terms of a firm-quarter observation, a sample used in this paper is considerably larger than Myers et al. (2007)'s sample of 746 firms and Yao (2014)'s sample of 11,469 firms.

Panel B of Table 1 reports the Fama and French 17-industry classifications of the 440,105 firm-quarter observations.[20] This panel further distinguishes between string and non-string observations. The number of firms reporting strings of at least twenty-quarter increasing earnings varies across industries. In fact, firms in certain industries are more likely to show trend in positive earnings growth than other industries. For example, an incidence of sequentially increasing earnings strings is high in Banks, Insurance Companies, and Other Financials industry but it is low in Consumer Durable industry, implying that service sectors seem have a greater ability to prolong growth in earnings. None of firms in Mining and Minerals, and Steel Works industries, however, reports earnings strings, reflecting that traditionally heavy industries are even more difficult to sustain lengthily growing reported earnings.

I present the sample of 440,105 firm-quarter observations classified by year in Panel C of table 1. Overall, the number of observations continuously has been increasing over time. The sample contains an average of 11,285 observations per year. With respect to firms reporting earnings strings, nearly half of earnings string firms (46.66%) are concentrated during the period of 1977 – 1982.[21] From year 1982 onward, there is not a clear pattern of string firms. However, it seems to be a decreasing trend in string firms during the last great financial crisis, i.e. year 2008 – 2010.

[Insert Table 1 Here]

Table 2 analyses firm-quarter observations of earnings strings by their length. As expected, the number of string observations is inversely related to the duration of earnings momentum. Specifically, more than 80% of firms (80.42%) do not report strings of at least four quarters. Only 0.36% of firms report consecutively growing earnings strings for at least twenty quarters.

[20] See http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html.
[21] I do sensitivity checks and find that the main results are qualitatively unaffected with the exclusion of a period between 1977 and 1982.

Because there is a very small number of firms reporting earnings strings longer than forty quarters, I report the total number of observations of this group in a single category, namely 40 quarters or more.[22]

[Insert Table 2 Here]

Table 3 reports a transition matrix of an earnings string of a particular four quarters ahead given the length of prior strings. Initially, there are only 20% of firms reporting four-quarter strings of earnings increases. However, 29% of such string firms are able to proceed with the other four-quarter strings in the subsequent periods. Suppose firms have previously earnings strings of eight quarters, 36% of these firms end up reporting an earnings string of twelve quarters, i.e. additional four quarters. More interestingly, if firms report patterns of increasing earnings for twenty quarters in a row, they tend to maintain earnings momentum with the probability which is higher than 0.50. That is, firms having strings of twenty-quarter earnings increases are more likely than other firms to continue increasing earnings trend in the following four quarters. A string momentum is clear with the passage of time. An overriding conclusion from Table 3 is that the likelihood of a future string increases with the length of prior strings.

[Insert Table 3 Here]

5.2 Descriptive Statistics

Table 4 provides descriptive statistics for the aggregate sample. The table also reports means and medians for the string and non-string firms, and the results of t-tests in differences in mean and Wilcoxon rank sum tests in differences in median across two groups. Summary statistics for main variables are generally consistent with those documented in previous studies (Burgstahler

[22] The maximum length of a streak of consecutively increasing earnings in the sample is 64 quarters.

and Dichev, 1997; Barth et al., 1999). For instance, a mean stock price (*PRICE*) is 20.709, and mean quarterly earnings per share (*EPS*) is 0.281. In comparison with Barth et al. (1999), they report a mean stock price of 20.27, and mean annual earnings per share of 1.21. These statistics indicate that there is a large variation in prices, and that firms report profit on average.

Turning to differences across two sub-samples, I find that all variables but firm age of string firms are significantly different from those of non-string firms. In particular, firms reporting sequentially increasing earnings have significantly higher stock prices, higher earnings, higher growth, lower risk, stronger fundamentals, and larger capital investment in physical assets. On the other hand, non-string firms have substantially higher assets, higher debts, greater sales turnover, higher book-to-market ratio, and higher research and development expense. Note that a string should not manifest the advantage of being a large company because string firms are smaller measured by either total assets or sales.

[Insert Table 4 Here]

6. Main Results

6.1 A Replication and Modifications of Barth et al. (1999)

In this section I first replicate the main analysis in Barth et al. (1999) and then run the modified specification according to equation (2). Table 5 reports the results.

Summary statistics and correlations for variables used in this analysis are presented in Panel A and B of Table 5 respectively. The number of observations is reduced to 313,594 because all variables are required to be available for entering the model specifications. Distributional statistics of financial and market variables in Panel A are slightly different from those of the

entire sample reported in Table 4. For example, the averages and variations in this set of data are higher for stock prices, earnings per share, and book equity value. The correlations in Panel B corroborate the relations between primary variables in my specification which correspond to prior works. This panel documents a positive association between prices and earnings strings. It also displays the positive (negative) relation between firm performance, growth (risk and firm age) and a string.

Panel C reports the results for estimating equation (1). Recall the model is similar to Barth et al. (1999) in all respect except the more restricted definition of a string and sample. The coefficient estimate on the interaction term *EPS x STRING* is positively and highly significant (β_2 = 10.942, p-value = 0.000), suggesting that the price-earnings multiple is higher for firms reporting earnings strings than other firms with the same level of growth, risk, and book equity value. As for control variables, risk is negatively associated with price as expected. The findings also document that earnings and book value of equity have positive association with prices. The inverse relationship between price and an indicator variable for utilities and banks, indicates that highly restricted regulation possibly destroys firm value. However, the coefficient estimate on *EPS x LTGROWTH* is negatively significant, implying that higher past growth rate yields lower price because market may perceive that firms are more likely not to continue their growth. Taken together, the evidence from equation (1) confirms the findings of Barth et al. (1999) in that earnings of string companies attract higher valuation than earnings of non-string companies.

I next extend the primary model specification of Barth et al. (1999) to incorporate level variables, add the *AGE* variable, include industry fixed effects, and cluster regression residuals at the firm and year levels as expressed in equation (2). The results of estimating equation (2) are presented in column (2) of Panel C. I find that the main findings are as in column (1). Prices are

also higher for string companies regardless of the level of earnings, as is indicated by the positive and highly significant coefficient on *STRING*. In addition, the positive and significant coefficient estimate on *AGE* indicates that older firms are associated with higher prices. All control variables but growth are qualitatively unchanged. While the results suggest that growth is positively associated with prices indicated by the positive and significant coefficient on *LTGROWTH*, the parameter estimate on *EPS x LTGROWTH* indicates that the relation between growth interacted with earnings and prices becomes insignificant.

Having corrected for potential omitted-but-important variable problem, business cycle effects, time invariant effects, and dependence in errors, the main results of estimating equation (2) are consistent with those reported by Barth et al. (1999). The results confirm that the incrementally positive effect of a string of increasing earnings documented by Barth et al. (1999) is robust to the inclusion of the econometric treatment.

To investigate whether different lengths of earnings strings are associated with higher price-earnings multiples, I estimate regressions of price on a variety of lengths of earnings strings, i.e. 4, 8, 12, 16 quarters, and a set of covariates as indicated in equation (2). Panel D reveals that higher price associated earnings strings are only for firms reporting strings of 8, 12, 16 quarters with coefficients on *STRING* are increasingly larger at equal 1.660, 3.946, and 5.231, respectively. Higher price-earnings multiples are also associated with earnings strings at these specified lengths whereby the coefficients on *EPS x STRING* are 5.638, 4.712, and 4.881, respectively. This implies that earnings growth trajectory may induce investors to revise their expectations of firm value, or that markets may anticipate longer strings by observing certain lengths of strings, or both. They, therefore, reward firms for particular durations of earnings

strings with higher price.[23] However, I will examine the role of a length of an earnings string in explaining growth and risk shortly.

[Insert Table 5 Here]

6.2 Estimating Pricing Effects of Future Earnings Uncertainty

I now examine whether the second moment of future earnings command stock price. In Table 6 I report the estimation results for equation (3). Because of the data requirement for variability of realized future earnings, it yields the sample of 167,300 firm-quarter observations during year 1976 – 2009. The descriptive statistics in Panel A reveal that future earnings variability (*FEVAR*) has higher average value and greater variation relative to past earnings variability (*EVAR*), indicating that higher fundamentals-based risk relating to future economic benefits for sample firms. The correlations in Panel B display that Pearson (Spearman) correlations exhibit a marginally (moderately) positive association between future earnings variability and past earnings variability with the correlation coefficient of 0.088 (0.435); although future earnings variability and past earnings variability are identically constructed.

Panel C depicts an insight into how earnings risk depends on the specific duration of earnings strings. I use future/past earnings risk dichotomy in this analysis so as to assess the comparative effects of earnings patterns on both risk measures. Findings suggest that both risks in past and future earnings are more pronounced for non-string firms compared to firms reporting any other lengths of strings, consistent with the view that a firm with an unpredictable growth of earnings is embedded with higher fundamentals-based risk reflected in time-series variation in earnings.

[23] Further to prior research, I offer an explanation for market rewards to shorter strings of earnings increases that is investors probably view the continuation of string momentum as indicated in Table 3. String momentum conveys information that signals higher growth for shorter strings, lower risk for longer strings, and strong fundamentals of a firm.

This panel indicates that risk in past earnings monotonically decreases with an extension of a string of earnings increases; while, risk in future earnings almost monotonically reduce as an earnings string prolongs, suggesting that earnings risk is negatively associated with a series of consecutively earnings growth.

Panel D of Table 6 reports regression-based results for testing hypothesis I. I find that price-earnings multiples are significantly higher for string firms, after controlling for variability of future earnings. In fact, I reject hypothesis I because I find the positive coefficient estimate on *EPS x STRING* (β_8 = 5.231), significant at 1 percent level. The results, however, suggest that future earnings variability is capable of explaining a variation in price and a price-earnings multiple, incremental to past earnings variability. It can be thought that past earnings variability may be a reliable proxy for time-series earnings variation, but a poor measure for uncertainty in future earnings. In addition, the mean coefficient estimate on *EPS x STRING x FEVAR* is positive (β_{14}= 0.010), significant at 1 percent level, implying that string firms have smaller negative or even positive effects of risk in future earnings. Economically, the rewards for lower future earnings risk fully compensate the discount for risk in future earnings on price-earnings multiples. However, markets do not assign premiums for lower past earnings variability.

Accordingly, Inferences from the results reported in Panel D are consistent with a denomination explanation for the market rewards. That is, premiums are due at least in part to the smaller negative effects of risk in future earnings which, in turn, lead to higher price-earnings multiples for firms having certain strings of earnings. This reflects that a string of earnings increases contains risk-relevant information.

Panel E of Table 6 reports the effect of future earnings risk associated with various lengths of strings on price-earnings multiples. Specifically, I re-estimate equation (3) with specific string durations, i.e. 4, 8, 12, and 16 quarters. The results confirm that future earnings variability has a negative association with price and a price-earnings multiples. However, the findings reveal that the parameter estimates on *EPS x FEVAR x STRING* for twelve-quarter and sixteen-quarter strings are positive, suggesting that rewards associated with lower future earnings risk commence from a string of twelve quarters onward. In sum, the evidence agrees with my fundamental notion that consecutively earnings growth is rewarded for lower earnings uncertainty in future periods.

[Insert Table 6 Here]

6.3 The Role of Firm Fundamentals in Valuation

To investigate the valuation consequence of firm fundamentals, I examine the relation between a string of earnings increases and past fundamentals of a firm. Table 7 presents the results of estimating equation (4).

The main results, which are reported in Panel C, are consistent with hypothesis II. In particular, the average slopes on FSCORE are significantly positive (δ_1= 1.266 in column 1 and δ_1= 1.333 in column 2, significant at 1 percent level), suggesting that an earnings string is associated with past firm fundamentals. There are three empirical implications from Panel C being worth noting. First, the positive association between an earnings streak and past firm fundamentals mirrors the fact that earnings growth stems from strong economic grounds which lead to higher market price. Second, a sequence of earnings growth is in line with investors' higher earnings expectation, as indicated by the significantly negative coefficient on BMRATIO. Third,

consecutively earnings increases can be justified on investment reflected in the positive association between a string of positive earnings changes and capital expenditure.

To assess how firm fundamentals affect other lengths of strings, I regress an indicator variable for certain duration of earnings strings, i.e. 4, 8, 12, and 16 quarters on fundamental score and control variables. Similar to the main results, Panel D indicates a positive relation between an earnings string at particular lengths and firm fundamentals, after controlling other potential effects. To sum up, evidence presented in Table 7 suggests that a string of sequentially increasing earnings is created and lengthened by strong firm fundamentals.

[Insert Table 7 Here]

6.4 Shifting From Growth to Risk Signalling

Table 8 presents the results for estimating equation (5). For brevity, I only report coefficient estimates on a past increasing earning string of particular lengths (δ_1). The results suggest that, consistent with hypothesis III, the longer earnings strings are, the less likely firms sustain growth.

In fact, in column 4Q ahead, all lengths of past earnings strings are positively associated with the next four-quarter earnings strings. The magnitude of the longest strings or twenty-quarter strings is the largest (δ_1= 0.577) compared to the shortest strings or four-quarter strings which is the smallest (δ_1= 0.303), implying that growth persistence is more pronounced for longer past strings in the presence of shorter future periods. Similar results are obtained with 8Q and 12Q ahead are qualitatively similar to column 4Q. In contrast, in column 16Q and 20Q ahead, I find that a twenty-quarter earnings string is not significantly related to future earnings strings,

suggesting growth is reversal in the long run. These findings are consistent with the view that profitability is mean reverting process (Fama and French, 2000).

In conclusion, empirical evidence documents that longer earnings strings are weakly associated with future earnings growth than shorter earnings strings, as conjectured by hypothesis III. The results also indicate that the magnitude of string persistence is lower for longer past earnings string for future long-run horizon. This analysis suggests that growth is not long-lasting, implying that growth signalling explanation is only suitable for a shorter earnings string. Consequently, growth explanation seems less important because, in fact, strong firm fundamentals really drive a string of increasing earnings.

[Insert Table 8 Here]

I provide evidence that a longer earnings string is not a good signal for better future financial performance in the previous section. Instead, I argue that a long string of earnings increases reflects uncertainty of future earnings. Results for examining the association between a string of earnings and variability of future earnings, based on equation (6), are reported in Table 9.

The empirical results reveal that all lengths of past earnings string are significantly and negatively associated with variability of future earnings. The slopes on past earnings strings monotonically increase with the lengths of strings, suggesting that longer strings are better risk predictor than shorter strings. These findings can be interpreted that, as the duration of a string develops, the predictive ability of an earnings string shifts the direction from growth to risk. This

evidence is consistent with hypothesis IV, indicated by coefficients on longer earnings strings are more negative than those of shorter earnings strings.[24]

To sum up, the empirical results offer evidence that a shorter string of increasing earnings has equally predictive ability for future growth and future risk. As a string prolongs, its predictive ability transfers from growth to risk. In other words, a longer string of increasing earnings has more ability to explain risk in future earnings than growth in future earnings. This conclusion emphasizes the importance of risk signalling provided by an earnings string, and tampers a growth-related explanation.

[Insert Table 9 Here]

7. Additional Findings

7.1 Penalties for a String of Decreasing Earnings

Previous research on MBEB suggests the relation between market rewards and a break in earnings string, for example, Barth et al. (1999), Xie (2011), and Yao (2014). My first additional analysis complementing prior studies is to address how investors behave upon terminating of a sequentially increasing earnings string. Specifically, I investigate whether markets recall their rewards or impose penalties for firms that report earnings decreases after a series of twenty-quarter increasing earnings. In doing so, I extend equation (3) by adding indicator variables for firms with the number of consecutive quarters of decreasing earnings, i.e. 1 – 8 quarters, following at least twenty consecutive quarters of increasing earnings (*BSTRING2xQ*). To capture the effects on price-earnings multiples, all above indicator variables are interacted with earnings

[24] I re-estimate the regressions after the inclusion of past earnings variability as an additional control variable. I find that the main results are qualitatively unaffected. However, I document the significant association between past and future earnings variability.

per share. The results of this analysis – a penalty for a string of decreasing earnings – are provided in Table 10.

The findings are consistent with previous literature. In particular, investors do not penalize firms reporting a break of strings ($\beta_{2,21}$ = -0.954 and $\beta_{8,21}$ = -3.579, insignificant at 10 percent level); although investors assign premiums to string firms. The results also reveal that there are no penalties imposed on firms reporting decreasing earnings strings of a quarter up to 6 quarters in a row, preceded by strings of increasing earnings. However, if firms continue with another quarter of earnings decrease or seven quarters of a decreasing earnings string, they will be severely punished by significantly lower price-earnings multiples ($\beta_{8,27}$ = -21.111, significant at 5 percent level). Note that I find the coefficient estimate on an indicator variable of an eight-quarter string of earnings decreases is significantly positive.

In brief, this analysis yields evidence of the market behaviour and a string of decreasing earnings. I find corroborating evidence that rewards are revoked right after firms report earnings decreases after a string development. My additional results also document that the heavy penalties imposed by markets accrue to firms with lengthy decreasing earnings patterns, i.e. seven quarters in sequence. These suggest that investors revise their expectations when they observe firms underperform consistently for long.

[Insert Table 10 Here]

7.2 Market Rewards and Portfolio Analysis

Table 11 explores the effects of future earnings variability on prices from a portfolio perspective. I conduct this test because it is presumable that market rewards are conditioned to the levels of capital structure. The intuition is that a streak of reported earnings growth is more difficult to be

accomplished if firms are financially supported by debts as a primary source of funds and bear a large amount of interest expenses. I therefore conjecture that markets assign larger premiums to firms having higher debt-to-equity ratio. In empirical design, my five portfolios are constructed based on the quintile ranks of debt-to-equity ratio. I next re-estimate equation (3) for the partitioned sample of extreme quintiles, i.e. the highest and lowest debt-to-equity ratio.

In contrast to the main findings, the additional results of extreme ranks of debt-to-equity ratio highlight that there is no reward due solely to a string of consecutively earnings increases. I do, however, note significantly positive slopes on *EPS x FEVAR x STRING*, suggesting that rewards are assigned to string firms because of lower future earnings variability. In particular, premiums are more pronounced for the highest debt-to-equity portfolio nearly eight times than those of the lowest debt-to-equity portfolio. It is evident that firms being financed by a large amount of interest bearing debts are obtained higher prices as long as they are able to sustain a series of increasing earnings. The reason may be that investors view these firms can pass more difficult test for earnings growth. In addition, it seems possible that market rewards associated to future earnings risk subsume the traditional rewards to an earnings pattern for extreme ranks of debt-to-equity ratio.

[Insert Table 11 Here]

8. Summary and Concluding Remarks

This paper estimates the association between market rewards associated with a string of earnings increases, future earnings uncertainty, and firm fundamentals. Recent literature on meeting or beating earnings benchmarks suggest that markets assign premiums to firms with exceeding three types of earnings targets, i.e. profit, prior periods' earnings, and analyst forecasts,

motivating me to investigate the economic implications of an increasing earnings string. Therefore, I first articulate the empirical link between market rewards and future earnings uncertainty, second examine whether past fundamentals of a firm drive earnings momentum, and third explore the predictive ability of earnings series for future growth and future risk.

My results suggest that, at least in part, incremental pricing effects are due to lower fundamentals-based risk, i.e. variability of future earnings. When looking into primitives of firms, I find that firms announcing long earnings streaks are fundamentally stronger than other firms. Moreover, there is evidence that growth in earnings is less persistent in the long run, suggesting that a longer earnings pattern is not a good predictor for future profitability. In contrast, I show that the predictive ability of a string is better for future earnings risk when a string is sufficiently long.

In sum, all findings unfold the economic meaning of an earnings series. Other than growth opportunities, a string of consistently earnings growth contains information about fundamentals and uncertainty of subsequent earnings which, in turn, lead to higher market outcomes. My findings strongly document that risk-based explanation is empirically applied to the rewards for meeting or beating earnings thresholds, and support the notion that fundamental variables are really important. In addition, they confirm that accounting conveys risk relevant information.

References

Abarbanell, J. S., & Bushee, B. J. (1997). Fundamental analysis, future earnings, and stock prices. *Journal of Accounting Research 35*(1), 1-24.

Abarbanell, J. S., & Bushee, B. J. (1998). Abnormal returns to a fundamental analysis strategy. *Accounting Review 73*(1), 19-45.

Amir, E., Guan, Y., & Livne, G. (2007). The association of R&D and capital expenditures with subsequent earnings variability. *Journal of Business Finance & Accounting*, *34*(1-2), 222-246.

An, H., Lee, Y. W., & Zhang, T. (2014). Do corporations manage earnings to meet/exceed analyst forecasts? Evidence from pension plan assumption changes. *Review of Accounting Studies*, *19*(2), 698-735.

Barth, M. E., Elliott, J. A., & Finn, M. W. (1999). Market rewards associated with patterns of increasing earnings. *Journal of Accounting Research*, *37*(2), 387-413.

Bartov, E., Givoly, D., & Hayn, C. (2002). The rewards to meeting or beating earnings expectations. *Journal of Accounting and Economics*, *33*(2), 173-204.

Beaver, W. H., McNichols, M. F., & Nelson, K. K. (2007). An alternative interpretation of the discontinuity in earnings distributions. *Review of Accounting Studies*, *12*(4), 525-556.

Brown, L. D., & Caylor, M. L. (2005). A temporal analysis of quarterly earnings thresholds: Propensities and valuation consequences. *The Accounting Review*, *80*(2), 423-440.

Brown, S., Hillegeist, S. A., & Lo, K. (2009). The effect of earnings surprises on information asymmetry. *Journal of Accounting and Economics*, *47*(3), 208-225.

Burgstahler, D., & Dichev, I. (1997). Earnings management to avoid earnings decreases and losses. *Journal of accounting and economics*, *24*(1), 99-126.

Burgstahler, D., & Eames, M. (2006). Management of earnings and analysts' forecasts to achieve zero and small positive earnings surprises. *Journal of Business Finance & Accounting, 33*(5-6), 633-652.

Chen, C. (2013). Time-Varying Earnings Persistence and the Delayed Stock Return Reaction to Earnings Announcements. *Contemporary Accounting Research, 30*(2), 549–578.

Collins, D. W., & Kothari, S. P. (1989). An analysis of intertemporal and cross-sectional determinants of earnings response coefficients. *Journal of accounting and economics, 11*(2), 143-181.

Collins, D. W., Kothari, S. P., Shanken, J., & Sloan, R. G. (1994). Lack of timeliness and noise as explanations for the low contemporaneuos return-earnings association. *Journal of Accounting and Economics, 18*(3), 289-324.

DeAngelo, H., DeAngelo, L., & Skinner, D. J. (1996). Reversal of fortune dividend signaling and the disappearance of sustained earnings growth. *Journal of financial economics, 40*(3), 341-371.

Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics, 50*(2), 344-401.

Degeorge, F., Patel, J., & Zeckhauser, R. (1999). Earnings management to exceed thresholds. *The Journal of Business, 72*(1), 1-33.

Dichev, I. D., Graham, J. R., Harvey, C. R., & Rajgopal, S. (2013). Earnings quality: Evidence from the field. *Journal of Accounting and Economics, 56*(2), 1-33.

Dichev, I. D., Graham, J. R., Harvey, C. R., & Rajgopal, S. (2014). The misrepresentation of earnings (Goizueta Business School and Fuqua School of Business Working Paper). Retrieved from http://papers.ssrn.com/sol3/Papers.cfm?abstract_id=2376408

Dichev, I. D., & Tang, V. W. (2009). Earnings volatility and earnings predictability. *Journal of accounting and Economics*, *47*(1), 160-181.

Donelson, D. C., & Resutek, R. J. (2015). The predictive qualities of earnings volatility and earnings uncertainty. *Review of Accounting Studies 20*(1), 470-500.

Durnev, A., Morck, R., Yeung, B., & Zarowin, P. (2003). Does greater firm-specific return variation mean more or less informed stock pricing?. *Journal of Accounting Research*, *41*(5), 797-836.

Durtschi, C., & Easton, P. (2005). Earnings management? The shapes of the frequency distributions of earnings metrics are not evidence ipso facto. *Journal of Accounting Research*, *43*(4), 557-592.

Fama, E. F., & French, K. R. (1995). Size and book-to-market factors in earnings and returns. *The Journal of Finance*, *50*(1), 131-155.

Fama, E. F., & French, K. R. (2000). Forecasting Profitability and Earnings*. *The Journal of Business*, *73*(2), 161-175.

Fama, E. F., & French, K. R. (2006). Profitability, investment and average returns. *Journal of Financial Economics*, *82*(3), 491-518.

Francis, J., LaFond, R., Olsson, P., & Schipper, K. (2003). Earnings quality and the pricing effects of earnings patterns (The Fuqua School of Business Working Paper). Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=414142

Gebhardt, W. R., Lee, C., & Swaminathan, B. (2001). Toward an implied cost of capital. *Journal of accounting research*, *39*(1), 135-176.

Gode, D., & Mohanram, P. (2003). Inferring the cost of capital using the Ohlson–Juettner model. *Review of accounting studies*, *8*(4), 399-431.

Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of accounting and economics*, *40*(1), 3-73.

Hayn, C. (1995). The information content of losses. *Journal of accounting and economics*, *20*(2), 125-153.

Jiang, J. (2008). Beating earnings benchmarks and the cost of debt. *The Accounting Review*, *83*(2), 377-416.

Kasznik, R., & McNichols, M. F. (2002). Does meeting earnings expectations matter? Evidence from analyst forecast revisions and share prices. *Journal of Accounting Research*, *40*(3), 727-759.

Ke, B. (2001). Why do CEOs of publicly traded firms prefer reporting small increases in earnings and long duration of consecutive earnings increases? (Smeal College of Business Administration Working Paper). Retrieved from http://papers.ssrn.com /sol3/papers.cfm?abstract_id=250308

Ke, B. (2004). Do equity-based incentives induce CEOs to manage earnings to report strings of consecutive earnings increases? (Smeal College of Business Administration Working Paper). Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=446540

Kinney, W., Burgstahler, D., & Martin, R. (2002). Earnings surprise "materiality" as measured by stock returns. *Journal of Accounting Research*, *40*(5), 1297-1329.

Konstantinidi, T., & Pope, P. F. (2014). Forecasting risk in earnings (Cass Business School and London School of Economics Working Paper). Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1903378

Koonce, L., & Lipe, M. G. (2010). Earnings trend and performance relative to benchmarks: How consistency influences their joint use. *Journal of Accounting Research*, *48*(4), 859-884.

Kothari, S. P., Laguerre, T. E., & Leone, A. J. (2002). Capitalization versus expensing: Evidence on the uncertainty of future earnings from capital expenditures versus R&D outlays. *Review of accounting Studies*, *7*(4), 355-382.

Kothari, S. P., & Sloan, R. G. (1992). Information in prices about future earnings: Implications for earnings response coefficients. *Journal of Accounting and Economics*, *15*(2), 143-171.

Lang, L., Ofek, E., & Stulz, R. (1996). Leverage, investment, and firm growth. *Journal of financial Economics*, *40*(1), 3-29.

Lev, B., & Thiagarajan, S. R. (1993). Fundamental information analysis. *Journal of Accounting research 31*(2), 190-215.

Lopez, T. J., & Rees, L. (2002). The effect of beating and missing analysts' forecasts on the information content of unexpected earnings. *Journal of Accounting, Auditing & Finance*, *17*(2), 155-184.

Liu, S. P. (2013). *Market Rewards to Patterns of Increasing Earnings: Effects of Cash Flow Patterns, Accruals Manipulation, Real Activities Manipulation and Conservative Accounting* (Unpublished doctoral dissertation). Universidad Carlos III de Madrid, Madrid.

McInnis, J. (2010). Earnings smoothness, average returns, and implied cost of equity capital. *The Accounting Review*, *85*(1), 315-341.

Myers, J. N., Myers, L. A., & Skinner, D. J. (2007). Earnings momentum and earnings management. *Journal of Accounting, Auditing & Finance*, *22*(2), 249-284.

Nekrasov, A., & Shroff, P. K. (2009). Fundamentals-based risk measurement in valuation. *The Accounting Review*, *84*(6), 1983-2011.

Nissim, D., & Penman, S. H. (2001). Ratio analysis and equity valuation: From research to practice. *Review of accounting studies*, *6*(1), 109-154.

Ohlson, J. A. (1995). Earnings, book values, and dividends in equity valuation*. *Contemporary accounting research*, *11*(2), 661-687.

Penman, S. H., & Yehuda, N. (2015). A matter of principle: accounting reports convey both cash-flow news and discount-rate news (Columbia Business School Working Paper). Retrieved from http://papers.ssrn.com/sol3/Papers.cfm?abstract_id=2406389

Petersen, M. A. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *Review of financial studies*, *22*(1), 435-480.

Shanthikumar, D. M. (2012). Consecutive earnings surprises: Small and large trader reactions. *The Accounting Review*, *87*(5), 1709-1736.

Skinner, D. J., & Sloan, R. G. (2002). Earnings surprises, growth expectations, and stock returns or don't let an earnings torpedo sink your portfolio. *Review of accounting studies*, *7*(2-3), 289-312.

Tomy, R. E. (2012). Earnings Persistence over the Business Cycle (Stanford University Working Paper). Retrieved from http://www.gsb.stanford.edu/sites/default/files/documents/acct_10_12_Tomy.pdf

Xie, Y. (2011). The market effects of breaking a string of meeting or beating analysts' expectations: downward revision of future cash flows or increase in cost of equity capital?. *Journal of Business Finance & Accounting*, *38*(1-2), 95-118.

Yao, L. (2014). Earnings Persistence, Fundamentals, and Anticipation of Breaking Earnings (Strings John Molson School of Business Working Paper). Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2374695

APPENDIX A

Theoretical Development of a Relation between Earnings Persistence and a String of Earnings Increases

Standard earnings persistence model:

$$EARN_{t+1} = \alpha_1 + \beta EARN_t \tag{1}$$

Where EARN is earnings and $\beta > 0$.

Earnings string model:

$$\mathrm{EARN_{t+1}} - \mathrm{EARN_t} = \alpha_2 + \delta(\mathrm{EARN_t} - \mathrm{EARN_{t-1}}) \tag{2}$$

$$\mathrm{EARN_{t+1}} = \alpha_2 + (\delta + 1)\mathrm{EARN_t} - \delta\mathrm{EARN_{t-1}} \tag{3}$$

Where $\delta > 1$ and $\mathrm{EARN_{t+1}} - \mathrm{EARN_t} > 0$ for every t and $t + 1$.

Since (1) = (3)

$$\mathrm{EARN_{t+1}} = \alpha_2 + (\delta + 1)\mathrm{EARN_t} - \delta\mathrm{EARN_{t-1}}$$

$$= \alpha_1 + \beta\mathrm{EARN_t} \tag{4}$$

Hence,

$$\beta = \delta + 1 \tag{5}$$

and

$$\delta = \beta - 1 \tag{6}$$

and

$$\alpha_1 = \alpha_2 - \delta\mathrm{EARN_{t-1}}. \tag{7}$$

Requiring $\mathrm{EARN_{t+1}} - \mathrm{EARN_t} > 0$ yields from (1):

$$\mathrm{EARN_{t+1}} - \mathrm{EARN_t} = \alpha_1 + \beta\mathrm{EARN_t} - \mathrm{EARN_t} > 0$$

$$\Delta\mathrm{EARN_{t+1}}/\mathrm{EARN_t} = \alpha_1/\mathrm{EARN_t} + \beta - 1 \quad > 0 \tag{8}$$

$$\Delta\mathrm{EARN_{t+1}}/\mathrm{EARN_t} = \alpha_1/\mathrm{EARN_t} + \delta \quad > 0 \tag{9}$$

Under the circumstance of a profit-making firm i.e. $EARN_t > 0$, a mathematical relation between earnings persistence and an earnings string as indicated in equation (8) and (9) suggests that a string of growing reported earnings is a function of earnings persistence, a time trend in earnings, and a constant. In other words, an increasing earnings string is conditioned on both a time trend in earnings and a string parameter itself.

More specifically, high persistence of earnings ($\beta > 1$) is necessary for an earnings string in the presence of a weak time trend in earnings, according to equation (6). In contrast, to the extent a time trend in earnings is sufficiently strong ($\alpha_1/EARN_t > 1$), an earnings string can exist in the presence of low persistence of earnings ($0 < \beta < 1$). It is worth noting that a string parameter (δ) that is a rate of growth persistence is simply a persistent parameter (β) minus one.

In conclusion, this theoretical development implies that earnings persistence mathematically differs from a string of earnings increases and that earnings persistence is required for a string conditional on the degree of a time trend in earnings.

APPENDIX B
Definitions of Variables

Variable	Definition
PRICE	Price per share at the end of fiscal quarter.
EPS	Earnings per share before extraordinary items and discontinued operations at the end of fiscal quarter.
STRING	An indicator variable for firms with consecutively increasing earnings, defined as a firm reporting at least twenty consecutive quarters of increases in seasonally adjusted earnings. An increase is defined compare to EPS from the same quarter of the prior year.
PSTRING	An indicator variable for firms with consecutively previously increasing earnings, i.e. past 4, 8, 12, 16, and 20 quarters. It is defined as a firm reporting positive increases in seasonally adjusted earnings in the prior periods. An increase is defined compare to EPS from the same quarter of the prior year.
FSTRING	An indicator variable for firms with consecutively increasing earnings over the next periods, i.e. 4, 8, 12, 16, and 20 quarters ahead. It is defined as a firm reporting positive increases in seasonally adjusted earnings in the future periods. An increase is defined compare to EPS from the same quarter of the prior year.
BSTRING2xQ	An indicator variable for firms with 2x - 20 consecutive quarters of decreasing earnings following at least twenty consecutive quarters of increasing earnings in seasonally adjusted earnings (breaking a string). Both a decrease and an increase are defined compare to EPS from the same quarter of the prior year.
U&B	An indicator variable for firms in banking and utility industries.
ASSET	Total assets at the end of fiscal quarter divided by lagged market value of equity.
LIABILITY	Total liabilities at the end of fiscal quarter divided by lagged market value of equity.
BVE	Book value of equity per share at the end of fiscal quarter.
STGROWTH	Four-quarter (one-year) growth rate of book value of equity.
LTGROWTH	Twenty-quarter (five-year) compound growth rate of book value of equity.
EVAR	Variance of the past twenty quarters' (five years) percentage changes in earnings per share.
FEVAR	Variance of the future twenty quarters' (five years) percentage changes in earnings per share.
DE	Debt-to-equity ratio, calculated as long-term debt plus debt in current liabilities divided by book value of equity at the end of fiscal quarter.
FSCORE	An average standardized aggregate fundamental score. *FSCORE* is averaged over twenty quarters from quarter t-20 to t-1. This methodology is developed by Lev and Thiagarajan (1993).
BMRATIO	Book value of equity per share at fiscal quarter-end divided by share price at the end of fiscal quarter.

Variable	Definition
RD	Quarterly research and development expense divided by lagged market value of equity.
CAPEX	Quarterly capital expenditure divided by lagged market value of equity.
SALES	Sales revenue at the end of fiscal quarter divided by lagged market value of equity.
SALESGROWTH	Four-quarter (One-year) growth rate of sales revenue.
SALESVAR	Variance of the past four quarters (one year's) percentage changes in sales revenue.
AGE	Age of a firm calculated as the difference between current year and year when it was first collected by COMPUSTAT.

TABLE 1
Sample Composition

Panel A: Sample Selection

Data	Firm-Quarter Observations	Firms
Data set from matched Compustat/CRSP database for the period 1971 – 2014	975,526	23,393
Less missing CUSIP and duplicate observations	(34,410)	(825)
Quarterly Data without missing CUSIP and duplicates for the period 1971 – 2014	941,116	22,568
Less observations without five years of earnings history	(501,011)	(10,865)
Sample with at least five years of earnings history for the period 1976 – 2014	**440,105**	**11,703**
Less observations without five years of future earnings	(224,573)	(5,420)
Final Sample with required earnings data for the period 1976 – 2009	215,532	6,283

Panel B: Industry Composition

Industry	Firm-Quarter			% of Observations
	String[a]	Non-String	Total	
Food	68	13,160	13,228	3.01%
Mining and Minerals	0	6,013	6,013	1.37%
Oil and Petroleum Products	13	19,196	19,209	4.36%
Textiles, Apparel, and Footware	19	10,567	10,586	2.41%
Consumer Durables	3	12,574	12,577	2.86%
Chemicals	47	8,912	8,959	2.04%
Drugs, Soap, Perfumes, Tobacco	134	15,161	15,295	3.48%
Construction and Construction Materials	79	17,708	17,787	4.04%
Steel Works	0	7,242	7,242	1.65%
Fabricated Products	32	4,375	4,407	1.00%
Machinery and Business Equipment	217	60,741	60,958	13.85%
Automobiles	34	6,908	6,942	1.58%
Transportation	16	15,893	15,909	3.61%
Utilities	9	21,146	21,155	4.81%
Retail Stores	118	25,068	25,186	5.72%
Banks, Insurance Companies, and Other Financials	288	74,428	74,716	16.98%
Other	509	119,427	119,936	27.25%
Total	**1,586**	**438,519**	**440,105**	**100.00%**

[a] *String means a number of firms with an earnings string.*

Panel C: Year Composition

Year	Firm-Quarter			% of Observations
	String[a]	Non-String	Total	
1976	24	1,737	1,761	0.40%
1977	106	7,316	7,422	1.69%
1978	123	7,979	8,102	1.84%
1979	132	8,728	8,860	2.01%
1980	165	8,499	8,664	1.97%
1981	124	8,351	8,475	1.93%
1982	90	8,046	8,136	1.85%
1983	37	7,890	7,927	1.80%
1984	22	7,602	7,624	1.73%
1985	19	7,298	7,317	1.66%
1986	16	7,630	7,646	1.74%
1987	12	9,865	9,877	2.24%
1988	12	10,809	10,821	2.46%
1989	18	11,213	11,231	2.55%
1990	19	11,504	11,523	2.62%
1991	19	11,634	11,653	2.65%
1992	30	12,350	12,380	2.81%
1993	21	13,177	13,198	3.00%
1994	25	13,330	13,355	3.03%
1995	28	13,216	13,244	3.01%
1996	36	13,097	13,133	2.98%
1997	29	13,293	13,322	3.03%
1998	32	13,286	13,318	3.03%
1999	27	13,832	13,859	3.15%
2000	44	14,395	14,439	3.28%
2001	49	14,076	14,125	3.21%
2002	41	14,472	14,513	3.30%
2003	16	14,570	14,586	3.31%
2004	20	14,754	14,774	3.36%
2005	17	14,958	14,975	3.40%
2006	51	15,105	15,156	3.44%
2007	27	14,423	14,450	3.28%
2008	38	13,711	13,749	3.12%

Panel C: Year Composition (Continued)

Year	Firm-Quarter			% of Observations
	String[a]	Non-String	Total	
2009	14	13,295	13,309	3.02%
2010[b]	19	13,242	13,261	3.01%
2011[b]	29	13,142	13,171	2.99%
2012[b]	22	13,181	13,203	3.00%
2013[b]	31	12,919	12,950	2.94%
2014[b]	2	594	596	0.14%
Total	**1,586**	**438,519**	**440,105**	**100.00%**
Average Per Year	41	11,244	11,285	

[a] *String means a number of firms with an earnings string.*
[b] *Data for year 2010 to year 2014 are used for calculating future earnings variability.*

Note:

This table reports sample composition.

Panel A presents sample selection process.

Panel B provides the number of observations based on the Fama and French 17 industry classifications.

Panel C provides the number of observations based on fiscal year. An earnings string is defined as a firm that reports at least twenty consecutive quarters of increases in seasonally adjusted earnings per share (EPS). An EPS increase is defined compared with earnings per share (EPS) from the same quarter of the prior year.

TABLE 2
The Distribution of Observations
by Lengths of an (Past) Increasing Earnings String

Length of Earnings Strings	Firm-Quarter Observations	% of Observations
No String	353,951	80.42%
4 quarters (12 months)	61,253	13.92%
8 quarters (24 months)	15,916	3.62%
12 quarters (36 months)	5,409	1.23%
16 quarters (48 months)	1,990	0.45%
Total for strings with 4 - 16 quarters	**84,568**	**19.22%**
20 quarters (60 months)	245	0.06%
24 quarters (72 months)	706	0.16%
28 quarters (84 months)	326	0.07%
32 quarters (96 months)	142	0.03%
36 quarters (108 months)	63	0.01%
40 quarters or more (120 months)	104	0.02%
Total for strings with at least 20 quarters	**1,586**	**0.36%**
Total	**440,105**	**100.00%**

Note:

This table analyses the sample distribution based on lengths of a string of earnings increases. An earnings string is defined as a firm that reports at least twenty consecutive quarters of increases in seasonally adjusted earnings per share (EPS). An EPS increase is defined compared with earnings per share (EPS) from the same quarter of the prior year.

TABLE 3
Conditional Probability of String Momentum for the Next Four Quarters by A Previously Earnings String

Length of Earnings Strings	Conditional Probability of Future Four-Quarter Earnings Strings	
	No String	4 Quarters Ahead
No String	0.8042	0.1958
4 quarters (12 months)	0.7111	0.2889
8 quarters (24 months)	0.6392	0.3608
12 quarters (36 months)	0.6020	0.3980
16 quarters (48 months)	0.5565	0.4435
20 quarters (60 months)	0.4877	0.5123
24 quarters (72 months)	0.4530	0.5470
28 quarters (84 months)	0.4682	0.5318
32 quarters (96 months)	0.4324	0.5676
36 quarters (108 months)	0.3333	0.6667
40 quarters (120 months)	0.1379	0.8621

Note:

This table reports the probability of string development for the next four quarters conditional on lengths of a previous earnings string. An earnings string is defined as a firm that reports at least twenty consecutive quarters of increases in seasonally adjusted earnings per share (EPS). An EPS increase is defined compared with earnings per share (EPS) from the same quarter of the prior year.

TABLE 4
Descriptive Statistics

Variable	Observ.	Mean	Median	S.D.	Max	Min	Differences in Means			Differences in Median		
							String[a]	Non-String	p-value	String[a]	Non-String	p-value
PRICE	439,018	20.709	15.670	18.875	87.920	0.187	44.644***	20.623	0.000	39.085***	15.625	0.000
EPS	440,105	0.281	0.210	0.615	2.290	-2.060	1.043***	0.278	0.000	0.890***	0.210	0.000
STRING	440,105	0.004	0.000	0.060	1.000	0.000	1.000	0.000	N/A	1.000	0.000	N/A
ASSET	436,334	57.833	10.987	161.516	1,398.8	0.148	30.149***	57.934	0.000	10.846***	10.988	0.003
LIABILITY	435,623	42.018	5.345	131.422	1,127.1	0.021	21.474***	42.092	0.000	5.019***	5.346	0.001
BVE	433,143	12.538	9.441	11.721	56.129	-1.805	21.799***	12.505	0.000	19.316***	9.407	0.000
STGROWTH	429,987	0.041	0.041	0.511	3.618	-1.709	0.175***	0.041	0.000	0.140***	0.041	0.000
LTGROWTH	411,407	0.021	0.019	0.151	0.639	-0.403	0.154***	0.020	0.000	0.132***	0.019	0.000
EVAR	364,106	33.451	2.362	120.467	939.649	0.013	0.719***	33.593	0.000	0.014***	2.395	0.000
FEVAR	215,532	34.329	2.336	122.906	940.049	0.013	6.277***	34.489	0.000	0.096***	2.376	0.000
DE	404,534	0.901	0.480	1.829	12.423	-4.766	0.741***	0.901	0.001	0.361***	0.480	0.000
FSCORE	439,964	0.500	0.498	0.068	0.658	0.000	0.511***	0.500	0.000	0.510***	0.498	0.000
BMRATIO	432,076	0.789	0.632	0.680	4.116	-0.525	0.547***	0.790	0.000	0.470***	0.633	0.000
RD	136,839	0.194	0.024	0.603	4.964	0.000	0.034***	0.195	0.000	0.009***	0.024	0.000
CAPEX	421,885	0.033	0.002	1.135	6.588	-7.046	0.161***	0.032	0.000	0.032***	0.002	0.000
SALES	437,598	10.814	2.013	31.417	283.206	0.000	7.319***	10.826	0.000	2.435**	2.012	0.041
SALESGROWTH	435,705	0.126	0.070	0.471	4.100	-0.867	0.170***	0.126	0.000	0.135***	0.070	0.000
SALESVAR	436,227	367.170	0.616	2,390.7	24,170.1	0.000	96.652***	368.155	0.000	0.532***	0.617	0.000
AGE	438,612	18.186	15.000	10.723	49.000	5.000	17.584**	18.188	0.025	15.000	15.000	0.982

[a] *String means a firm with an earnings string.*

Note:

*This table reports the descriptive statistics of all accounting and pricing variables for the entire sample and two subsamples, namely string firms and non-string firms. Moreover, it provides tests for differences in means and medians across two subsamples. A string firm is defined as a firm that reports at least twenty consecutive quarters of increases in seasonally adjusted earnings per share (EPS). An EPS increase is defined compared with earnings per share (EPS) from the same quarter of the prior year. In addition, *, **, *** indicate statistical significance of t-tests and Wilcoxon rank sum tests for differences in means or medians, at the 10 percent, 5 percent, and 1 percent level, respectively. All variables are defined in Appendix B*

TABLE 5
A Price Association with an Increasing Earnings String
- A Replication and Modifications of Barth et al. (1999)

Panel A: Descriptive Statistics

Variable	Observ.	Mean	Median	S.D.	Max	Min
PRICE	313,594	23.355	18.813	19.045	87.92	0.187
EPS	313,594	0.340	0.290	0.625	2.290	-2.060
STRING	313,594	0.004	0.000	0.064	1.000	0.000
U&B	313,594	0.157	0.000	0.364	1.000	0.000
LTGROWTH	313,594	0.016	0.020	0.136	0.639	-0.403
EVAR	313,594	32.205	2.301	117.825	939.649	0.013
DE	313,594	0.993	0.528	1.691	12.423	-4.766
BVE	313,594	14.211	11.214	11.745	56.129	-1.805
AGE	313,594	19.202	16.000	11.158	49.000	5.000

Panel B: Correlation Metrix - Pearson (Spearman) Correlations Below (Above) the Diagonal

Variable	*PRICE*	*EPS*	*STRING*	*U&B*	*LT GROWTH*	*EVAR*	*DE*	*BVE*	*AGE*
PRICE		0.674***	0.060***	0.119***	0.207***	-0.354***	0.029***	0.670***	0.329***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EPS	0.541***		0.072***	0.166***	0.201***	-0.364***	0.057***	0.600***	0.225***
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
STRING	0.076***	0.075***		-0.006***	0.075***	-0.090***	-0.011***	0.046***	-0.006***
	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
U&B	0.104***	0.154***	-0.005***		-0.056***	-0.202***	0.387***	0.287***	0.035***
	(0.000)	(0.000)	(0.002)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LTGROWTH	0.149***	0.134***	0.053***	-0.044***		-0.121***	-0.155***	0.262***	-0.095***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
EVAR	-0.085***	-0.115***	-0.018***	-0.052***	-0.076***		0.037***	-0.247***	-0.066***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
DE	0.001	-0.004***	-0.005***	0.145***	-0.225***	0.037***		0.168***	0.068***
	(0.384)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
BVE	0.639***	0.542***	0.047***	0.270***	0.167***	-0.048***	0.044***		0.304***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
AGE	0.335***	0.215***	-0.003**	0.032***	-0.072***	-0.009***	0.013***	0.340***	
	(0.000)	(0.000)	(0.025)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Panel C: Empirical Tests for Market Rewards

Variable	Result	
	(1)	(2)
INTERCEPT	-0.446 (0.141)	-0.377 (0.700)
EPS	23.780*** (0.000)	22.439*** (0.000)
STRING		4.988*** (0.010)
U&B		-1.705* (0.065)
LTGROWTH		3.475** (0.013)
EVAR		-0.005*** (0.000)
DE		0.256*** (0.005)
EPS x STRING	10.942*** (0.000)	6.372*** (0.000)
EPS x U&B	-6.872*** (0.000)	-3.698*** (0.000)
EPS x LTGROWTH	-2.325*** (0.000)	-1.742 (0.194)
EPS x EVAR	-0.013*** (0.000)	-0.011*** (0.000)
EPS x DE	-0.561*** (0.000)	-0.556*** (0.000)
BVE	0.824*** (0.000)	0.810*** (0.000)
AGE		0.187*** (0.000)
Adjusted R^2	0.550	0.576
Observ.	313,594	313,594
String Observ.	1,270	1,270
Year Fixed Effects	✓	✓
Industry Fixed Effects	×	✓
Clustered by Firms	×	✓
Clustered by Years	×	✓

Panel D: Empirical Tests for Market Rewards to Specific Lengths of Strings (Less Than 20 Quarters)

Variable	Lengths of A String			
	4 Quarters	**8 Quarters**	**12 Quarters**	**16 Quarters**
Dependent Variable: *PRICE*				
INTERCEPT	-0.306 (0.751)	-0.484 (0.614)	-0.515 (0.595)	-0.438 (0.653)
EPS	21.843*** (0.000)	22.184*** (0.000)	22.394*** (0.000)	22.437*** (0.000)
STRING	-0.369 (0.116)	1.660*** (0.000)	3.946*** (0.000)	5.231*** (0.010)
U&B	-1.822** (0.049)	-1.859** (0.044)	-1.780* (0.054)	-1.723* (0.062)
LTGROWTH	3.343** (0.017)	3.196** (0.022)	3.241** (0.021)	3.345** (0.017)
EVAR	-0.006*** (0.000)	-0.006*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)
DE	0.229*** (0.010)	0.249*** (0.005)	0.255*** (0.005)	0.255*** (0.005)
EPS x STRING	5.871*** (0.000)	5.638*** (0.000)	4.712*** (0.000)	4.881*** (0.000)
EPS x U&B	-3.664*** (0.000)	-3.753*** (0.000)	-3.735*** (0.000)	-3.701*** (0.000)
EPS x LTGROWTH	-3.398** (0.013)	-2.949** (0.028)	-2.430* (0.070)	-2.004 (0.137)
EPS x EVAR	-0.011*** (0.000)	-0.011*** (0.000)	-0.011*** (0.000)	-0.011*** (0.000)
EPS x DE	-0.547*** (0.000)	-0.552*** (0.000)	-0.553*** (0.000)	-0.554*** (0.000)
BVE	0.800*** (0.000)	0.810*** (0.000)	0.812*** (0.000)	0.811*** (0.000)
AGE	0.185*** (0.000)	0.186*** (0.000)	0.186*** (0.000)	0.187*** (0.000)
Adjusted R^2	0.583	0.581	0.578	0.577
Observ.	313,594	313,594	313,594	313,594
String Observ.	63,932	19,263	7,059	2,855

Note:

This table mainly reports the empirical results from the replication and modifications of Barth et al. (1999) in order to corroborate the presence of a market reward measured by an incremental price-earnings multiple. The sample comprises of 313,594 observations covering the period of 1976 – 2014.

Panel A provides descriptive statistics of the sample used in the regressions.

Panel B offers correlation coefficients and p-value indicated in parentheses.

Panel C exhibits the results in which column (1) is obtained from an OLS regression according to equation (1), and colume (2) obtained from OLS regressions according to equation (2) as follows.

Equation (1):

$$PRICE_{it} = \beta_0 + \beta_1 EPS_{it} + \beta_2 (EPS_{it} \times STRING_{it}) + \beta_3 (EPS_{it} \times U\&B_{it}) + \beta_4 (EPS_{it} \times LTGROWTH_{it}) + \beta_5 (EPS_{it} \times EVAR_{it}) + \beta_6 (EPS_{it} \times DE_{it}) + \beta_7 BVE_{it} + \varepsilon_{it}$$

Equation (2):

$$PRICE_{it} = \beta_0 + \beta_1 EPS_{it} + \beta_2 STRING_{it} + \beta_3 U\&B_{it} + \beta_4 LTGROWTH_{it} + \beta_5 EVAR_{it} + \beta_6 DE_{it} + \beta_7 (EPS_{it} \times STRING_{it}) + \beta_8 (EPS_{it} \times U\&B_{it}) + \beta_9 (EPS_{it} \times LTGROWTH_{it}) + \beta_{10} (EPS_{it} \times EVAR_{it}) + \beta_{11} (EPS_{it} \times DE_{it}) + \beta_{12} AGE_{it} + \beta_{13} BVE_{it} + \varepsilon_{it}$$

The number of all observations, the number of string firms, and adjusted R^2 are also reported. Moreover, the panel indicates the inclusion of firm fixed effects, industry fixed effects, clustered standard errors by firm and year.

Panel D reports results of tests for market rewards associated with a variety of lengths of strings of earnings increases. For brevity, only regressions including firm fixed effects, industry fixed effects, clustered standard errors by firm and year are reported. The number of all observations, the number of string firms, and adjusted R^2 are also presented.

*P-values are reported in parentheses. *, **, *** indicate statistical significance of parameter estimates, at the 10 percent, 5 percent, and 1 percent level, respectively. All variables are defined in Appendix B.*

TABLE 6
An Association between Price and an Increasing Earnings String Controlling for Variability in Future Earnings

Panel A: Descriptive Statistics

Variable	Observ.	Mean	Median	S.D.	Max	Min
PRICE	167,300	26.333	22.625	18.519	87.92	0.187
EPS	167,300	0.441	0.380	0.609	2.290	-2.060
STRING	167,300	0.006	0.000	0.077	1.000	0.000
U&B	167,300	0.172	0.000	0.377	1.000	0.000
LTGROWTH	167,300	0.019	0.019	0.121	0.639	-0.403
EVAR	167,300	23.817	1.192	99.143	939.649	0.013
FEVAR	167,300	32.703	1.932	120.740	940.049	0.013
DE	167,300	0.932	0.541	1.482	12.423	-4.766
BVE	167,300	15.870	12.837	11.868	56.129	-1.805
AGE	167,300	19.833	17.000	11.065	49.000	5.000

Panel B: Correlation Metrix - Pearson (Spearman) Correlations Below (Above) the Diagonal

Variable	*PRICE*	*EPS*	*STRING*	*U&B*	*LT GROWTH*	*EVAR*	*FEVAR*	*DE*	*BVE*	*AGE*
PRICE		0.635***	0.062***	0.091***	0.096***	-0.307***	-0.258***	0.016***	0.577***	0.322***
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EPS	0.541***		0.079***	0.174***	0.132***	-0.324***	-0.338***	0.080***	0.595***	0.200***
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
STRING	0.076***	0.075***		-0.011***	0.096***	-0.108***	-0.076***	-0.018***	0.048***	-0.013***
	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
U&B	0.104***	0.154***	-0.005***		-0.094***	-0.231***	-0.169***	0.442***	0.289***	0.036***
	(0.000)	(0.000)	(0.002)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LTGROWTH	0.149***	0.134***	0.053***	-0.044***		-0.053***	0.007***	-0.144***	0.184***	-0.161***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.008)	(0.000)	(0.000)	(0.000)
EVAR	-0.085***	-0.115***	-0.018***	-0.052***	-0.076***		0.435***	0.030***	-0.200***	-0.038***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
FEVAR	-0.052***	-0.090***	-0.017***	-0.052***	0.020***	0.088***		0.070***	-0.094***	-0.036***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
DE	0.001	-0.004***	-0.005***	0.145***	-0.225***	0.037***	0.050***		0.207***	0.085***
	(0.384)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
BVE	0.639***	0.542***	0.047***	0.270***	0.167***	-0.048***	0.002	0.044***		0.287***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.148)	(0.000)		(0.000)
AGE	0.335***	0.215***	-0.003**	0.032***	-0.072***	-0.009***	-0.009***	0.013***	0.340***	
	(0.000)	(0.000)	(0.025)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	

Panel C: Lengths of (Past) Earnings Strings and Variability in Past and Future Earnings

Length of Earnings Strings	*EVAR*	*FEVAR*
Non String	33.451	34.329
1 Quarter	33.403	29.493
2 Quarters	32.309	26.585
3 Quarters	31.076	24.358
4 Quarters	29.524	22.486
5 Quarters	26.530	20.023
6 Quarters	23.877	17.824
7 Quarters	21.578	15.437
8 Quarters	19.258	13.731
9 Quarters	16.830	12.477
10 Quarters	14.329	10.921
11 Quarters	12.177	9.936
12 Quarters	10.212	9.343
13 Quarters	8.991	9.111
14 Quarters	7.661	8.707
15 Quarters	6.399	8.683
16 Quarters	5.365	8.951
17 Quarters	4.067	8.314
18 Quarters	2.965	7.241
19 Quarters	1.533	6.528
20 Quarters	0.719	6.277

Panel D: Empirical Tests for Market Rewards and Variability in Future Earnings

Variable	Result
Dependent Variable: *PRICE*	
INTERCEPT	6.697*** (0.000)
EPS	8.216*** (0.000)
STRING	4.389** (0.030)
U&B	-0.665 (0.582)
LTGROWTH	-0.043 (0.980)
EVAR	-0.003*** (0.005)
FEVAR	-0.006*** (0.000)
DE	0.207* (0.080)
EPS x STRING	5.231*** (0.006)
EPS x U&B	-4.962*** (0.000)
EPS x LTGROWTH	-3.226* (0.096)
EPS x EVAR	-0.010*** (0.000)
EPS x EVAR x STRING	0.394 (0.138)
EPS x FEVAR	-0.008*** (0.000)
EPS x FEVAR x STRING	0.010*** (0.002)
EPS x DE	-0.523*** (0.000)
BVE	0.754*** (0.000)
AGE	0.195*** (0.000)
Adjusted R^2	0.553
Observ.	167,300
String Observ.	996

Panel E: Empirical Tests for Market Rewards to Specific Lengths of Strings (Less Than 20 Quarters) and Variability in Future Earnings

Variable	Lengths of A String			
	4 Quarters	8 Quarters	12 Quarters	16 Quarters
Dependent Variable: *PRICE*				
INTERCEPT	6.759*** (0.000)	6.608*** (0.000)	6.632*** (0.000)	6.699*** (0.000)
EPS	6.776*** (0.000)	7.901*** (0.000)	8.190*** (0.000)	8.206*** (0.000)
STRING	-0.629* (0.053)	1.269** (0.023)	3.429*** (0.000)	5.226*** (0.010)
U&B	-0.812 (0.491)	-0.856 (0.472)	-0.758 (0.529)	-0.688 (0.569)
LTGROWTH	-0.132 (0.937)	-0.368 (0.827)	-0.305 (0.858)	-0.208 (0.903)
EVAR	-0.004*** (0.004)	-0.003*** (0.005)	-0.003*** (0.005)	-0.003*** (0.006)
FEVAR	-0.006*** (0.000)	-0.006*** (0.000)	-0.006*** (0.000)	-0.005*** (0.000)
DE	0.177 (0.133)	0.197* (0.094)	0.206* (0.080)	0.206* (0.081)
EPS x STRING	5.547*** (0.000)	5.125*** (0.000)	3.839*** (0.001)	3.160*** (0.009)
EPS x U&B	-4.826*** (0.000)	-4.920*** (0.000)	-4.954*** (0.000)	-4.956*** (0.000)
EPS x LTGROWTH	-4.986** (0.013)	-4.755** (0.016)	-4.043** (0.036)	-3.486* (0.071)
EPS x EVAR	-0.009*** (0.000)	-0.009*** (0.000)	-0.009*** (0.000)	-0.009*** (0.000)
EPS x EVAR x STRING	-0.003 (0.237)	-0.004 (0.219)	-0.007 (0.212)	-0.042** (0.023)
EPS x FEVAR	-0.007*** (0.000)	-0.007*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)
EPS x FEVAR x STRING	-0.002 (0.230)	0.003 (0.278)	0.008** (0.046)	0.013*** (0.000)
EPS x DE	-0.534*** (0.000)	-0.533*** (0.000)	-0.522*** (0.000)	-0.520*** (0.000)
BVE	0.746*** (0.000)	0.755*** (0.000)	0.756*** (0.000)	0.755*** (0.000)
AGE	0.193*** (0.000)	0.193*** (0.000)	0.194*** (0.000)	0.195*** (0.000)
Adjusted R^2	0.559	0.558	0.556	0.554
Observ.	167,300	167,300	167,300	167,300
String Observ.	37,823	12,548	4,907	2,102

Note:

This table mainly reports an empirical association between price, a price-earnings multiple and an increasing earnings string, after controlling for variability in future earnings. The sample comprises of 167,300 observations covering the period of 1976 – 2009.

Panel A provides descriptive statistics of the sample used in the regressions.

Panel B offers correlation coefficients and p-value indicated in parentheses.

Panel C presents average values of variability in past and future earnings in accordance with lengths of earnings strings. Lengths are from zero to twenty quarters of an earnings string.

Panel D exhibits the results obtained from OLS regressions according to equation (3) as follows.

$$\begin{aligned} PRICE_{it} = {} & \beta_0 + \beta_1 EPS_{it} + \beta_2 STRING_{it} + \beta_3 U\&B_{it} + \beta_4 LTGROWTH_{it} + \beta_5 EVAR_{it} \\ & + \beta_6 FEVAR_{it} + \beta_7 DE_{it} + \beta_8 (EPS_{it} \times STRING_{it}) + \beta_9 (EPS_{it} \times U\&B_{it}) \\ & + \beta_{10} (EPS_{it} \times LTGROWTH_{it}) + \beta_{11} (EPS_{it} \times EVAR_{it}) \\ & + \beta_{12} (EPS_{it} \times FEVAR_{it}) + \beta_{13} (EPS_{it} \times STRING_{it} \times EVAR_{it}) \\ & + \beta_{14} (EPS_{it} \times STRING_{it} \times FEVAR_{it}) + \beta_{15} (EPS_{it} \times DE_{it}) \\ & + \beta_{16} AGE_{it} + \beta_{17} BVE_{it} + \varepsilon_{it} \end{aligned}$$

The number of all observations, the number of string firms, and adjusted R^2 are also reported. All regressions including firm fixed effects, industry fixed effects, clustered standard errors by firm and year are reported.

Panel E reports results of tests for the empirical association between a price-earnings multiple and a variety of lengths of strings of earnings increases, after controlling for variability in future earnings. The number of all observations, the number of string firms, and adjusted R^2 are also presented.

*P-values are reported in parentheses. *, **, *** indicate statistical significance of parameter estimates, at the 10 percent, 5 percent, and 1 percent level, respectively. All variables are defined in Appendix B.*

TABLE 7

An Association between an (Past) Increasing Earnings String and Firm Fundamentals

Panel A: Descriptive Statistics

Variable	Observ.	Mean	Median	S.D.	Max	Min
STRING	385,402	0.003	0.000	0.058	1.000	0.000
FSCORE	385,402	0.504	0.500	0.065	0.658	0.042
BMRATIO	385,402	0.779	0.623	0.673	4.116	-0.525
CAPEX	385,402	0.027	0.002	1.098	6.588	-7.046
STGROWTH	385,402	0.041	0.042	0.505	3.618	-1.709
SALESGROWTH	385,402	0.125	0.069	0.467	4.100	-0.867
DE	385,402	0.894	0.480	1.809	12.423	-4.766
AGE	385,402	18.478	15.000	10.949	49.000	5.000

Panel B: Correlation Metrix - Pearson (Spearman) Correlations Below (Above) the Diagonal

Variable	*STRING*	*FSCORE*	*BMRATIO*	*CAPEX*	*STGROWTH*	*SALES GROWTH*	*DE*	*AGE*
STRING		0.006***	-0.021***	0.029***	0.049***	0.028***	-0.006***	-0.003*
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.093)
FSCORE	0.009***		-0.059***	0.040***	0.065***	0.029***	-0.050***	0.254***
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
BMRATIO	-0.021***	-0.079***		-0.032***	-0.080***	-0.181***	0.183***	-0.003**
	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.037)
CAPEX	0.007***	-0.009***	-0.035***		0.169***	0.208***	0.077***	0.050***
	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
STGROWTH	0.016***	0.000	0.002	0.066***		0.237***	-0.080***	-0.010***
	(0.000)	(0.882)	(0.193)	(0.000)		(0.000)	(0.000)	(0.000)
SALESGROWTH	0.006***	-0.037***	-0.125***	0.065***	0.126***		0.001	-0.078***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.643)	(0.000)
DE	-0.005***	-0.081***	0.076***	0.009***	-0.052***	0.001		0.082***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.332)		(0.000)
AGE	-0.003**	0.265***	0.017**	0.003***	-0.023***	-0.118***	0.013***	
	(0.025)	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)	(0.000)	

Panel C: Empirical Tests for an Association between an (Past) Increasing Earnings String and Firm Fundamentals

Variable	Results	
	(1)	**(2)**
Dependent Variable: *STRING*		
INTERCEPT	-3.372*** (0.000)	-3.268*** (0.000)
FSCORE	1.266*** (0.000)	1.333*** (0.001)
BMRATIO		-0.655** (0.000)
CAPEX		0.028*** (0.000)
STGROWTH		0.155*** (0.000)
SALESGROWTH		0.018 (0.360)
DE		-0.004 (0.633)
AGE		0.003 (0.242)
Pseudo R^2	0.102	0.151
Observ.	374,175	374,175
String Observ.	1,303	1,303

Panel D: Empirical Tests for an Association between Specific Lengths of Strings (Less Than 20 Quarters) and Firm Fundamentals

Variable	Lengths of A String			
	4 Quarters	**8 Quarters**	**12 Quarters**	**16 Quarters**
Dependent Variable: *STRING*				
INTERCEPT	-1.569*** (0.000)	-2.342*** (0.000)	-2.777*** (0.000)	-2.914*** (0.000)
FSCORE	1.258*** (0.000)	1.500*** (0.000)	1.415*** (0.000)	1.463*** (0.000)
BMRATIO	-0.310*** (0.000)	-0.491*** (0.000)	-0.562*** (0.000)	-0.599*** (0.000)
CAPEX	0.014*** (0.000)	0.038*** (0.000)	0.036*** (0.000)	0.034*** (0.000)
STGROWTH	0.281*** (0.000)	0.241*** (0.000)	0.196*** (0.000)	0.165*** (0.000)
SALESGROWTH	0.224*** (0.000)	0.104*** (0.000)	0.068*** (0.000)	0.052*** (0.006)
DE	-0.008** (0.019)	-0.011** (0.011)	-0.008 (0.141)	-0.007 (0.341)
AGE	0.002*** (0.007)	0.002** (0.050)	0.003 (0.125)	0.003 (0.174)
Pseudo R^2	0.055	0.083	0.104	0.123
Observ.	385,402	385,402	385,402	385,402
String Observ.	75,851	21,748	7,731	3,028

Note:

This table mainly reports an empirical association between an (Past) increasing earnings string and firm fundamentals. The sample comprises of 385,402 observations covering the period of 1976 – 2014.

Panel A provides descriptive statistics of the sample used in the regressions.

Panel B offers correlation coefficients and p-value indicated in parentheses.

Panel C exhibits the results obtained from Probit Maximum Likelihood Estimation according to equation (4) as follows.

$$STRING_{it} = \delta_0 + \delta_1 FSCORE_{it} + \delta_2 BMRATIO_{it} + \delta_3 CAPEX_{it} + \delta_4 STGROWTH_{it}$$

$$+ \delta_5 SALESGROWTH_{it} + \delta_6 DE_{it} + \delta_7 AGE_{it} + \varepsilon_{it}$$

The number of all observations, the number of string firms, and Pseudo R^2 are also reported. All regressions including firm fixed effects, industry fixed effects, and clustered standard errors by firm and year are reported.

Panel D reports results of tests for an empirical association between other lengths of strings (less than 20 quarters) and firm fundamentals. The number of all observations, the number of string firms, and Pseudo R^2 are also presented.

*P-values are reported in parentheses. *, **, *** indicate statistical significance of parameter estimates, at the 10 percent, 5 percent, and 1 percent level, respectively. All variables are defined in Appendix B.*

TABLE 8
The Predictive Ability of Lengths of Past Increasing Earnings Strings For Future Earnings Strings

Variable	Lengths of Future Earnings Strings (FSTRING)				
	4Q Ahead	**8Q Ahead**	**12Q Ahead**	**16Q Ahead**	**20Q Ahead**
Dependent Variable: *FSTRING*					
A Past Increasing Earnings String of Consecutive Four Quarters					
PSTRING	0.303*** (0.000)	0.337*** (0.000)	0.301*** (0.000)	0.304*** (0.000)	0.306*** (0.000)
Pseudo R^2	0.030	0.049	0.060	0.072	0.090
Observ.	345,081	308,705	276,203	247,131	207,550
String Observ.	69,694	63,351	56,709	50,930	47,099
A Past Increasing Earnings String of Consecutive Eight Quarters					
PSTRING	0.421*** (0.000)	0.416*** (0.000)	0.376*** (0.000)	0.354*** (0.000)	0.306*** (0.000)
Pseudo R^2	0.028	0.045	0.057	0.068	0.085
Observ.	345,081	308,705	276,203	247,131	207,550
String Observ.	20,104	18,278	16,607	15,533	14,551
A Past Increasing Earnings String of Consecutive Twelve Quarters					
PSTRING	0.465*** (0.000)	0.470*** (0.000)	0.436*** (0.000)	0.390*** (0.000)	0.232 (0.119)
Pseudo R^2	0.025	0.042	0.054	0.065	0.080
Observ.	345,081	308,705	276,203	247,131	207,550
String Observ.	7,144	6,581	6,166	5,810	5,453
A Past Increasing Earnings String of Consecutive Sixteen Quarters					
PSTRING	0.514*** (0.000)	0.546*** (0.000)	0.485*** (0.000)	0.309** (0.020)	0.080 (0.741)
Pseudo R^2	0.024	0.040	0.052	0.061	0.078
Observ.	345,081	308,705	276,203	247,131	207,550
String Observ.	2,836	2,664	2,481	2,349	2,245
A Past Increasing Earnings String of Consecutive Twenty Quarters					
PSTRING	0.577*** (0.000)	0.558*** (0.000)	0.423*** (0.002)	0.207 (0.270)	-0.063 (0.877)
Pseudo R^2	0.024	0.039	0.051	0.061	0.078
Observ.	345,081	308,705	276,203	247,131	207,550
String Observ.	1,255	1,184	1,112	1,063	1,026

Note:

This table mainly reports the predictive ability of lengths of past increasing earnings strings for future earnings strings. The sample varies across estimation specifications but covering the period of 1976 – 2013 with the

maximum of 345,081 firm-quarter observations. The results are obtained from Probit Maximum Likelihood Estimation according to equation (5) as follows.

$$FSTRING_{it} = \delta_0 + \delta_1 PSTRING_{it} + \delta_2 FSCORE_{it} + \delta_3 BMRATIO_{it} + \delta_4 CAPEX_{it} + \delta_5 STGROWTH_{it} + \delta_6 SALESGROWTH_{it} + \delta_7 DE_{it} + \delta_8 AGE_{it} + \varepsilon_{it}$$

The number of all observations, the number of string firms, and Pseudo R^2 *are also reported. All regressions including firm fixed effects, industry fixed effects, clustered standard errors by firm and year are reported.*

*P-values are reported in parentheses. *, **, *** indicate statistical significance of parameter estimates, at the 10 percent, 5 percent, and 1 percent level, respectively. All variables are defined in Appendix B.*

TABLE 9
The Predictive Ability of Lengths of Past Increasing Earnings Strings for Variability in Future Earnings

Variable	Lengths of Past Earnings Strings (*PSTRING*)				
	4Q	**8Q**	**12Q**	**16Q**	**20Q**
Dependent Variable: *FEVAR*					
INTERCEPT	30.015** (0.016)	30.157** (0.016)	30.624** (0.014)	31.165** (0.012)	31.516** (0.011)
PSTRING	-12.483*** (0.000)	-17.726*** (0.000)	-19.016*** (0.000)	-20.803*** (0.000)	-31.585*** (0.000)
FSCORE	-25.760 (0.333)	-27.112 (0.312)	-29.660 (0.269)	-30.747 (0.250)	-31.016 (0.246)
RD	3.659 (0.300)	3.677 (0.297)	3.809 (0.279)	3.867 (0.272)	3.876 (0.271)
CAPEX	0.315 (0.893)	0.265 (0.910)	0.212 (0.927)	0.216 (0.926)	0.213 (0.927)
ASSET	0.094** (0.032)	0.095** (0.030)	0.096** (0.031)	0.096** (0.031)	0.096** (0.031)
DE	4.151*** (0.006)	4.162*** (0.006)	4.161*** (0.006)	4.160*** (0.006)	4.159*** (0.006)
AGE	-0.280* (0.077)	-0.282* (0.077)	-0.280* (0.079)	-0.278* (0.081)	-0.278* (0.082)
SALES	-0.151* (0.086)	-0.151* (0.088)	-0.148* (0.094)	-0.145* (0.099)	-0.145 (0.101)
SALESVAR	-0.001** (0.011)	-0.001*** (0.009)	-0.002*** (0.008)	-0.002*** (0.008)	-0.002*** (0.008)
Adjusted R^2	0.017	0.016	0.016	0.015	0.015
Observ.	50,052	50,052	50,052	50,052	50,052
String Observ.	11,239	3,388	1,170	425	160

Note:

This table mainly reports the predictive ability of lengths of past increasing earnings strings on variability in future earnings. The sample comprises of 50,052 firm-quarter observations covering the period of 1989 – 2009. The results are obtained from OLS regression according to equation (6) as follows.

$$FEVAR_{it} = \gamma_0 + \gamma_1 PSTRING_{it} + \gamma_2 FSCORE_{it} + \gamma_3 RD_{it} + \gamma_4 CAPEX_{it} + \gamma_5 ASSET_{it}$$
$$+ \gamma_6 DE_{it} + \gamma_7 AGE_{it} + \gamma_8 SALES_{it} + \gamma_9 SALESVAR_{it} + \varepsilon_{it}$$

The number of all observations, the number of string firms, and Adjusted R^2 *are also reported. All regressions including firm fixed effects, industry fixed effects, and clustered standard errors by firm and year are reported.*

*P-values are reported in parentheses. *, **, *** indicate statistical significance of parameter estimates, at the 10 percent, 5 percent, and 1 percent level, respectively. All variables are defined in Appendix B.*

TABLE 10
A Price Association with a Decreasing Earnings String

Variable	Result
Dependent Variable: *PRICE*	
INTERCEPT	6.848*** (0.000)
EPS	13.751*** (0.000)
STRING	4.059 (0.121)
BSTRING21Q	-0.954 (0.809)
BSTRING22Q	2.997 (0.701)
BSTRING23Q	-5.399 (0.558)
BSTRING24Q	-0.287 (0.972)
BSTRING25Q	2.187 (0.798)
BSTRING26Q	-1.539 (0.932)
BSTRING27Q	4.588 (0.813)
BSTRING28Q	-11.621 (0.245)
U&B	-0.230 (0.862)
LTGROWTH	-2.167 (0.289)
EVAR	-0.004*** (0.008)
FEVAR	-0.006*** (0.000)
DE	0.238* (0.073)
EPS x STRING	5.671** (0.011)
EPS x BSTRING21Q	-3.579 (0.306)
EPS x BSTRING22Q	3.617 (0.563)
EPS x BSTRING23Q	-2.942 (0.685)
EPS x BSTRING24Q	9.108 (0.185)

Variable	Result
Dependent Variable: *PRICE*	
EPS x BSTRING25Q	-3.544 (0.721)
EPS x BSTRING26Q	5.017 (0.581)
EPS x BSTRING27Q	-21.111** (0.031)
EPS x BSTRING28Q	33.628*** (0.005)
EPS x U&B	-5.282*** (0.000)
EPS x LTGROWTH	-3.562* (0.082)
EPS x EVAR	-0.009*** (0.000)
EPS x EVAR x STRING	0.551*** (0.001)
EPS x FEVAR	-0.008*** (0.000)
EPS x FEVAR x STRING	0.010*** (0.002)
EPS x DE	-0.503*** (0.000)
BVE	0.770*** (0.000)
AGE	0.192*** (0.000)
Adjusted R^2	0.552
Observ.	137,673
String Observ.	708

Note:

This table mainly reports an empirical association between price, a price-earnings multiple and a decreasing earnings string. The sample comprises of 137,673 observations covering the period of 1976 – 2009. The results are obtained from OLS regressions as follows.

$$PRICE_{it} = \beta_0 + \beta_1 EPS_{it} + \beta_2 STRING_{it} + \beta_{2,2X} BSTRING2XQ_{it} + \beta_3 U\&B_{it} + \beta_4 LTGROWTH_{it}$$
$$+ \beta_5 EVAR_{it} + \beta_6 FEVAR_{it} + \beta_7 DE_{it} + \beta_8 (EPS_{it} \times STRING_{it}) + \beta_{8,2X} (EPS_{it} \times BSTRING2XQ_{it})$$
$$+ \beta_9 (EPS_{it} \times U\&B_{it}) + \beta_{10} (EPS_{it} \times LTGROWTH_{it}) + \beta_{11} (EPS_{it} \times EVAR_{it})$$
$$+ \beta_{12} (EPS_{it} \times FEVAR_{it}) + \beta_{13} (EPS_{it} \times STRING_{it} \times EVAR_{it})$$
$$+ \beta_{14} (EPS_{it} \times STRING_{it} \times FEVAR_{it}) + \beta_{15} (EPS_{it} \times DE_{it})$$
$$+ \beta_{16} AGE_{it} + \beta_{17} BVE_{it} + \varepsilon_{it}$$

The number of all observations, the number of string firms, and adjusted R^2 are also reported. All regressions including firm fixed effects, industry fixed effects, clustered standard errors by firm and year are reported.

*P-values are reported in parentheses. *, **, *** indicate statistical significance of parameter estimates, at the 10 percent, 5 percent, and 1 percent level, respectively. All variables are defined in Appendix B.*

TABLE 11
Market Rewards and Portfolio Analysis

Variable	Highest D/E Portfolio	Lowest D/E Portfolio
INTERCEPT	1.109 (0.553)	12.821*** (0.000)
EPS	4.535*** (0.000)	17.711*** (0.000)
STRING	-0.256 (0.938)	5.180 (0.306)
U&B	-2.356 (0.135)	1.700 (0.685)
LTGROWTH	-0.907 (0.666)	4.023** (0.029)
EVAR	-0.006*** (0.000)	0.001 (0.762)
FEVAR	-0.006*** (0.000)	-0.006*** (0.004)
DE	0.314** (0.013)	18.686 (0.467)
EPS x STRING	3.922 (0.334)	8.319 (0.226)
EPS x U&B	-1.213 (0.142)	-10.578** (0.032)
EPS x LTGROWTH	-3.538 (0.119)	-7.823* (0.056)
EPS x EVAR	-0.006*** (0.000)	-0.016*** (0.000)
EPS x EVAR x STRING	-0.120 (0.703)	0.320 (0.122)
EPS x FEVAR	-0.006*** (0.001)	-0.018*** (0.000)
EPS x FEVAR x STRING	0.779** (0.025)	0.098* (0.053)
EPS x DE	-0.169* (0.215)	-5.664 (0.916)
BVE	0.809*** (0.000)	0.736*** (0.000)
AGE	0.277*** (0.011)	-0.007 (0.889)
Adjusted R^2	0.017	0.015
Observ.	31,123	22,839
String Observ.	161	139

Note:

This table mainly reports contextual analysis - portfolios ranked by capital structure. The sample comprises of 31,123 and 22,839 firm-quarter observations for highest DE and lowest DE portfolios respectively, covering the period of 1976 – 2009. The results are obtained from OLS regression according to equation (3) as follows.

$$PRICE_{it} = \beta_0 + \beta_1 EPS_{it} + \beta_2 STRING_{it} + \beta_3 U\&B_{it} + \beta_4 LTGROWTH_{it} + \beta_5 EVAR_{it}$$
$$+ \beta_6 FEVAR_{it} + \beta_7 DE_{it} + \beta_8 (EPS_{it} \times STRING_{it}) + \beta_9 (EPS_{it} \times U\&B_{it})$$
$$+ \beta_{10} (EPS_{it} \times LTGROWTH_{it}) + \beta_{11} (EPS_{it} \times EVAR_{it})$$
$$+ \beta_{12} (EPS_{it} \times FEVAR_{it}) + \beta_{13} (EPS_{it} \times STRING_{it} \times EVAR_{it})$$
$$+ \beta_{14} (EPS_{it} \times STRING_{it} \times FEVAR_{it}) + \beta_{15} (EPS_{it} \times DE_{it})$$
$$+ \beta_{16} AGE_{it} + \beta_{17} BVE_{it} + \varepsilon_{it}$$

The number of all observations, the number of string firms, and Adjusted R^2 *are also reported. All regressions including firm fixed effects, industry fixed effects, clustered standard errors by firm and year are reported.*

*P-values are reported in parentheses. *, **, *** indicate statistical significance of parameter estimates, at the 10 percent, 5 percent, and 1 percent level, respectively. All variables are defined in Appendix B.*