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It's All Overreaction: Earning Momentum to Value/Growth

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Abstract

In this paper, I examine whether consistent trends in quarterly earnings signals generate momentum and subsequent return reversals. Conditioning on growth consistency in quarterly earnings, I show that an unbroken earnings string over the last four quarters creates strong financial momentum that peaks at the end of the first three months following the ranking period and then reverses over the next nine-month period. By the end of the first twelve months after the ranking horizon, this momentum has been completely dissipated. The magnitude of this price continuation and subsequent reversal are more pronounced for consistent high (low) growth firms than inconsistent good (bad) performers. This evidence shows securities markets in which stock prices systematically overreact to consistent earnings signals. As well, my finding suggests that the earnings momentum and the value/glamour effect are likely to be empirically linked. These results are robust to the Fama-French three-factor model and the momentum factor as well as to earnings surprise effects and various robustness tests. Evidence reported in this study is consistent with the spirit of the behavioral models.

Key words: Earnings signal consistency; Earnings momentum; Price reversals; Investor overreaction; Investor psychology

JEL classification: G12; G14; M41

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1. Introduction

Empirical research in the accounting and finance literature has documented two major market anomalies that seem to move in diametrically opposing directions: the contrarian or value strategy investigated in the finance literature (e.g., Lakonishok, Shleifer and Vishny, 1994) and the post-earnings announcement drift, that is, the earnings momentum studied in the accounting literature (e.g., Ball and Brown, 1968; Bernard and Thomas, 1989). The contrarian (value-glamour) strategy is designed to exploit a market overreaction to long-term past accounting data while the earnings momentum anomaly is interpreted as investors' underreaction to a change in a firm's recent earnings that has significant implications for its future financial performance. The investor behavior story is not universal. Some argue (e.g., Fama and French, 1992, 1996) that the greater return earned by value firms represents compensation for risk exposure.

The reconciliation of these market anomalies presents a significant challenge to financial scholars. If these market regularities are caused by investors' psychology, as suggested by their respective literature, how does the market seem to overreact to one set of accounting data and underreact to another? In the last decade, a number of psychology-based models (e.g., Barberis, Shleifer, and Vishny, 1998; Daniel, Hirshleifer, and Subrahmanyam, 1998) have attempted to reconcile these two mispricing patterns in an investor behavioral context. Although these models differ in the nature and causes of the market underreaction, they agree that consistent earnings signals trending in the same direction should trigger a market overreaction.

In this paper I am interested in whether consistent earnings signals can generate both financial momentum and a subsequent return reversal. Specifically, I examine whether consistently good (bad) quarterly earnings performance creates a market overreaction as suggested by the behavioral finance models. According to Barberis et al. (1998) and Daniel et al. (1998), good (bad) earnings news followed by a string of confirmatory earnings signals leads to a market overreaction. This mispricing is gradually corrected as investors discover that their earnings expectations are not warranted. Experimental findings (e.g., Bloomfield and Hales, 2002) show that investors are inclined to overweight patterns of past earnings when forecasting future earnings performance unless a recent earnings change is preceded by a relatively high number of reversals.

The literature on the relationship between consistent trends in accounting measures and subsequent price movements has been almost exclusively focused on the ability of the magnitude of past fundamentals (e.g., earnings) to predict future returns. However, a few empirical studies (e.g., Barth, Elliott and Finn, 1999; Chan, Frankel and Kothari, 2004; Alwathainani, 2009) that have attempted to examine the relationship between the direction (i.e., consistency) of these accounting-based variables and future price movements report mixed results.

Barth et al. (1999) find that firms with increasing price-earnings ratios in the last five years are priced at a premium relative to other firms. However, they do not examine subsequent price movements of these firms to determine whether increasing the price-earnings ratios leads to a market overreaction. Alwathainani (2009) explores whether persistent trends in long-term accounting variables (i.e., average annual trends in earnings) leads to an extrapolation bias and shows that top (bottom) ranking firms based on their annual average earnings growth rates for the last two to five years tend to experience a long-term price reversal. The interests of these two studies fall in the value/glamour category, as does that of Lakonishok et al. (1994).

Chan et al. (2004) investigate the link between patterns of quarterly data and subsequent stock returns and find inconclusive evidence. However, as illustrated in Figure I, their study does not examine the influence of the direction (i.e., consistency) of past quarterly earnings on

expected returns, whereas my study focuses on the price impact of the direction of consistent past earnings signals, as shown in Figure II.[1] Watkins (2006) argues that the effect of performance consistency is significantly different from that of the magnitude of change in past prices. Further, he argues that even in some cases when there is not a strong past return, consistency results in exceptionally strong price predictability.

Given the fixation of the media, financial press, financial analysts, and investors on quarterly earnings reports, consistency in quarterly earnings signals is likely to provide a more powerful and sharper test of the descriptive validity of behavioral finance theories than that of annual earnings measures. Using quarterly data of a sample of firms from 1976 to 2011, I show that growth consistency in quarterly earnings performance leads to substantial financial momentum that continues to be statistically and economically significant for the next twelve months following the formation period. Consistently high (low) growth stocks exhibit a much stronger price run than their inconsistent good (bad) performer counterparts. Taken at face value, this evidence would suggest a market underreaction to consistency in earnings signals. However, when the holding horizon is broken down into four sub-periods of three months each (months 1 to 3, months 4 to 6, months 7 to 9, and months 10 to 12) and the return for each sub-period is measured independently from that of other periods, a different picture emerges. This picture reveals that financial momentum continues to move in the same direction of past quarterly measures until it peaks at the end of the first three months after the portfolio formation date and then reverses over the next 9-month period. By the end of the holding horizon, the financial momentum has been completely offset by subsequent reversals in stock prices. The price momentum and reversal is more pronounced for consistently top (bottom) ranking firms relative to their inconsistent high (low) growth counterparts. A similar pattern remains throughout the holding horizon. This evidence is very important because it shows that the market prices' response to consistent earnings news is likely to be a manifestation of investors' overreaction, not a market underreaction as commonly interpreted. This finding is robust to the Fama-French (Market-RF, size, B/M) model and the momentum factor (UMD) as well as to earnings surprises and a number of robustness tests.

Overall, results reported in this paper show a market in which investors systematically overreact to consistency in quarterly earnings performance signals. This overreaction leads to a temporary mispricing that is eventually corrected, creating financial momentum and subsequent return reversals. This evidence paints a picture of a continuing market overreaction to consistency in public (possibly private) information signals; eventually, this overreaction is reversed as the market realizes its erroneous expectations. The financial momentum observed in the first three months of the holding period can be viewed as the last leg in a market overreaction that gradually returns to fundamentals.

The finding of this study provides support to the predictions of a group of behavioral finance models, particularly theories offered by Daniel et al. (1998) and Barberis et al. (1998). According to Daniel et al. (1998), price momentum and long-run price reversals are a manifestation of securities markets that overreact to information signals. Barberis et al. (1998) argue that consistency in past performance creates a market overreaction.

My finding contributes to three streams of literature. First, I add to the growing body of literature on how investor cognitive biases affect asset prices by providing direct evidence on investors' overreactions to past earnings patterns. Eventually, this overreaction is dissipated as further information signals move stock prices back to their underlying values. Second, I

[1] I expand on the difference between my study and Chan et al. (2004) in the next section.

contribute to the debate about market efficiency and the price discovery process. My finding shows securities markets in which stock prices do not always reflect their fundamental values. Rather, it implies a market in which stock prices constantly overreact to consistent information signals, causing these prices to diverge substantially from their fair values. As well, I show that the financial momentum and reversal is a function of past earnings patterns. In other words, momentum and reversal are exceptionally strong and occur faster for consistent good and bad performing firms relative to their inconsistently performing counterparts. This characterization of the market price discovery process is consistent with predictions of the behavioral models (e.g., Daniel et al., 1998; Barberis et al., 1998).

Finally, my finding contributes to the growing studies that have attempted to provide a link between the literature on the price momentum and reversal (e.g., Lee and Swaminathan, 2000; Alwathainani, 2012a). Lee and Swaminathan (2000) argue that a significant part of the momentum gain should be characterized as an overreaction that is subsequently corrected instead of a simple market underreaction. Alwathainani (2012a) finds stocks with a string of high (low) returns over the past two to four months to exhibit substantial price momentum that subsequently reverses over the long horizon. He interprets his results as a manifestation of market overreaction.

Evidence reported in this study extends the findings of Lee and Swaminathan (2000) and Alwathainani (2012a) by showing that consistent good (bad) earnings firms exhibit strong financial momentum that is eventually wiped out by the reversal in stock prices of these firms. The timing of this momentum and reversal is predictable based on the consistency of past earnings signals. Further, my finding suggests that earnings momentum (e.g., Bernard and Thomas, 1989) and the value-glamour effects (e.g., Lakonishok et al., 1994) are likely to be empirically linked. For example, my consistent high-growth firms (CHG) can be characterized as growth stocks since they have high earnings growth rates and low book-to-market ratios (B/M). Similarly, consistent low-growth firms share similar attributes with value firms, such as low past earnings growth and high B/M ratios.

The remainder of the paper is organized as follows: Section 2 discusses related literature and Section 3 describes data sources, variables, consistency measurement, and descriptive statistics. Empirical tests, results, and robustness analyses are discussed in Section 4. Finally, Section 5 presents a summary of my findings.

2. Related literature

Accounting and finance researchers have documented two empirical regularities that appear to move in opposite directions: the post-earnings announcement literature in accounting (e.g., Ball and Brown, 1968; Foster, Olsen and Shevlin, 1984; Bernard and Thomas, 1989; 1990) and the value-glamour anomaly in finance literature (e.g., Lakonishok et al., 1994; La Porta, Lakonishok, Shleifer, and Vishny, 1997; Skinner and Sloan, 2002). The earnings momentum refers to a well-documented market regularity in which shares of firms with good (bad) earnings news continue to experience positive (negative) returns over the next twelve months. This momentum is interpreted as evidence of investors' underreaction to current earnings news and its implications for future earnings performance (e.g., Bernard and Thomas, 1989, 1990; Bernard, Thomas, and Abarbanell, 1993).

The value-glamour or contrarian strategy is designed to exploit what financial scholars and investment managers believe to be investors' overreaction to long-term accounting data.

Empirical evidence shows that value firms, i.e., firms with high book-to-market ratios (B/M), low sales growth rates, or high earnings-to-price ratios (E/P) over the last five years earn superior stock returns over the next five years relative to their glamour firm counterparts, i.e., firms with high B/M, E/P, or high sales growth rates (e.g., Lakonishok et al., 1994). The differential in returns between value and glamour stocks is attributed to a market overreaction to the past performance patterns of these firms. Lakonishok et al. (1994) argue that, by observing past accounting measures of value and growth stocks, investors form high (low) future growth expectations for glamour (value) stocks. However, as the subsequent performance of growth (value) stocks fails to meet (exceeds) market expectations, share prices of these firms reverse to fundamentals, leading to a long-term return reversal.

The link between investor sentiments and expected returns is not universal. Some authors (e.g., Fama and French, 1992, 1996) argue that the superior stock return for the value strategy is reward for risk. However, Skinner and Sloan (2002) and La Porta et al. (1997) find that the bulk of returns for the value/glamour firms tend to be clustered around the release of future earnings. This evidence does not support the notion that value stocks are fundamentally riskier than their growth counterparts. As well, Daniel and Titman (1997) find no evidence that value/glamour firms are associated with additional risk factors. These two major mispricing phenomena present significant challenges not only to the classic economic model that is predicated on the assumption that new information signals are incorporated into market prices quickly and in an unbiased manner, but also to financial scholars. If these two phenomena are caused by cognitive biases on the part of investors, how do investors seem to underreact to one set of accounting data and overreact to another?

In recent years, a number of psychology-based theories (e.g., Barberis et al., 1998; Daniel et al., 1998) have sought to reconcile these two seemingly contradictory regularities in an investors' behavioral context. Although these models have different assumptions about the nature and causes of the market underreaction, they agree that consistency in a firm's past earnings signals should trigger a market overreaction. Barberis et al. (1998) argue that investors underestimate an earnings change when it disconfirms prior earnings signals, and simultaneously overestimate a string of earnings news moving in the same trajectory as earlier signals. In an experimental setting, Bloomfield and Hales (2002) test the prediction of Barberis et al.'s (1998) model and find evidence of overreaction to earnings patterns. Their finding shows that investors are likely to form high (low) growth expectations about good (bad) earnings news unless the current earnings change is preceded by a significant number of reversals. Other experimental researchers (e.g., Kahneman and Tversky, 1973; Tversky and Kahneman, 1974) find that individuals tend to use patterns of past data in predicting future outcomes even if these patterns exist only for a very short period of time. According to Daniel et al. (1998), consistency in a firm's earnings news can cause continuing overreaction (i.e., persistent momentum), but eventually this momentum should reverse course as future information gradually brings share prices of the firm to its fundamentals. In this paper I am interested in examining the impact of consistent earnings signals on future returns. Specifically, I test whether an unbroken string of a relatively high (low) firm's quarterly earnings triggers a market overreaction, that is, financial momentum and price reversal. If consistent earnings signals lead to investors' overreaction, firms that have experienced a string of relatively good (bad) performance results in the past should exhibit a strong price continuation. However, this price momentum should recover to firms' underlying values as future earnings performance shows that prior investors' expectations are not fully warranted.

The existing literature on the earnings news momentum and value/glamour phenomena has been almost exclusively focused on the relationship between the magnitude of past accounting measures and expected returns. Watkins (2006) argues that the impact of past return consistency on future prices is significantly different from that of the magnitude of stock price returns. Further, he argues that even in a case of weak past returns, consistency leads to strong future price movements.

However, empirical studies examining the relationship between the direction (i.e., consistency) of these accounting variables and future price movements are scarce. The few papers in the finance literature that have attempted to illuminate the impact of past return performance consistency on expected returns find consistency to be a determining factor of subsequent price movements (e.g., Grinblatt and Moskowitz, 2004; Watkins, 2006).

In the accounting literature, however, the findings are mixed (e.g., Barth et al., 1999; Alwathainani, 2009; Chan et al., 2004). Barth et al. (1999) examine the relationship between increasing annual earnings and price-earnings ratios and conclude that firms reporting earnings increases for at least five years enjoy a price premium compared to other firms. However, they do not examine subsequent returns to determine whether increasing earnings patterns lead to mispricing.

Alwathainani (2009) studies whether persistent trends in long-term accounting variables (i.e., average annual trends in earnings) lead to a market overreaction, and reports that the best (worst) performing firms in the last two to five years, based on their annual average earnings growth rates, are likely to experience a long-term price reversal. The interests of these two studies fall in the same value/glamour category as that of Lakonishok et al. (1994).

Chan et al. (2004) examines whether quarterly earnings patterns influence investor expectations. They find no conclusive evidence of investor biases. Their finding could be due to three reasons. First, they use the median growth rates to divide their sample into consistent high-and-low performers, while in this paper a firm is classified as a consistent high (low) growth firm if it consistently ranks in the highest (lowest) 30 percentile of all firms based on its quarterly earnings growth in the rolling four quarters comprising the entire ranking interval. Thus, my definition of consistency is both tighter and more precise than theirs.

Second, their empirical test does not measure the impact of the direction (i.e., consistency) of past quarterly earnings on expected returns. In other words, they do not measure the return differentials of high- and low-growth firms separately. Rather they group consistent winners and losers into one portfolio (A) and group their inconsistent performers in another (B) and then the returns of these two groups are compared (see Figure I). Conversely, my research focuses on the direction of past earnings signals by comparing the price performance of each growth group separately, as shown in Figure II. I measure the return performance of consistent well-performing firms (CHG) against that of their inconsistent good performer (IHG) counterparts and the return of consistent bad-performing firms (CLG) is compared with that of inconsistent low-growth stocks (ILG).

Finally, Chan et al. (2004) use a holding period that begins three months after their ranking period, while in this study I follow Alwathainani (2012b) by tracking the return performance of my portfolio tests from the first month after the ranking quarter (quarter t).[2] This method allows me to capture the full extent of the market reaction to the preannouncements of

[2] Alwathainani (2012b) argues that his test design allows him to capture the full extent of the stock price reaction to preannouncements of earnings news. For a robustness check, I form my portfolio tests with one and two month lags and I obtain similar results to those reported in this study.

firms' quarterly earnings reports. In this study, I provide evidence that supports this assumption. As shown in Panel B of Table III, the financial momentum associated with earnings consistency reaches its peak at the end of the third month following the ranking period and then begins to reverse. By the end of the sixth month after the ranking interval, more than one half of the initial financial momentum has been reversed (see under the CHG – CLG column).

Skinner and Sloan (2002) find returns for growth firms to be concentrated in the 31 days prior to the announcement of firms' quarterly earnings.[3] They argue that their research design provides a powerful test that captures the full dynamics of market price reactions to preannouncements of earnings news. Further, Skinner and Sloan (2002) argue that their methodology overcomes the problem of research designs that examine investor responses to earnings announcement dates because many companies preannounce their earnings. A number of empirical studies (e.g., Skinner, 1994, 1997; Kasznik and Lev, 1995; Soffer, Thiagarajan, and Walther, 2000) provide evidence that a large number of firms, particularly growth stocks, preannounce their earnings. Further, Skinner (1997) and Soffer et al. (2000) show that 75 percent of these earnings preannouncements take place within two weeks on either side of the fiscal quarter end. Ke, Huddart, and Petroni (2003) show that firms reporting an earnings decline following a string of earnings increases earn an average abnormal return of -4.29 percent over the 30-trading days preceding their earnings announcement dates.

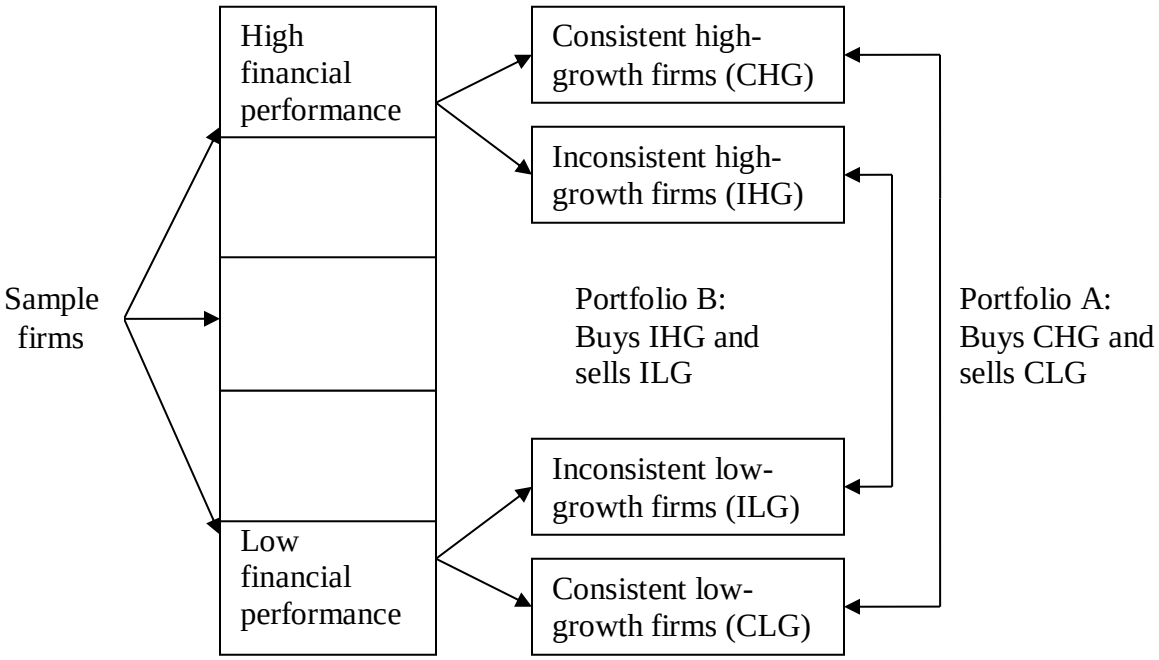

Figure I: Chan et al.'s (2004) Fig. 2 (p. 20). "Difference" = Return (A) – Return (B): Prediction: "Difference" < 0.

[3] The holding period of Skinner and Sloan (2002) begins twelve trading days prior to the end of the current fiscal quarter (the ranking period). They argue that the bulk of earnings surprises are expected to be announced within two weeks on both sides of the fiscal quarter end (see Skinner and Sloan [2002]).

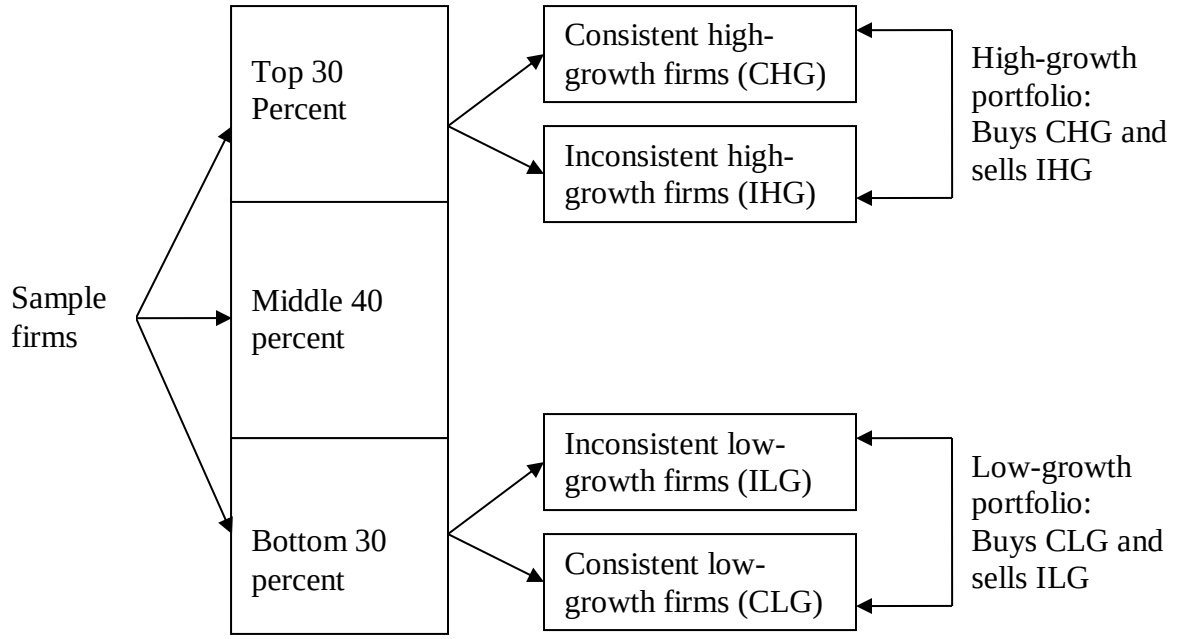

Figure II : Method used to calculate return performance of portfolios shown in Tables II, III, IV, and V. Predictions: (1) High-growth portfolio: Returns, i.e., CHG – IHG > 0.
(2) Low-growth portfolio: Returns, i.e., CLG – ILG < 0.

3. Sample firms, variables measurements, and descriptive statistics

3.1 Data sources and variable measurements

To measure growth rates in quarterly accounting-based variables, I use three metrics: operating earnings after depreciation and amortization expense (OEG), earnings before extraordinary items and discontinued operations (EBG), and cash flow (CFG). The latter is measured as quarterly earnings before extraordinary items and discontinued operations, plus depreciation and amortization expense. Quarterly growth rates in OEG, EBG, and CFG are calculated as current per share quarterly earnings or cash flow less the same per share measure from the corresponding quarter of one year ago. Then, as in Alwathainani (2009 and 2012b), the quarterly change in each of these measures is divided by the absolute value of the average per share lagged values for the same variable in the last two quarters.[4]

I use all firms on the COMPUSTAT quarterly file with sufficient data on at least one of the accounting-based performance measures used in this study (i.e., OEG, EBG, and CFG) for the period 1975-2011. Book values, number of shares outstanding, and share prices are taken from the COMPUSTAT quarterly file. For a firm to be included, it should have, at least, seven quarters of performance measures prior to the ranking period. Monthly stock returns, including the delisting returns, are obtained from the Center for Research in Security Price (CRSP) for the period from 1976 to 2012.[5]

3.2 *Growth consistency of quarterly earnings*

[4] $(EPS_{jq} - EPS_{jq-4})/\left|\ ((EPS_{jq-4} + EPS_{jq-5})/2)\right|$. Because some firms report negative earnings, I use the absolute value of the average earnings per share lagged values for the last two quarters as deflators. Growth rates are winsorized to the 99 percent and 1 percent value to reduce the influence of outliers.

[5] ADRs, REITs, closed-end funds, and Americus Trust are excluded.

Growth consistency in a firm's past quarterly earnings (i.e., OEG and EGB) and cash flow (CFG) is defined as the number of quarters in which a firm maintains quarterly growth rates that place it in the top (bottom) 30 percent of all firms for the last four-quarters prior to the portfolio ranking date. At the end of each quarter, from the fourth quarter of 1975 to the third quarter of 2011, firms are ranked by their quarterly growth rates in each performance measure (OEG, EBG, and CFG) over the last fourth quarters and then assigned to three groups: top 30 percent, middle 40 percent, and bottom 30 percent. Firms consistently ranking in the highest (lowest) 30 percent based on their quarterly growth rates for the entire four quarters are classified as "*consistent high (low) growth firms.*" Firms are defined as "*inconsistent high (low) growth firms*" if they fall in the highest (lowest) 30 percent category for at least one, but not more than two quarters of the same ranking period.

3.3 Descriptive statistics

Table I reports the time-series average of cross-sectional correlations of the financial performance variables used in this paper and summary descriptive statistics of firms with sufficient past quarterly data. As shown in Panel A, quarterly growth rates in OEG, EBG, and CFG are highly correlated. For instance, OEG is strongly correlated with both EBG and CFG ($r = 0.87$, $p = < 0.0001$ and $r = 0.86$, $p = 0.0001$, respectively). Performance measures, OEG, EBG, and CFG, exhibit positive associations with Beta but none of them is statistically significant. Furthermore, the book-to-market ratio (B/M) and Beta are negatively related to market capitalization (Size), indicating that large firms tend to have smaller B/M ratios and Beta compared to their small stock counterparts. However, none of these associations is significant.

Panel B provides descriptive statistics about counts of firm-quarters sorted by their quarterly growth rates in OEG, EBG, and CFG, as well as about the total counts of all firm-quarters with required data. The CHG and CLG portfolios tend to have approximately the same number of firms. The same can be said about the number of stocks in the IHG and ILG groups. Panel B indicates that growth stocks (CHG and IHG) have positive average growth rates in all three accounting measures (i.e., OEG, EBG, and CFG) for the last rolling four quarters, ranging from 0.35 (OEG) for IHG to 1.21 (OEG) for CHG firms. On the other hand, their low-growth counterparts (i.e., CLG and ILG firms) have negative growth rates in the same measures, ranging from -0.34 (OEG) to -1.24 (OEG) for ILG and CLG firms, respectively.

The CHG and CLG firms are slightly smaller in terms of market values, with relatively higher betas compared to those of the average sample IHG and ILG firms. However, in comparison to the inconsistent firms (IHG and ILG), the CHG firms have lower B/M ratios, while their CLG firm counterparts tend to have greater B/M ratios.

Table I
Summary statistics and correlations

Panel A: Spearman (Pearson) correlations are in the upper-right (lower-left) diagonal

Variables	Variables					
	OEG	**EBG**	**CFG**	**B/M**	**BETA**	**SIZE**
OEG		0.87	0.86	0.14	0.54	-0.05
EBG	0.75		0.82	0.19	0.49	-0.03
CFG	0.78	0.68		0.15	0.57	-0.02
B/M	0.26	0.23	0.21		0.53	-0.48
BETA	0.46	0.55	0.51	0.48		-0.56
SIZE	0.15	0.11	0.13	-0.17	-0.50	

Panel B: Firms with required data

Statistics	Portfolios				
	CHGP	**IHGP**	**ILGP**	**CLGP**	**ALL**
Firms	826	2,847	2,859	812	11,436
OEG	1.21	0.35	-0.34	-1.24	0.03
EBG	1.16	0.33	-0.28	-1.14	0.05
CFG	1.19	0.38	-0.31	-1.18	0.06
Beta	1.22	1.04	1.02	1.15	1.03
B/M	0.67	0.78	0.89	1.02	0.82
Size	982	1,274	1,248	865	1,471

At the end of each quarter from the fourth quarter of 1975 to the third quarter of 2011, firms with required data on past earnings (OEG and EBG) and cash flow (CFG) are ranked by their growth rates in these metrics over the last rolling four quarters and assigned to 3 categories: top 30 percent, middle 40 percent, and bottom 30 percent. Firms consistently ranking in the highest (lowest) 30 percent in all quarters included in the estimation intervals are defined as "*consistent high (low) growth firms*." Firms that rank in the top (bottom) 30 percent for at least one, but no more than two quarters are labeled as "*inconsistent high (low) growth firms.*"

Variable definitions:

OEG = the average growth rate in quarterly operating earnings over the last rolling four quarters before portfolios are formed.

EBG = the average growth rate in quarterly earnings before extraordinary items and discontinued operations over the last rolling four quarter before portfolios are formed.

CFG = the average growth rate in quarterly cash flow over the last rolling four quarters before portfolios are formed. It is calculated as the quarterly earnings before extraordinary items and discontinued operation plus depreciation and amortization expense.

B/M = the quarterly book-to-market ratios at the end of the most recent quarter before portfolios are formed.

Beta = a firm market beta and it is computed using monthly return data for the last 60 months with a minimum of at least 36 months before portfolios are formed.

Size = the market value of equity capital in millions, calculated as the number of shares outstanding multiplied by the market price at the end of the last quarter.

Firms = the average number of firm-year observations with required data.

CHG = consistent high-growth firms.

IHG = inconsistent high-growth firms.

CLG = consistent low-growth firms.
ILG = inconsistent low-growth firms.

4. Empirical tests

4.1 Portfolio formation

Four equal-weighted individual portfolios formed based on consistency in quarterly earnings (i.e., CHG, IHG, CLG, and ILG portfolios) and two hedge portfolios shown in Figure II are held without rebalancing for the next 12 months following the ranking period, and their returns are measured.[6] The first hedge portfolio takes a long position in consistent high-growth firms (CHG) and a short position in inconsistent high-growth firms (IHG); it is called a "*high-growth portfolio*" and its return is referred to as "CHG – IHG." The second hedge portfolio buys consistent low-performing firms (CLG) and sells inconsistent low-growth firms (ILG); it is defined as a "*low-growth portfolio*" and its return performance is labeled as "CLG – ILG."

4.2 Portfolio results

Table II presents the average monthly returns for portfolios formed based on quarterly growth consistency in OEG. The returns for EBG and CFG portfolios are virtually the same as those of OEG portfolios and, in the interest of simplicity, they are not reported. The average buy-and-hold monthly returns over four periods, 3, 6, 9, and 12 months, are provided in Panel A, while the average buy-and-hold monthly returns for four sub-holding periods of three months each (months 1 to 3, months 4 to 6, months 7 to 9, and months 10 to 12) are presented in Panel B. The average return for each sub-period (months 1 to 3, months 4 to 6, months 7 to 9, and months 10 to 12) is calculated independently from the average return of other sub-periods.

Results reported in Panel A show that growth consistency in quarterly operating earnings generates substantial financial momentum that continues to be statistically and economically significant for the next twelve months following the ranking interval. This price run is more pronounced for consistently top (bottom) ranking firms relative to their inconsistent performer counterparts. As shown under the CHG – IHG column, the average monthly return differential between the CHG and IHG portfolios, that is, the CHG – IHG return, falls between 0.88 percent (t = 8.21) and 0.36 percent (t = 5.64) for the three-and twelve-month horizons, respectively. Similarly, the average monthly return gap between the CLG portfolio and ILG firms, that is, the CLG – ILG return, ranges from -0.85 percent (t = -7.65) for the first three months and -0.37 percent (t = -4.78) for the last three months of the holding period (see the CLG – ILG column of Panel A). The return differential between CHG firms and their CLG counterparts, which is shown under the CHG – CLG column, tells a similar story. The average monthly return spread between these two portfolios declines from 2.43 percent (t = 15.54) for the first three months to 1.06 percent (t = 11.03) for the 12-month holding period (see the last row of the CHG – CLG column).

Taken at face value, this evidence would suggest an investor underreaction to consistency of quarterly earnings news. However, when the 12- month holding period is broken down into four sub-periods of three months each (months 1 to 3, months 4 to 6, months 7 to 9, and months 10 to 12), and the return for each sub-period is computed independently from that of other sub-periods, a different picture emerges. This picture reveals securities markets in which investors systematically overreact to persistent earnings signals, pushing stock prices above (below) their

[6] I rerun my analysis using value-weighted returns and I find no differences between the value-weighted and the equal-weighted results.

fair values. Eventually, this overreaction will reverse as further information pushes back share prices to fundamentals.

A closer look at Panel B indicates that the financial momentum for all portfolios continues to move in the same trajectory of past earnings until reaching its peak at the end of the first three months after the ranking period. However, from month 4 to the end of the holding period, all these portfolios experience price reversals. The reversal is more pronounced for CHG and CLG portfolios relative to their inconsistent portfolio (IHG and ILG) cohorts. As the holding period draws to a close, the momentum has been completely wiped out by subsequent reversals in stock prices.

The average monthly return, for example, for the CHG firms for the first three months (months 1 to 3) is 2.80 percent, but their average monthly return for the next three months (months 4 to 6) drops to 2.10 percent; by the fourth quarter (months 10 to 12), it slides to 1.68 percent a month. The average monthly return for the IHG portfolio shows a similar pattern as that of the CHG firms, but on a smaller scale. This pattern is reflected in their return differential, that is, the CHG – IHG return, which drops from 0.88 percent (t = 8.21) a month in the first-three months to -0.01 percent (t = -0.24) per month for the last three months of the holding period (months 10 to 12). The bulk of this reversal comes from the decline in monthly returns of the CHG stocks.

Returns of CLG and ILG portfolios exhibit the same patterns, but in the opposite direction. In the first three months, the CLG firms earns 0.37 percent (t = 1.76) per month, as shown in Panel B under the CLG column, but its average monthly return for the next three months (months 4 to 6) increases to 0.88 percent (t = 5.17). By the end of the holding period, the return for the CLG firms is 1.59 percent (t = 7.25) a month for months 10 to 12 (the last three months). The average monthly return for the ILG firms tells a similar story, but with a much weaker price reversal. The return gap between CLG and ILG portfolios increases from an average of -0.85 percent (t = -7.65) a month for the first three months to 0.09 percent (t = 0.67) per month for the last three months (months 10 to 12) as shown under the CLG – ILG column in Panel B.

Results reported in Panel B paint a picture of a market that systematically overreacts to information signals contained in consistency of past performance measures; eventually, this mispricing corrects itself as investors learn that their prior expectations are unwarranted. The most revealing evidence of this overreaction and subsequent correction is the return gap between the CHG and CLG portfolios, that is, the CHG – CLG return, that falls from 2.43 percent (t = 15.54) in the first three months to 0.09 percent (t = 0.61) for the last three months of the holding period, as shown under the CHG – CLG column in Panel B. This stunning reversal is driven equally by the price performance of both the CHG and CLG portfolios.

To better understand the dynamic of the strong earnings momentum and subsequent price reversals that are exhibited by CHG and CLG stocks, I examine the behavior of quarterly changes in returns on assets (ROA) of CHG and CLG firms over nine consecutive quarters, from quarter q – 4 to quarter q +4 (see Figure III). Quarters q – 4 to q – 1 refer to the four quarters that immediately precede the ranking period (quarter q), while quarters q + 1 to q + 4 are the four quarters subsequent to quarter q. ROA is measured as the change in current quarterly operating earnings per share compared to the same quarter a year prior, and divided by the lagged total assets per share. I use the lagged total assets per share in the denominator because assets are likely to be stable over a relatively short period of time and, unlike stock prices, assets are unlikely to be affected by changes in reported quarterly earnings.

As shown in Figure III, the quarterly change in ROA for both CHG and CLG firms exhibits increasing (declining) patterns over the four quarters (q – 4 to q – 1) leading to the ranking period (quarter q). These patterns reach their peak at the end of quarter q. However, the quarterly change in ROA grinds to a halt in the following two quarters (i.e., q +1 and q +2), and even switches directions, that is, becomes positive (negative), for CLG (CHG) firms in the remaining two quarters (i.e., q + 3 and q +4).

According to the behavioral models (e.g., Daniel et al., 1998; Barberis et al., 1998), when observing a string of good (bad) earnings performance reported by CHG (CLG) firms, investors are likely to conclude erroneously that the future performance of these firms is unlikely to be different than their performance in the recent past. This assumption will lead to a market overreaction that subsequently reverts to fundamentals when future reported quarterly earnings fail to meet investor expectations. This prediction is consistent with my finding that CHG (CLG) firms exhibit strong earnings momentum that pushes their share prices away from their underlying values. Subsequently, however, this mispricing is corrected when investors realize that their prior expectations are not fully warranted.

It is evident from Figure III that earnings momentum can be best described as the first stage in the patterns of mispricing growth and value firms documented in the literature (e.g., Lakonishok et al., 1994). From B/M ratios reported in Table I coupled with the patterns of quarterly changes in ROA graphically presented in Figure III, it is quite clear that the CHG and CLG firms tend to behave as growth and value stocks, respectively.

Table II

Panel A: Average monthly returns for portfolios based on consistency in quarterly OEG

Portfolios / Holding Periods	CHG	IHG	CLG	ILG	CHG – IHG	CLG – ILG	CHG – CLG
3 Months	2.80	1.92	0.37	1.22	0.88	-0.85	2.43
	15.63	**13.10**	**1.76**	**8.11**	**8.21**	**-7.65**	**15.54**
6 Months	2.45	1.83	0.63	1.30	0.67	-0.67	1.82
	15.59	**13.42**	**3.47**	**9.02**	**7.31**	**-7.31**	**14.26**
9 Months	2.22	1.74	0.83	1.36	0.48	-0.53	1.37
	11.90	**10.52**	**4.06**	**8.17**	**6.92**	**-6.35**	**11.34**
12 Months	2.08	1.72	1.02	1.39	0.36	-0.37	1.06
	10.46	**10.18**	**4.76**	**8.07**	**5.64**	**-4.78**	**11.03**

Panel B: Average monthly returns for sub-holding periods for portfolios based on consistency in quarterly OEG

Portfolios / Sub-Holding Periods	CHG	IHG	CLG	ILG	CHG – IHG	CLG – ILG	CHG – CLG
1 to 3 Months	2.80	1.92	0.37	1.22	0.88	-0.85	2.43
	15.63	**13.10**	**1.76**	**8.11**	**7.81**	**-7.65**	**15.54**
4 to 6 Months	2.10	1.70	0.88	1.38	0.40	-0.49	1.22
	12.38	**12.24**	**5.17**	**9.08**	**4.31**	**-5.69**	**8.83**
7 to 9 Months	1.75	1.64	1.22	1.46	0.11	-0.23	0.53
	10.29	**12.21**	**6.34**	**10.05**	**1.44**	**-2.21**	**3.71**
10 to 12 Months	1.68	1.69	1.59	1.50	-0.01	0.09	0.09
	8.02	**10.67**	**7.25**	**10.55**	**-0.24**	**0.67**	**0.61**

This table provides average monthly return performance for portfolios formed based on consistency in growth rates in OEG. The CHG – IHG portfolio buys CHG stocks and sells short IHG firms, while the CLG – ILG portfolio takes a long position in CLG and a short position in ILG stocks. The CHG – CLG is the return differential between CHG and CLG portfolios. These portfolios are held without rebalancing for the ensuing 12 months (please see Table I for portfolio formation procedures). Returns in Panel A are calculated as the average buy-and-hold monthly returns for 3-, 6-, 9-, and 12-month horizons. In Panel B, however, the holding period is divided into four sub-periods of three months each (months 1 to 3, months 4 to 6, months 7 to 9, and months 10 to 12), and returns are calculated as the average buy-and-hold monthly returns for each sub-period independently from the average returns of other sub-periods. Newey West t-statistics are shown in **bold** below the portfolio returns. The sample period is from the fourth quarter of 1975 to the third quarter of 2011.

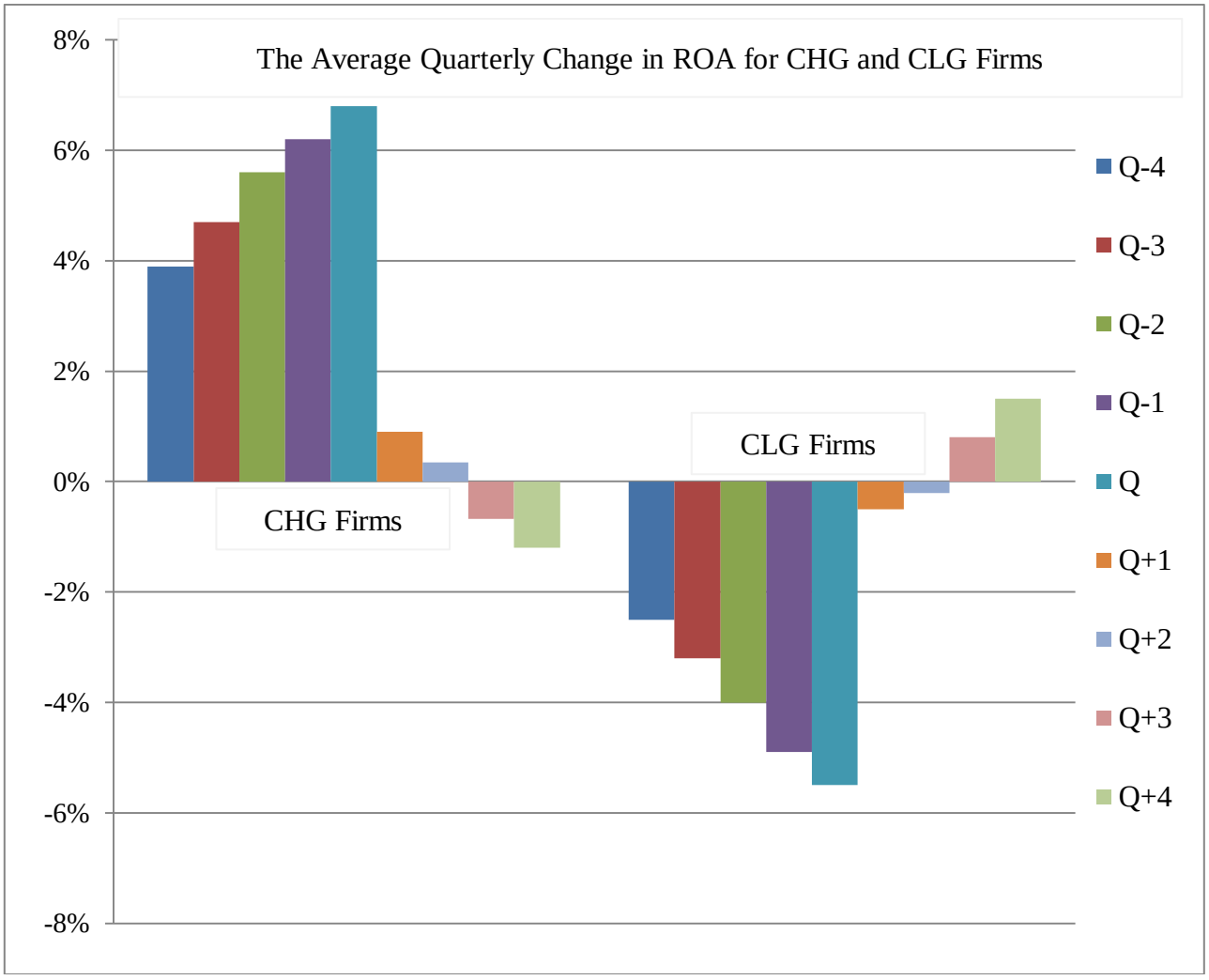

Figure III: In this figure, I graph the average quarterly change (growth/decline) in returns on assets (ROA) for consistent high-growth (CHG) and consistent low-growth (CLG) firms over nine consecutive quarters (q – 4 to q +4), where q is the ranking quarter, while q –1 to q – 4 refer to the four quarters immediately preceding quarter q, and q +1 to q + 4 are the four quarters subsequent to quarter q. ROA is calculated as the change in current quarterly operating earnings (OEG) per share compared to the same quarter from one year ago, divided by the lagged assets per share over the period from 1974 to 2012. It is intended to show the patterns of quarterly earnings changes (growth/decline) for both CHG and CLG firms over the four quarters prior to the ranking period, as well as the four quarters following the ranking quarter. I use the lagged total asset per share as a denominator because assets tend to be stable over a relatively short period and they are unlikely to be affected by changes in reported quarterly earnings.

4.3 Regression analysis

Table III presents the average monthly four-factor alphas from the time-series regressions of the Fama-French three factor model (Market-RF, size, and B/M) and the momentum factor (UMD) for portfolios based on consistency in quarterly OEG. Results for the EBG and CFG

portfolios are basically the same as those of OEG firms and, for simplicity of presentation, they are omitted. The average monthly alphas from the regressions over four periods, 3, 6, 9, and 12 months are reported in Panel A, while the average monthly alphas for four sub-periods of three months each (months 1 to 3, months 4 to 6, months 7 to 9, and months 10 to 12) are displayed in Panel B.

As shown in Panel A, the average monthly estimated intercepts (four-factor alphas) increase monotonically from -0.21 percent (t = -1.56) for the CLG portfolio, to 0.50 percent (t = 2.66) for the ILG portfolio, to 1.41 percent (t = 4.67) for the IHG portfolio, to 2.22 percent (t = 6.72) for the CHG portfolio in the first three-month period. Similarly, the differences in average monthly alphas for these portfolios increase uniformly from -0.71 percent (t = -4.62) for the CLG – ILG, to 0.81 percent (t = 5.44) for the CHG – IHG, to 2.43 percent (t = 13.68) for the CHG – CLG (see the last three columns of Panel A). These patterns hold across the remaining three horizons, i.e., 6-, 9-, and 12-month periods (see Panel A).

A closer look at Panel A reveals that consistent high-growth firms (CHG) outperform their inconsistent high-growth firm (IHG) counterparts by a significant margin for the entire holding period, ranging from 0.81 percent (t = 5.44) a month for the 3-month horizon to 0.36 percent (t = 4.75) per month for the 12-month period. On the other hand, consistent low-growth stocks (CLG) underperform their inconsistent low-growth (ILG) cohorts by a similar rate, falling between -0.71 percent (t = -4.62) per month and -0.33 percent (t = -3.81) a month for the 3- and 12-month periods, respectively.

Furthermore, the average abnormal monthly return differential between the CHG and CLG portfolios (i.e., the CHG – CLG return) is 2.43 percent (t = 13.68) for the first three months, but it drops to 1.02 percent (t = 8.90) by the end of the holding period (see Panel A, under the CHG – CLG column). Similar to evidence reported in Panel A of Table II, this evidence suggests a market momentum that continues to be statistically and economically significant over the following twelve months.

However, when I break my 12- month holding period down into four-sub-periods of three months each (months 1 to 3, months 4 to 6, months 7 to 9, and months 10 to 12), a different picture emerges, as shown in Panel B, Table III. Evidence reported in Panel B reveals strong financial momentum that reaches its peak at the end of the first quarter after the ranking period (months 1 to 3) and then begins to reverse. By the end of the holding period, the momentum has been completely wiped out by the subsequent reversals in share prices (months 10 to 12). For instance, the CHG – IHG portfolio has an average abnormal monthly return of 0.81 percent (t = 5.44) for the first three months, but subsequently this average declines to 0.43 percent (t = 4.53), 0.21 percent (t = 1.87), and -0.02 percent (t = -0.28) for months 4 to 6, months 7 to 9, and months 10 to 12, respectively (see Panel B under the CHG – IHG column).

The average abnormal monthly return for the CLG – ILG portfolio tells a similar story (see Panel B under the CLG – ILG column). As shown in Panel B, the average abnormal monthly return for the CLG – ILG firms in the first three months (months 1 to 3) is -0.71 percent (t = -4.62), but subsequently the portfolio earns average abnormal monthly returns of -0.40 percent (t = -4.71) for months 4 to 6, -0.14 percent (t = -1.09) for months 7 to 9, and -0.03 percent (t = -0.41) for months 10 to 12. Similarly, the average abnormal monthly return for the CHG – CLG portfolio varies from 2.43 percent (t = 13.68) to -0.01 percent (t = -0.16) for months 1 to 3 and months 10 to 12, respectively (see under the CHG – CHG column).

Taken together, the findings reported in Tables II and III reveal securities markets in which investors systematically overreact to an unbroken string of good or bad quarterly earnings

news. Eventually, this market overreaction is corrected, resulting in financial momentum and subsequent reversal in returns. This momentum reaches its peak at the end of the first quarter (three months) after the ranking horizon and begins to reverse over the next 9-month period. By the end of the holding horizon, the momentum effect has been completely offset by the subsequent price reversal.

This result suggests that consistency in earnings news produces statistically and economically significant financial momentum that is gradually corrected as further information shows that prior market expectations were not fully justified. Moreover, results reported in this study are consistent with the predictions of psychology-based theories, particularly models proposed by Barberis et al. (1998) and Daniel et al. (1998). Although these models differ in their view of the intermediate positive price run, they predict that consistency in a firm's performance in the past should lead investors to conclude erroneously that the future prospects of the firm can be predicted from its performance in the recent past.[7]

By showing that consistency in good (bad) earnings news creates strong financial momentum that is subsequently wiped out by price reversal, I provide evidence that empirically links the earnings news momentum (e.g., Bernard and Thomas, 1989) to the value/glamour effect (e.g., Lakonishok et al., 1994). This finding extends that of Lee and Swaminathan (2000), whose evidence reconciles the market underreaction (Jegadeesh and Titman, 1993) and long-term price reversal (DeBondt and Thaler, 1985).

Results documented in this study contradict the findings of Chan et al. (2004). These differences could be due to three major reasons. First, in this study, a firm is defined as a consistent high (low) growth firm if it consistently ranks in the top (bottom) 30 percent based on its quarterly financial performance over the last rolling four quarters included in the ranking period.[8] However, in Chan et al. (2004) firms are broken down into two groups: consistent high- and low-growth firms based on their median growth rates over the last four quarters.

Second, to examine whether quarterly growth consistency leads to systematic errors in expectations, I compare the return performance of consistent high (low) growth stocks with that of inconsistent good (bad) performers, as illustrated in Figure II. On the other hand, Chan et al. (2004) combine consistent good (bad) performers into one portfolio (A) and inconsistent good (bad) performers into another (B), and then compare the return differential of these two portfolios. As illustrated in Figure II, their study does not examine the impact of the direction (i.e., consistency) of past quarterly earnings on future prices.

Finally, Chan et al. (2004) use a holding period that begins three months after their ranking period. However, in this study, I follow Alwathainani (2012b) by tracking the return performance of my portfolios from the first month after the ranking quarter (quarter t).[9] This research design allows me to capture the full extent of the market reaction to firms' preannouncements of their quarterly earnings. In this study, I provide evidence that supports this assumption. As shown in Panel B of Table III, the financial momentum associated with earnings consistency reaches its peak at the end of the third month following the ranking period and then

[7] In unreported results, I repeat my regression analysis for January and months outside of January (i.e., December-February) and my findings remain qualitatively the same. Additionally, I use the largest 50 percent of firms in terms of their equity market value and obtain similar results, although the magnitude of the momentum and reversal in stock prices is slightly smaller relative to the results reported, suggesting that my findings are not driven by firm-size effects or transaction costs.

[8] In an earlier draft, I used six quarters instead of four and I obtained similar results.

[9] For robustness checks, I form my portfolios with one- and two-month lags and I obtain similar results as those reported in this study.

begins to reverse. By the end of the sixth month after the portfolio formation date, more than one half of the initial financial momentum has been reversed (see under the CHG – CLG column).

Skinner and Sloan (2002, 290-291) argue that their research design provides a powerful test that captures the full dynamics of investors' reactions to preannouncements of earnings news that are documented in the literature. Further, they argue that their method avoids the shortcomings of research designs that examine market price movements around earnings announcement dates because many companies preannounce their earnings. Researchers (e.g., Skinner, 1994, 1997; Kasznik and Lev, 1995; Soffer et al., 2000) provide evidence indicating that a large number of firms, particularly growth firms, preannounce their earnings. Skinner (1997) and Soffer et al. (2000) show that 75 percent of these earnings preannouncements take place within two weeks on either side of the fiscal quarter end. On the other hand, Chan et al. (2004) form their portfolio tests three months after the ranking period.

Table III

Panel A: The average monthly four factor FF alphas for portfolios based on consistency in OEG

Portfolios / Holding Periods	CHG	IHG	CLG	ILG	CHG – IHG	CLG – ILG	CHG – CLG
3 Months	2.22	1.41	-0.21	0.50	0.81	-0.71	2.43
	6.72	**4.67**	**-1.56**	**2.66**	**5.44**	**-4.62**	**13.68**
6 Months	1.88	1.26	0.12	0.71	0.62	-0.59	1.76
	8.31	**6.91**	**0.87**	**3.05**	**5.39**	**-5.27**	**12.54**
9 Months	1.70	1.23	0.35	0.78	0.47	-0.43	1.35
	7.73	**6.81**	**2.01**	**4.21**	**4.60**	**-4.08**	**9.62**
12 Months	1.54	1.18	0.52	0.85	0.36	-0.33	1.02
	7.55	**6.84**	**2.33**	**4.88**	**4.75**	**-3.81**	**8.90**

Panel B: The average monthly four factor FF alphas for sub-holding periods for portfolios based on consistency in OEG

Portfolios / Sub-Holding Periods	CHG	IHG	CLG	ILG	CHG – IHG	CLG – ILG	CHG – CLG
1 to 3 Months	2.22	1.41	-0.21	0.50	0.80	-0.71	2.43
	6.72	**4.67**	**-1.56**	**2.66**	**5.44**	**-4.62**	**13.68**
4 to 6 Months	1.54	1.11	0.45	0.85	0.43	-0.40	1.09
	6.80	**5.95**	**2.41**	**3.48**	**4.53**	**-4.71**	**7.66**
7 to 9 Months	1.36	1.15	0.81	0.95	0.21	-0.14	0.41
	7.79	**6.83**	**3.51**	**5.79**	**1.87**	**-1.09**	**3.50**
10 to 12 Months	1.01	1.03	1.02	1.05	-0.02	-0.03	-0.01
	4.63	**5.70**	**5.88**	**5.32**	**-0.28**	**-0.41**	**-0.16**

This table provides the average monthly four-factor regression alphas from the Fama-French three-factor (Market-RF, size and B/M) model and the momentum factor (UMD) for high-growth and low-growth portfolios. Panel A presents the average monthly returns over subsequent 3-, 6-, 9-, and 12-month periods, while Panel B reports the average monthly returns for each sub-period (months 1 to 3, months 4 to 6, months 7 to 9, and months 10 to 12). The regressions for each sub-period are estimated independently from those of other sub-periods. The CHG – IHG portfolio takes a long position in consistent high-growth firms (CHG) and a short position in inconsistent high-growth firms (IHG), and its return is defined as CHG – IHG. Additionally, the CLG – ILG portfolio buys

stocks in consistent low-growth firms (CLG) and sells shares in inconsistent low-growth stocks (ILG), and its return is referred to as CLG – ILG. The return differential between CHG and CLG is CHG – CLG. These portfolios are held without rebalancing for the ensuing 12 months (please see Table I for portfolio formation procedures). The dependent variables in these cross-sectional monthly regressions are the monthly returns for each portfolio less the risk-free rate, except for the return differentials of CHG – IHG, CLG – ILG, and CHG – CLG. Newey West t-statistics are shown in **bold** below portfolio returns. The sample period is from the fourth quarter of 1975 to the third quarter of 2011.

4.4 Robustness tests

4.4.1 Discriminating between financial and earnings surprise momentum

The earnings momentum literature has shown that a firm's earnings surprise can predict the future price movement of the firm for up to twelve months following the firm's earnings announcement date (e.g., Ball and Brown, 1968; Foster et al., 1984; Bernard and Thomas, 1989). To discriminate between the financial earnings momentum reported in Tables II and III and the earnings surprise effect, I repeat my analysis in Table III after excluding earnings surprise firms. To eliminate earnings surprise stocks, at the end of each quarter from the fourth quarter of 1975 to the third quarter of 2011, I rank my sample firms by their standardized earnings surprises (SUE) and assign them into ten deciles. The top (bottom) deciles include stocks with the highest (lowest) SUE. Then, I purge firms included in each ranking period from stocks in the highest and lowest SUE deciles. This stringent filter enables me to discriminate between investors' reactions to quarterly growth consistency and earnings surprises.[10]

Table IV reports the average monthly four-factor regression alphas from the Fama-French three-factor (Market-RF, size and B/M) model and the momentum factor (UMD) for high- and low-growth firms after eliminating earnings surprise firms. The results shown in Table IV indicate that the financial momentum reported in Table III is still statistically and economically significant after excluding earnings surprise firms. For example, the CHG firms continue to outperform their IHG counterparts by a significant margin, while the CLG stocks underperform stocks in the ILG portfolio by a similar margin. This evidence suggests that the financial momentum documented in Tables II and III is distinct from post-earnings announcement surprises.[11]

[10] For robustness checks I remove firms in the top (bottom) 20 percent and 30 percent of SUE, with no impact on my findings. Results reported in Table 4 are based on excluding the highest (lowest) 10 percent of SUE. I believe this method is more stringent at capturing earnings surprises than the other two, and it is consistent with the post-earnings announcement literature (e.g., Bernard and Thomas, 1989).

[11] In unreported analysis, I divided my sample period (1975-2011) into four equal sub-periods and I obtained similar results as those reported in Tables 2 and 3. As well, in untabulated results, I include industry dummies in the regression analysis and my findings remain unchanged.

Table IV

The average monthly four factor FF alphas for portfolios based on consistency in OEG after excluding earnings surprise firms

Portfolios / Holding Periods	CHG	IHG	CLG	ILG	CHG – IHG	CLG – ILG	CHG – CLG
3 Months	2.05	1.18	-0.07	0.54	0.87	-0.61	2.12
	5.24	**3.56**	**-0.16**	**1.50**	**4.86**	**-3.66**	**10.34**
6 Months	1.63	1.03	-0.00	0.55	0.60	-0.55	1.63
	7.40	**5.26**	**-0.00**	**2.61**	**4.75**	**-4.64**	**10.09**
9 Months	1.59	1.17	0.39	0.79	0.42	-0.41	1.20
	6.65	**6.01**	**1.58**	**3.97**	**3.67**	**-3.43**	**8.36**
12 Months	1.45	1.14	0.53	0.83	0.31	-0.29	0.92
	6.61	**6.11**	**2.26**	**4.41**	**3.71**	**-2.90**	**7.96**

This table provides the average monthly four-factor regression alphas from the Fama-French three-factor (Market-RF, size and B/M) model and the momentum factor (UMD) after excluding earnings surprise firms for high-growth and low-growth portfolios over subsequent 3-, 6-, 9-, and 12-month periods. The CHG – IHG portfolio takes a long position in consistent high-growth firms (CHG) and a short position in inconsistent high-growth firms (IHG) and its return is defined as CHG – IHG. Additionally, the CLG – ILG portfolio buys stocks in consistent low-growth firms (CLG) and sells shares in inconsistent low-growth stocks (ILG); its return is referred to as CLG – ILG. The return differential between CHG and CLG is CHG – CLG. These portfolios are held without rebalancing for the ensuing 12 months (please see Table I for portfolio formation procedures). To eliminate earnings surprise stocks, at the beginning of each quarter from the fourth quarter of 1975 to the third quarter of 2011, I ranked my sample firms by their standardized earnings surprises (SUE) and assigned them into ten deciles. The top (bottom) deciles include stocks with the highest (lowest) SUE. Then, I purge firms included in each ranking period from stocks in the highest and lowest SUE deciles. The dependent variables in these cross-sectional monthly regressions are the monthly return for each portfolio less the risk-free rate except for the return differentials of CHG – IHG, CLG – ILG, and CHG – CLG. Newey West t-statistics are shown in **bold** below portfolio returns. The sample period is from the fourth quarter of 1975 to the third quarter of 2011.

4.4.2 Consistent profitability of the CHG – CLG strategy

In this section I examine how often the CHG stocks underperform firms in the CLG portfolio. If the high return earned by the CHG firms represents compensation for risk that is priced by the market but is not captured by the four-factor regression, the Fama-French three-factor (Market - RF, size and B/M) model, and the momentum factor (UMD), then the CHG portfolio should underperform its CLG cohorts during "bad" states of the economy since CHG stocks will be unattractive to risk-averse investors during down markets. In these states, the CHG – CLG portfolio should generate a negative return.

Figure IV presents the average monthly four-factor alphas from the Fama-French (Market-RF, size, B/M) model and the momentum factor (UMD), excluding earnings surprise firms for the CHG – CLG portfolio for each year of the sample period. As shown in Figure IV, the returns for the CHG – CLG portfolio are positive in 34 out of 36 years. The consistent profitability of the CHG – CLG portfolio does not support the view that CHG firms are fundamentally riskier than their CLG counterparts. If the return for the CHG firms is reward for

risk exposure, the CHG – CLG strategy should have reported negative returns more often (see Bernard and Thomas, 1989; Fama and MacBeth, 1973 for a review).

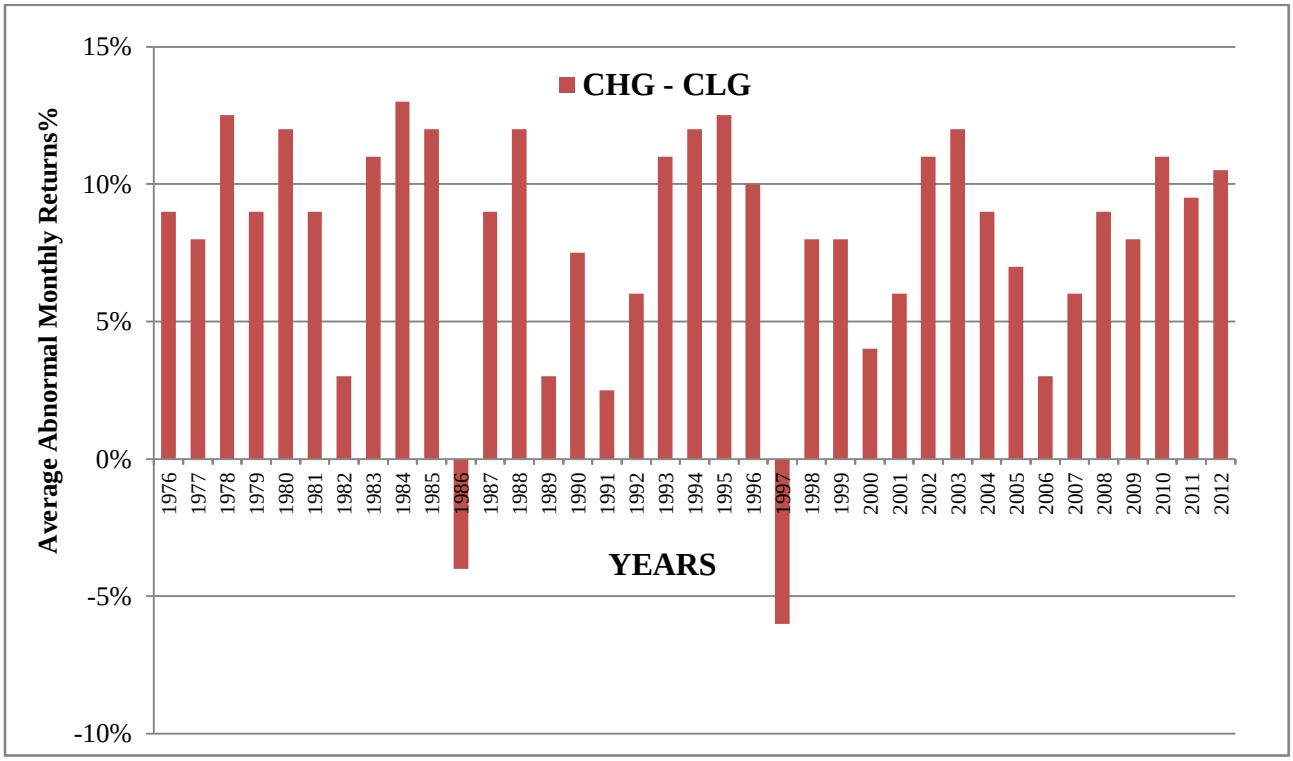

Figure IV: This figure presents the average monthly four-factor regression alphas for the CHG – CLG portfolio for each year (1976-2012) from the Fama-French three-factor (Market-RF, size and B/M) model and the momentum factor (UMD) after excluding earnings surprise firms. The CHG – CLG portfolio takes a long position in consistent high-growth firms (CHG) and a short position in consistent low-growth firms (CLG). It is held without rebalancing for the ensuing 12 months (please see Table I for portfolio formation procedures). To eliminate earnings surprise stocks, at the end of each quarter from the fourth quarter of 1975 to the third quarter of 2011, I ranked my sample firms by their standardized earnings surprises (SUE) and assigned them into ten deciles. The top (bottom) deciles include stocks with the highest (lowest) SUE. Then, I purge firms included in each ranking period, from stocks in the highest and lowest SUE deciles. The dependent variable in this cross-sectional monthly regression is the monthly return for the CHG – CLG. The sample period is from the fourth quarter of 1975 to the third quarter of 2011.

4.4.3 Alternative measure of growth

The results reported thus far are based on the consistency of the earnings growth rate divided by the absolute value of the average per share lagged value for the same measure in the last two quarters, as in Alwathainani (2012b). In this section, in order to assess the robustness of my findings, I use two measures that have been used in the literature as denominators. The first is a share price used in the earnings-to-price ratios, or E/P (e.g., Lakonishok et al., 1994), and the second is lagged asset per share, used by Chan et al. (2004). Using these measures in the denominators, I compute growth in earnings as a change in earnings per share in the current quarter from the corresponding quarter of last year, divided by stock price at the end of the quarter, that is, E/P (quarterly operating earnings growth divided by share price), and lagged

asset per share, that is, E/A (quarterly operating earnings growth divided by lagged asset per share).

In Table V, using the above two growth measures, I report the average monthly four-factor alphas from the Fama-French three-factor (Market-RF, size, B/M) model and the momentum factor (UMD) for the growth portfolios in order to demonstrate that my results are robust to other growth proxies used in the literature. The average monthly four-factor regression alphas for portfolios based on growth consistency in E/P and E/A are reported in Panels A and B, respectively.

Table V

Panel A: the average monthly four factor FF alphas for portfolios based on consistency in E/P (quarterly operating earnings change divided by share price)

Portfolios / Holding Periods	CHG	IHG	CLG	ILG	CHG – IHG	CLG – ILG	CHG – CLG
3 Months	2.21	1.49	-0.15	0.42	0.72	-0.57	2.36
	5.26	**4.73**	**-0.35**	**1.17**	**5.31**	**-4.45**	**15.86**
6 Months	1.74	1.28	0.06	0.48	0.46	-0.42	1.68
	6.28	**4.84**	**0.21**	**2.36**	**4.72**	**-4.12**	**10.52**
9 Months	1.65	1.25	0.40	0.72	0.40	-0.32	1.25
	6.15	**5.71**	**1.60**	**3.67**	**4.78**	**-3.14**	**8.97**
12 Months	1.45	1.21	0.54	0.76	0.24	-0.20	0.91
	5.98	**6.82**	**2.34**	**3.83**	**2.41**	**-2.18**	**8.62**

Panel B: the average monthly four factor FF alphas for portfolios based on consistency in E/A (quarterly operating earnings change divided by asset per share)

Portfolios / Holding Periods	CHG	IHG	CLG	ILG	CHG – IHG	CLG – ILG	CHG – CLG
3 Months	2.15	1.44	-0.15	0.47	0.71	-0.63	2.30
	5.34	**4.08**	**-0.34**	**1.38**	**4.48**	**-4.72**	**14.25**
6 Months	1.73	1.21	-0.02	0.49	0.52	-0.51	1.75
	6.35	**5.85**	**-0.08**	**2.40**	**4.56**	**-4.96**	**10.07**
9 Months	1.60	1.22	0.34	0.75	0.38	-0.41	1.26
	5.67	**6.26**	**1.45**	**3.82**	**3.25**	**-3.30**	**8.56**
12 Months	1.49	1.18	0.51	0.79	0.31	-0.28	0.98
	5.52	**6.55**	**2.10**	**4.26**	**2.78**	**-2.56**	**8.74**

This table provides the average monthly four-factor regression alphas from the Fama-French three-factor (Market-RF, size and B/M) model and the momentum factor (UMD) for high-growth and low-growth portfolios over subsequent 3-, 6-, 9-, and 12-month periods. Panel A presents the average monthly returns for portfolios formed based on consistency in E/P, measured as a change in current quarter operating earnings per share from the same quarter one year ago divided by the stock price at the end of the quarter. Similarly, Panel B reports the average monthly returns for portfolios based on consistency in E/A, measured as a change in current quarter operating earnings from the same quarter one year ago divided by the lagged asset per share. The CHG – IHG portfolio takes a long position in consistent high-growth firms (CHG) and a short position in inconsistent high-growth firms (IHG); its return is defined as CHG – IHG. Additionally, the CLG – ILG

portfolio buys stocks in consistent low-growth firms (CLG) and sells shares in inconsistent low-growth stocks (ILG); its return is referred to as CLG – ILG. The return differential between CHG and CLG is CHG – CLG. These portfolios are held without rebalancing for the ensuing 12 months (please see Table I for portfolio formation procedures). The dependent variables in these cross-sectional monthly regressions are the monthly return for each portfolio less the risk-free rate except for the return differentials of CHG – IHG, CLG – ILG, and CHG – CLG. Newey West t-statistics are shown in **bold** below portfolio returns. The sample period is from the fourth quarter of 1975 to the third quarter of 2011.

5. Conclusions

In this paper, I examine the impact of a firm's consistent good (bad) quarterly earnings signals on market expectations. Specifically, I investigate whether consistent earnings signals trigger a market overreaction, as suggested by recent psychology-based theories (e.g., Daniel et al., 1998; Barberis et al., 1998). If the market overreacts to patterns of reported earnings performance, firms with a string of relatively high (low) quarterly earnings in the past will experience strong financial momentum followed by a reversal in their share prices.

My finding shows that earnings signal consistency creates substantial financial momentum that continues to be statistically and economically significant over the next twelve months. The momentum is more pronounced for consistently well (poor) performing firms relative to their inconsistent good (bad) counterparts. When taken at face value, this evidence would suggest a market underreaction to earnings news that is gradually incorporated into market prices over the next twelve months.

However, when the holding period is broken down into four sub-periods of three months each (months 1 to 3, months 4 to 6, months 7 to 9, and months 10 to 12) and the return for each sub-period is measured independently from that of other sub-periods, a different picture emerges. This picture suggests securities markets in which investors systematically overreact to consistency in firms' quarterly accounting-based measures. Eventually, this overreaction is corrected, resulting in financial momentum followed by subsequent return reversals.

A careful examination of the return behavior in the sub-period analysis of the holding horizon reveals that financial momentum continues to move up until it peaks at the end of the first 3-month period after portfolio formation, and then reverses over the next 9-month horizons. By the end of the holding period, this financial momentum effect is completely wiped out by the subsequent price reversals. This evidence suggests that the financial momentum observed in the first three months of the holding period can be better interpreted as the last leg in a market overreaction that gradually reverses as future information signals push market prices back to fundamentals. My finding is robust to the Fama-French three-factor (Market-RF, size and B/M) model and the momentum factor (UMD), as well as to earnings surprises and various sensitivity analyses.

Overall, evidence reported in this paper paints a picture of securities markets in which market prices systematically overreact to quarterly earnings patterns. The market overreaction creates a temporary misevaluation that is subsequently dissipated. The timing of this momentum and reversal can be predicted from past earnings patterns. This evidence highlights the important impact that performance consistency has on future price behavior. My finding is consistent with the spirit of psychology-based theories, especially Barberis et al.'s (1998) and Daniel et al.'s (1998) models. Although they have different views about the nature and causes of the momentum effect (underreaction), both Barberis et al. (1998) and Daniel et al. (1998) predict

that consistency in a firm's historical performance creates market overreaction that will be corrected at the long horizon. This cycle of overreaction and correction manifests itself in a positive correlation in short-term stock returns and subsequent reversal in share prices.

My finding contributes to three research literature streams. First, by providing evidence on investor overreactions to consistent patterns of quarterly earnings, I add to the growing body of literature on how investor sentiments influence market prices. In this paper, I shed light on the role that consistent earnings signals play in shaping investor expectations. Results reported in this paper show that consistent good (bad) earnings firms experience substantial financial momentum that eventually reverses over the next nine-month horizon. Moreover, this evidence shows that the timing of this momentum and its subsequent reversal can be predicted from past earnings patterns.

Second, I contribute to the debate about market efficiency and price discovery mechanisms. Evidence reported in this paper indicates that stock market prices do not always reflect their underlying values. Rather, it suggests a market in which investors constantly overreact to public (and possibly private) information signals, driving market prices away from their fundamental values. Eventually, this mispricing regresses to fundamentals as investors' prior earnings expectations are proven unwarranted. This description of the market price adjustment is consistent with the behavioral models (e.g., Daniel et al., 1998; Barberis et al., 1998).

Finally, evidence reported in this study extends the findings of Lee and Swaminathan (2000) and Alwathainani (2012a) that have attempted to reconcile the literature of both the short-term price continuation and long-horizon reversal by showing that the earnings momentum and the value/glamour effect are likely to be empirically linked.

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