DO MARKETS ACCURATELY PRICE EARNINGS MOMENTUM?

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Prior research on meeting or beating earnings targets documents that firms with earnings momentum are awarded with valuation premiums. However, it still leaves unclear from the literature why this is the case. This study attempts to provide the rational explanation for such market rewards. We mathematically show that earnings momentum can be obtained through high earnings persistence or strong economic shocks. However, our empirical evidence suggests that earnings momentum is a reflection of high earnings persistence. It further reveals that longer duration of earnings momentum is associated with higher fundamentals-driven earnings persistence. More importantly, our findings indicate that valuation premiums are exclusively assigned to earnings momentum determined by strong firm fundamentals, not momentum itself. Our conclusion supports the view that markets are rational.

Keywords - Component; Valuation Premiums; Earnings Momentum; Earnings Persistence; Firm Fundamentals

I. INTRODUCTION

Evidence reported by Barth et al. (1999), Bartov et al., (2002), Kasznik and McNichols (2002), Myers et al. (2007), and Jiang (2008) suggests that valuation premiums are given to firms that report consecutive earnings increases (i.e., earnings momentum). Previous literature advances two main explanations for such rewards. These are growth-based and risk-based explanations. For example, Bartov et al. (2002) argue that incremental pricing effects of achieving earnings thresholds are investors' reactions to information about future growth. Brown et al. (2009) suggest that decreased information risk stemming from surpassing earnings forecasts leads to higher excess returns. Nevertheless, those factors cannot fully account for valuation premiums to firms who report meeting or beating earnings targets (MBET). In other words, unexplained market rewards are still observed. This phenomenon is not consistent with the view that markets are rational. Therefore, we attempt to penetrate the determinants of unidentified valuation premiums based on the assumption of rational investors. One can view that we simply ask the following question: Are valuation premiums accrued to earnings momentum rational?

To conduct the initial investigation, we mathematically show that earnings momentum is a function of (i) earnings persistence and (ii) economic shocks. That is, earnings momentum can be driven by high earnings persistence but weak shocks, or low earnings persistence but strong shocks, or a combination of high earnings persistence and strong shocks. According to the theoretical background, we empirically examine whether earnings momentum is determined by either earnings persistence or economic shocks. The findings suggest that earnings persistence is higher for firms reporting at least one year of earnings momentum. We also find that longer momentum firms present larger persistence of earnings than shorter momentum firms. This yields evidence that, on average, earnings momentum is induced by strong firm fundamentals, rather than economic shocks. It is possible that valuation premiums are investors' reactions to outstanding fundamentals of firms. Therefore, we ask whether and how investors respond to earnings momentum created by fundamentals-driven earnings persistence. To answer this question, we investigate an association between returns and earnings momentum conditional on fundamentals-driven earnings persistence. We have two empirical predictions based on the assumption of rational investors as follows: if earnings momentum is driven by economic fundamentals and markets accurately understand this information, we expect positive reactions. However, if economic shocks induce earnings momentum, we expect that investors will not price earnings momentum, hence no reaction. Our findings suggest that stronger business fundamentals reflect in higher excess returns. They also show that shock-driven earnings momentum is not priced by markets. More importantly, valuation premiums are only assigned to firms who report earnings momentum determined by firm fundamentals. In conclusion, we provide evidence supporting the view that markets are rational. Specifically, the results indicate that investors accurately respond to fundamental information conveyed by earnings momentum. In addition, they do not price earnings momentum created by economic shocks which are not relevant to firms' business activities. Therefore, valuation premiums are simply a manifestation of rational reactions to information signaling that the business of firms is good. This study makes contributions to the literature on MBET in several ways. First, it shows that earnings momentum does not necessarily imply high earnings persistence as firms can obtain earnings momentum through economic shocks. Second, it provides evidence supporting that earnings momentum is economically real because it is determined by firm fundamentals. Third, it documents that duration of earnings momentum is a function of fundamentals of firms. Finally, it yields novel evidence that valuation

premiums are exclusively for genuine earnings momentum driven by business fundamentals. This is consistent with the assumption of rational markets.

II. RELATED RESEARCH

The literature on MBET has been largely developed over the last two decades. It shows that a disproportionate number of firms tend to report profits, positive earnings growth relative to a prior period's earnings, and positive earnings surprises compared with analysts' forecasts. Barth et al. (1999), Bartov et al. (2002), Kasznik and McNichols (2002), Myers et al. (2007), and Jiang (2008) provide evidence that there are economic-related incentives attached to MBET, i.e. higher price-earnings multiples, higher excess returns, and lower cost of debt. On the other hand, firms that slightly miss earnings targets, i.e. non-MBET firms experience significant decreases in stock prices (Skinner and Sloan, 2002). It is known that firm fundamentals are directly related to earnings generating process and hence firm valuations. That is, stronger economic fundamentals would enhance a firm's better operating, investing, and financing activities and, in turn, lead to higher earnings growth. If such strong fundamentals manifest themselves over one fiscal year, they are expected to create consecutive earnings growth, i.e. earnings momentum. There are a number of studies that investigate roles of firm fundamentals. Lev and Thiagarajan (1993) find that fundamental signals help markets estimate persistent earnings, implying that investors use fundamental information when valuing stocks. In addition, firms who are fundamentally strong are more likely to report higher earnings response coefficients which, in turn, indicate higher earnings persistence. Abarbanell and Bushee (1997) suggest that a number of fundamental variables are capable of explaining future earnings changes. Fundamental information is beneficial to investors and analysts with regard to predicting both short-term and long-term earnings after being conditional on earnings surprises. Abarbanell and Bushee (1998) further show that excess returns on fundamentals-based portfolios are highly correlated with one-year-ahead earnings growth. Chen (2013) documents that time-varying earnings persistence (or fundamentals-driven earnings persistence) estimated from a set of accounting and economic fundamentals is positively associated with a magnitude of post-earnings-announcement drift. This indicates that primitive variables are able to explain investors' responses through earnings persistence.

There are a few studies directly related to earnings persistence and earnings momentum. Barth et al. (1999) provide evidence that valuation premiums are still present after controlling for earnings persistence and persistence in abnormal earnings. Yao (2015) finds that fundamentals-driven earnings persistence is capable of predicting impending ends of increasing earnings trend. His results also suggest that fundamental information can account for earnings persistence over the course of earnings momentum. This implies that certain economic performance may create earnings momentum through high earnings persistence.Taken together, although prior research documents that valuation premiums are rational reactions to information with respect to future growth and future risk, it still leaves unclear whether and how market rewards are associated with earnings momentum driven by fundamentals. Specifically, this study is expected to answer the following question: Are valuation premiums rational? In order to answer this question, we argue that earnings momentum is a manifestation of high earnings persistence driven by strong firm fundamentals. Therefore, if markets are rational, they will reward firms with earnings momentum caused by high earnings persistence. On the other hand, after controlling for fundamentals-based persistence, valuation premiums still are observed. It suggests that markets are irrational.

III. THEORETICAL BACKGROUND

The following standard earnings persistence model is used as a starting point.

$$NI_{t+1} = \alpha_1 + \beta NI_t \quad (1)$$

Where NI is reported earnings and β is the earnings persistence parameter and $\beta > 0$.

Earnings momentum model is defined as follows.

$$NI_{t+1} - NI_t = \alpha_2 + \delta(NI_t - NI_{t-1}) \quad (2)$$

$$NI_{t+1} = \alpha_2 + (\delta + 1)NI_t - \delta NI_{t-1} \quad (3)$$

Where δ is the momentum parameter and$\delta > 0$ and $NI_{t+1} - NI_t > 0$. Note that α_1 and α_2 are economic shocks in equations (1) and (2), respectively.

Since (1) = (3)

$$NI_{t+1} = \alpha_2 + (\delta + 1)NI_t - \delta NI_{t-1} = \alpha_1 + \beta NI_t \quad (4)$$

Hence,

$$\beta = \delta + 1 \quad (5)$$

or

$$\delta = \beta - 1 \quad (6)$$

and

$$\alpha_1 = \alpha_2 - \delta NI_{t-1} \quad (7)$$

Requiring $NI_{t+1} - NI_t > 0$ or $\Delta NI_{t+1} > 0$ yields from (1):

$$NI_{t+1} - NI_t = \alpha_1 + \beta NI_t - NI_t > 0$$

$$\Delta NI_{t+1}/NI_t = \alpha_1/NI_t + \beta - 1 > 0 \quad (8)$$

$$\Delta NI_{t+1}/NI_t = \alpha_1/NI_t + \delta > 0 \quad (9)$$

For a profit-making firm, i.e. $NI_t > 0$, a mathematical relation between earnings persistence and earnings momentum as indicated in equations (8) and (9) suggests that earnings momentum is a function of earnings persistence, a shock in earnings, and a constant. In other words, earnings momentum is conditional on both a shock in earnings and a momentum parameter itself. More specifically, high persistence of earnings (β > 1) is necessary for

earnings momentum in the presence of a weak shock in earnings, according to equation (6). In contrast, to the extent a shock in earnings is positively and sufficiently strong ($\alpha_1/NI_t > 1$), earnings momentum can exist in the presence of low persistence of earnings ($0 < \beta < 1$). Note that a momentum 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 earnings momentum and that earnings persistence is required for momentum conditional on a degree of a shock in earnings.

IV. RESEARCH QUESTIONS

A. Earnings Persistence and Earnings Momentum

According to equations (8) and (9) in Section III, earnings persistence manifests to what extent earnings growth sustains. That is, earnings momentum is a function of earnings persistence, economic shock in earnings, and a constant. Importantly, in the absence of positively strong economic shocks, high earnings persistence is a necessary condition for earnings growth and thus earnings momentum.

Horton et al. (2016) find that firms reporting consecutively increasing earnings for at least one year report higher abnormal accruals which are one form of working capitals than other firms. Hribar and Yehuda (2015) argue that firms have to invest in working capitals in the beginning stage of life-cycle, i.e. growth stage, in order to expand their operations. Taken together, this implies that firms having earnings momentum are growing firms. It seems logical that growth firms tend to have higher persistent earnings in order to drive positive earnings changes and hence earnings momentum. We argue that if earnings momentum is determined by true firm performance reflected in high earnings persistence, larger earnings persistence of momentum firms relative to non-momentum firms is observed. On the other hand, if earnings momentum is driven by economic shocks, we do not expect the difference in earnings persistence between momentum and non-momentum firms. Therefore, we ask the first empirical question: Are earnings persistence higher for firms with earnings momentum?

B. Duration of Earnings Momentum and Fundamentals-driven Earnings Persistence

Previous literature indicates that earnings momentum captures dimensions of growth and risk which are relevant to share prices. In addition, it implies that economic fundamentals are important for earnings momentum and hence firm values. Primitive variables, therefore, play important roles under a link between earnings persistence and earnings momentum. Chen (2013) argues that persistence of earnings is not only time-series firm specific but also varies with firm fundamentals. This is, in fact, time-varying earnings persistence (henceforth fundamentals-driven earnings persistence). In particular, earnings persistence shifts once economic fundamentals change. It implies that earnings persistence and earnings growth depend on firm fundamentals at every point of time. If the duration of earnings momentum is driven by firm fundamentals, we expect a positive association between lengths of earnings momentum and fundamentals-driven earnings persistence. In contrast, if earnings momentum is induced by shocks, we expect no relation. The second empirical question hence is asked: Is duration of earnings momentum positively associated with fundamentals-driven earnings persistence?

C. The Pricing Implications of Fundamentals-driven Earnings Persistence

According to the rational explanation, if firm value is driven by firm fundamentals, valuation premiums are more likely to arise from such fundamentals. By fundamentals, we mean that earnings generating process is related to operating, investing, and financing activities of a firm (Nekrasov and Shroff, 2009). All economic activities are represented by accounting and economic variables. For example, an inventory account is working capital investment reflecting managers' expectation with regard to future economic conditions or an accounts receivable account informs of a firm's collection system. Therefore, earnings and earnings growth purely rely on fundamentals in the absence of earnings management.It is interesting to investigate whether and how investors react to earnings momentum conditional on levels of fundamentals-driven earnings persistence. Specifically, if earnings momentum is on economic grounds, markets are expected to understand this information and translate it into positive responses. But if shocks help create such momentum, investors should not price earnings momentum, this leads to no reactions. Thus, the final empirical question is: are valuation premiums assigned to either fundamentals-driven earnings momentum or momentum itself?

V. RESEARCH DESIGN

We exploit a firm who reports earnings momentum as an MBET research setting. A firm with earnings momentum is defined as a firm that reports increases in adjusted earnings per share before extraordinary items (EPS) for at least one year. An increase in EPS is compared with that of prior year. Using EPS is consistent with Barth et al. (1999) and Myers et al. (2007) who investigate price premiums and earnings momentum. Although earnings momentum, by construction, gives rise to survivorship bias, we believe that our definition should alleviate such concerns.

According to the first empirical question, we test whether earnings persistence is significantly higher for firms carrying earnings momentum. To conduct the first analysis, we start from the unmatched sample test. Specifically, we investigate the differences between the means of fundamentals-driven earnings persistence (FDEP) for firms who report earnings momentum and firms who do not report earnings momentum.

To estimate FDEP, we adapt Chen's (2013) fundamentals-driven earnings persistence estimation model by using annual data, rather than quarterly data. Equation (10) imposes first order autoregressive process of annual earnings' time-series and allows the autocorrelation varies with accounting-based and economic-based variables. Mathematically,

$$EARN_{i,t-1} = a_1 + \sum_{j=1}^{j} b_j F_{j,i,t-2} + \left(c_0 + \sum_{j=1}^{j} c_j F_{j,i,t-2}\right) \times EARN_{i,t-2} + \varepsilon_{i,t-1} \quad (10)$$

Where EARN is a firm's annual earnings before extraordinary items scaled by total assets. F is a firm's persistent determinants based on fundamentals. Primitive variables for estimating persistent determinants include market share, capital intensity, firm size, profit margin dummy, asset turnover dummy, asset growth, an interaction between profit margin and asset turnover, an interaction between asset turnover and asset growth, accruals, loss dummy, decrease dummy, and extreme earnings change. Fundamentals-driven earnings persistence for time t is estimated using equation (2).

$$FDEP_{i,t} = c_0^{t-1} + \sum_{j=1}^{j} c_j^{t-1} F_{i,j,t} \quad (11)$$

To estimate equation (10), we use data before year t due to avoiding look-ahead bias and perform annual regressions. Then, we apply estimated coefficients from equation (10) to equation (11) in order to obtain the fundamentals-driven earnings persistent coefficient for each firm and each year. Therefore, this model is very important to this study as it yields the answer whether earnings momentum reflects fundamentals-driven earnings persistence.

In the subsequent test, we consider relevant firm characteristics. That is, we employ the Propensity Score Matching (PSM) procedure when contrasting FDEP. Treated firms, i.e. firms reporting earnings momentum, are matched by the propensity score using the following variables: one-year growth in sales, sales turnover, net profit margin, leverage, asset growth, book-to-market ratio, industry membership, and fiscal year. All matched variables capture dimensions of growth, size, profitability, capital structure, markets' expectations, industry effects, and time effects. Those variables are accounting and market information reflecting that firms who possess the same levels of economics are expected to report the same levels of earnings persistence. We also conduct tests of differences in potential effects in order to verify the adequacy of the match. Note that the number of treated group can be different from that of control group because we use a replacement procedure, implying that a single non-treated observation is able to be the best match for a number of treated observations. Per the first question, we expect that firms who report earnings momentum for at least one year present higher persistence of earnings relative to other firms.

To answer the second question, we use the following specification, equation (12), in order to estimate a relation between earnings momentum and fundamentals-driven earnings persistence.

$$MOMENTUM_{i,t} = \delta_1 + \delta_2 FDEP_{i,t} + \delta_3 MB_{i,t} + \delta_4 SIZE_{i,t} + \delta_5 SALEG_{i,t} + \delta_6 STG_{i,t} + \delta_7 AG_{i,t} + \delta_8 LEV_{i,t} + \varepsilon_{i,t} \quad (12)$$

Where MOMENTUM is the duration (year) of earnings momentum. MB is market-to-book ratio. SIZE is log of market equity value. SALEG is growth rate of sales. STG is short-term growth of book value of equity. AG is asset growth rate. LEV is leverage. FDEP is previously defined. ε is residual. i and t indicate firm and time. The model is controlled for growth options, firm size, sale growth, investment, and capital structure (Fama and French, 1995: Lang et al., 1996; and Fama and French, 2006). Year fixed effects, industry fixed effects, and double-clustered standard errors are included in the model. In addition, all continuous variables are winsorized at the 1% top and bottom tails of the distribution so as to avoid outlier effects. Consistent with the view that earnings momentum is driven by firm fundamentals, we expect δ_2 to be positive. In contrast, if earnings momentum is induced by economic shocks, δ_2 is expected to be zero or even negative.

According to the final question, we investigate the market effects of earnings momentum associated with fundamentals-driven earnings persistence. In particular, prior research does not examine whether investors understand and rationally react to fundamental information conveyed by earnings momentum. An examination of how investors respond to earnings momentum conditional on firm fundamentals is expected to yield the results as to whether markets understand underlying information and update their expectations. The following model, equation (4), is used to assess the pricing implications of earnings momentum conditional on fundamentals-driven earnings persistence.

$$MARET_{i,t} = \gamma_1 + \gamma_2 MOMENTUM_{i,t} + \gamma_3 FDEP_{i,t} + \gamma_4 (MOMENTUM_{i,t} \times FDEP_{i,t}) + \gamma_4 EPS_{i,t} + \gamma_5 ChgEPS_{i,t} + \gamma_6 MB_{i,t} + \gamma_7 SIZE_{i,t} + \gamma_8 LEV_{i,t} + \varepsilon_{i,t} \quad (13)$$

Where MARET is market-adjusted annual returns compounded from market-adjusted monthly returns ending the third month after fiscal year end. EPS is adjusted earnings per share. ChgEPS is a change in EPS relative to prior year. We perform year fixed effects, industry fixed effects, and clustered standard errors by year and firm. We also winsorize all continuous variables at the 1% top and bottom tails of the distribution. According to equation (13), positive γ_3 means that stronger fundamentals reflect in higher returns. Positive γ_2 suggests that markets rewards are

given to firms with earnings momentum generated by economic shocks. Positive γ_4 exhibits that markets assign additional premiums to momentum firms having strong firm fundamentals.

VI. SAMPLE

We collect accounting and pricing data from COMPUSTAT and CRSP databases. Our data set involves all US listed firms from 1988 to 2015. We start from 1988 because SFAS 95 Statement of Cash Flows provides the cash flow data from that year. The initial data set is 230,179 firm-year observations or 23,784 unique firms. Having deleted firms not listed on NYSE, AMEX, and NASDAQ, and excluded firms without momentum variable, this provides 100,304 firm-year observations or 10,106 unique firms during 1989 – 2015. Since we require FDEP variable, the sample is reduced to 83,599 firm-year observations or 8,760 unique firms during 1991 – 2013. Finally, the sample used in this study is composed of 60,928 observations or 6,684 firms between 1992 and 2013. There are an increasing trend in the first half of the sample period and a decreasing trend from 2001 onwards. The average annual sample is 2,769 observations of which 1,677 momentums are held. The ratio of momentum firms to total firms is approximately 60.6% which is consistent with Myers et al. (2007). We highlight that the number of momentum firms is relatively low during dot com crisis and financial crisis in 2001 and 2008 respectively.We analyze firm-year observations of earnings momentum by their duration. It suggests that the longer duration of earnings momentum, the fewer the number of firms. In particular, 60.6% of firms report earnings momentum for at least one year. Nevertheless, only 0.8% of firms show earnings momentum for ten to twenty four years. This evidence seems consistent with the view that profitability is a mean reverting process in competitive markets (Fama and French, 2000).

VII. MAIN FINDINGS

Descriptive statistics for the main variables are reported in Table I. The mean and median of MOMENTUM are 1.491 and 1.000 respectively, suggesting that firms report earnings growth for one year on average. The longest duration of earnings momentum in this sample is twenty four years. The average and standard deviation of FDEP are 0.634 and 0.230, respectively. This implies that firms are able to carry 63.4% last year's earnings forward to current earnings based on fundamental economics. We also assess correlations among main variables (not tabulated). As expected, earnings momentum is positively (negatively) associated with fundamentals-driven earnings persistence, earnings, contemporaneous returns, size, growth opportunities (leverage). This is consistent with the view that earnings momentum reflects better financial performance. We find that fundamentals-driven earnings persistence is positively related to firm performance and market performance. However, size and earnings persistence are inversely correlated, suggesting that larger firms are less likely to report fundamentally persistent earnings.

Variable	Observ.	Mean	Median	S.D.	Max	Min
MOMENTUM	60,928	1.491	1.000	1.956	24.000	0.000
FDEP	60,928	0.634	0.640	0.230	1.247	-0.001
EPS	60,928	0.364	0.474	3.050	9.450	-28.506
ChgEPS	60,928	0.096	0.081	2.368	16.470	-14.359
MARET	60,928	0.034	-0.051	0.508	2.207	-0.776
SIZE	60,928	12.815	12.756	2.008	17.522	8.417
MB	60,928	2.992	1.994	3.905	27.451	-6.692
LEV	60,928	0.729	0.153	2.399	21.203	0.000

Table 1 - Descriptive Statistics

Per the first question, we investigate whether fundamentals-driven earnings persistence levels are different between momentum and non-momentum firms. We report the results in Table II.Initially, we conduct the unmatched test of differences in FDEP for momentum and non-momentum firms. The results show that fundamentals-driven earnings persistence is higher for firms who report at least one year of earnings momentum relative to non-momentum firms. Specifically, FDEP for momentum firms is 0.668 that is significantly larger than 0.556 for non-momentum firms. In addition, we find that firms with earnings momentum have higher sales growth rate (SALEG), higher sales revenue (SALE), higher net profit margin (NPM), lower leverage (LEV), and higher market-to-book ratio (MB).The PSM test reveals the results suggesting that FDEP of momentum firms is still significantly higher than that of non-momentum firms. In other words, firms who report at least one-year of earnings momentum hold larger fundamentals-driven earnings persistence compared as firms who do not report earnings momentum. To conclude, fundamentals-driven earnings persistence is more pronounced for firms announcing earnings momentum relative to firms who do not report earnings momentum. Moreover, longer earnings momentum firms report higher fundamentals-driven earnings persistence than shorter earnings momentum firms.

Variable	Unmatched Sample			Matched Sample		
	Mean 1Y Momentum	Mean No Momentum	t-stat.	Mean 1Y Momentum	Mean No Momentum	t-stat.
FDEP	0.668	0.556	46.97***	0.668	0.552	34.68***
SALEG	0.215	0.095	21.74***	0.215	0.206	1.19
SALE	5.703	5.630	3.25***	5.703	5.733	-1.17
NPM	14.840	7.230	16.13***	14.840	14.591	0.42
LEV	0.794	0.878	-3.12***	0.794	0.735	2.08**
AG	0.128	0.128	-0.05	0.128	0.134	-1.14
MB	2.846	2.477	9.55***	2.846	3.046	-4.27***
Observ.	14,856	24,026		14,856	9,523	

Table 2. Tests of Differences in Fundamentals-driven Earnings Persistence

Table III reports the results of estimating equation (12). Specifically, the parameter estimate on FDEP is significantly positive or $\delta_2 = 2.155$, significant at one percent level. This suggests that earnings momentum is positively associated with fundamentals-driven earnings persistence. We also find that duration of earnings momentum is directly (inversely) related to market-to-book ratio, size, growth in sales, and short-term growth in book equity value (asset growth).

Dependent Variable: MOMENTUM	
INTERCEPT	-2.718***
	(0.000)
FDEP	2.155***
	(0.000)
MB	0.039***
	(0.000)
SIZE	0.225***
	(0.000)
SALEG	0.160***
	(0.000)
STG	0.122***
	(0.000)
AG	-0.080**
	(0.032)
LEV	-0.002
	(0.811)
Adjusted R^2	0.138
Observ.	60,928

Table.3. The Association between Earnings Momentum and Fundamentals-driven Earnings Persistence

Table IV reports the estimation results of the association between contemporaneous market-adjusted returns and earnings momentum conditional on fundamentals-driven earnings persistence, i.e. equation (13).

Model (1) is estimated without fundamentals-driven earnings persistence and the interaction between earnings momentum and fundamentals-driven earnings persistence. We find that the coefficient estimate on MOMENTUM is 0.013, suggesting that earnings momentum is positively associated with current market-adjusted returns. This implies that investors reward firms with additional returns of 1.3% for expanding earnings momentum for one year. On balance, the results are qualitatively consistent with prior literature, e.g. Barth et al. (1999). Model (2) is estimated after controlling for fundamentals-driven earnings persistence. As expected, the results in Column (2) suggest that the coefficient on FDEP is significantly positive or γ_3 is positive, suggesting that stronger fundamentals reflect in higher returns. The coefficient estimate on MOMENTUM or γ_2 remains positive but is reduced to 0.008. It implies that, once controlling for fundamentals, markets still assign additional premiums to firms with earnings momentum, albeit lower ones.

Dependent Variable: MARET	(1)	(2)	(3)
INTERCEPT	-0.324***	-0.499***	-0.484***
	(0.000)	(0.000)	(0.000)
MOMENTUM	0.013***	0.008***	-0.004
	(0.000)	(0.000)	0.511
FDEP		0.209***	0.182***
		(0.000)	0.001
MOMENTUM x FDEP			0.021**
			(0.031)
EPS	0.005	0.003	0.003
	(0.181)	(0.495)	(0.478)
ChgEPS	0.026***	0.025***	0.026***
	(0.000)	(0.000)	(0.000)
MB	0.031***	0.031***	0.031***
	(0.000)	(0.000)	(0.000)
SIZE	0.014**	0.019***	0.019***
	(0.013)	(0.005)	(0.005)
LEV	-0.004**	-0.002	-0.002
	(0.023)	(0.215)	(0.215)
Adjusted R^2	0.103	0.109	0.110
Observ.	60,928	60,928	60,928

Table.4. The Association between Market-adjusted Returns and Earnings Momentum Conditional on Fundamentals-driven Earnings Persistence

More importantly, Model (3) is estimated with inclusions of fundamentals-driven earnings persistence and the interaction between earnings momentum and fundamentals-driven earnings persistence. We find that γ_3 is still positive, suggesting that stronger fundamentals are associated with higher returns. However, γ_2 loses its significance, suggesting that markets do not reward firms reporting earnings increases induced by economic shocks, rather than firm fundamentals. Interestingly, the coefficient on the interaction between earnings momentum and fundamentals-driven earnings persistence or γ_4 is positively significant, implying that markets reward firms with earnings increases driven by strong firm fundamentals. Table IV yields evidence that investors only assign valuation premiums to earnings momentum created by fundamentals-driven earnings persistence, not distinct rewards for earnings

momentum per se. It highlights the importance of firm fundamentals in earnings momentum and implies that earnings momentum determined by economic shocks is not rewarded by markets.

VIII. ROBUSTNESS CHECKS

To test whether our results are sensitive to an alternative proxy for market outcomes, we re-examine equation (13) using contemporaneous raw returns as the dependent variable. The association between contemporaneous raw returns and earnings momentum conditional on fundamentals-driven earnings persistence is consistent with the main results. It is possible that earnings momentum is induced by lagged firm fundamentals. Therefore, we investigate the relation between earnings momentum and lagged variables. We find that earnings momentum is still positively associated with fundamentals-driven earnings persistence. Overall, the results do not qualitatively change when using lagged information.

IX. SUMMARY AND CONCLUDING REMARKS

Previous literature on MBET does not provide evidence that valuation premiums to firms who report earnings momentum are completely explained. In addition, it does not examine the role of firm fundamentals in determining earnings momentum. According to the rational assumption, this study attempts to penetrate valuation premiums based on firm fundamentals. We perform several analyses to examine whether business fundamentals drive market rewards. The results provide evidence suggesting that earnings persistence is higher for firms with earnings momentum. Moreover, duration of earnings momentum is positively correlated with fundamentals-driven earnings persistence. These initial findings lead to the possibility that valuation premiums may be solely for firm fundamentals. We, therefore, investigate an association between returns and earnings momentum conditional on fundamentals-driven earnings persistence. The findings reveal that additional returns are only assigned to earnings momentum driven by firm economics, not earnings momentum per se. This is consistent with the assumption of rational markets. We believe that this study makes contributions that are relevant to investors, regulators, and auditors. The entire evidence supports the view that markets are functioning well. We note some limitations. Our measure of fundamentals-driven earnings persistence is heavily based on model estimations. It is very sensitive to estimated parameters. Moreover, we cannot rule out the possibility that earnings momentum is a product of earnings management as we cannot directly observe managers' activities.

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