Stock Valuations on Earnings versus Cash Flow

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ABSTRACT

Stock prices are mainly affected by short-term earnings. This is contrary to conventional wisdom in finance. However, we did find that cash flow is also used primarily to price what we classify as negative stocks or in distress times. This is consistent with the arguments of rational bubbles. For stocks under strong public scrutiny, investors tend to follow others' decisions and, for whatever reason, they feel compelled to conform to the majority even though their private information suggests otherwise.

JEL Classifications: G11, G12, G13

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I.   INTRODUCTION

At Berkshire Hathaway's 2002 annual shareholders meeting, Buffett said "We'll never buy a company when the managers talk about EBITDA. There are more frauds talking about EBITDA. That term has never appeared in the annual reports of companies like Walmart, General Electric, and Microsoft. The fraudsters are trying to con you or they're trying to con themselves."

The most celebrated investor's message couldn't be clearer. In terms of value, it is what you can take out of a business that really counts, not the earnings reported by the company. A major earnings-centric culprit is the equity analyst community, which has a clear bias toward earnings when formulating forecasts. An examination of the widely used IBES database indicates that only 15% of the equity analysts reporting provide estimates on future cash flow, yet all of them routinely make earnings forecasts. This evidence manifests the fact that for public firms there is a disproportional emphasis on earnings.

One problem with earnings focus is that forecasts of future earnings have been known to be overly optimistic. On September 21, 2001, despite a negative cash event, Amazon.com was trading at an unreal price/earnings ratio (P/E) of 2000 at time when its stock was $192. The only way to justify such a lofty price level would be as if Amazon's earnings were to grow at an annual rate of 80% for the next 10 years. When its price peaked at $225, Amazon's market capitalization of $52 billion was larger than the GDPs of 125 countries. This exaggerated valuation has since been explained as an example of "stock market myopia" -- investors' fixating on short-term earnings.

Furthermore, since 2002 there has been a new movement led by the CEOs of top blue chip companies such as GE, Microsoft, and Intel to voluntarily stop providing earnings guidance, with the goal to relieve managers from being boxed into hitting short-term targets, and investors from being misguided. The critics claim, rather, that the firms are self-serving, especially since most of the firms that stopped issuing earnings guidance had already experienced poor earnings and stock performance. This is evident by a separation between public opinion and stock prices. When surveying online regarding whether the practice of earnings guidance should be stopped, the "blog" comments were overwhelmingly supportive. Yet, market prices reacted negatively after firms announced to stop earnings guidance.[8]

For the question at hand, two well-cited surveys produce contrasting results. In Block's survey of AIMR members in 1999, earnings was ranked as the most important variable than cash flow, book value, and dividend in valuing a stock. However, according to the *Merrill Lynch Institutional Factor Survey*, institutional investors used an average of eight valuation factors in selecting stocks, and price to cash flow was more widely used in investment practice than other value measures during 1989-2001. On average, 46.1% of the respondents consistently used price to cash flow. The inconsistency between the above two surveys does not help resolve the question of what variable(s) investors actually use in their valuation process. It is still puzzling as to why the masses appear to know cash flow is the correct pricing methodology, yet they continue to focus on earnings. This, however, cannot be explained by irrationality given its ubiquity throughout the stock market history.

Another duality is investors' drastically different approaches to valuing publically traded stocks versus private equities, though the lack of public information

for private firms somewhat dictates the obvious difference in thinking. By law, private firms are not required to disclose information, except to the holders of debt instruments to whom the relevant information is the change in cash flow that reflects debt-servicing ability. It is not surprising that firms that turn private also switch their focus on financial reporting from earnings to cash flow.[9] Thus, to value private equities, at a minimum, it may be a matter of necessity to use cash flow.[10]

In this paper, we seek to answer the question of why investors focus more on earnings rather than cash flow in valuing stocks. The practice of deviating from cash flow pricing can be explained by rational herding.[11] In any society, it seems rational for people to follow others before them even if the action is against their own belief. We find evidence in this paper to indicate that stock prices generally follow short-term earnings, but exceptions for cash flow pricing are also ubiquitous. A likely and logical explanation is that when current cash flow is a better predictor for future cash flow, investors simply use it as the best instrument to derive the present value of future cash flows. In the end, the choice to value stocks with either earnings or cash flow is still a rational one.

Rational Bubbles

Considering the intense focus on reported earnings, we begin to entertain some rational explanations as to why this behavior is so prevalent. Since the behavior of earnings fixation may be a result of a systematic, erroneous decision made by the entire market, we also consider the possibility of "rational herding." An abbreviated way to describe herding is that individuals behave similarly but not because they receive similar information. Instead, people herd due to the inaccurate information they receive, imperfect expectations they form, or as discussed before, the suboptimal incentive package by which they are compensated.

Therefore, whether to follow others' actions (i.e., using earnings to value stocks) is a result of the evaluation of payoff externalities. An externality, in layman's terms, is the public impact of a private action. Actions made by decision makers will have a spillover impact, positive or negative, on the others surrounding them. This is referred to as "the neighborhood effect"[15]. For example, people who do not pay taxes receive the same benefits (e.g., roads, national security, etc.) as people who pay taxes.

Within this context, when performance measurement is conducted on a relative basis, the decision of acquiring a piece of costly information will also be determined on a relative basis. The payoff of a costly information acquisition is thus evaluated based on the expectation or the observation of what others are doing. Specifically, when investors decide which type of information to acquire in their investment process, they will consider the reaction of, or the lack of, other investors when making their choice.[16] For instance, if no one uses cash flow in valuation and stock prices do not react to this choice, there is no payoff for investing in the acquisition of such information regarding cash flow. Even though cash flow may be a "true" piece of information, investors will not acquire it if it is costly given that no other peers do. If they do choose to acquire the information, it will not be used to differentiate the measurement of performance.[17]

II.   EMPIRICAL PROCEDURES

For the purpose of the paper, we identify a sample of U.S. public stocks for the time period 1970-2008. Firms included in this study must be contained in CRSP, COMPUSTAT, and DataStream databases. The selection process is intended to preserve as many firms as possible. The components of the valuation metrics used in this study include earnings per share, book value per share, dividend per share, sales per share, and cash flow per share. Table 1 presents the total number of firms, the actual number of firms used in this study, and the data availability of each of the five valuation metrics over various sample sub-periods. For example, during the period of 2000-2008, there were a total of 7,753 firms, live of dead, jointly covered by CRSP, COMPUSTAT, and DataStream, 7,125 firms with a least one of the five valuation metrics reported were selected for this study, and the three databases included earnings per share for 78% of the sample firms, book value per share 75%, sales per share 72%, dividend per share 89%, and cash flow per share 65%. Since the data availability implicitly reflects the bias of each valuation metric, it is not surprising that next to dividend per share, earnings per share has the most coverage, while cash flow per share has the least.

Table 1
Sample description and data availability

Time Period	Average No. US Stocks[a]	No. of Stocks Used[b]	Earnings Per Share	Book Value Per Share	Sales Per Share	Dividend Per Share	Cash Flow Per Share
1970-1979	1,456	1,025	52%	48%	43%	67%	31%
1980-1989	4,218	3,172	67%	55%	51%	72%	51%
1990-1999	6,715	6,015	71%	67%	64%	81%	62%
2000-2008	7,753	7,125	78%	75%	72%	89%	65%

[a] All US firms, live or dead, jointly covered by CRSP, COMPUSTAT, and DATASTREAM.
[b] Firms with valid values for at least 1 of the 5 variables.

Valuation Metrics

The fair stock price is usually modeled with valuation metrics such as cash flow per share, earnings per share, book value per share, sales per share, and dividend per share. Book value per share is included as a control variable to account for the cross-sectional scale differences in stock price levels. Assuming there are no changes in the degree of debt financing, the stock price and the book value per share at time t can be defined by the following:

$$P_t = P/B(BPS_t) \qquad (1)$$

where $BPS_t = BPS_{t-1} + EPS_t - DPS_t$, and P/B is the market to book multiple paying for future growth. If a stable P/B multiple is applied to a homogeneous group of stocks, the cross-sectional difference in P_t can be explained by its book value per share as shown by Equation (1). Although the relationship between BPS_t and P_t becomes a little

messier if the debt ratio varies over time or the fair P/B ratio is stochastic, the positive relationship between BPS_t and P_t is still preserved.

Sales per share is often more meaningful than earnings per share in terms of valuation for several reasons. Under economic distress, top-line growth is considered more informative than bottom-line growth as an indicator for predicting future economic activity. Furthermore, the economically sensitive or cyclical industries are most affected by the revenue growth outlook. There is a school of valuation models that relies mainly on sales growth, and the sales franchise model is a good example. The use of sales is also more relevant in homogeneous industries, such as commodity, material, and basic industries, since their profit margins are similar. Lastly, sales is also used over earnings or cash flow as a matter of convenience. Negative fundamentals do not compute well in a traditional valuation process and most investors don't know how to deal with them. As a passive alternative, when earnings or cash flow is negative, sales per share is often used as a logical substitute.

The justification for using dividend in the process of valuation is even more obvious. From an irrelevant dividend in the Modigliani-Miller Proposition I, a bird-in-hand dividend, to dividend changes that signal future earnings and cash flow, modern corporate finance theories are mainly built around the different treatment of dividends.[18] In summary, the following valuation metrics are tested in Equation (2):

$$P_{it} = \beta_1 EPS_{it} + \beta_2 BPS_{it} + \beta_3 SPS_{it} + \beta_4 DPS_{it} + \beta_5 CFS_{it} \qquad (2)$$

and $\Sigma \ss_j = 1$, where P_{it} is stock price at time t; EPS_{it} is earnings per share at time t; BPS_{it} is book value per share at time t; SPS_{it} is sales per share at time t; DPS_{it} is dividend per share at time; CFS_{it} is cash flow per share at time t; and $\ss_j$'s are the parameters to be estimated.

To measure the relative impact of each value metric on stock price, every variable in Equation (2) is first standardized conventionally by subtracting the observed value from its mean and then divided by standard deviation. Thus, the distribution of each value metric is assumed to be normally distributed, with zero mean and unit variance. The standardization procedure also eliminates biases resulting from the scale differences in each variable. Using the lower case to denote the standardized value for each variable and adding a disturbance term (ε_{it}), Equation (2) can be expressed as:

$$p_{tt} = \beta_1 eps_{it} + \beta_2 bps_{it} + \beta_3 sps_{it} + \beta_4 dps_{it} + \beta_5 cfs_{it} + \varepsilon_{it} \qquad (3)$$

The OLS regression on Equation (3) with the condition $\Sigma \ss_j = 1$ provides an estimate of the parameter $\ss_j$ that can be directly compared for its relative contribution power.

We first estimate Equation (3) on a cross-sectional basis for each month in the sample period. The monthly estimates are averaged over 468 monthly OLS regressions. In Table 2(A), the mean estimates of $\ss_j$ are presented. The results indicate that earnings per share contributes 35%, the largest among all value metrics, in determining stock price, while cash flow per share 21%, with both significant at the 1% level. The chi-square test for the difference among the estimates of $\ss_j$ is also significant at the 1% level.

A reduced version of Equation (3) given by Equation (4) below allows a comparison between the relative contribution of earnings and cash flow:

$$p_{it} = \beta_1 eps_{it} + \beta_5 cfs_{it} + \delta_{it} \qquad (4)$$

The results of the estimation of Equation (4) are reported in Table 2(B). A statistically larger impact from earnings (68%), compared to that from cash flow (32%), confirms the inference from Table 2(A). The weight on earnings is almost twice as on cash flow. The above results indicate that stock price was mainly affected by earnings per share over the 34-year time period.

Table 2
Stock valuation metrics (1974-2008)

Tested Sample	β_1	β_2	β_3	β_4	β_5	F-Value	R-Square	N
(A)	0.35[a]	0.05 [a]	0.29 [a]	0.10 [a]	0.21 [a]	2018	0.45	2845
	(.0007)	(.0008)	(.0008)	(.0008)	(.0009)			
(B)	0.68 [a]	-	-	-	0.32 [a]	1672	0.40	3517
	(.0007)				(.0007)			

Chi-Square Tests: H0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5$
                                      H0: $\beta_1 = \beta_5$

(A)[a] $p_{it} = \beta_1 eps_{it} + \beta_2 bps_{it} + \beta_3 sps_{it} + \beta_4 dps_{it} + \beta_5 cfs_{it}$ · where $\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 = 1$

(B)[b] $p_{it} = \beta_1 eps_{it} + \beta_5 cfs_{it}$, where $\beta_1 + \beta_5 = 1$

[a] Significant at the 1% level; Mean standard errors are in the parentheses.
[b] Equations (A) and (B) are first estimated cross-sectional on a monthly basis. All beta coefficients are averaged across over the 456 monthly regressions. The statistics including F-value, R-square, number of observations and the standard errors are means over each regression.
Note: The beta coefficient is significantly different from each other at the 1% level.

Although stock prices are generally determined by earnings, we find many exceptions to the rule, that is stocks are at times priced based on cash flow. However, we cannot resist the temptation to ask why average investors choose to "go through the charade" of earnings following. Why do they behave differently than their own beliefs say they should? If the majority of market participants rely on earnings during most time periods, should we reexamine the notion of pricing stocks using the present value of cash flows? Of course, without a direct, ex ante, laboratory cause-and-effect test, we cannot answer this question. One encouraging aspect of this study, though, is that a significant portion of stock pricing is based on cash flow, as predicted by several rational explanations.

III.   CONCLUSION

Stock prices are mainly affected by short-term earnings. However, in this study we find that cash flow pricing is next frequently used -- a practice appears to collide with modern finance theories. It seems too trivial to conclude that people are simply irrational. Instead, the evidence is consistent with the argument that investors tend to follow others' decisions, and for whatever reason, feel compelled to conform to the

majority even though their private information suggests they behave otherwise. This may be a reflection of human's fundamental need to belong in a society.

ENDNOTES

1. Fernandez (2013) uses Alpha Commerce as an example to show why a company could have positive net income but negative cash flows.
2. See Hanke (2004).
3. See Ma (2009a).
4. Using a relative P/E model, the relationship between the implied growth rate and the number of compounding years can be derived. In this model, an annual growth rate of 80% for 10 years is the same as an annual growth rate of 42% for 20 years.
5. For more information, see Mizik (2010).
6. See Yen (2008).
7. See Cheng, Subramanyam, and Zhang (2007).
8. Chen, Matsumoto, and Rajgopal (2009) find a -3.6% stock price reaction during the three-day announcement period for firms stopping earnings guidance.
9. See Ma (2009b).
10. This is also in line with what Warren Buffet was quoted as saying at the beginning of this paper.
11. See Devenow and Welch (1996) for more information on rational herding.
12. For example, Campbell and Shiller (1988).
13. See Ma (2009b).
14. Even though this may be a promising argument, a tempting, but still unclear, question is who started the information cascade.
15. Another example of "the neighborhood effect" is reported by Hong, Kubik, and Stein (2005) who discover that a mutual fund manager is more likely to buy (or sell) a particular stock in any quarter if other managers in the same city are buying (or selling) that same stock.
16. The model developed by Hershleifer, Subrahmanyam, and Titman (1994) implies that, under some conditions, investors will focus only on a subset of stocks (herding), while neglecting other stocks with identical exogenous characteristics.
17. See Brennan (1990) and Hirshleifer et al. (1994) for more information.
18. See Modigliani and Miller (1963).
19. The evidence also suggests the need of a different valuation model for stocks of negative fundamentals.
20. This is not the same as, at what level, the stock fair value should be.

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