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Three Patterns in Need of a Unified Theory

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How earnings affect stock price, how earnings are formed from underlying events and management actions, and how pay affects performance are questions that have been prominent in the research agendas of many accounting scholars. Among the results of this extensive research effort are three striking empirical regularities: (1) stock returns are an S-shaped function of earnings; (2) the distribution of earnings is lumpy around benchmarks; and (3) pay for top executives is an increasing convex function of stock price. To my mind, these findings suggest a big unanswered question in accounting: *Why are stock prices, earnings, and pay packages related in these ways?* Because price, earnings, and pay are interrelated, a good theory ought to imply relationships among these variables that are consistent with the patterns schematized in Figure 1. We have some explanations for these regularities in isolation and even a few explanations that address two of them simultaneously, but no model I know persuasively comprehends them all.

Some elements in Figure 1 bear emphasizing: First, the "divots" in the distribution of firms' reported earnings lie just above a variety of salient benchmarks.[1] Second, at least one divot lies in the region of steepest slope in the S-shaped relationship between the unexpected component of earnings and the contemporaneous price response.[2] Finally, compensation contracts are *smooth* functions of stock price.[3]

To illustrate some inadequacies of partial explanations, consider the argument that caps and floors in managers' compensation contracts lead them to distort reported earnings in the neighborhood of the kinks in the pay schedule. While kinks may indeed induce divots, this line of reasoning begs the theoretical question of why kinked compensation contracts are optimal and the empirical question of whether kinks are prevalent enough to drive the divot. On the latter point, stock-based compensation is widespread and obviously imposes no cap. Another difficulty that

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[1] Divots, first described by Hayn (1995), have been documented extensively in a stream of papers including Burgstahler and Dichev (1997) and Degeorge et al. (1999). They are plain in histograms of earnings and significant in statistical tests premised on the notion that the distribution of earnings ought to change smoothly over small intervals. For instance, the tests indicate unusually low frequencies of small decreases in earnings and small losses and unusually high frequencies of small increases in earnings and small profits.

[2] Freeman and Tse (1992) and Skinner and Sloan (2002) document that the stock price reaction to an earnings announcement, measured relative to earnings forecasts, is nonlinear: stock return is a monotone increasing function of the forecast error, but stock returns increase most sharply when earnings are in the neighborhood of the forecast. Stock returns increase less sharply when earnings are either far above or far below the forecast so that stock returns are a convex function of earnings below the forecast and a concave function of earnings above the forecast.

[3] Hall and Liebman (1998) and Core and Guay (2002) describe how CEO wealth and pay are related to stock price.

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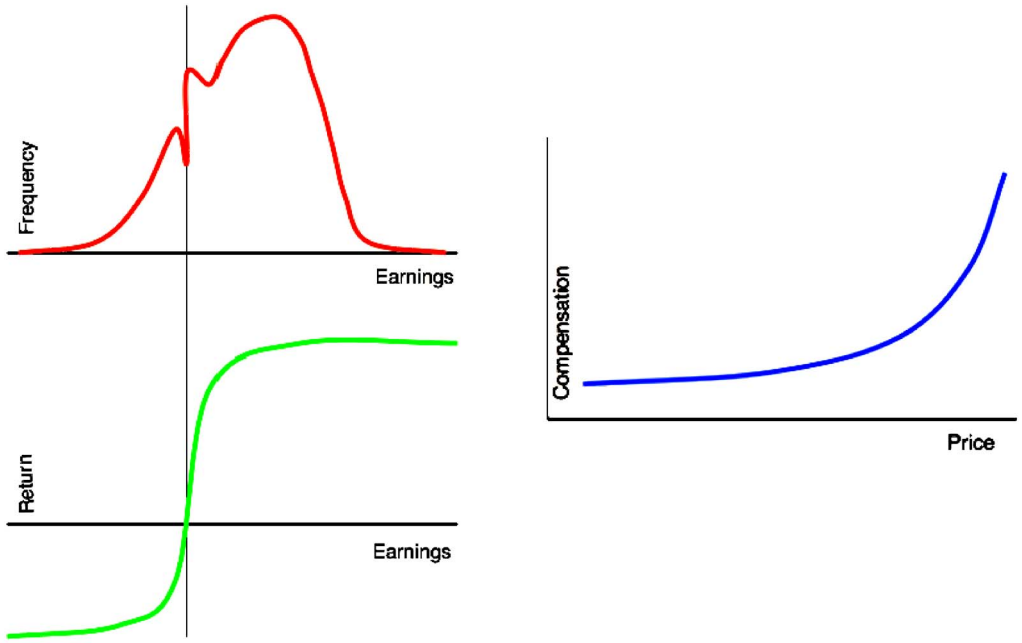
FIGURE 1
Empirical Regularities in Earnings, Stock Returns, and Compensation



arises in trying to use compensation caps to explain divots is that caps, where they exist, are unlikely to coincide with the earnings benchmarks (i.e., zero earnings, the prior year's earnings, and analysts' consensus forecast of earnings) around which divots have been observed.[4] So, this explanation rests unsatisfactorily on a presumed and exogenous structure for compensation contracts. Furthermore, the data suggest that compensation contracts generally lack the characteristic necessary to produce the divot.

A complete explanation would detail, for example, how a change in compensation policy would affect earnings and stock prices, recognizing that the managers affected by the compensation policy change might change their actions and reports, which the market ought to anticipate to some degree. How stock price adjusts when earnings are announced is complicated when the report is not the result of a purely neutral and mechanistic operation of the financial reporting process. Nevertheless, something can be gleaned from distorted earnings reports. Plainly, there are many interdependent factors to take into account, which is probably why the question is unanswered. Some progress has been made on this problem by Guttman et al. (2006), who provide a model that yields a divot in the distribution of earnings in the neighborhood of the steepest part of an endogenous S-shaped curve depicting the stock returns following an earnings announcement, thereby connecting two of the patterns. Their model does not address the final panel of the

[4] Gaver et al. (1995) note that in a sample of 1,588 proxy statements, only 7.9 percent of firms operate a bonus plan and explicitly state the bonus formula. Of these firms, only 31.4 percent impose a cap, which suggests that caps are rare. Of course, the prevalence of caps is hard to assess in part because some terms of compensation arrangements are either nonpublic or implicit.

triptych, because they treat compensation arrangements as exogenous. Further progress will come, I predict, from incorporating more of the facts into the models and from refinements in statements of the facts.[5]

The question I pose may disappoint because it is not "big." It is framed narrowly as a puzzle that emerges from looking at three stylized curves that I claim represent empirical facts. Moreover, the question is at a locus of existing studies, not on an unexplored frontier. And, some of the facts are in dispute. Nevertheless, I think it is a good question for several reasons. First, it is simple to state and specific, yet it encompasses the structure of contracts, the actions and reports people make, and the operation of financial markets. Second, the schematics leave lots of room for choice in the design of a solution to the puzzle. For instance, is the financial market efficient or inefficient in impounding information into price? Is the divot in the distribution of earnings reports an artifact of accounting conservatism or earnings management? Do managers respond primarily to financial incentives or social norms? Finally, seeking a coherent explanation for all three phenomena serves to refine and discipline the solution.[6] If an answer is found, it will be compelling because it will explain a lot of facts. Solving the puzzle implies gaining new insight into the multiple, simultaneous roles of accounting, which should be of interest to scholars and practitioners alike.

Thinking about this puzzle also raises other questions. The three figures are static in that they represent pay, price response, and earnings reported at a point in time; however, the flow of pay, stock price path, and evolution of earnings are dynamic. In particular, the earnings reported this period affects the earnings to be reported next period because accounting allocates income over time. If earnings management is the cause of the divot in the distribution of earnings reports, then how do managers choose the series of earnings that they report over time? A decision to manage earnings upward in the current period implies reducing reserves that could be used to smooth earnings in the future. Conversely, building reserves implies reporting lower current earnings. So, the goals of higher earnings and smoother earnings are conflicting. This raises additional questions: Do managers trade off volatility against growth in the reported earnings series? Why? How does the pattern of earnings over time influence the stock price path? Again, the answer ought to encompass the structure of contracts, the actions and reports people make, and the operation of financial markets, and the explanation ought to conform to the evidence.

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[5] For instance, Durtschi and Easton (2005) and Beaver et al. (2007) challenge the existence and interpretation of divots.

[6] For example, suppose the explanation is to be founded on a framework of efficient markets, manipulable earnings, and optimal incentive contracting. A parsimonious and rigorous economic theory would yield a structure in which (1) the manager reports value above fundamental value in some states and reports value below fundamental value in others, (2) the contracts between managers and shareholders are optimal, (3) stock prices are rational, (4) the equilibrium is not supported by *ad hoc* beliefs about off-equilibrium behaviors, and (5) observed empirical regularities—a divot in the distribution of earnings, the S-shaped response of price to reported earnings, and a compensation schedule that is an increasing concave function of the performance measure—are characteristics of the equilibrium.

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