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# Can earnings fixated investors survive in a competitive securities market? Implications for sustained price anomalies and mark-to-market accounting

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ABSTRACT

We model the dynamic survival of earnings fixated investors in a competitive securities market that allows for learning and arbitrage and that is populated by heterogeneous investors. Our model is distinct from those based on aggressive trading by overconfident investors. We prove that in the absence of noise traders, rational investors will drive out earnings fixated investors from the market in the long-run. More interestingly, we show that in a market with noise traders, some proportion of earnings fixated investors survive in long-run equilibrium for all feasible model parameter values. Furthermore, under no circumstances can the earnings fixated investors be driven out of the market completely. On the contrary, for some parameter values, the earnings fixated investors drive out the rational investors entirely. These results rationalize the long-run sustainability of common pricing anomalies. They also highlight potential benefits to society of mark-to-market accounting.

## 1. Introduction

We model the survival of earnings fixated investors in a competitive securities market that allows for learning and arbitrage and that is populated by heterogeneous investors. Three potential investor types operate in this market: (1) sophisticated rational investors (2) earnings fixated investors and (3) noise traders.[1] The primary intent of the model is to determine whether earnings fixated investors can survive in long-run equilibrium. Intuition suggests that rational investors will arbitrage away the profits of the earnings fixated investors and drive them out of the market, if not in the short-run, then surely in the long-run. We find indeed that this intuition is correct absent noise traders in the economy. Without noise traders, rational investors drive out the earnings fixated investors from the market in long run equilibrium.[2] More interestingly, and contrary to the above intuition, we find that if the securities market also includes noise traders then earnings fixated investors and rational sophisticated investors may both survive in long-run equilibrium. Furthermore, under no circumstances, can the earnings fixated investors be driven out of the market

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[1] Earnings fixated investors are very different from noise traders conceptually. Noise traders disregard the characteristics of risky investments and all value relevant information. They trade on the basis of liquidity needs and/or "gut feel". As a result their actions are highly unpredictable. Earnings fixated investors trade on the basis of bottom line accounting numbers and ignore value relevant information beyond these accounting numbers.

[2] Noise traders in our model are price takers. They are not employed as a device to keep traders from fully inferring information from price as in noisy rational expectations models. Rather, the function of noise traders in our model is to supply liquidity to the market and to provide background noise in our market environment.

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completely. On the contrary, under some conditions, an equilibrium obtains in which earnings fixated investors drive out sophisticated rational investors from the capital market altogether.

Our model shows that in a competitive market environment characterized by misvaluations generated by noise traders, earnings fixated investors are better able to exploit these misvaluations than are rational investors. We model earnings fixation by reference to the ubiquitous conservatism of accounting earnings numbers.[3] If nothing else, earnings are conservative because accounting standards do not generally permit recognition of future profits before they are realized.[4] Hence, earnings fixated investors underestimate *simultaneously* both the mean and variance of risky asset payoffs. Underestimation of the risky asset variance by earnings fixated investors induces a trading strategy on their part that dominates the trading strategy of rational investors at exploiting the misvaluations generated by noise traders. Consequently, earnings fixated investors profit by being better able to exploit risky profit opportunities created by the trades of liquidity-motivated noise traders (and the valuation errors of noise traders). If trader types replicate according to the relative profitabilities of their trading strategies, then the number of earning fixated traders will increase. On the other hand, underestimation of the mean of risky asset payoffs by the earnings fixated investors causes them to short sell the risky asset (on average). This decreases their own relative expected profitability and increases the relative expected profitability of the rational investors who buy long (on average) causing the number of rational investors to increase. These countervailing pressures induced by the interrelated underestimation of the mean and variance of risky asset payoffs can produce an internal dynamic equilibrium where both types of traders coexist in the long run.

Furthermore, we show that the greater the volatility of noise trading, the more earnings fixated investors benefit from misvaluations caused by noise traders and the greater the pool of earnings fixated investors that profit and survive in the long run. Indeed, a corner-solution equilibrium characterized by the absence of rational investors altogether is possible. With sufficiently high volatility of noise trading, earnings fixated investors drive out the rational investors entirely from the market in the long run. Contrariwise, earnings fixated investors can never be driven out of the market completely in this competitive security market due to the fact that the underestimation of the variance of the risky asset always favors the survival of earning fixated traders for all feasible model parameter values.

The results of our model have important implications for empirical financial accounting research. Many empirical studies claim to have found (functional fixation induced) pricing anomalies of different sorts, in some cases over extended periods of time.[5] For example, the Sloan (1996) accrual anomaly has been documented over many years, although there is some evidence that it may have attenuated in the recent crisis period (Green et al., 2011). Absent mechanisms that preclude learning and arbitrage, it is difficult to envision a pricing anomaly of such duration in North American capital markets, especially if the anomaly has been pointed out to (sophisticated) investors by the research community. In fact, one might be tempted to argue that a long duration anomaly is prima facia evidence that no such anomaly exists in fact. Our model by contrast helps to rationalize (some of) the anomalies literature by presenting a conceptual framework within which an anomaly induced by earnings fixation can exist in long-run equilibrium.

Our results also speak to two potential interrelated benefits to society of mark-to-market accounting. Many opponents of mark-to-market accounting argue that it introduces excessive volatility in corporate earnings numbers. In contrast, our model implies that conventional accounting standards cause earnings fixated investors to underestimate risk. With mark-to-market accounting, earnings fixated investors are induced to adopt the same trading strategy as rational investors. As a consequence, mark-to-market accounting offsets earnings fixation so that unlike current GAAP which hides the “true” volatility of earnings and exacerbates irrational behavior by earnings fixated investors, mark-to-market accounting reflects the true earnings volatility of the firm and induces rational behavior by investors. Moreover, given that the accounting conceptual framework expresses a marked preference for investors who make judicious use of accounting reports, in contrast to noise traders, it could be argued that mark-to-market accounting is welfare enhancing relative to current US accounting standards by reducing the welfare losses associated with earnings fixation.

In what follows, Section 2 provides a literature review. Section 3 introduces the model. Section 4 provides the analytical results. Section 5 concludes. Proofs are in Appendix A.

## 2. Literature review

The literatures that inform our study include the large number of papers on functional fixation and the literature modeling the long term survival of irrational investors. We briefly survey each.

### 2.1. Functional fixation

The Functional Fixation Hypothesis maintains that investors who are unfamiliar with different methods of producing accounting output rely on published bottom line accounting numbers for their investment strategy without paying attention to the procedures used in generating these numbers and/or alternative sources of value relevant information.[6] The empirical accounting and behavioral finance literatures have ostensibly documented the fixation of (unsophisticated) investors on bottom line accounting numbers,

[3] Other potential forms of earnings fixation are not addressed in this paper.

[4] Other forms of conservatism whether conditional, such as the lower of cost or market in inventory valuation, or unconditional, such as the expensing of R&D, act in a similar fashion.

[5] For recent reviews of the anomalies literature, see Khan (2011) and Richardson et al. (2010).

[6] We analyze functional fixation in a valuation context. One could potentially evaluate functional fixation with reference to debt and compensation contracts. Contractual issues are not the subject matter of this study.