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## Performance shocks and misreporting<sup>☆</sup>

Joseph Gerakos\*, Andrei Kovrijnykh

University of Chicago, Booth School of Business, 5807 S. Woodlawn Avenue, Chicago, IL 60637, United States



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### ABSTRACT

We propose a parsimonious stochastic model of reported earnings that links misreporting to performance shocks. Our main analytical prediction is that misreporting leads to a negative second-order autocorrelation in the residuals from a regression of current earnings on lagged earnings. We also propose a stylized dynamic model of earnings manipulation and demonstrate that both earnings smoothing and target-beating considerations result in the same predictions of negative second-order autocorrelations. Empirically, we find that the distribution of this measure is asymmetric around zero with 27% of the firms having significantly negative estimates. Using this measure, we specify a methodology to estimate the intensity of misreporting and to create estimates of unmanipulated earnings. Our estimates of unmanipulated earnings are more correlated with contemporaneous returns and have higher volatility than reported earnings. With respect to economic magnitude, we find that, in absolute terms, median misreporting is 0.7% of total assets. Moreover, firms in our sample subject to SEC AAERs have significantly higher estimates of manipulation intensity.

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## 1. Introduction

A firm's financial reports are prepared by agents whose interests are not always aligned with the interests of the users of accounting information. This misalignment can lead to misreporting. Broadly, misreporting represents any deviation from the most accurate and informative report of the firm's performance within the standards of GAAP. Practically, it can range from the misuse of the discretion allowed under GAAP to outright fraud.

One potentially important motive for misreporting is to mitigate the impact of the period's innovation to earnings (the "performance shock"). Such a motive can arise from incentives to either meet or beat accounting-based performance targets or reduce the volatility of reported earnings. We propose a model of reported earnings that links misreporting to the period's performance shock. We then use this model to predict and identify serial correlation patterns in reported earnings that arise from misreporting with the goal of masking the period's performance shock. Specifically, we show that in the presence of such misreporting the residuals from a regression of reported earnings on lagged reported earnings have a negative second-order autocorrelation. Intuitively, this means that if the firm engages in systematic misreporting to mask performance shocks, then a shock to the firm's reported earnings is likely to partially reverse two periods into the future.

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\* Corresponding author. Tel.: +1 773 834 6882.

E-mail addresses: [jgerakos@chicagobooth.edu](mailto:jgerakos@chicagobooth.edu), [joseph.gerakos@chicagobooth.edu](mailto:joseph.gerakos@chicagobooth.edu) (J. Gerakos).

To derive our main prediction, we make two assumptions: (1) earnings are persistent; and (2) the purpose of misreporting is to mask the period's shock to performance. There are both economic and accounting-based explanations for the persistence in earnings. From the economic perspective, a performance shock to the firm rarely dissipates completely within a single year. Several structural reasons lead to this delayed dissipation. For example, as discussed by Lerner (2002), patent protection of technological innovations typically lasts for multiple years. Other barriers to competition that determine industry structure (trade restrictions, increasing returns to scale, licenses, etc.) are also typically long-lived. Furthermore, commodity prices, interest rates, and wages are highly persistent (for discussions, see Cashin et al., 1999; Neely and Rapach, 2008).

The persistence of economic profits does not, however, necessarily translate into the persistence of accounting earnings. In principle, one could devise a system of financial reporting rules that accounts for the impact of every shock in present-value terms. Namely, all expected effects of the current shock on economic profits could be recognized in the current period, thereby leading to accounting earnings that are uncorrelated across periods. Such fair value accounting is not the financial reporting system currently in place. Instead, financial reporting rules dictate that performance shocks are not immediately recognized to their full extent because of verifiability standards. Such delayed recognition of performance shocks leads to persistence in accounting earnings. Moreover, as discussed by Watts (2003), verifiability standards are asymmetric in the sense that they are stricter for favorable events. These standards can result in asymmetric recognition of positive and negative shocks.<sup>1</sup>

Regarding our second assumption, a link between misreporting and performance shocks can arise in several settings. Intuitively, if the manager seeks to reduce the variance of reported earnings, then she under-reports earnings when performance shocks are favorable to create a precautionary buffer against future adverse shocks. This buffer produces a negative bias in reported earnings when shocks are positive and subsequently a positive bias when the manager takes advantage of the precautionary buffer. In the context of meeting or beating an earnings target, the same prediction holds. If performance is poor but the target is reasonably close, the manager over-reports to produce the desired number. Again, the bias is in the opposite direction from the performance shock. For both settings, we analytically demonstrate a negative correlation between reporting bias and the period's performance shock.<sup>2</sup> In doing so, we develop a dynamic framework for analyzing earnings manipulation in which the agent can misreport earnings to meet or beat a target or to smooth earnings. The principal, in turn, takes the agent's manipulation into account when rationally setting targets.

Empirically, we demonstrate that negative second-order autocorrelation appears in the data consistent with the analytical predictions.<sup>3</sup> We find that approximately 27% of firms with sufficient data on Compustat have significantly negative second-order autoregressive coefficients that are consistent with the systematic manipulation of reported earnings. We next propose a methodology to estimate the intensity of misreporting and to create estimates of unmanipulated earnings. This methodology assumes that discretion is a linear function of the period's performance shock. Based on the linearity assumption, we find that median absolute misreporting for our sample is 0.7% of total assets. This estimate appears more plausible than the discretionary accruals estimates documented in prior research. For example, Hribar and Nichols (2007) report for their sample that median absolute discretionary accruals are 5.2% of total assets, which is similar in magnitude to mean and median ratios of earnings before extraordinary items to total assets (see, for example, Dechow and Dichev, 2002; Wysocki, 2009). Furthermore, correcting the manipulation in reported earnings results in estimates of unmanipulated earnings that are more highly correlated with contemporaneous returns and have higher volatility than reported earnings. Moreover, firms in our sample subject to SEC Accounting and Auditing Enforcement Releases (AAERs) have significantly higher estimates of manipulation intensity.

We contribute to the accounting literature by deriving a testable prediction about the stochastic properties of manipulated earnings, which we use to construct a benchmark of unmanipulated earnings. This benchmark allows us to create measures of systematic earnings manipulation that we use to estimate both the incidence and intensity of earnings manipulation among firms with sufficient data on Compustat. The incidence of earnings manipulation in the economy is relevant for researchers and policy makers who evaluate the efficacy of existing or proposed accounting standards and the reporting incentives arising from compensation and governance mechanisms. Burgstahler and Dichev (1997) and Myers et al. (2007) provide some evidence on the possible incidence of earnings manipulation in the economy and Cohen et al. (2008) compare the incidence of earnings manipulation in the pre- and post-Sarbanes-Oxley periods. Moreover, Leuz et al. (2003), Haw et al. (2004), and Lang et al. (2006) compare the incidence of earnings manipulation across countries.<sup>4</sup> Similarly, our measure can be used to compare the incidence of earnings manipulation across countries, industries, and groups of firms. The same way we create the distribution of second-order autocorrelation coefficients for the US, one could create the distribution for any portfolio (country, industry, growth options, etc.). Moreover, our measure can be used on

<sup>1</sup> We later discuss minimal and straightforward modifications to our model that accommodate full and immediate recognition of negative shocks but no recognition of future effects of positive shocks. The downside of these modifications is that they lead to significant data losses in empirical applications.

<sup>2</sup> These results are consistent with the findings of Fudenberg and Tirole (1995) and Trueman and Titman (1988), who analyze similar earnings-smoothing settings.

<sup>3</sup> For prior work on autocorrelations in earnings, see Dechow (1994) who documents a negative first-order autocorrelation for changes in earnings per share. Within our analytical framework, this result is a natural property of earnings. The negative first-order autocorrelation is driven by the same performance shock entering the two variables in the covariance expression with different signs.

<sup>4</sup> For a review of the earnings management literature, see Dechow et al. (2010).

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