



# Analysis of earnings management influence on the investment efficiency of listed Chinese companies☆



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## ABSTRACT

This study examines the “EM (earnings management) and excess investment hypothesis,” which posits that upward EM increases investment spending. Two types of EM proxies and two types of investment proxies are calculated to ensure the robustness of results. The two types of EM proxies are case studies (firms with three fraudulent activities) and econometric estimation of regression residuals (of revenues and accrual functions). The two investment proxies are industry-adjusted investment and investment function residuals. Considering that outliers are common in panel data but are often ignored in estimation, the aforementioned proxies are determined with and without considering the outliers using listed companies in China from 1998 to 2010. Empirical results demonstrate that the hypothesis is supported when the outliers are considered, whereas the opposite result is obtained when the outliers are not considered. The analysis and findings of this study indicate that considering the influence of the outliers is crucial to support the hypothesis.

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## 1. Introduction

Several studies have investigated the effects of earnings management (EM) on investment decision. EM occurs when firms' reported economic performance is altered by insiders to “mislead stakeholders” or “influence contractual outcomes” (Healy and Wahlen, 1999; Schipper, 1989). Overinvestment ensues when actual investments exceed equilibrium investment. Firms that manipulate earnings may indicate a favorable outcome for investors; such misrepresentations can affect internal decision making and lead to suboptimal or inefficient investment decisions (McNichols and Stubben, 2008). Biddle and Hilary (2006) explained that higher quality accounting and limited EM reduce information asymmetry between managers and outside suppliers of capital, thereby increasing investment efficiency. Fischer and Merton (1984) specified that firms with upward (or downward) EM are expected to invest more (or less) in subsequent periods than does the average firm. Tang (2007) indicated that EM affects subsequent corporate investments by accounting manipulation. Cohen and Zarowin (2009) discovered that firms engaged in either real or accrual EM tend to overinvest. Biddle et al. (2009) argued that managers who prioritize their personal welfare are inclined to make investments that are not in the shareholders' best interest. F. Chen et al. (2011) observed that the quality of financial reporting affects investment efficiency.

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McNichols and Stubben (2008; hereafter referred to as MS) investigated whether firms that manipulate reported financial results make suboptimal investment decisions.

The present study investigates whether firms that conduct EM exhibits investment inefficiency. We particularly focus on whether upward EM causes excess investment, which is called the “EM and excess investment hypothesis” in this study. To examine this hypothesis, we use the basic statistics and regression analysis with and without considering the outliers, and determine that results differ considerably. We conclude that the results that did not consider the outliers (i.e., conventional approach) reject the hypothesis, whereas the results that consider the outliers (i.e., our new approach) support the hypothesis.

The succeeding paragraphs thoroughly explain our analysis.

First, we follow MS to consider the two types of EM proxies. The first EM proxy classifies firms into three groups based on their fraudulent activities, namely, manipulation of stock price (MSP), tunneling of controlling shareholders (TCS), and avoiding loss manipulation (ALM). Following the assumption of MS, firms with fraudulent accounting activities tend to conduct upward EM, thereby resulting in overinvestment. We examine each firm whether it has conducted any fraudulent cases. The second EM type involves the econometric estimation of the regression residuals of two functions. The first proxy for EM is the discretionary revenues (*DREV*) that involve residuals after estimating a revenue function. Stubben (2010) suggested using *DREV* as a proxy for EM rather than the commonly used discretionary accrual because the latter comprises the noisy estimates of EM. Dechow et al. (1995) and Thomas and Zhang (2000) also explained that the accrual models provide biased and weak EM estimation. The second proxy is the conventional discretionary accrual (*DAC*) by using the residuals after fitting an accrual function. Lenard and Yu (2012) are an effective example for using *DAC* as the proxy for EM.

We consider two types of overinvestment to ensure the robustness of the estimated results. Following MS, the first type is the intuitive investment inefficiency measure, which is based on industry-adjusted investment. The positive investment inefficiencies are referred to as overinvestment. The second type of overinvestment (referred to as the economic investment inefficiency measure) is based on fitting an equilibrium investment function, in which the resulting residuals represent investment inefficiency (Richardson, 2006). Two different investment functions are adopted to generate the residuals. The positive residuals are similarly referred to as overinvestment.

Three types of proxies for EM and two types of proxies for investment inefficiency are used in this study. These different series of proxies ensure that our results are robust and insensitive to different model specifications and proxies. Our EM and excess investment hypothesis is examined using data from China. Based on theoretical reasoning and empirical results around the world, a similar association can be expected between EM and investment inefficiency in China. The theoretical argument that supports this relationship is explained in the latter part of this paper. This section elucidates the empirical studies, which overwhelmingly suggested that high-quality financial reporting can increase investment efficiency (Bushman and Smith, 2001; Healy and Palepu, 2001; Lambert et al., 2007). Biddle and Hilary (2006) observed that firms with high-quality financial reporting exhibit high investment efficiency. Biddle et al. (2009) determined that high reporting quality is associated with a low tendency to over- and underinvest.<sup>1</sup> However, our preliminary results using conventional ordinary least square (OLS) reject the hypothesis, which implies that firms that conduct upward EM do not exhibit overinvestment. This rejection is provocative because it is inconsistent with the majority of the existing evidence with samples from other countries and theoretical reasoning. Such inconsistency is further explored in this study.

To resolve the aforementioned inconsistency, we propose the well-known but not fully emphasized econometric approach: the robust estimation method (explained shortly) with the consideration of the outliers. Several robust estimation methods are available, and we adopt Yohai's (1987) MM method to conduct the regression analysis. The reason for adopting the MM method is explained in Section 3. Many existing empirical studies demonstrate that results that consider the outliers yield significantly different findings from those without such consideration. For example, Sturm and Haan (2001) argued that outlying observations must first be identified in cross-country growth models. The two researchers also indicated that running multiple regressions, which is commonly used in applied academics, becomes unnecessary once the outliers are controlled. Knez and Ready (1997) identified that the risk premium on size, which was estimated by Fama and French (1993), completely disappears when the 1% most extreme observations are removed each month. An increasing number of studies determine that the results using methods that consider the outliers significantly differ from those that do not consider the outliers.<sup>2</sup> Knez and Ready (1997) stated, “We view outliers as precious in the sense that they may convey a lot of information about the return generating process and a proper model specification.” Examining the underlying reasons of each extreme value is difficult. Thus, one of the approaches is to rely on the statistical method to remove these extreme values.

Discussing the influence of the outliers is particularly suitable for the current issue. Given that the second type of our EM proxies (i.e., *DREV* and *DAC*) and two investment inefficiencies are replaced by the residuals after estimating an investment function (Biddle et al., 2009; McNichols and Stubben, 2008; Richardson, 2006), the positive and negative residuals represent overinvestment and underinvestment, respectively. Considering that OLS assigns a considerable weight on outliers, their existence significantly biases the

<sup>1</sup> Cheng et al. (2013) provided additional direct evidence on the causal relationship between FRQ and investment efficiency (see also Bens and Monahan, 2004; Bushman et al., 2011; Beatty et al., 2010; Francis and Martin, 2010; Hope and Thomas, 2008; McNichols and Stubben, 2008). In China, F. Chen et al. (2011) empirically suggested that FRQ positively affects investment efficiency in emerging markets. Li and Wang (2010) mentioned that the proxies for FRQ, namely, self-constructed composite measures, are negatively associated with under- and overinvestment of listed corporations, in which accrual quality and earnings smoothness exert the most significant effect on under- and overinvestment. The majority of the extant empirical studies support this argument by using different samples at various periods.

<sup>2</sup> Considering that the outliers are particularly common in panel data, the use of OLS that results in residual classification may be inappropriate. Zhu et al. (2004) identified that outliers exist in the positive relationship between financial development and growth estimated by Levine and Zervos (1998); however, this positive relationship disappears when these outliers are excluded. These findings suggest that applied econometric studies are often biased if the outliers are not appropriately considered. Berggren et al. (2008) indicated that the positive relationship between trust and growth disappears when the outliers are eliminated. Verardi and Wagner (2010) estimated the exporter productivity premium in Germany and determined that a small fraction of outliers influence the results of an empirical estimation.

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