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The Impact of Audit Quality on Real and Accrual Earnings Management around IPOs

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Abstract We examine the relation between audit quality and the earnings management activities of IPO firms. The impact of high quality auditors on real earnings management has been researched in a number of settings e.g. SEOs. However, to date, there has been no work on the effect of high quality auditors on real activities-based manipulation around IPOs. We examine UK IPOs between 1998 and 2008 and find evidence that high quality auditors constrain the use of real activities manipulation that occurs via the management of discretionary expenses. We also find evidence, consistent with prior research, that high quality auditors constrain the manipulation of discretionary accruals. Crucially, we find IPO firms audited by high quality auditors undertake sales-based manipulation in order to manage earnings upward at the end of the IPO year. The presence of high quality auditors is not, therefore, sufficient to constrain all forms of earnings management.

Keywords: Earnings management · Discretionary accruals · Real activities manipulation · Audit quality · Initial public offering

JEL Classification: G14 · M40 · M41 · M42

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1. Introduction

This paper extends the literatures on earnings management by analysing the impact of audit quality on real and accrual earnings management in the context of Initial Public Offerings (IPOs). Previous work, such as Cohen and Zarowin (2010) and Chi, Lisic and Pevzner (2011), finds firms engage in higher levels of real earnings management to avoid the monitoring of accrual earnings management by big-N audit firms in the context of SEOs. However, there is no work to date on the relationship between the presence of a big-N auditor and whether this affects the real and accrual earning activities of IPO firms.

IPOs present an ideal setting in which to examine the impact of enhanced audit quality on the real and accrual earnings management activities of firms.[1] Specifically, the IPO event changes firms from being private unlisted companies that are subject to very little oversight and monitoring, to publicly traded companies that have to comply with stringent listing requirements. Moreover, as public companies they are subject to scrutiny by market participants and regulators. Consistent with this view, Teoh, Wong, and Rao (1998) note that incentives and opportunities to manage earnings around the offer year is limited for SEO firms as compared to IPO firms. This difference exists as SEO firms have, more audited public information, analyst followings, a larger market capitalization, and are easier to short-sell.

Around an IPO, corporate managers need to maintain high stock prices and are therefore incentivized to undertake earnings management in the year of the IPO to achieve

[1] Confirming the view about the strong incentives to manage earnings around IPOs, Teoh, Welch and Wong (1998) indicate that managers of IPO firms also have strong incentives to manage earnings upwards at the end of the IPO year to obtain private gains. Examples include, maintaining high stock prices given the lock-up restriction on managerial share selling post-IPO, avoiding litigation risks when post-IPO earnings decline compared to the pre-IPO period, meeting earnings forecasts in the IPO prospectus to avoid any reputational damage, and meeting performance-based compensation targets.

this goal. Teoh et al. (1998a) put forward three reasons why managers are more likely to undertake earnings management during the IPO year to help boost the price of the firm's shares. First, there is often a lock-up period that restricts managers from immediately selling their holdings after an IPO. A fall in earnings after an IPO could therefore negatively affect stock prices and consequently the value of the entrepreneurs' investment.[2] Consistent with this view, Darrough and Rangan (2005) find that managers reduce R&D expenses at the end of the IPO year to manage earnings upward. This is due to a belief that investors place greater emphasis on current earnings and cutting R&D is therefore beneficial in trying to maintain high share prices.

Second, IPO firms have higher litigation and this risk is much higher when firms utilise earnings management to boost current earnings before an IPO and post-IPO earnings decline. As shown by Teoh et al. (1998a) IPO firms that manage earnings upward pre-IPO are likely to manage their first reported earnings after the IPO.

Third, IPO firms may provide earnings forecasts in the IPO prospectus. Managers are, therefore, under pressure to meet their earnings forecast in an effort to maintain good relations with investors, underwriters, and analysts. In addition, managers will seek to avoid any reputational damage or litigation risk from shareholders due to a reversal of earnings in the post-IPO period. Gramlich and Sorensen (2004) find evidence that IPO firms engage in accrual manipulation at the end of the IPO year (the first reported earnings after the date of IPO) to meet earnings forecasts. Teoh et al. (1998b) also show that executive compensation creates a strong incentive to manage earnings upwards, noting that the time to exercise stock

[2] Lock-up periods may lead managers to manage earnings upward in the months following the IPO to maintain high stock prices. For our UK IPO sample, the average post-IPO lock-up is 14 months from the IPO date.

options awarded as part of managerial compensation is usually after the IPO date with a period of several months being common.

At the same time, the IPO is an event where the range of incentives to manage earnings has the potential to show the impact of audit quality in stark relief. Audit firms who are unable to uncover material misstatement during the IPO e.g. excessive levels of earnings management, face higher litigation risk, especially when firms experience poor post-IPO stock return performance (Hogan, 1997). Moreover, litigation risk has a much greater impact on the reputation of high quality auditors (big-N audit firms) compared with lower quality auditors (non-big-N audit firms).

To examine the impact of audit quality on real and accrual earnings management we analyze a sample of 498 IPO firms that went public on the London Stock Exchange (LSE) over the period 1998-2008. Our results show that IPO firms audited by big-N audit firms have significantly higher levels of sales-based manipulation and significantly lower levels of discretionary expenses-based and accrual-based manipulations.[3]

Prior research on IPOs and earnings management in the UK make it an ideal environment to examine the impact of auditor quality on the real and accrual earnings management activities of IPO firms. Moreover, the UK IPO market is large and London is a key financial centre globally. In looking at prior research in the UK, Lo's 2008 critique of Ball and Shivakumar's (2008) study of UK IPOs, states that the conclusion that earnings management was not present around IPOs was not possible as real earnings management had not been considered. Further, Gerakos, Lang and Maffett (2013), find that due to higher levels of accrual earnings management, AIM IPOs experience higher levels of information asymmetry, failure rates, post-listing underperformance, as well as lower liquidity than firms

[3] We classify an audit firm as big-N if it is one of the big 4 audit firms – PWC, Deloitte, KPMG and EY.

listed on the London Main market and US markets. Current evidence concerning accrual earnings management around IPOs in the UK is, therefore, inconclusive and merits further investigation. Moreover, no examination of real earnings management has been undertaken in either of these recent studies.

Second, the UK has two IPO markets - the Alternative Investment Markets (AIM) and Main market of the London Stock Exchange. The AIM market is characterized by smaller younger firms and the Main market in the UK by larger more mature firms. As such, the UK provides a setting with a large cross-section of IPO firms, and because of this heterogeneity, there is a significant variation in the auditors who are involved in the audit of IPO firms. Third, the UK is a key financial market globally and was found to be the premier financial centre in the World in the most recent Global Financial Centres study. Finally, the scale of London in terms of IPOs is also clear with London attracting 35% of all European IPOs between 1995 and 2010.

Last, as Alhadab, Clacher, and Keasey (2015) state, by focussing on only one country, we do not have to consider the impact of differing legal or economic environments, and so we have a cleaner test as our results are not driven by differing legal structures regarding the IPO process or litigation risks.

Our results show that the presence of high quality auditors constrains the manipulation of discretionary accruals, which is consistent with prior research. Moreover, we present evidence that high quality auditors constrain the use of real activities manipulation that occurs via the management of discretionary expenses. However, we also find IPO firms audited by higher quality auditors undertake sales-based manipulation in order to manage earnings upwards at the end of the IPO year. Consequently, the presence of high quality auditors does not constrain all forms of earnings management.

The main result of the study, that the presence of high quality auditors is not sufficient to constrain all forms of earnings management, is consistent with the approach for detecting real earnings management via the use of ratios, trends, financial and non-financial information, set out in the International Standards on Auditing. A divergent trend between increasing sales and the costs associated with increasing sales would be a signal to high-quality auditors that there may be pervasive manipulation going on. Consequently, the current approach to detecting earnings management is in part successful, where higher quality auditors are present. However, as Alhadab, et al. (2015) show, IPO failure is more likely where higher levels of real earnings management are present. Consequently, regulators and standard setters may have to strengthen the emphasis placed on these forms of earnings management. In doing so, auditors would have to undertake greater scrutiny on potential sources of real earnings management in an attempt to limit the riskier forms of earnings management that occur.

The study proceeds as follows. Section 2 presents the related literature and the development of the main hypothesis, data and methodology is presented in section 3, and the results in section 4. Conclusions are provided in section 5.

2. Literature Review and Hypothesis Development

In this section, we first set out the institutional context of the UK audit market. We next review the literature on the association between audit quality and real and accrual earnings management. Last, we discuss whether IPO firms are expected to choose between real and accrual earnings management according to the quality of their auditors during the IPO.

2.1 The Role of the Auditor in Constraining Real and Accrual Earnings Management

In the UK, auditors follow the International Standards on Auditing (ISA), which place a number of different responsibilities on the audit firm to ensure that financial accounts reflect a true and fair view of the long-term position of an entity. As part of these standards,

an auditor must be satisfied there are high levels of managerial integrity, and as such, there is no material misstatement, fraud, or opportunistic earnings management. In adhering to these standards, auditors have mechanisms by which they scrutinize both real and accrual earnings management. These issues are pertinent to any audit engagement in the UK and are covered by ISA 240 (the detection and prevention of fraud), ISA 315 (identifying the risks of material misstatement through understanding the entity and its environment), and ISA 580 (managerial representations). In combination, these standards set out a clear burden on the auditor, as part of the external governance of the firm, to limit managerial opportunism in financial reporting to ensure there is no material misstatement.

Representations by management are one of the mechanisms by which auditors arrive at their 'true and fair' view, regarding the veracity of the annual reports of the firm. In doing so, auditors are concerned with three key ethical factors - management competence, management integrity, and due care (ISA 580, Section A2). Opportunistic earnings management, and in particular real earnings management, represent managerial actions that deviate from normal business practice and as such, have real economic consequences for the reporting entity. From the auditor's perspective, such actions matter in two ways. First, the internal and external pressures on management to influence perceptions of value and performance around a corporate event like an IPO may result in increased levels of earnings management and can cross the line between earnings management and misstatement. Second, such actions increase the likelihood of litigation. Consequently, this should increase the level of scrutiny of transactions that are a potential audit risk.

Within this environment of increased scrutiny of the firm's activities, managers who engage in earnings management will be faced with a number of differing pressures. This is particularly true a firm is audited by a big-N auditor, given the experience and technologies of large auditors versus small auditors. Moreover, based on the analytical approach

prescribed by the applicable audit standards of using heuristics, ratios, and financial and non-financial information (ISA 315, Section A7), it would be difficult for managers to undertake sales manipulation whilst simultaneously decreasing discretionary expenses for example. It would be expected that increasing sales, on average, would be positively associated with increases in marketing, sales, and general admin. Although, there may be instances where this can be achieved via clever marketing etc. it does not seem possible that sales can be increased whilst the associated cost of sales are reduced on a systematic basis. If a divergent relationship was observed, then this is something that would therefore constitute a warning sign under the prescribed approach.

The presence of a big-N auditor from a regulatory standpoint would therefore be expected to curtail managerial manipulation, as a big-N auditor will have the technology/experience to identify real earnings management. Moreover, because of the higher litigation risk faced by a big-N auditor they will be more likely to qualify the audit report. Consequently, managers, while still incentivised to undertake earnings management, may be less likely to utilise all the potential levers at their disposal, as their ultimate goal is to have a successful IPO. The risk that the newly listed company is sanctioned in some way, for example through a qualified audit opinion is, therefore, likely to curtail the full extent of earnings management that firms undertake.

2.2 Real and Accrual Earnings Management around IPOs

There is an extensive literature examining IPOs and accrual earnings management, the primary conclusion of which is that IPO firms do engage in accrual earnings management around IPOs (e.g., Friedlan, 1994; Teoh et al., 1998a, 1998b; Malatesta & Sefcik, 2001; Gramlich & Sorensen, 2004; Morsfield & Tan, 2006; DuCharme, Fan, 2007; Ball &

Shivakumar, 2008; Armstrong, Foster & Taylor, 2009; Chang, Chung & Lin, 2010; and Cecchini, Jackson & Liu, 2012).

However, the results of the above literature do not always support the presence of accrual earnings management at IPO. For a sample of IPOs in the UK that with similar characteristics with respect to information, reports, and prospectuses, Ball and Shivakumar (2008), examine accrual earnings management around the IPO. The results show high quality reporting prior to the IPO, tending towards accounting conservatism rather than accounting manipulation. They argue that IPO firms report conservatively in response to the expected demand for high quality reporting, which is enforced by capital market participants. Ball and Shivakumar (2008) argue that the previous evidence of accrual manipulation around IPOs is therefore attributable to measurement error.

Lo (2008), however, highlights the possibility that Ball and Shivakumar (2008) may exclude IPO firms that manage earnings because their sample is restricted to firms that present similar categorizations and information between the prospectus and the financial report. Moreover, Lo (2008) states that real earnings management activities are not examined by Ball and Shivakumar (2008) and so earnings management may still be present, but in the form of real earnings management. In line with Lo's (2008) view concerning the potential sample selection bias of Ball and Shivakumar (2008), Chahine, Arthurs and Filatotchev (2012) examine accrual earnings management around IPOs in the UK. Their results show that IPO firms manage accruals prior to the IPO. Moreover, Chahine et al. (2012) show that the level of accrual earnings management predicts post-IPO stock return underperformance.

Recently, a growing body of research has shown that real earnings management is undertaken to improve reported earnings (e.g., Roychowdhury, 2006; Cohen, Dey & Lys, 2008; Gunny, 2010; Zang, 2012). This research shows that managers prefer to manipulate the

real activities of the firm rather than through accrual earnings management for three reasons. First, accrual earnings management, unlike real earnings management, falls within the scope of audit. The manipulation of real activities is not therefore subject to the same level of scrutiny as accruals and is more likely to remain undetected whereas high levels of accrual earnings management are likely to be discovered by auditors and regulators and are therefore constrained by this (Graham, Harvey & Rajgopal, 2005). Second, real earnings management is undertaken through the year, while accrual earnings management only takes place occurs at the end of a quarter or fiscal year. As managers have earnings targets, if the only form earnings management used were to be accrual earnings management, this would be risky as they may not be able to achieve their target solely through accruals manipulation. Moreover, it would not be possible to utilize real earnings management to bridge any shortfall as there would not be enough time for real activities manipulation to be effective (Roychowdhury, 2006). Finally, the balance sheet accumulates all the prior changes of accounting methods (Barton & Simko, 2002). Consequently, firms that utilized higher levels of accrual earnings management in previous years are likely to manipulate real activities in the current period if they have a continued motivation to manipulate earnings (Gunny, 2010).

The recent developments in the field of real earnings management have led to a renewed interest in examining whether IPO and SEO firms engage in such activities around the offer year. Darrough and Rangan (2005) for example, show that IPO firms reduce R&D expenses during the IPO year to increase reported earnings. They find that the reduction in R&D is motivated by managerial share selling, as managers believe investors place greater emphasis on current earnings. Wongsunwai (2013) finds evidence that IPO firms manage both real and accrual-based activities during the IPO year, but that the presence of reputable venture capitalists constrains real earnings management. While, Cohen and Zarowin (2010) and Kothari, Mizik and Roychowdhury (2012) find evidence that SEO firms undertake real

earnings management during the offer year. Taken together, these findings indicate that both real and accrual earnings management are likely to be utilized by firms that have strong incentives to inflate reported earnings.

2.3 Audit Quality and Real and Accrual Earnings Management

Focusing on monitoring bodies that may mitigate earnings manipulation, previous research finds evidence that high-quality auditing plays a significant role in mitigating accrual earnings management (Balsam, Krishnan & Yang, 2003; Becker, DeFond, Jiambalvo & Subramanyam, 1998). One explanation for this negative relationship is that such manipulations increase the probability of litigation, as firms with a higher level of abnormal accruals experience worse stock return performance in the subsequent period (e.g., Teoh et al., 1998a).

The main objective of an auditor is to ensure the integrity of the financial reporting of their clients and that the financial accounts are true and fair and the firm is a going concern. Indeed, the quality of the audit firm is an important factor that can influence investment by external stakeholders. In line with this, Brau and Fawcett (2006) provide evidence that hiring high quality auditors represents an important signal that executives of IPO firms attempt to send to outside investors regarding their quality. In comparison with low quality audit firms, it is expected that high quality auditors provide greater scrutiny of financial reports to avoid any future litigation by external stakeholders, as litigation would lead to severe reputational damage (Hogan, 1997).

Confirming the previous view on the probability of litigation risk due to accruals manipulation, Heninger (2001) examines the relation between abnormal accruals and auditor litigation risk. Using a larger sample of audit litigation cases, he finds the probability of litigation risk is positively associated with income increasing abnormal accrual accounting. Auditors, therefore, face a higher litigation risk if auditees undertake greater accrual earnings management.

While accruals manipulation falls within the scope of audit, real activities represent managerial decisions that are less subject to the scrutiny of audit firms (Graham et al., 2005).

However, given the increased audit risk associated with an IPO, and the internal and external pressures on management to manipulate the financial accounts of the firm, high quality auditors are going to be scrutinizing all activities of the firm. Consistent with this view, Sohn (2011) conducted a survey with high quality auditors (big-4) and found that more than 30% of the respondents admitted that real earning management activities are associated with a higher probability of future litigation penalties. Moreover, Kim and Park (2014) showed that where firms undertake higher levels of real earnings management, they are less likely to be retained as an audit client. Specifically, they find the use of real earnings management to meet or beat earnings targets etc. increases the likelihood of auditor resignations. Crucially, their results show that sales and discretionary expenses manipulation is significantly associated with litigation risk against the auditor.

Despite the extensive evidence on the association between accrual earnings management and audit quality, few studies have examined whether enhanced audit quality affects real earnings management activities. One notable study is Chi et al. (2011), who examine the association between audit quality and real and accrual earnings management for firms that have strong incentives to manage earnings upward e.g., firms that try to meet or just beat earnings benchmarks. Their results show that a higher level of real earnings management is positively associated with high quality auditing as proxied by the presence of big-N audit firms, audit industry specialism, higher audit fees, and longer audit tenure. Chi et al. (2011) indicate that high quality auditors constrain accrual-based manipulation and, therefore, their clients switch to higher levels of real earnings management.

In summary, based on the previous discussion and given the strong incentives IPO firms have to manage earnings upward at the end of the IPO year, IPO firms audited by high quality auditors (big-N audit firms) are expected to exhibit a higher level of sales-based

manipulation to avoid the monitoring of accrual-based and discretionary expenses-based manipulations by their auditors. Hence, our main hypothesis is as follows:

> **H1**: IPO firms that are audited by big-N audit firms exhibit a lower level of accrual-based and real earnings management.

3. Data and Methodology

3.1 Data

The sample consists of 498 IPO firms that went public on the London Stock Exchange between January 1998 and December 2008. Our sample period starts in 1998 as The London Stock Exchange provides data on IPOs on the Main market starting 1998. We end in 2008 and the global financial crisis had a significant impact on the IPO market not only in the UK but globally. In looking at the IPO market post 2008 in the UK, between 2008 and 2012 there were only four IPOs that met our filter criteria as set out below.

Our sample covers all non-financial IPO firms where the IPO prospectus and the data to estimate our proxies for real and accrual earnings management are available. We also exclude any group of firms with fewer than 6 observations in the different 2-digit SIC code industry-year group from our control sample, in line with previous research.[4] Year 0 is the IPO year, and is the calendar year in which the IPO occurs.[5]

As indicated earlier, IPO firms have incentives to manage earnings during the months occurring immediately post-IPO for several reasons due to: restrictions on managers selling shares post-IPO via the IPO due to lock-up; litigation risk from significant declines in stock prices after the IPO; managerial compensation; and the need to meet or beat analyst forecasts.

[4] We follow Rosner (2003), Iqbal, Espenlaub & Laub (2009) and Athanasakou, Strong & Walker (2011) by using 6 observations.
[5] To overcome any mis-specification of the financial year-end, the financial data we obtained from WorldScope are crosschecked with the financial data in the prospectus.

Thus, the period under examination for both accrual and real activities is the first year when the IPO firm is a public firm, which includes months prior to and after the IPO date. This approach of estimating earnings management is consistent with previous research that examines earnings management around IPOs (see Teoh et al., 1998a).

Our data is collected from a range of sources. Our list of IPO firms are taken from the IPO list of the LSE website, which covers all firms listed on both the Main and AIM markets between 1998 and 2008. This gives us key information about the IPO including, the IPO date, market capitalization, and issue price etc. To obtain company identifier information for our sample firms we use Lexis-Nexis and ICC Plum and collect ISIN and WorldScope codes. WorldScope is used to collect financials for both our IPO firms and our control sample of non-IPO companies. Stock prices for both IPO firms and control firms are taken from Datastream. FAME is used to identify the auditor of both our IPO and control samples. Finally, we use the IPO prospectus to collect manually all missing data.

3.2 Methodology

For our earnings management metrics, we are applying the standard methods within the literature. We, therefore, describe our methodology for estimating both the real and accrual earnings management proxies in detail in the appendix to this paper. Following Ball and Shivakumar (2008), the piecewise linear variant of Jones (1991) is used to estimate our accrual earnings management proxies. For our real earnings management proxies, we apply the models developed by Dechow, Kothari and Watts (1998) and that have been used in number studies in the area e.g. Roychowdhury (2006).[6]

[6] Our main focus in examining real earnings management are sales manipulation and discretionary expenses manipulation. However, production cost manipulation is eaxamined in section 4.4, but only as a sub-sample analysis given the limited data vailable to examine this form of real earnings management.

4. Results

4.1 Descriptive Statistics

Table 1 (Panel A) presents descriptive statistics for our pooled IPO sample, while Panels B and C present the descriptive statistics based on audit quality. The mean market capitalization for IPO firms audited by big-N auditors is approximately £176 million and for IPO firms audited by non-big-N auditors it is approximately £32 million. This large difference in market values between IPO firms audited by big-N auditors and IPO firms audited by non-big-N auditors is consistent with view that large IPO firms have strong incentives to hire high quality auditors to send a positive signal about IPOs to outsiders (Brau & Fawcett, 2006; Titman & Trueman, 1986). Similarly, the other figures of Table 1 namely total assets and money raised, show that IPO firms audited by big-N auditors are on average larger than those audited by non-big-N audit firms. With regards to the operating performance of IPO firms, Panels B and C show that the mean (median) net income for IPO firms audited by big-N auditors is approximately £0.6 (0.12) million, while for IPO firms audited by non-big-N auditors it is approximately £0.12 (-0.4) million. This in turn shows that IPO firms audited by non-big-N auditors have a lower level of operating performance during the IPO year compared with IPO firms audited by big-N auditors.

[Insert Table 1 here]

Table 2 (Panel A) reports the distribution of IPOs over the period from 1998 to 2008 and shows that the years 2000, 2004, 2005, and 2006 account for more than 64% of the sample. Table 2 (Panel B) shows the frequency of IPOs relative to the industry standard classification, measured by 2-digit SIC codes. Except for the clustering in the Business Services industry, which accounts for 34% of the total sample, the percentages of IPOs in other industries range from 1% to 11%.

[Insert Table 2 here]

Table 3 reports descriptive statistics for all the variables in our regression models for the pooled sample. We interpret our results on the basis of mean values. For real activities-based and accrual-based manipulations, significant and positive coefficients indicate income-increasing earnings management. Panel A shows preliminary evidence that IPO firms in the UK exhibit higher levels of sales manipulation during the IPO year. We find the mean abnormal cash flows from operations is a positive 5.3% and statistically significant at the 5% level. These statistics provide preliminary evidence that IPO firms engage in sales-based manipulation to manage earnings upward during the IPO year. In addition, Table 3 (Panel A) shows that approximately 46% of our IPO sample is audited by big-N audit firms. This provides us with an approximately equal sample of IPOs in each group, big-N versus non-big-N firms, to examine the effect of high-quality auditing on real and accrual earnings management around IPOs.[7]

[Insert Table 3 here]

Table 4 reports the correlation matrix for all the variables of interest for the pooled sample. Notably, big-N auditors are negatively correlated with abnormal discretionary expenses and positively correlated with abnormal cash flows from operations (sales-based

[7] Since the development of Roychowdhury's (2006) model to estimate sales-based manipulation (abnormal cash flows from operations), a large number of studies have examined sales-based manipulation in many different settings. However, none of these studies has attempted to explore whether this abnormal increase in operating cash flows is due to real earnings management or due to other reasons (e.g., cut-off errors, fictitious sales, recording too little deferred revenue, etc.). Thus, to examine whether the increase in top line sales is primarily due to real earnings management, we run the following OLS regression:
$ABNCFO_{i,t} = a_0 + \beta_1 DebtorsCollectionPeriod + \beta_2 Big\ N + \beta_3 Ln(MK) + \beta_4 BM + \beta_5 Ln(1+age) + \varepsilon_{i,t}$
Where ABNCFO is abnormal cash flows from operations estimated using the model of Roychowdhury (2006), Debtors Collection Period is calculated as, [Receivables at the end of the year-Receivable at the beginning of the year]/Sales*365 days. IPO firms that manage sales upward by providing more lenient credit terms are expected to have a longer debtor collection period. Consistent with this expectation, we find evidence that IPO firms with high levels of sales-based manipulation during the IPO year have a higher debtor collection period, and so the increases in top line sales are primarily due to real earnings management.

manipulation). These correlations indicate that the level of discretionary expenses-based real earnings management is a decreasing function of high quality auditing, which in turn leads IPO firms to resort to a higher level of sales-based manipulation. Moreover, there is a significant and negative relation between big-N auditors and our proxy for aggregate real earnings management.

[Insert Table 4 here]

4.2 Regression Results

To test whether high-quality auditing, proxied by the presence of big-N audit firms, affects the levels of real and accrual earnings management during the IPO year, we estimate the following model:

$$\begin{aligned} EM_{i,t} = {} & a_0 + \beta_1 Big\ N + \beta_2 Ln(MK) + \beta_3 BM + \beta_4 Ln(1+age) + \beta_5 LEV + \beta_6 Loss + \beta_7 ROA \\ & + \beta_8 Capex\ growth + \beta_9 SEO + \beta_{10} AIM + \beta_{11} VC + \beta_{12} Underwriter \\ & + \beta_{13} Retained\ Ownership + \beta_{14} OutDirectors + \beta_{15} BrdSize \\ & + \beta_{16} Chrm/CEO + IND + Year + \varepsilon_{i,t} \end{aligned} \quad (7)$$

EM is each of our earnings management proxies in the year of the IPO. Big-N equals 1 if the firm is audited by a big-N audit firm and 0 otherwise. Following prior research (e.g., Balsam et al., 2003; Becker et al., 1998; Chi et al., 2011; Cohen et al, 2008; Cohen & Zarowin, 2010; DeFond & Jiambalvo, 1994; Fan, 2007; Gunny, 2010; Kothari, Leone & Wasley, 2005; Morsfield & Tan, 2006; Rangan, 1998; Roosenboom, Van der Goot & Merterns, 2003; Teoh et al., 1998a, 1998b; Zang, 2012), we add a set of control variables that are found to be associated with real and accrual earnings management.

We control for the possible impact of a size effect by adding the natural logarithm of market value (Ln(MK)) to the model, calculated as the offer price multiplied by the number of outstanding shares on the first day of listing. To control for growth opportunities we include

the book-to-market-ratio (BM), calculated as the book value of equity divided by the market value of equity. IPO firm age [ln(1+age)] measured as the natural logarithm of 1+IPO firm age, where firm age is calculated as the difference between the founding date of the firm and the date of its IPO. Capital expenditure growth (Capex growth) is computed as capital expenditure during the IPO year minus the capital expenditure in the previous year scaled by total assets in the year prior to the IPO year (e.g., Cohen & Zarowin, 2010; Rangan, 1998; Roosenboom et al., 2003; Teoh et al., 1998a).

Fan (2007) shows that investors find it hard to apraise the value of younger and high-growth firms due to the difficulty in valuing their growth opportunities, which in turn provides managers with more flexibilty to manage reported earnings and mislead investors. However, ernings management proxies might be correlated with firm size and growth characterstics due to measurement errors when estimating earnings management proxies (Cohen and Zarowin, 2010). Thus, we make no prediction concerning the sign (+/-) of coefficients on firm size and growth.

Firms with greater levels of debt have stronger incentives to undertake earnings management (DeFond and Jiambalvo, 1994). As such, we control for the level of debt in the firm (LEV) which is calculated as total $debt_t$/total $assets_{t-1}$ and the expected sign on the coefficient of (LEV) is negative. We control for profitability by adding ROA following prior research (e.g., Kothari et al. 2005; Gunny, 2010), and we include a dummy variable for firms that have reported a loss (Loss) as Roychowdhury (2006) shows that firms engage in higher levels of real earnings management to avoid reporting losses. Thus, the coefficient on (Loss) is expected to be positive. A dummy for SEOs (SEO) is added to control for those firms that raise further funds during the IPO year as Cohen and Zarowin (2010) find evidence that SEO

firms engage in higher levels of real and accrual earnings management during the SEO year. We predict the sign on (SEO) to be positive.

As there are two stock markets in the UK, namely the Alternative Investment Market (AIM) and the Official List (Main market), we add an AIM dummy (AIM) to control for the differences in regulation and market characteristics. Recent research shows AIM IPO firms to have lower abnormal discretionary expenses and higher discretionary accruals and abnormal cash flow from operations (e.g. Alhadab et al. 2015; Gerakos et al. 2013). Thus, the sign on the coefficient of (AIM) is expected to be either positive or negative depending on the proxy of real or accrual earnings management.

Prior research also finds that venture capitalists and high profile underwriters impact the levels of real and accrual earnings management during the IPO year. For example, Lee and Masulis (2011), Morsfield and Tan (2006), and Wongsunwai (2013), find IPO firms that are backed by venture capitalists or have a high profile underwriter have lower levels of real and accrual earnings management. Chahine et al. (2012) find evidence the diversity of a VC syndicate is associated with higher levels of accrual-based manipulation pre-IPO. As such, we include dummy variable controls for underwriter (Underwriter) and venture capitalist (VC). In doing so, we control for the impact that these intermediaries have on the earnings manage behavior of IPO firms.[8] The coefficients on (VC) and (Underwriter) are expected to be negative consistent with monitoring role observed in prior research.

We also control for ownership structure (Retained Ownership), which is the percentage of retained ownership by insiders at IPO. Teoh et al. (1998a) and Darrough and

[8] Underwriters are those global investment banks as defined by Derrien and Kecskes (2007), while venture capitalist are those investors who hold more than 3% of a firm's shares and appear in the list of venture capitalists provided by British Venture Capitalist Association. Specifically, we collect data about all the shareholders who hold more than 3% from the prospectuses and then we match the shareholder's name with a list of venture capitalists, which is obtained from the British Venture Capitalist Association.

Rangan (2005) indicate that managerial shareholding at the time of the IPO leads managers to manage earnings upward to maintain high stock prices. This occurs, as any reversal in earnings performance would negatively affect share prices and consequently, the value of managerial share holdings. However, Fan (2007) shows that IPO issuers use retained ownership and earnings management as a signal to the market. Thus, no prediction is made on the coefficient on Retained Ownership.

Prior research has highlighted the role of corporate governance in effectively constraining the use of real and accrual earnings management (e.g., Klein, 2002; Osma, 2008). We therefore control for governance in our IPO firms by including three proxies. First, board independence (OutDirectors) measured as the percentage of outside directors on the board. Second, board size (BrdSize) measured as the number of directors on the board. Third, whether there is Chairman and CEO duality (Chrm/CEO), which is a dummy variable equalling 1 if the Chairman of the board and the Chief Executive Officer (CEO) is the same individual and zero otherwise.

Based on the monitoring role of the board of directors, IPO firms with a higher percentage of outside directors, a larger number of directors on the board, and no Chairman/CEO duality are expected to have a lower level of earnings management (e.g., Klein, 2002; Osma, 2008). We, therefore, predict the coefficients on (OutDirectors), (BrdSize) to be negative, and the coefficient on (Chrm/CEO) to be positive. Finally we include (IND) and (Year) dummies to control for industry and time effects, respectively.

Table 5 reports the results for our analysis of whether enhanced audit quality affects real and accrual earnings management activities of IPO firms during the offer year. We find a significant and positive coefficient (0.102) on big-N in the abnormal cash flows from operations regression. This result shows that IPO firms audited by high quality auditors exhibit higher levels of abnormal cash flows from operations during the IPO year as

compared to IPO firms audited by low quality auditors. Sales-based manipulation is one of the most common real earnings management activities used to inflate reported earnings upward around equity offerings (e.g., Cohen and Zarowin, 2010; Wongsunwai, 2012). Moreover, sales manipulation is hard to detect. Consequently, it is less likely to be picked up by an auditor, investor or regulator (Graham et al. 2005; Cohen et al. 2008).

For discretionary expenses we find a significant negative coefficient (-0.173) on big-N, suggesting that the presence of high quality auditors constrains discretionary expenses-based manipulation. Consistent with prior research on the monitoring role of high quality auditors to detect accrual-based manipulation, we find a significant negative coefficient (0.099) on big-N (e.g., Elder and Zhou, 2002; Chen and Zhou, 2005; Balsam et al., 2003; Krishnan, 2003; Reichelt and Wang, 2010).

We also re-run the above model and control for pay incentives (*Directors'* remuneration) in our analysis as prior research shows that executive compensation is positively associated with real and accrual earnings management (e.g., Cheng and Warfield 2005). *Directors' remuneration* is the sum of directors' remuneration reported in prospectuses. This variable is not available for our entire IPO sample and, therefore, including this variable would reduce our sample size by almost 50%. However, for robustness we repeat our analysis including directors' remuneration.

Our results are similar and present evidence that IPO firms audited by big-N audit firms show lower levels of accrual-based and a higher level of sales-based earnings management. Further, we find the coefficient on Abnormal discretionary expenses is negative (in the same expected direction), but statistically is insignificant. This is attributable to the drop the in the sample size. It is also worth noting that we find evidence consistent with the view that managers engage in earnings management to meet their compensation incentives

(Cheng and Warfield, 2005). Our result shows a positive and significant coefficient (0.057) on director remuneration in the abnormal cash flow from operations regression.[9]

Our results suggest that the presence of high quality auditors constrains discretionary expenses-based and accrual-based manipulations. However, in contrast to our expectations that the presence of big-N auditors will constrain all forms of earnings management, we find a higher level of sales-based manipulation. In looking at this result, firms audited by big-N auditors are not manipulating both discretionary expenses and sales. As a result, while managers are undertaking real earnings management they are not doing this in a manner that would give rise to concerns under the current approach of International Auditing Standards.

Within the standards, there is a degree of judgement to be exercised by the auditor in detecting earnings management. The standards set out two ways of identifying real and accrual earnings management. Year-end transactions are most likely to be accrual earnings management. However, for the identification of real activities, such as sales manipulation or expenses manipulation, the identification mechanism is based on operating cash flow, ratios, and trends. The presence of high quality auditors, therefore, constrains discretionary expenses manipulation, as a divergent trend between increasing sales and the costs associated with increasing sales should be a signal to a high quality auditor that there may be pervasive manipulation going on. These results suggest that even though real activities manipulation is perceived to be subject to lower levels scrutiny by auditors, the presence of high quality auditors does constrain some of these activities. That said, IPO firms audited by the big-N are undertaking earnings management and are focussed on the size of the firm as opposed to the profitability.

[9] The results are not reported for the sake of brevity but are available upon request.

[Insert Table 5 here]

4.3 Self-selection Bias

A key econometric issue concerning big-N and non-big-N auditors is firms choose their auditor, and as such, bias could be introduced into OLS regressions (Basioudis & Francis, 2007; Chaney, Jeter & Shivakumar, 2004; Clatworthy, Makepeace & Peel 2009; Datar, Feltham & Hughes, 1991; Lawrence, Minutti-Meza & Zhang, 2011; Titman & Trueman 1986). To account for the fact that the choice of auditor may not be random, it is common in the accounting literature to use the Heckman (1979) two-step procedure for self-selection. To apply this approach requires meeting the standard exclusion criteria, which necessitates finding an exogenous variable that relates the likelihood engaging an audit firm in the first stage model, but does not explain our dependent variable (earnings management proxies) in the second stage. This is a challenging task in reality. For example Lennox and Pittman (2010) states,

> *"*In the context of auditor choice, a researcher who wishes to use the Heckman model faces the often intractable task of identifying an independent variable that meets the following conditions: (a) it is exogenous, (b) it is a very powerful predictor of auditor choice in the first stage model, and (c) it does not affect the dependent variable in the second stage model.*"*

Moreover, a recent paper by Lennox et al. (2012) shows the Heckman two-step model to be sensitive to model specification. Small changes in specification or minor changes in sample composition can therefore change the result of the selection model.

As a result of the challenges finding suitable exogenous variables and the sensitivity of the Heckman two-step approach, many papers have applied a propensity-score matching approach to control for auditor self-selection bias e.g., Boone et al. (2010), Lawrence et al.

(2011), Eshleman and Guo (2014), and DeFond et al. (2014). The propensity-score matching approach, developed by Rosenbaum and Rubin (1983), matches an IPO firm audited by a big-N auditor with an IPO firm audited by a non-big-N auditor on a wide range of observed IPO firm characteristics. This approach was found to be superior to the Heckman two-step model in this context as it does not require finding an exogenous variable that meets the standard exclusion criteria (Lennox and Pittman, 2010; Eshleman and Guo, 2014).

We, therefore, estimate the probability of hiring big-N audit firms using a logit regression as this is the most common approach to estimate the propensity scores (Guo and Fraser 2010). Our logit model is similar to Lawrence et al. (2011), Eshleman and Guo (2014), and DeFond et al. (2014) and includes five variables that have been found to be associated with the probability of hiring a big-N auditor. The model is set out below,

$$BigN = a_0 + \beta_2 LNASSETS + \beta_3 ATURN + \beta_4 CURR + \beta_5 LEV + \beta_7 ROA + IND + Year + \varepsilon_{i,t} \quad (8)$$

Where LnAssets is the natural logarithm of total assets, ATURN is asset turnover ratio, calculated as sales divided by total assets prior to the IPO, and CURR is current assets divided by current liabilities. All other variables are previously defined. Recent research shows that large client firms are likely to choose big-N auditors and that big-N auditors are likely to choose large client firms (Lawrence et al., 2011, Eshleman and Guo, 2014; and DeFond et al., 2014). To control for size we include the natural logarithm of total assets (LNASSETS). Following Jain and Kini (1994) assets turnover ratio (ATURN) is included in the model to control for growth opportunities. Further, big-N auditors are likely to choose less risky clients. Both the current ratio (CURR) and leverage (LEV) are therefore included to control for client financial distress (e.g., Eshleman and Guo, 2014). While return on assets (ROA), a proxy of clients' profitability, industry effects (IND), and time effects (Year) are added into the model following Lawrence et al. (2011) and Eshleman and Guo (2014).

After we obtain the predicted value from the above equation, we match each IPO firm audited by a big-N auditor with an IPO firm audited by a non-big-N auditor. Following prior research (e.g., Lawrence et al., 2011; DeFond et al., 2014), we do so where the closest value is within a maximum distance of a caliper of 0.03 between the two predicted values.[10] We conduct our matching without replacement as this leads to a more conservative test. In effect, this procedure of matching creates a pseudo "random" sample that consists of two groups of IPO firms; treatment (IPOs audited by big-N auditors) and control (IPOs audited by non-big-N auditors) groups. Differences in real and accrual earnings management should therefore be attributed to the treatment effect, namely audit quality and not to pre-existing IPO firm characteristics (e.g., Heckman et al. 1997, 1998; Dehejia and Wahba 1999, 2002 as cited by Lawrence et al. 2011).

The above matching process results in a final sample of 222 IPOs, with 111 IPO firms audited by a big-N auditor and 111 IPO firms audited by a non-big-N auditor. We, therefore, estimate the following OLS regression on the matched sample:

$$\begin{aligned} EM_{i,t} = {} & a_0 + \beta_1 Big\ N + \beta_2 Ln(MK) + \beta_3 BM + \beta_4 Ln(1+age) + \beta_5 LEV + \beta_6 Loss + \beta_7 ROA \\ & + \beta_8 Capex\ growth + \beta_9 SEO + \beta_{10} AIM + \beta_{11} VC + \beta_{12} Underwriter \\ & + \beta_{13} Retained\ Ownership + \beta_{14} OutDirectors + \beta_{15} BrdSize + \beta_{16} Chrm/CEO \\ & + IND + Year + \varepsilon_{i,t} \end{aligned} \quad (9)$$

Where (EM) is our different proxies for real and accrual earnings management during the IPO year, and all other variables are previously defined. Table 6 Panel A, reports the results for the logit regression, model (8), on the probability of hiring a high quality audit firm. As expected, high quality auditors are found to be associated with larger, less risky IPO clients. The coefficients on LnAssets (0.800) and CURR (0.019) are positive and statistically significant at

[10] We check the balance of our matching procedure using the post estimation command pbalcheck in Stata, and a 0.03 calliper is appropriate for our sample as we get a good match and the Hosmer-Lemeshow test shows that our model has good functional form and fits our data well.

1% and 10% levels, respectively. Further, the coefficients on ATURN (-0.237) and ROA (-0.053) are negative and statistically significant at 5% level. These results are comparable to DeFond et al. (2014).[11]

Table 6 Panel B reports the results of our analysis controlling for self-selection using a propensity-score matching approach. Consistent with the results presented in Table 5, we find significant negative coefficients on big-N for aggregate real earnings management (-0.220), abnormal discretionary expenses (-0.287), and discretionary accruals regressions (-0.185), respectively. Consistent with our previous evidence we find that IPO firms audited by big-N auditors have significantly lower levels of accrual earnings management and discretionary expenses manipulation, and a higher level of sales-based manipulation. These results are consistent with our main analysis (Table 5) our results are, therefore, robust having controlled for self-selection.[12]

4.4 Production Cost-Based Manipulation

Production cost manipulation can also be used to manage earnings upward by producing more units to lower the total cost of goods sold and increase profit margins (Roychowdury, 2006; Cohen et al., 2008). We have three reasons for not having considered production cost manipulation in our main analysis. First, IPO firms are less likely to engage in production cost manipulation as these firms are at the early stages of their life cycles (Wongsunwai, 2013). Second, production cost manipulation is a method that is mainly utilized by firms engaged in manufacturing, and only 25.5% of our sample fall into this categorization. Third, to calculate production cost manipulation we need to collect the sale revenues for two years

[11] Lawrence et al. (2011) and Eshleman and Guo (2014) do not report the results of the logit regression, as such we are unable to compare with their results.

[12] We also repeat our matching by decreasing the maximum distance the caliper from 0.03 to 0.01. This leads to a decrease in the matched sample size to 158 IPOs with 79 IPO firms audited by a big-N auditor and 79 IPO firms audited by a non-big-N auditor. We re-estimated model 9 on this restricted matched sample and find qualitatively similar results as our key finding.

prior to the IPO year ($\Delta SALES_{i,t-1}$), which are not always available our sample firms. This is due most of our sample (375 IPOs) going public on the Alternative Investment Market (AIM) of the London Stock Exchange. AIM does not require the IPO firms to have a previous earnings record as a listing requirement and many IPO firms on the AIM market went public within a short period of commencing trading.

For robustness, we manually collected the required data from IPO prospectuses to estimate production cost manipulation. This process ends up finding data for just 240 IPO firms over the sample period. We, therefore, estimate abnormal production cost manipulation following Roychowdhury (2006). All variables are scaled by average total assets consistent with our estimation of our other proxies for real earnings management. First, for all non-IPO firms, the normal level of production cost is estimated from the cross-sectional regression below for each industry and year:

$$\frac{PRODCST_{i,t}}{AvAssets_{i,t}} = \alpha_0 + \beta_1 \frac{1}{AvAssets_{i,t}} + \beta_2 \frac{SALES_{i,t}}{AvAssets_{i,t}} + \beta_3 \frac{\Delta SALES_{i,t}}{AvAssets_{i,t}} + \beta_4 \frac{\Delta SALES_{i,t-1}}{AvAssets_{i,t}} + \varepsilon_{i,t} \quad (10)$$

Where $PRODCST_{i,t}$ is the total of cost of goods sold and change in inventories for firm i at period t. For our sample of IPO firms, abnormal PRODCST is actual PRODCST minus the normal level of PRODCST, which we estimate using the coefficients from regression 10.

Table I in the Appendix, reports the results for our analysis of whether enhanced audit quality affects real earnings management activities that occurs via product cost-based manipulation. We find a significant negative coefficient (-0.280) on big-N for the REM-Index regression, suggesting that the presence of high quality auditors constrains production cost-based and discretionary expenses-based manipulation. These results should be read with caution as they may be driven by the discretionary expenses-based manipulation. Moreover,

when we test for the individual measure of abnormal production cost the result is insignificant. Table II reports the propensity score matched results, which control for self-selection. The results for our propensity score matched sample shows similar evidence that audit quality impacts production cost manipulation and discretionary expenses-based manipulation.[13]

5. Conclusions

We examine the impact of audit quality on real and accrual earnings management around IPOs. Although prior research has examined accruals earnings management around IPOs (e.g., Friedlan, 1994; Gramlich and Sorensen, 2004; Morsfield and Tan, 2006; Teoh et al. 1998a), and a small number of recent papers have started to investigate real earnings management activities and IPOs (e.g., Darrough & Rangan, 2005; Wongsunwai, 2013), our paper progresses the literature by examining the effect of enhanced audit quality on real and accrual earnings management activities during the IPO year. We contribute to the research in this area by showing IPO firms audited by high quality auditors resort to a higher level of sales-based manipulation but have significantly lower levels of discretionary expenses-based and accrual-based manipulations.

[13] For robustness, we also examine whether our results hold using other proxies for audit quality (e.g., Chi et al. 2011). In doing so, we re-estimate our analysis in model 7 by replacing our proxy of audit quality (big-N) with two proxies; audit fees (AuditFees) and the sum of audit and non-audit service fees (TotalFees). The unreported results show that high-quality auditing (proxied by either AuditFees or TotalFees) is positively associated with sales-based manipulation, but not with other earnings management activities. Specifically, we find a positive coefficient of 0.053 [0.037] on AuditFees [TotalFees] in the abnormal cash flows from operations regression, which is statistically significant at the 10% level. The results are available upon request.

While this finding can only lead to a partial acceptance of our hypothesis, our results are consistent with the approach for detecting real earnings management via the use of ratios, trends, financial and non-financial information, set out in the International Standards on Auditing. The presence of high quality auditors does not constrain sales manipulation. However, discretionary expense manipulation is significantly lower, as a divergent trend between increasing sales and the costs associated with increasing sales would be a signal to high-quality auditors that there may be pervasive manipulation going on. The mere presence of a big-N auditor is not, however, sufficient to constrain all forms of earnings management.

From a regulatory perspective, there are two conclusions that can be drawn from the current study. The approach for detecting real earnings management as set out in the International Standards on Auditing partially limits real earnings management where a big-N auditor is present. However, IPO failure is more likely where higher levels of real earnings management are present e.g. Alhadab et al. (2015). Regulators and standard setters should therefore strengthen the emphasis placed on these forms of earnings management, as the consequences of manipulation are not costless. In doing so, auditors would have to place greater scrutiny on potential sources of real earnings management, thereby limiting the riskier forms of earnings management that occur.

Finally, there are two important caveats to our work. First, given we have only considered the UK in this study, future research should consider whether these results hold under different legal systems as the impact of different levels of shareholder rights and the risk of litigation may have an effect on the extent to which big-N auditors seek to constrain earnings management around IPOs. Second, as our sample stops in 2008 because of the financial crisis, future work should therefore consider if there has been any change auditor behaviour and whether our results still hold. Since 2008, there has been a significant amount

of attention placed on auditors in the UK with a Competition and Markets Authority investigation and a significant amount of enforcement activity around audit failures (e.g. Connaught) both of which may have change the market dynamics.

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Table 1
Descriptive statistics for sample IPO firms during 1998-2008

	Total assets (£ mill.)	Net income (£ mill.)	Market value (£ mill.)	Money raised (£ mill.)
Panel A: Pooled IPOs sample				
Mean	59.64	0.35	99.34	35.12
Median	11.40	0.01	26.28	7.43
Std. dev	228.45	14.46	257.54	102.47
Minimum	0.28	-124.10	1.44	0.14
Maximum	2359.40	175.80	2020.68	1140.00
N	498	498	498	498
Panel B: IPO clients of big-N audit firms sample				
Mean	109.84	0.60	176.42	62.68
Median	25.63	0.12	56.16	21.16
Std. dev	321.96	20.79	336.72	131.78
Minimum	0.54	-124.10	2.39	0.28
Maximum	2359.40	175.80	2020.68	1140.00
N	232	232	232	232
Panel C: IPO clients of non-big-N audit firms sample				
Mean	15.86	0.12	32.12	11.08
Median	5.64	-0.04	15.54	3.70
Std. dev	58.24	3.88	125.77	57.52
Minimum	0.28	-11.84	1.44	0.14
Maximum	911.69	37.67	2020.68	928.80
N	266	266	266	266

Notes:
This table presents sample descriptive statistics for the pooled IPOs, IPO clients of big-N auditors, and IPO clients of non-big-N auditors over the period 1998-2008. Total assets are the end of the period total assets; net income is the end of period net income; market value is the market capitalization for IPO firms immediately after the listing; money raised is the offer amount of the IPO. Total assets and net income are obtained from the WorldScope database; market value and money raised are obtained from the London Stock Exchange website.

Table 2
Time and industry distribution

Panel A: Time distribution of IPOs during 1998-2008

	Pooled sample		Big-N clients		non-big-N clients	
Year	Freq	%	Freq	%	Freq	%
1998	33	6.63	24	10.34	9	3.38
1999	26	5.22	10	4.31	16	6.02
2000	94	18.88	59	25.43	35	13.16
2001	40	8.03	17	7.33	23	8.65
2002	27	5.42	14	6.03	13	4.89
2003	19	3.82	8	3.45	11	4.14
2004	80	16.06	37	15.95	43	16.17
2005	87	17.47	30	12.93	57	21.43
2006	62	12.45	20	8.62	42	15.79
2007	29	5.82	12	5.17	17	6.39
2008	1	0.20	1	0.43	-	-
Total	498	100.00	232	100.00	266	100.00

Panel B: Industry distribution of IPOs during 1998-2008

		Pooled sample		big-N clients		non-big-N clients	
Industry	2-digit SIC	Freq	%	Freq	%	Freq	%
Oil and gas extraction	13	24	4.82	9	3.88	15	5.64
Food products	20	11	2.21	3	1.29	8	3.01
Printing and publishing	27	11	2.21	5	2.16	6	2.26
Chemicalsand allied products	28	35	7.03	19	8.19	16	6.02
Industrial machinery	35	15	3.01	9	3.88	6	2.26
Electronic equipment	36	33	6.63	17	7.33	16	6.02
Instruments and related products	38	22	4.42	10	4.31	12	4.51
Communications	48	26	5.22	14	6.03	12	4.51
Electric, gas, and sanitation	49	3	0.60	1	0.43	2	0.75
Durable goods	50	10	2.01	5	2.16	5	1.88
Eating and drinking establishments	58	13	2.61	5	2.16	8	3.01
Retail	59	8	1.61	3	1.29	5	1.88
Business services	73	173	34.74	87	37.50	86	32.33
Media and entertainment	78	5	1.00	1	0.43	4	1.50
Amusement and recreation	79	26	5.22	7	3.02	19	7.14
Engineering and management services	87	56	11.24	19	8.19	37	13.91
All others	-	27	5.42	18	7.75	9	3.37
Total	-	498	100.00	232	100.00	266	100.00

Notes:

This table reports time and industry distributions for the pooled IPO sample, IPO clients of big-N auditors, and IPO clients of non-big-N auditors over the period 1998 -2009. Panel A presents the time distribution, while Panel B presents the industry distribution.

Table 3
Descriptive statistics for the all the variables in the regressions models

	Mean	Median	Std.dev	Q1	Q3
The aggregate measure of real earnings management	0.087	0.071	0.564	-0.145	0.279
Abnormal cash flows from operations	0.053	0.032	0.443	-0.134	0.223
Abnormal discretionary expenses	0.018	0.043	0.598	-0.213	0.243
Discretionary accruals	-0.176	0.002	0.509	-0.290	0.094
Big-N	0.466	-	0.499	-	-
Ln(MK)	3.407	3.269	1.404	2.390	4.191
BM	0.170	0.150	0.276	0.026	0.275
Ln(1+age)	1.076	0.852	0.883	0.257	1.744
LEV	0.353	0.106	0.660	0.000	0.427
Loss	0.492	-	0.500	-	-
ROA	-0.879	0.005	2.721	-0.809	0.137
Capex growth	3.034	0.233	9.377	0.035	1.273
SEO	0.050	-	0.219	-	-
AIM	0.755	-	0.431	-	-
VC	0.233	-	0.423	-	-
Underwriter	0.191	-	0.393	-	-
Retained Ownership	0.659	0.701	0.208	0.576	0.789
OutDirectors	0.447	0.444	0.162	0.333	0.500
BrdSize	5.715	6.000	1.689	5.000	7.000
Chrm/CEO	0.078	-	0.269	-	-
Ln(Assets)	1.510	1.471	1.945	0.191	2.637
ATURN	1.081	0.667	1.334	0.212	1.466
CURR	4.487	1.923	7.418	1.092	4.296
N	498	498	498	498	498

Notes:
This table reports descriptive statistics for the all the variables in our regressions models. For our dummy variables we only report the mean and standard deviation. Where the aggregate measure of real earnings management is measured as the sum of abnormal cash flows from operations and abnormal discretionary expenses; Abnormal cash flows from operations (sales-based manipulation) is abnormal levels of cash flows from operations, multiplied by minus one; Abnormal discretionary expenses is abnormal levels of discretionary expenses, multiplied by minus one; Big-N is a dummy variable equalling 1 if the firm is audited by big-N audit firm and 0 otherwise.Ln(MK) is the natural logarithm of market value; BM is the book-to-market ratio calculated as the book value of equity divided by the market value of equity; Ln(1+age) is the natural logarithm of 1+ IPO firm age where the IPO firm's age is calculated as the difference between the founding date of the IPO firm and the date of its IPO; LEV is leverage ratio calculated as total debt divided by total assets in the year prior to the IPO; Loss is a dummy variable equalling 1 if the firm reported a loss during the IPO year and 0 otherwise; ROA is return on assets measured as earnings before extraordinary items divided by total assets in the year prior to the IPO; Capex growth is capital expenditure growth which is computed as capital expenditure for the IPO year minus the previous year scaled by total assets in the year prior; SEO is a dummy variable equalling 1 if the firms issued seasoned equity offering during the IPO year and 0 otherwise; AIM is a dummy variable equalling if the firm is listed on the Alternative Investment Market (AIM) and 0 otherwise; VC is a dummy variable equalling 1 if the firm is backed by a venture capitalist and 0 otherwise; Underwriter is a dummy variable equalling 1 if the firm is underwritten by a prestigious underwriter and 0 otherwise; Retained Ownership is measured as the percentage of retained ownership by insiders; OutDirectors is measured as the percentage of outside directors on the board; BrdSize is the number of directors on the board; and Chrm/CEO is a dummy variable equalling 1 if the chairman of the board and the CEO is the same individual and zero otherwise; LnAssets is the natural logarithm of total assets; ATURN is asset turnover ratio, calculated as sales divided by total assets prior to the IPO; (CURR) is current assets divided by current liabilities. To avoid the influence of outliers, all financial continuous data are winsorized at the top 1% and bottom 99%. Abnormal cash flows from operations (sales-based manipulation) and Abnormal discretionary expenses are estimated using models developed by Dechow at al. (1998) and as implemented by Roychowdhury (2006). Discretionary accruals are estimated using the Ball and Shivakumar (2008) model.

Table 4
Correlations matrix below the diagonal for all variables used in the analysis

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	Aggregate real earnings management	1.00																						
2	Abnormal cash flows from operations	**0.32**	1.00																					
3	Abnormal discretionary expenses	0.71	**-0.44**	1.00																				
4	Discretionary accruals	-0.07	**-0.55**	**0.34**	1.00																			
5	Big-N	**-0.11**	**0.09**	**-0.17**	0.03	1.00																		
6	Ln(MK)	**-0.17**	0.06	**-0.20**	**0.16**	**0.53**	1.00																	
7	BM	0.07	0.00	0.06	**0.13**	0.03	-0.05	1.00																
8	Ln(1+age)	**-0.15**	**-0.12**	-0.05	**0.21**	0.05	**0.10**	0.00	1.00															
9	LEV	0.02	0.00	0.01	**-0.12**	-0.04	**-0.11**	**-0.21**	-0.04	1.00														
10	Loss	**0.16**	**0.32**	**-0.09**	**-0.60**	-0.05	**-0.11**	0.00	**-0.18**	0.04	1.00													
11	ROA	**-0.10**	**-0.43**	**0.22**	**0.63**	0.02	0.05	-0.04	**0.18**	**-0.14**	**-0.41**	1.00												
12	Capex growth	-0.02	-0.05	0.01	**0.12**	**0.27**	**0.56**	0.04	0.06	0.00	-0.06	**0.09**	1.00											
13	SEO	-0.02	-0.03	0.01	0.06	0.01	0.00	0.06	0.01	-0.04	-0.06	0.08	0.03	1.00										
14	AIM	0.07	0.00	0.06	**-0.15**	**-0.46**	**-0.68**	0.08	**-0.12**	0.04	0.08	**-0.10**	**-0.44**	-0.06	1.00									
15	VC	-0.07	0.00	-0.07	0.04	**0.15**	**0.14**	0.01	0.02	0.03	0.05	0.08	**0.14**	-0.04	**-0.17**	1.00								
16	Underwriter	-0.08	0.05	**-0.12**	0.02	**0.23**	**0.25**	-0.04	-0.01	-0.08	-0.02	0.01	0.00	-0.06	**-0.21**	**0.16**	1.00							
17	Retained Ownership	0.01	0.03	-0.01	**-0.20**	**-0.18**	-0.08	-0.08	0.03	-0.06	**0.17**	**-0.10**	-0.07	0.05	**0.11**	**-0.15**	**-0.15**	1.00						
18	OutDirectors	0.06	0.03	0.04	-0.07	**0.16**	**0.18**	-0.03	-0.05	0.05	0.07	-0.02	**0.12**	0.04	**-0.10**	0.08	0.00	-0.08	1.00					
19	BrdSize	**-0.11**	0.01	**-0.11**	0.01	**0.30**	**0.47**	0.03	**0.18**	-0.05	0.01	-0.01	**0.29**	0.05	**-0.35**	**0.11**	0.05	0.07	0.04	1.00				
20	Chrm/CEO	-0.05	-0.03	-0.02	0.02	0.03	0.08	-0.04	0.02	0.06	-0.02	0.07	0.06	0.04	**-0.09**	-0.05	0.01	0.08	0.01	0.04	1.00			
21	Ln(Assets)	**-0.12**	-0.07	-0.06	**0.39**	**0.42**	**0.66**	0.04	**0.19**	**-0.14**	**-0.35**	**0.43**	**0.53**	0.03	**-0.47**	**0.15**	0.08	**-0.27**	**0.15**	**0.30**	0.08	1.00		
22	ATURN	-0.02	-0.03	0.01	**0.21**	-0.06	-0.02	**-0.19**	**0.10**	-0.05	**-0.36**	**0.22**	0.01	-0.03	-0.04	-0.08	0.03	-0.06	**-0.10**	-0.06	-0.03	**0.19**	1.00	
23	CURR	0.04	0.05	0.00	-0.03	0.03	**0.12**	**0.28**	-0.08	**-0.17**	**0.26**	**-0.16**	-0.08	-0.05	0.01	**0.09**	**0.15**	-0.03	0.04	0.06	-0.06	**-0.19**	**-0.29**	1.00

This table reports a correlation matrix for all the variables for the pooled sample with Pearson correlation in the lower diagonal. Characters in bold denote correlations that are significant at $p < 0.05$. All variables are as previously defined.

Table 5

Relation between big-N audit firms and real and accrual earnings management

$$EM = a + \delta * (BigN) + \beta * X + \varepsilon$$

	Predicted Sign	Aggregate real earnings management	Abnormal cash flows from operations	Abnormal discretionary expenses	Discretionary accruals
Intercept		0.227	-0.456***	0.684***	0.318**
		(1.014)	(-2.594)	(3.029)	(2.091)
Big-N	-	-0.071	0.102***	-0.173***	-0.099**
		(-1.284)	(2.658)	(-3.094)	(-2.381)
Ln(MK)	-	-0.073*	0.046	-0.120***	0.057**
		(-1.856)	(1.609)	(-3.224)	(2.533)
BM	-	0.119	-0.052	0.170*	0.325***
		(1.217)	(-0.782)	(1.873)	(4.543)
Ln(1+age)	-	-0.065**	-0.011	-0.054*	0.029*
		(-2.200)	(-0.536)	(-1.826)	(1.805)
LEV	-	-0.003	-0.031	0.028	0.020
		(-0.059)	(-1.114)	(0.583)	(0.569)
Loss	+	0.150***	0.186***	-0.036	-0.395***
		(2.625)	(4.542)	(-0.627)	(-12.643)
ROA	-	-0.008	-0.056***	0.048**	0.088***
		(-0.440)	(-5.632)	(2.478)	(6.779)
Capexgrowth	-	0.006**	-0.005***	0.011***	-0.001
		(2.421)	(-2.877)	(4.559)	(-0.378)
SEO		-0.028	0.041	-0.069	-0.003
		(-0.330)	(0.868)	(-0.817)	(-0.069)
AIM	+	-0.150*	-0.000	-0.150*	-0.042
		(-1.794)	(-0.005)	(-1.686)	(-0.730)
VC	-	-0.088*	-0.019	-0.069	0.014
		(-1.698)	(-0.512)	(-1.217)	(0.387)
Underwriter	-	-0.026	0.015	-0.041	-0.031
		(-0.481)	(0.371)	(-0.698)	(-0.808)
Retained Ownership		-0.045	0.037	-0.082	-0.214***
		(-0.368)	(0.421)	(-0.661)	(-2.918)
OutDirectors	-	0.292**	-0.080	0.372**	-0.156
		(2.045)	(-0.706)	(2.517)	(-1.448)
BrdSize	-	-0.015	-0.014	-0.001	-0.017
		(-0.810)	(-1.238)	(-0.073)	(-1.402)
Chrm/CEO	-	-0.061	0.047	-0.108	-0.058
		(-0.684)	(0.699)	(-1.009)	(-1.090)
Year dummies		Yes	Yes	Yes	Yes
Industries dummies		Yes	Yes	Yes	Yes
N		498	498	498	498
Adj. R-squared		0.086	0.255	0.184	0.577

Note:

*, **, *** Denote 0.1, 0.05, and 0.01 significance levels, respectively.

This table reports the regression of real and accrual earnings management measures on audit quality proxy (big-N audit firms) and other associated control variables for the IPO sample. All models include year and industry dummies to control for time and industry effects, and robust t-statistics (appear in parentheses). To avoid the influence of outliers, all financial continuous data are winsorized at the top 1% and bottom 99%. All variables are as previously defined.

Table 6.
Selection-corrected results

	Constant	LNASSETS	ATURN	CURR	LEV	ROA	Industry Effect	Year Effect
Panel A: result of the logit regression								
$BigN = a_0 + +\beta_2 Ln(Assets) + \beta_3 ATURN + \beta_4 CURR + \beta_5 LEV + \beta_7 ROA + IND + Year + \varepsilon_{i,t}$								
Coefficient	-0.749	0.800***	-0.237**	0.019*	0.295	-0.053**	Yes	Yes
t value	(-1.034)	(9.058)	(-2.073)	(1.709)	(1.489)	(-1.973)		
Log likelihood = -245.15006								
Pseudo R2 = 0.2658								
Chi squared = 177.49								
P value < 0.0000								
N =485								

Panel B: Relation between big-N audit firms and real and accrual earnings management for the Propensity-Score matched IPOs sample

$EM = a + \delta * (BigNg) + \beta * X + \varepsilon$

	Aggregate real earnings management	**Abnormal cash flows from operations**	**Abnormal discretionary expenses**	**Discretionary accruals**
Intercept	-0.092	-0.701**	0.609	0.686
	(-0.333)	(-2.368)	(1.579)	(1.198)
Big-N	-0.101	0.088*	-0.189***	-0.153**
	(-1.605)	(1.869)	(-2.779)	(-2.477)
Ln(MK)	-0.006	0.087**	-0.093*	-0.057
	(-0.123)	(2.166)	(-1.688)	(-0.603)
BM	0.008	-0.061*	0.069	0.094*
	(0.218)	(-1.912)	(1.315)	(1.841)
Ln(1+age)	-0.038	-0.030	-0.008	0.045*
	(-1.251)	(-1.134)	(-0.227)	(1.769)
LEV	0.035	0.053	-0.018	-0.083
	(0.588)	(1.470)	(-0.253)	(-1.016)
Loss	0.114*	0.201***	-0.088	-0.448***
	(1.762)	(3.739)	(-1.260)	(-8.176)
ROA	0.005	-0.017***	0.022	0.026***
	(0.545)	(-2.760)	(1.564)	(2.747)
Capexgrowth	0.002	-0.010**	0.012**	0.007*
	(0.334)	(-2.344)	(2.060)	(1.723)
SEO	-0.094	-0.001	-0.093	-0.049
	(-0.820)	(-0.008)	(-0.736)	(-0.580)
AIM	-0.052	-0.053	0.001	-0.187
	(-0.507)	(-0.491)	(0.007)	(-0.874)
VC	-0.042	-0.048	0.006	0.081
	(-0.636)	(-0.858)	(0.074)	(1.307)
Underwriter	0.087	0.010	0.076	0.055
	(1.200)	(0.163)	(0.895)	(0.565)
Retained Ownership	0.023	-0.047	0.070	-0.170
	(0.144)	(-0.448)	(0.442)	(-1.533)
OutDirectors	0.041	-0.342**	0.383	0.047
	(0.191)	(-2.044)	(1.460)	(0.218)
BrdSize	-0.019	-0.019	-0.000	-0.020
	(-0.700)	(-1.100)	(-0.013)	(-0.912)

Table continues on the next page

Table 6 Panel B –continued

Chrm/CEO	0.031	-0.017	0.048	-0.003
	(0.270)	(-0.140)	(0.335)	(-0.030)
Year dummies	Yes	Yes	Yes	Yes
Industries dummies	Yes	Yes	Yes	Yes
N	222	222	222	222
Adj. R-squared	0.005	0.321	0.165	0.318

Note:

*, **, *** Denote 0.1, 0.05, and 0.01 significance levels, respectively.

This table reports the regression of real and accrual earnings management measures on audit quality proxy (big-N audit firms) after controlling for the sample selection bias using the Propensity-Score matched IPOs sample. Panel A reports the result of logit regression of the probability of hiring big-N audit firms. The dependent variable Big-N is a dummy variable equalling 1 if the firm is audited by big-N audit firm and 0 otherwise. Panel B reports the regression of real and accrual earnings management measures on audit quality proxy (big-N audit firms) and other associated control variables for the Propensity-Score matched IPOs sample. The dependent variable is one of real and accrual earnings management proxies. All models include year and industry dummies to control for time and industry effects, and robust t-statistics (appear in parentheses) are clustered at the firm level as suggested by Petersen (2009). To avoid the influence of outliers, all financial continuous data are winsorized at the top 1% and bottom 99%. All other variables are as previously defined.

Appendix

Methodology and Earnings Management Metrics

Accrual-based Earnings Management

We estimate the piecewise-linear variant of the Jones (1991) model as implemented by Ball and Shivakumar (2008). Ball and Shivakumar (2008) point out that estimating discretionary accruals for IPO firms using lagged total assets to scale accrual variables may inflate the measure of accruals in the current year. They argue that lagged total assets are qualitatively smaller than total assets at the end of the IPO year because IPO firms tend to use IPO proceeds to invest in assets. In order to overcome this problem, we follow Armstrong et al. (2009) and scale all variables by average total assets rather than lagged total assets. We, therefore, follow Ball and Shivakumar (2008) and run a cross sectional regression for each year for all non-IPO firms for each 2-digit SIC industry category. This approach, in part, controls for changes in economic conditions that impact on total accruals across different industry groups, but allows for coefficients to vary through time (Cohen & Zarowin, 2010; DeFond & Jiambalvo, 1994; Kasznik, 1999). Next, the estimated coefficients are used to estimate discretionary accruals for our IPO firms. From the model of Ball and Shivakumar (2008) normal accruals are estimated as follows:[14]

$$TA_{i,t} = \alpha_0 + \beta_1 \Delta SALES_{i,t} + \beta_2 PPE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 DCFO_{i,t} + \beta_5 DCFO_{i,t} * CFO_{i,t} + \varepsilon_{i,t} \quad (1)$$

Here $TA_{i,t}$ is total accruals, which is earnings before extraordinary items less cash flow from operations.

To estimate normal total accruals for our sample of IPO firms by year and industry, we take the coefficient estimates from equation (1) and input use them in model (2) below:

[14] Variables are winsorized at 1% and 99% to mitigate the impact of extreme values.

$$NA_{i,t} = \hat{\alpha}_0 + \hat{\beta}_1 \Delta SALES_{i,t} + \hat{\beta}_2 PPE_{i,t} + \hat{\beta}_3 CFO_{i,t} + \hat{\beta}_4 DCFO_{i,t} + \hat{\beta}_5 DCFO_{i,t} * CFO_{i,t} \quad (2)$$

Discretionary accruals (DA) are measured as the difference between total accruals and fitted normal accruals where:

$$DA_{i,t} = \left(\frac{TA_{i,t}}{AvAssets_{t-1}}\right) - NA_{i,t} \quad (3)$$

Real Earnings Management

We examine two real earnings management activities; discretionary expenses-based (abnormal discretionary expenses) and sales-based manipulations (abnormal cash flows from operations). Discretionary expenses represent the sum of R&D, advertising expenses, and selling, general and administrative expenses (SG&A). Reducing discretionary expenses in the current period will boost reported earnings in the current period. In addition, where discretionary expenses are paid for in cash, any reduction in these expenses will increase cash flows in the current period (Cohen & Zarowin, 2010). The second activity that we analyze is sales-based manipulation. Sales-based manipulation leads to lower levels of cash flows from operations, and can be managed through offering more price discounts and/or more lenient credit terms (see, Roychowdhury, 2006). Following prior research, we estimate our real earnings management proxies based on models of real earnings management developed by Dechow, Kothari and Watts (1998) and applied by Roychowdhury (2006). Later researchers such as Cohen et al. (2008), Cohen and Zarowin (2010), and Zang (2012), also apply these models to estimate real earnings management. As with estimating our measures of accrual earnings management, all variables are scaled by average total assets. The first step is to estimate the normal level of cash flows from operations for our control sample for each industry and year from model (4) below:

$$\frac{CFO_{i,t}}{AvAssets_{i,t}} = \alpha_0 + \beta_1 \frac{1}{AvAssets_{i,t}} + \beta_2 \frac{SALES_{i,t}}{AvAssets_{i,t}} + \beta_3 \frac{\Delta SALES_{i,t}}{AvAssets_{i,t}} + \varepsilon_{i,t} \quad (4)$$

Where $CFO_{i,t}$ is cash flows from operations for firm $_i$ at period $_t$.

For our sample of IPO firms, abnormal CFO is estimated as actual CFO less the normal level of CFO based on the estimated coefficients in model (4). Normal levels of discretionary expenses are estimated as a linear function of contemporaneous sales from model (5):

$$\frac{DISX_{i,t}}{AvAssets_{i,t}} = \alpha_0 + \beta_1 \frac{1}{AvAssets_{i,t}} + \beta_2 \frac{SALES_{i,t}}{AvAssets_{i,t}} + \varepsilon_{i,t} \quad (5)$$

However, estimating normal levels of discretionary expenses as above can result in poor estimates if a company manages sales upwards to increase reported earnings in a given year (Roychowdhury, 2006). Where sales have been managed upwards, the result is unusually low residuals in model (5). To address this issue, discretionary expenses are estimated as a function of lagged sales. For our sample of IPO firms, we therefore follow Roychowdhury (2006) and estimate the normal level of discretionary expenses from model (6):

$$\frac{DISX_{i,t}}{AvAssets_{i,t}} = \alpha_0 + \beta_1 \frac{1}{AvAssets_{i,t}} + \beta_2 \frac{SALES_{i,t-1}}{AvAssets_{i,t}} + \varepsilon_{i,t} \quad (6)$$

Where $DISX_{it}$ is the sum of R&D, SG&A, and advertising expenses for firm $_i$ at period$_t$, and $SALES_{i,t-1}$ is sales during the previous year.

The abnormal level of discretionary expenses for IPO firms is calculated as actual discretionary expenses minus the normal level of discretionary expenses estimated using the coefficients from regression (6). As both the abnormal cash flows from operations (sales-based manipulation) and abnormal discretionary expenses represent deviation from normal levels, the sign of these two activates is expected to be negative when the manipulation occurs. We therefore multiply abnormal cash flows from operations (sales-based

manipulation) and abnormal discretionary expenses (discretionary expenses-based manipulation) by -1, so we have the same interpretation for our coefficients of accrual-based and real activities-based manipulations.

Finally, we construct a comprehensive measure of real earnings management following Cohen and Zarowin (2010), where the aggregate measure of real earnings management is measured as the sum of abnormal cash flows from operations and abnormal discretionary expenses.

Table I

Relation between big-N audit firms and production cost manipulation

	REM -Index	Abnormal production cost
Intercept	0.515	-0.650
	(1.025)	(-1.652)
Big-N	-0.280**	-0.044
	(-2.145)	(-0.478)
Ln(MK)	-0.135	0.048
	(-1.337)	(0.619)
BM	-0.003	-0.244*
	(-0.013)	(-1.779)
Ln(1+age)	-0.086	-0.014
	(-1.000)	(-0.242)
LEV	0.228**	0.166***
	(2.269)	(2.807)
Loss	0.312*	0.347***
	(1.931)	(3.168)
ROA	0.023	-0.012
	(0.534)	(-0.765)
Capexgrowth	0.019**	0.004
	(2.331)	(0.705)
SEO	-0.418	-0.321
	(-1.494)	(-1.219)
AIM	-0.179	0.026
	(-0.782)	(0.151)
VC	-0.213	-0.217*
	(-1.300)	(-1.908)
Underwriter	0.057	0.076
	(0.388)	(0.818)
Retained Ownership	-0.153	-0.198
	(-0.496)	(-0.874)
OutDirectors	0.491	0.198
	(1.349)	(0.829)
BrdSize	0.020	0.020
	(0.521)	(0.994)
Chrm/CEO	-0.280	-0.179
	(-0.862)	(-0.906)
Year dummies	Yes	Yes
Industries dummies	Yes	Yes
N	240	240
Adj. R-squared	0.149	0.167

Note:

*, **, *** Denote 0.1, 0.05, and 0.01 significance levels, respectively.

This table reports the regression of real earnings management measures on audit quality proxy (big-N audit firms) and other associated control variables for the IPO sample. All models include year and industry dummies to control for time and industry effects, and robust t-statistics (appear in parentheses) are clustered at the firm level as suggested by Petersen (2009). To avoid the influence of outliers, all financial continuous data are winsorized at the top 1% and bottom 99%. REM-Index is calculated as the sum of abnormal production cost and abnormal discretionary expenses. Abnormal production cost and Abnormal discretionary expenses are estimated using models developed by Dechow at al. (1998) and as implemented by Roychowdhury (2006). Abnormal discretionary expense is abnormal levels of discretionary expenses, multiplied by minus one. All other variables are as previously defined.

Table II

Relation between big-N audit firms production cost manipulation for the propensity score matched IPOs sample

	REM -Index	**Abnormal production cost**
Intercept	0.046	-0.982**
	(0.072)	(-2.401)
Big-N	-0.359***	-0.076
	(-2.691)	(-0.690)
Ln(MK)	-0.096	0.061
	(-0.848)	(0.711)
BM	0.058	0.003
	(1.548)	(0.127)
Ln(1+age)	-0.030	-0.039
	(-0.418)	(-0.728)
LEV	0.199	0.231***
	(1.641)	(2.679)
Loss	0.367**	0.326**
	(2.152)	(2.340)
ROA	0.052	-0.007
	(1.093)	(-0.479)
Capexgrowth	0.015	-0.002
	(0.950)	(-0.261)
SEO	-0.695*	-0.136
	(-1.788)	(-0.401)
AIM	-0.193	-0.108
	(-0.604)	(-0.449)
VC	-0.239	-0.209*
	(-1.564)	(-1.698)
Underwriter	-0.016	-0.076
	(-0.079)	(-0.589)
Retained Ownership	0.386	0.288
	(1.307)	(1.108)
OutDirectors	1.203**	0.746
	(2.139)	(1.590)
BrdSize	0.038	0.034
	(0.902)	(1.244)
Chrm/CEO	-0.496	-0.420
	(-0.978)	(-1.013)
Year dummies	Yes	Yes
Industries dummies	Yes	Yes
N	116	116
Adj. R-squared	0.231	0.295

Note:

*, **, *** Denote 0.1, 0.05, and 0.01 significance levels, respectively.

This table reports the regression of real earnings management measures on audit quality proxy (big-N audit firms) and other associated control variables for the propensity score matched sample. All models include year and industry dummies to control for time and industry effects, and robust t-statistics (appear in parentheses) are clustered at the firm level as suggested by Petersen (2009). To avoid the influence of outliers, all financial continuous data are winsorized at the top 1% and bottom 99%. REM-Index is calculated as the sum of abnormal production cost and abnormal discretionary expenses. Abnormal production cost and Abnormal discretionary expenses are estimated using models developed by Dechow at al. (1998) and as implemented by Roychowdhury (2006). Abnormal discretionary expense is abnormal levels of discretionary expenses, multiplied by minus one. All other variables are as previously defined.