



**Earnings Management, Earnings Benchmarks, and
Directors' Remuneration: UK evidence**

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Abstract

The primary objective of this study is to examine the quality of earnings reported by UK markets and explore whether firms manipulate reported earnings figures to hit specific targets. The analysis commenced by detecting earnings management using accrual-based earnings management and real activities manipulation. On the one hand, this study has aimed to investigate whether firms manage reported earnings by utilising accrual-based and real earnings management that just meet or beat important earnings benchmarks around zero earnings and last year's earnings. On the other hand, this study purposed to examine the relationship between directors' remuneration and their earnings management as to whether firm directors gain an excessive level of remuneration through managing reported earnings.

Using accounting and financial data from firms in the FTSE All-share between 2009 and 2015, the first part of this thesis revealed that UK firms are more likely to engage in real activities manipulation through reducing discretionary expenses and overproducing to manage earnings upwards when just meeting the zero level of earnings benchmark. Moreover, it has been established that firms in the UK market are not engaging in managing earnings upwards by utilising real activities manipulation via sales-based manipulation and overproduction, but are involved more in real activities manipulation by reducing or cutting discretionary expenses when just meeting the previous year's earnings benchmark. In addition, this study undertook an additional analysis ascertain that UK firms with negative earnings have incentives to use accrual-based earnings management and real activities manipulation through managing discretionary expenses and manipulating production costs to manage earnings downward.

The second part of this thesis built a new model to measure abnormal directors' remuneration and to indicate the degree of an excessive level of compensation gained by directors. Evidence was found that, UK directors report a decline in performance by using sales-based manipulation to manage earnings downward in order to receive additional rewards, whilst directors use production costs-based manipulation to boost earnings. The results also reveal that UK directors engage more in accrual-based earnings management to manipulate earnings downward to achieve abnormally high compensation themselves. Therefore, these results show that firms engage in accrual-based earnings management and real activities manipulation to manage earnings upwards or downwards to hit different specific targets.

The thesis presented a more comprehensive understanding of earnings management for the UK market, and offered forward some practical implications for researchers, policy makers, standard setters, and other practitioners. For example, it implies that there is higher demand for increased scrutiny or constraints regarding accounting discretions to eliminate earnings management and to ensure firms disclose good quality earnings information to the public; it draws the attention of regulators or standard-setters to the limitations of accounting regulations and standards and encourages them to implement improvements; the necessity for a closer scrutiny by auditors and regulators is suggested whilst, this thesis may motivate the Board to improve remuneration package setting to ensure directors act in the best interests of shareholders.

Dedication

To my parents

Acknowledgement

Undertaking this thesis has been an unforgettable and a truly life-changing experience for me, at this stage, I would like to express my gratitude to all those who helped me during my PhD journey.

First and foremost, I would like to show my deepest gratitude to my great supervisor, Professor Simon Hussain, a respectable, responsible and resourceful scholar, who has walked me through all the stages of the writing to this thesis with his valuable guidance and strong support. It has been an honor and fortunate enough to know him and to be one of his students, his profound knowledge, extensive research experience, and remarkable insight inspired me all along during the Ph.D. pursuit, and his enthusiastic assistance, kind understanding, and continuous support helped me through the most challenging times of my life, both physically and mentally. Without his enlightening guidance, impressive kindness, extraordinary patience, constant trust, and consistent encouragement, this thesis could not have reached its present form. I would also like to express my sincere acknowledge to my second supervisor, Professor. Aly Salama, for all his help and kindness.

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Declaration

This thesis is my own work and that no part of the material offered has been previously submitted by me for a degree or other qualification in this or any other University. This submission is in accordance with the requirements of Newcastle University for the degree of doctoral philosophy.

This thesis contains 77,202 words that are within the prescribed range as advised by Newcastle University for the Faculty of Humanities and Social Sciences.

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List of Abbreviations

Abbreviation	Full Name
AM	Accrual-based earnings management.
2006 Act	Companies Act 2006.
Big bath	A firm's management team knowingly manipulating its income statement to make poor results look even worse in order to make future results appear better, is often implemented in a relatively bad year so that a firm can enhance the next year's earnings in an artificial manner.
Board	The Board of Directors.
CBI	Confederation of British Industry
CEO	Chief Executive Officer.
CFO	Chief Financial Officer.
Cookie jar accounting	Or cookie jar reserves, is an accounting practice in which a firm takes a quantity of large reserves from an economically successful year and incurs them against losses from less successful years. Through this process, firms can mislead investors into believing that their losses are less than the actual value.
EEA	European Economic Area.
EM	Earnings management.
EPS	Earnings per share.
FAME	Bureau van Dijk FAME, the definitive source of firm information and financials for UK and Irish Businesses.
FCA	UK Financial Conduct Authority.
FTSE 100	The Financial Times Stock Exchange 100 Index, is a share index of the 100 firms listed on the London Stock Exchange with the highest market capitalisation.
FTSE 250	A capitalisation weighted index consisting of the 101 st to the 350 th largest firms listed on the London Stock Exchange.

FTSE 350	A market capitalisation weighted stock market index incorporating the largest 350 firms by capitalisation which have their primary listing on the London Stock Exchange.
FTSE All-share	A capitalisation-weighted index, comprising around 600 of more than 2000 firms traded on the London Stock Exchange.
GAAP	Generally Accepted Accounting Principles
IPO	Initial Public Offering.
LSE	London Stock Exchange.
MBE	Analysts' earnings expectations.
NPV	Net present value.
OLS	Ordinary least square.
R&D	Research and development.
RAM	Real activities manipulation.
SEC	Securities and Exchange Commission.
SEO	Seasoned Equity Offering.
SG&A	Selling, general and administrative expenditures.
SIC	Standard industrial classification of economic activities.
SOX	Sarbanes-Oxley Act.
the Code	The UK Corporate Governance Code.
the Regulation	The UK Directors' remuneration Report Regulations 2002 by Practical Law.
UK	United Kingdom.
US	United State.

Chapter 1 Introduction

1.1 Introduction

Earnings management, as an accounting choice, functions in some firms or organisations for their own private gain and to misrepresent or disguise their true economic performance. It has been the focus of many papers (i.e., Dechow, et al., 1995, 2010a; Roychowdhury, 2006; Cohen and Zarowin, 2010b; Zhang, 2012; Enomoto, et al., 2015; Kothari, et al., 2016; Cohen, et al., 2019). Exploring the issue of earnings management has a significant meaning, both for accounting researchers and practitioners. In accounting, earnings management is the firm's or organisation's capacity to intentionally affect the process of financial reporting in order to achieve specific targets. This comprises the alteration of financial reports to mislead stakeholders about the firm's underlying performance, or to change contractual results, dependant on reported accounting figures. Healy and Wahlen (1999, p368) reviewed earnings management research relevant to standard setters' shaping the definition of earnings management¹ as follows:

'Earnings management occurs when managers use judgement in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the firm or to influence contractual outcomes that depend on reported accounting numbers.'

Many studies present evidence of the belief that earnings management is pervasive. Akenrs et al. (1990) in a report on earnings management situations declared that short-term earnings are being managed in many, if not all firms. Levitt (1998), the chairman of the Securities and Exchange Commission (SEC) declared in a speech, that earnings management is a widespread,

¹ Schipper (1989) also provided an overview of the earnings management literature, although she avoided the perspective of standard setters. Her review provided an analysis of implications and trade-off among research design choices in earnings management research. As defined by Schipper (1998), earnings management as 'a purposeful intervention in the external financial reporting process, with the intent of obtaining some private gains (as opposed to say, merely facilitating the neutral operation of the process), ... , a minor extension of this definition would encompass real earnings management, accomplished by timing investment or financing decisions to alter reported earnings or some subset of it.' (p92).

but too little-challenged custom. Ball (2013) pointed out that there appears to be a widely held belief amongst accounting researchers that earnings management is rife, and personally agreed with the argument that earnings management takes place. He did not believe that accounting research reliably documents earnings management, however held that earnings management has a negative effect on earnings quality², and could undermine the credibility of financial reporting. Beyer, et al. (2019) studied a dynamic model of earnings management and quality, consistent with the findings of some prior studies (Dechow, et al., 2010b; Dichev, et al.,2013), they suggested that the reporting bias through earnings management contributes significantly to investor uncertainty about firm values, and that ignoring the presence of misrepresenting may lead to inferences that significantly underestimate the persistence of earnings. Although it is widespread, the complexity of accounting rules may make it difficult for individual investors to detect earnings management. Levitt (1998) on behalf of SEC, also declared in his report that earnings management has adverse consequences on financial reporting and that it masks the true consequences of management's decisions. SEC repeatedly called on standard-setters to make changes to accounting rules and standards to improve the transparency of financial reports. SEC also called for greater oversight of financial reporting procedures (Munter, 1999), and also issued several statements relating to the fact that they have filed charges against the management of firms involved in fraudulent earnings management (SEC, 2005 and 2009).

Firms or organisations are motivated to engage in earnings management which involves the opportunistic manipulation of their earnings towards a pre-determined target. This specific target can mainly be driven by a preference for more stable returns, in which care management is used for carrying out income smoothing, as opportunistic income smoothing can, in turn, signal a lower level of risk and increase a firm's market value. As evidenced by accountings researchers, there are several other possible factors which motivate firms using the earnings management method to manipulate their reported earnings, such as the need to maintain the level of certain according ratios resulting from debt covenants (i.e., DeFond and Jiambalvo, 1994; Daniel, et al., 2008; Atieh and Hussain, 2012), the need to avoid negative earnings (i.e., Burgstahler and Dichev, 1997b; Gunny, 2010), the ability to decrease earnings and comparison of analysts' forecasts in order to maintain a longer level of overvaluation (i.e., Badertscher, 2011). In addition, earnings management may involve the exploitation of opportunities to make accounting decisions which alter the earnings amount reported in the financial statements, this

² Dechow, Ge, and Schrand (2010) defined following earnings quality as higher quality earnings provide more information about the features of a firm's financial performance that are relevant to a specific decision made by a specific decision-maker.

is due to the fact that accounting decisions can, in turn, affect the timing of transactions and the estimates used in financial reporting to influence the reported earnings. For instance, Weil (2009) found that a comparatively small change in the estimates for uncollectible accounts can have a significant effect on net income, and a firm using last-in, first-out accounting for inventories can increase net income in times of rising prices by delaying purchases to future periods.

In spite of accounting researchers proposing several methods to measure earnings management (Price III, Sharp, and Wood, 2011), it may be difficult for individual stakeholder to detect whether firms manage reported earnings, due to the complexity of accounting regulations, rules, standards, and policies. Research studies have established that firms with high accruals and weak governance structure have more incentive to participate in earnings management (Dechow, and Skinner, 2000; Prawitt, Smith, and Wood, 2009; Buchholze, et al. 2019). Different methods have been adopted by firms in order to manage earnings. One type of earnings management, referred to as ‘accrual-based’ earnings management, is achieved by changing the accrual method of accounting or estimates used when presenting a given transaction in the financial statements. This type of earnings management has no direct cash flow consequence, and has been extensively studied by researchers of earnings management (e.g. Jones, 1991; DeFond and Jiambalvo, 1994; Healy and Wahlen, 1999; Fields et al., 2001; Dechow, et al. 2010a; Alhada and Clacher, 2018; Jackson, 2018). It includes provisions for bad debt expenses, delaying asset write-offs and changing the depreciation method for fixed assets. In addition, a variety of models including the Jones (1991) model and the Dechow (1995) model, have been widely used to detect abnormal accruals. The second kind of earnings management is referred to as ‘real activities manipulation’ or ‘real earnings management’ which involves seeking to alter the execution of a real transaction which takes place during the financial year. It affects underlying activities and therefore has cash flow consequences and is achieved by, for instance, reductions in expenditure on research and development, changing the time or restructuring an operation and investing or financing activities. Real earnings management has not been widely researched but has become increasingly popular in recent years (e.g. Cohen et al., 2008; Eldeberg et al., 2011; Kim and Park, 2014; Cheng, et al. 2016; Li, 2019). Graham et al. conducted a study in 2005 and produced evidence that earnings management is mostly achieved by real actions with 80% of surveyed CFOs declaring they would employ real transactions to manipulate earnings, such as the use of decreasing R&D, advertising costs and maintenance expenditure and postponement of new projects. A third type of earnings management also exists which is under-researched and is referred to as ‘classification shifting’.

This is undertaken by the deliberate mis-classification of items within the income statement without changing the bottom line earnings. The idea that firms engage in earnings management using classification shifting is supported by McVay (2006), who investigated the classification of items within an income statement as an earnings management tool and found evidence that managers overstate 'core' earnings with no change of bottom-line earnings by means of opportunistically taking expenses from core expenses (cost of goods sold and selling, general, and administrative expenses) and moving them to that of special items.

The primary purpose of this thesis is to examine the quality of earnings reported by UK markets and explore whether firms manipulate reported earnings figures to achieve specific targets. Analysis of this research commences by detecting earnings management using accrual-based earnings management and real activities manipulation which both act within Generally Accepted Accounting Principles (GAAP) and as the most common two categories of earnings management, have been relatively widely used in literature compared with classification shifting. Accrual-based earnings management and real activities manipulation change the bottom-line earnings of GAAP in income statements whilst classification shifting simply moves expenses from core expenses to special items to manipulate core earnings without any change of bottom-line GAAP earnings. Prior literature in earnings management documentation shows that firms aim to meet or just beat different earnings benchmark when they manipulate reported earnings as a motivation for engaging in earnings management activities (Burgstahler and Dichev, 1997; Graham et al., 2005; Roychowdhury, 2006; Gunny, 2010; Zang, 2012; Mindak, et al. 2016). Thus, the first purpose of thesis is to investigate whether firms manage reported earnings by using accrual-based and real earnings management which just meets or beats important earnings benchmarks (zero level of earnings, last year's earnings). In addition, research in the field of directors' compensation presents evidence that the level of directors' pay is positively related to a firm's performance as directors tend to maximise their compensation by improving the firm's performance as they act in the best interests of the shareholders (McGuire, et al., 1962; Ciscel, 1974; Rosen, 1990; Main, 1996, Ali and Zhang, 2015). Combined with earnings management studies, a degree of research shows that maximising directors' compensation may lead to incentives for engaging in earnings management (Healy, 1985; Cheng and Warfield, 2005; Dutta and Fan, 2014; Hou et al., 2015). The objective of the second part of this thesis, is to examine the relationship between directors' remuneration and earnings management.

The purpose of this chapter is to provide a clear introduction to the thesis. Section 1.2 specifically presents an overview of the first study including research objectives, background,

motivation, research questions, estimation methods, and main findings. Section 1.3, as with section 1.2, introduces the second part of this study; section 1.4 discusses contributions; section 1.5 briefly summarises this chapter and clearly outlines the structure of the whole thesis.

1.2 Part I: Earnings Management and Earnings Benchmarks

1.2.1 Research Background

According to prior literature in the field of earnings management, there are three different types of earnings management which can be used to manipulate firms' reported earnings: accrual-based earnings management (*AM*) (e.g., Jones, 1991; Dechow et al., 1995; Fields et al., 2001; Kothari et al., 2005; Dechow, et al. 2010a; Jackson, 2018), real activities manipulation (*RAM*) (e.g., Graham et al., 2005; Roychowdhury, 2006; Cohen et al., 2019), and classification shifting (e.g., McVay, 2006; Fan et al., 2010; Haw, et al., 2011; Zalata and Roberts, 2016). Accrual-based earnings management occurs when firms, change the accounting choices or estimated use by adjusting revenue or expenses accrual to alter the presenting of a given transaction in the financial reports. Accrual-based earnings management involves accounting choices within GAAP which seek to 'obscure' or 'mask' true economic performance (Dechow and Skinner, 2000; Gunny, 2010), and have no cash flow consequences. This is more likely to be used to destroy a firm's value in the short-term. Examples of accrual-based earnings management include providing for bad debt expenses, delaying asset write-off, and changing the depreciation methods for fixed assets so that changing accounting choices leads to biased financial reported earnings in a particular direction without changing the underlying operational activities. Managers may have incentives to manipulate reported earnings by using accrual-based earnings management in two directions: increase or decrease. On the one hand, accrual-based earnings management can be adopted to boost reported earnings when estimated change or expected earnings fall below the pre-determined earnings target, to ensure that the desired threshold is just met, or even slightly exceeded. It is also referred to as income-increasing accrual earnings management. On the other hand, managers may have incentives for manipulating earnings which decrease in a current period by utilising accrual-based earnings management to create a reserve that helps them report a larger improvement in earnings in the future, thus making subsequent earnings targets more easily achievable. This is also referred to as income-decreasing accrual-based earnings management (Levit, 1998; DeGeorge et al., 1999; Baton and Simko, 2002; Nelson et al., 2002). Levitt (1998), the chairman of SEC reported that income-

decreasing accounting gimmicks are pervasive, including ‘Big Bath³’ and ‘Cookie Jar reserves⁴’ which attracted the attention of accounting researchers and market practitioners. ‘Big bath’ is an earnings management technique which is described as ‘taking a bath’ by Healy⁵ (1985), in that managers have incentives to further reduce reported earnings in a current period by deferring revenue or accelerating write-offs if earnings are too low so that no matter which accounting procedures are used, target earnings will not be met.

Prior literature has extensively researched accrual-based earnings management and offers evidence that managers widely use accruals-based earnings management methods to manipulate reported earnings. Literature on earnings management, following evidence from a survey conducted by Graham et al. (2005), turned its attention to the study of real activities manipulation. According to the Graham et al.’ (2005) survey, 80% of their executive sample admitted that, in order to hit the earnings target, they are more reluctant to engage in accrual-based earnings management, rather they prefer to manage earnings by means of real economic actions such as delaying maintenance or advertising expenditure, even withdrawing from positive net present value (NPV) projects. Roychowdhury (2006) concurring with the conclusions in Graham et al. (2005), provided a comprehensive overview of real activities manipulation and developed empirical methods for real activities manipulation. Roychowdhury (2006, p336) defines real activities manipulation as ‘management actions that deviate from normal business practices, motivated by managers’ desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations’. He focused on three real activities manipulation methods to manage earnings upwards, including accelerating the timing of sales and/or generating more unsustainable sales by means of increased price discounts or more lenient credit terms, reduction of discretionary expenditures and overproduction or increasing production to report lower costs of goods sold (COGS). Real activities manipulation as an earnings management tool has been a prevalent topic in the field of earnings management study in recent years (Cohen and Zarowin, 2010; Badarscher, 2011; Zang, 2012; Kim and Park, 2014; Cohen et al., 2016; Kothari et al., 2016).

³ ‘Big Bath’ can be explained as a firm’s management team knowingly manipulating its income statement to make poor results look even worse in order to make future results appear better, is often implemented in a relatively bad year so that a firm can enhance the next year’s earnings in an artificial manner.

⁴ ‘Cookie Jar Reserves’ is an accounting practice in which a firm takes a quantity of large reserves from an economically successful year and incurs them against losses from less successful years. Through this process, firms can mislead investors into believing that their losses are less than the actual value.

⁵ Healy (1985) argued that a strategy known as ‘taking a bath’, which means if earnings are so low that no matter which accounting procedures are selected target earnings will not be met, managers have incentives to further reduce current earnings by deferring revenues or accelerating write-offs. This strategy does not affect current bonus awards and increases the probability of meeting future earnings’ target.

The issue of earnings benchmarks has also been investigated by accounting researchers in the field of earnings management. Prior literature suggests that firms engage in manipulation of reported earnings by employment of different earnings management methods, to meet or beat certain earnings benchmarks (Dechow et al., 1995; Burgstahler and Dichev, 1997; Dechow et al., 2003; Roychowdhury, 2006; Cohen et al., 2009; Gunny, 2010; Mindak, et al., 2016). The important earnings benchmarks can be measured within three thresholds: managers manipulate earnings to meet or just beat zero level of earnings to avoid negative earnings, to meet or beat last year's earnings to avoid earnings decreasing and maintaining the level of a firms' performance to meet the analysts' earnings forecast consensus. Burgstahler and Dichev (1997) provided evidence that firms manage reported earnings upwards through accrual accounting and cash flows from operations to avoid earnings losses and decreases. Roychowdhury (2006) adopted three measures to detect real activities manipulation to show that firms manage earnings to avoid losses. Some recent studies looked at accrual-based earnings management and real activities manipulation together and found that accrual-based and real earnings management act as substitutes and there is a trade-off relationship between them when meeting or beating earnings benchmarks (Gunny, 2010; Badertscher, 2011; Zang, 2012; Cohen and Zarowin, 2016).

1.2.2 Research Motivations

The focus of this study is to detect earnings management using accrual-based earnings management and real activities manipulation, and identify specific earnings targets of earnings manipulation. It is motivated by several important factors. Firstly, a large number of accounting researchers have focused their studies on examining earnings management, however the results are unreliable. With regard to accrual-based earnings management, a variety of models have been developed and widely used to detect abnormal accruals, including the Jones (1991) model, the Dechow et al. (1995) model, the Dechow and Dichev (2002) model, etc. There still remains the inherent limitation of their failure to validate the accuracy of their assessments. It cannot be verified whether estimates of discretionary accruals reflect exact expectations of management's opportunistic results, or are possibly simply an artefact for the adopted particular model. The validity problem also applies to real activities manipulation, whereby it is unclear whether the proxies actually measure the underlying theoretical constructs which the model is intended to measure. Roychowdhury (2006) was the first person to present a comprehensive overview of managers who use real activities manipulation to avoid losses and to offer an empirical method to detect real activities manipulation. A large number of subsequent research studies have

followed Roychowdhury's model seeking to detect real activities manipulation. Siriviriyakul (2013), however, failed to establish evidence that it is possible to use real earnings management to avoid losses in Roychowdhury's setting. The validity problem is thus one of the important motivations for this research in terms of detecting earnings management using accrual-based and real earnings management, based on the UK market.

Secondly, although the vast body of research has focused on accrual-based earnings management or the relatively under-researched real activities manipulation which has become popular in the past few years, little evidence is available until now which confirms the validity of each earnings management tool or their main results as previously discussed. As Fields et al. (2001) stated, it is not possible to explain the overall effect of earnings management at one time if a researcher only concentrates on one type of earnings management. Zang (2012), established a substitution relationship between real activities manipulation and accrual-based earnings management. Sohn (2016) provided the supporting evidence that managers' real earnings management increases whereas their accrual-based earnings management decreases with the degree of their firms' accounting comparability with other firms. These indicated that it is difficult to conclude a definitive result of earnings management if either type of earnings management, which exists in a relationship with each other, is separately investigated. The exploration of a potential relationship between the two common types of earnings management for UK firms is another motivation for the research.

Third, from an accounting perspective, earnings benchmarks play an important role in earnings management in that managers who try to reduce fluctuation may employ accrual earnings management or real activities manipulation to increase or decrease current period reported earnings figures to match pre-managed earnings targets to maintain income at an even level. Earnings benchmarks are used as target levels to be achieved by managers engaged in earnings management behaviour, because achieving earnings targets helps firms to sustain or enhance their credibility and reputation with stakeholders and managers. The purpose of management incentives is generally based on the assumption that wealth-maximisers realise that their wealth can be adversely impacted when their firms' reported earnings fail to meet earnings benchmarks. The choice of earnings benchmarks is motivating this research with regard to detecting accrual-based and real earnings management because a change in the earnings benchmark may offer different evidence and assists in enriching the literature by offering evidence regarding whether firms focusing on the UK market use different earnings management methods to meet important earnings benchmarks.

1.2.3 Research Aims, Questions, and Hypotheses

The first part of the thesis aims to examine whether firms manage reported earnings by using accrual-based earnings management and real activities manipulation that just meet or beat important earnings benchmarks ('zero' level of earnings, last year's earnings). On the one hand, the objective of this study is to detect earnings management by using accrual-based and real earnings management, as both common methods of earnings management involve GAAP and have been relatively extensively examined in literature compared with classification shifting. Accrual-based earnings management and real activities manipulate change in the bottom-line GAAP of the income statement, while classification shifting simply shifts expenses from core expenses to special items to manipulate core earnings without any change of bottom-line GAAP earnings. On the other hand, this study explores whether firms engage in earnings management which just meets or beats core earnings benchmarks, such as avoiding loss, avoiding earnings decrease, as prior research shows that firms aim to meet or just beat different earnings benchmarks when they manipulate earnings as a motivation for adopting earnings management activities.

Specifically, the first part of the thesis focuses on the following questions relating to the defined aim:

- Do firms which just meet/beat earnings benchmarks ('zero' level of earnings and last years' earnings) manage earnings upwards by engaging in real activities manipulation?
- Do firms which just meet/beat earnings benchmarks ('zero' level of earnings and last year's earnings) manage earnings upwards through the use of sales-based manipulation?
- Do firms which just meet/beat earnings benchmarks (('zero' level of earnings and last year's earnings) manage earnings upwards by cutting or reducing discretionary expenses?
- Do firms which just meet/beat earnings benchmarks (('zero' level of earnings and last year's earnings) manage earnings upwards through overproduction?
- Do firms engage in accrual-based earnings management which just meet/beat the earnings benchmarks ('zero' level of earnings and last year's earnings)?

Therefore, these research questions are addressed by formally testing the following hypotheses, respectively: **H1**. Firms that just meet or beat earnings benchmarks ('zero' level of earnings

and last year's earnings) are more likely to engage in real activities manipulation; **H1a.** Firms which just meet or beat earnings benchmarks ('zero' level of earnings and last year's earnings) exhibit unusually low cash flows from operations; **H1b.** Firms which just meet or beat earnings benchmarks ('zero' level of earnings and last year's earnings) exhibit unusually low discretionary expenses; **H1c.** Firms which just meet or beat earnings benchmarks ('zero' level of earnings and last year's earnings) exhibit unusually high production costs; **H2.** Firms that just meet or beat earnings benchmarks ('zero' level of earnings and last year's earnings) are more likely to engage in accrual-based earnings management.

1.2.4 Research Methodology and Findings

The investigation sample consisted of 2,513 firm-year observations from 2009 to 2015 of 11 main industries and 359 individual legal firms listed on FTSE All shares, after excluding firms from financial, bank, real estate, and insurance industries. All accounting and financial data was collected from the FAME Bureau van Dijk Electronic Publishing (FAME) database. Estimation models of both accrual-based and real earnings management were run by linear regressions for each industry and year.

Abnormal discretionary accruals (*Abn_Accruals*) were adopted to measure the degree of accrual-based earnings management, and estimate the residuals from the model of the normal level of discretionary accruals which follows the modified Jones' (1991) model developed by Dechow et al. (1995). Similar to Rochowdhury's (2006) study, this study used abnormal cash from operations (*Abn_CFO*), abnormal discretionary expenses (*Abn_DISEXP*), abnormal production costs (*Abn_PROD*), and an aggregate measure (*RAM*) to indicate the extent of real activities manipulation. Consistent with Roychowdhury (2006), Gunny (2010), and Zang (2012), the Fama-MacBeth approach was used to examine whether suspect firm-years were more likely to engage in different earnings management activities.

Univariate and multivariate analyses were used to present the empirical results of this study. Firstly, this empirical study finds that UK suspect firm-years are more likely to engage in real activities manipulation to boost earnings by cutting discretionary expenses and producing more goods when just beating/meeting the earnings benchmark around the 'zero' level, and they seek simultaneously to make earnings upwards through reduction in discretionary expenses and overproduction. However, it could not find evidence that suspect firm-years use sales-based manipulation and accrual-based earnings management to beat/meet the 'zero' level of earnings management. Secondly, evidence was provided that UK suspect firm-years have unusually

lower discretionary expenses, suggesting they are likely to engage more in real activities manipulation only through reducing/cutting discretionary expenses to boost earnings when just beating or meeting last year's earnings benchmark. It was also determined that suspect firm-years do not engage in managing earnings upwards by using sales-based manipulation, overproduction and accrual-based earnings management when comparing this year's earnings with that of last year. In addition, this study offers new evidence that UK firms with negative earnings have an incentive to further decrease their earnings or shift positive earnings to negative earnings through accrual-based earnings management, manipulating discretionary expenses, or manipulating production costs, in order to report better future performances. In short, the findings of this study contribute to literature on earnings management, suggesting that firms would like to engage in accrual-based and real earnings management to achieve their targets, with some engaging in earnings management activities to manage earnings upwards, whilst others are likely to use the earnings management method to make earnings downwards.

1.3 Part II: Earnings Management and Directors' Remuneration

1.3.1 Research Background

Directors' remuneration has always been a popular topic, which attracts considerable attention from researchers, regulators, policy makers, market participators and the public as it is an important corporate governance approach which helps to mitigate the interest-conflicts of directors and shareholders mainly caused by the separation of ownership and control. According to Firms Act 2006 regulations, the disclosure of directors' remuneration has become more developed and transparent in UK market practices. Directors in this study mainly refer to the executive directors, who are the senior officers or managers of a firm or organisation, their role being related to the formation of the firm's strategic and operational decisions which could have long-term consequences. They are responsible for everything that happens in the firm, such as strategic planning, working with the Board of Directors, and operating within a budget, and they report directly to the board and carry out the board's decisions. Remuneration is the main incentive for directors, which can be defined as a combination of the financial payment and other-financial compensation received for service or employment from the firm, and the remuneration package includes the basic salary, performance-related elements of remuneration such as stock/share options, any bonuses, and pension contributions, plus any other economic benefits. Directors' compensation is determined by the remuneration committee, whose

delegated responsibilities may include setting the policy for the remuneration of the executive management, determining targets for performance-related pay or share schemes and determining the total individual remuneration package of each director including, where appropriate, salary, bonuses, pensions, incentive payments and share schemes. Directors' remuneration, in accordance with the work of the remuneration committee, is essentially designed to ensure that the directors have a stake in performing well for the job to maximise shareholder benefits and the directors' compensation package provided by the firm should be designed to attract, retain and motivate the quality requirement of directors without paying more than necessary, although the remuneration package is determined by many factors, such as the paying should connect with relative firm performance, be aware of industry average rate and know what the other competitors are paying, understand where the position of the remuneration package should be if it in other firms, and especially should take account of pay and employment conditions elsewhere in the firm when determining annual salary increases. Each component of the compensation package is also designed to ensure that the director maintains a high level of concentration on the firm's behalf and provides motivation to improve the firm's performance as both firm and shareholders want directors to be compensated in a way that reflects the directors' performance in delivering the firm's strategy.

Directors' remuneration is set by the remuneration committee, however, the determination of remuneration can be affected by many factors, such as firm performance, firm size, and shareholder interest. The principal-agent theory (also referred to as 'agency theory'), is the predominant theory in the field of directors' compensation literature, and predicts a positive relationship between directors' pay and firm performance. It suggests that directors' remuneration be tied to firm performance to provide directors' financial incentives as it aims an alignment of interests between directors and their shareholders and alleviates a conflict of interest. The principal-agent theory suggests that managerial compensation is associated with performance measures. The rank order tournament theory, a simplified form of agency theory, offers a supplementary explanation. It considers the non-economic factor that position hierarchy plays a role in determining directors' compensation so that it is similar to a type of employment structure within a firm, whereby the tournament system may motivate employees through competition and promotion. However, the managerial power theory provides an opposite view that directors' remuneration may be part of the agency problem itself and directors are able to acquire favourable additional gains through their power to influence the determination of their compensation plans. The managerial power theory explains the directors' remuneration in a very different perspective and challenges the view of principal-agent theory,

Bechuk, Fried, and Walker (2002) argued that compensation practice could not be completely explained by either approach and should be explained by both the principal-agent approach and the managerial power theory. In short, these three important theories, the principal-agent theory, rank order tournament theory, and managerial power theory can be viewed as complementary theories in literature on directors' compensation.

Most prior literature investigated the relationship between directors' compensation and firm performance (Jensen and Meckling, 1990; Gibbons and Murphy, 1990; Cosh and Hugn, 1997; Bebchuk and Fried, 2004; Meo, et al., 2017), based on the principal-agent theory that determination of directors' remuneration is essential to ensure that the directors always act in the best interest of their shareholders to align the interests of directors with those of shareholders, and alleviate the conflict of interest between shareholders (the principals) and executive directors (the agent). Early studies suggested that directors behave or act in the best interests of shareholders and their pay is positively related to firm performance when performance is measured by accounting-based profitability such as profit and sales revenue (e.g., Baumol, 1959; McGuire, Chiu, and Elbing, 1962; Lewellen and Huntsman, 1970; Ciscel, 1974; Meeks and Wittington, 1975; Rosen, 1990). However further research suggests that studies into the relationship between directors' remuneration and performance should take note of the stock market factor as, on the one hand, equity-based compensation has become more prevalent in recent years and is an important component of remuneration plans whilst on the other hand, firm performance measured by accounting-based profitability may lead to measure errors, biased and misleading pay-performance relationship results (Coughlan and Schmidt, 1985). Therefore, after adding stock options, stock ownership, and other stock market-based compensation, there is evidence that the remuneration-performance link becomes relatively stronger and directors' remuneration tends to be more related to stock market-based firm performance (Jensen, and Murphy, 1990; Main, Bruce and Buck, 1996; Hall and Liebman, 1998; Murphy, 1999; Cheng, et al., 2016; Almadi and Lazic, 2016; Cheng, et al., 2016).

Consequently, in order to achieve a better performance regardless of accounting-based profitability, stock-market-based performance and the financial position, executive directors have strong incentives to engage in earnings management through accrual-based earnings management and real activities manipulation. Prior literature sought to investigate a positive relationship between directors' remuneration and earnings management, and offer evidence that directors are motivated by their remuneration to manage earnings upwards by using different types of earnings management (Healy, 1985; Balsam, 1998; Cheng and Warfield, 2005; Nwaeze, Yang and Yin, 2006; Cornett et al., 2008; Hou et al., 2015). Several recent studies into

the relationship between directors' remuneration and their earnings management found that the relationship between them tends to be negative. For instance, Cohen and Zarowin (2010) offered evidence that the post-SEO operating performance decline is driven not only by accrual reversal (accrual-based earnings management), but also reflects the real consequences of operational decisions (real activities manipulation) undertaken to manage earnings at the time of the SEO. Kothari et al. (2016) also noted a decline in performance in that earnings management is most closely and predictably linked with post-SEO stock market under-performance when it is driven by real activities manipulation. Therefore, executive directors motivated by their compensation have incentives to manage earnings not only upwards but also downwards by means of accrual-based and real earnings management. Tahir, et al. (2019) examined the relationship between earnings management, through accrual-based earnings management and real activities manipulation, and the choice of performance measures in directors' bonus compensation contracts, evidence that a negative association between earnings management through discretionary accruals and expenses, and directors' performance-based compensation.

1.3.2 Research Motivations

The second part of this thesis commences by exploring whether the directors incentive to take manipulative actions on reported earnings in UK market by increasing the link between directors' remunerations and performance is motivated by the following reasons. Firstly, a large number of previous studies have explored the positive relationship between directors' compensation and earnings management. Directors frequently have a position on the board of a firm whereby the main responsibilities include developing and implementing high-level strategies, making major corporate decisions, managing the overall operation and resources of a firm, and acting as the main point of communication between the board of directors and the corporate operations. However, some research studies have found a negative relationship between directors' pay and their performance, and evidence that directors have incentives for using accrual-based earnings management and real activities manipulation to manage reported earnings decrease to present a decline in firm performance (Cohen and Zarowin, 2010; Kothari et al., 2016; Tahir, et al., 2019). These ideas motivated this study to investigate whether directors tend to engage in different earnings management activities to manipulate earnings downwards for the purpose of maximising their personal gains as, on account of the interest-conflicts resulting from the separation of ownership and control, directors may not act in the best interests of their shareholders and work to acquire additional rewards for themselves.

Secondly, directors are responsible for managing the business of the firm and may exercise all the powers of the firm, subject to the provisions of relevant statutes, given by special resolution to any directors and to the firm's articles. Firms offer a performance-based incentives scheme linked to the directors' compensation, therefore in order to gain more remuneration, directors may engage in manipulation of a firm's earnings (i.e., Almadi and Lazic, 2016; Buchholze, et al., 2019). In addition, a better understanding of the relationship between directors' remuneration and earnings management is of great interest to both empirical and theoretical researchers and regulators, as prior literature presented evidence that such a governance-related factor plays a role in determining earning quality. However, literature on the relationship between directors' remuneration and earnings management performance is relatively limited and, until now, little evidence is available which confirms the validity of models to estimate the relationship between earnings management and directors' pay, or their principal results. These reasons motivated the carrying out of this study, which helps to enrich the available literature by providing evidence regarding whether directors adopt earnings management to manage earnings to maximise their personal gain.

1.3.3 Research Aims, Questions, and Hypotheses

Directors' remuneration is determined by the remuneration committee, but is affected by many factors. The principal-agent theory as a dominant theory in compensation study, predicts that performance tied to directors' compensation provides financial incentives for directors to alleviate the interest-conflicts as it aligns the relationship between executive directors' interests and those of their shareholders. Prior literature in earnings management suggests that directors have incentives to engage in earnings management by using accrual-based and real earnings management for the purpose of achieving a better performance, whilst some studies found that directors where there is a decline in performance, use earnings management to manage earnings to achieve their personal interests (Cohen and Zarowin, 2010; Kothari et al., 2016; Meo, et al., 2017; Tahir, et al., 2019). This study aims to investigate whether and how the relationship between earnings management and directors' remuneration varies with the degree of earnings management, the method of earnings management, and the level of directors' remuneration. Specifically, the second part of the thesis focuses on the following research question:

- Whether there is a relationship between firms which engage in accrual-based or real earnings management and directors' remuneration?

Therefore, this research question is addressed by formally testing the following hypothesis: **H3**. Directors' remuneration is negatively associated with their earnings management.

1.3.4 Research Methodology and Findings

The selected investigation sample data is that of the first study and is discussed in section 1.2.4. Directors' remuneration includes the financial payment and non-financial compensation which is the sum of the basic salary, pension contributions, equity-based compensation and other benefits, in order to capture the total effects of compensation. Abnormal directors' remuneration (*Abn_DSB*) is used to measure whether directors have received any excessive level of compensation by adopting accounting choices. This study built a new regression model to measure the degree of abnormal directors' remuneration, where the variables included sales revenue, profit margins, the z_score, and the number of employees used to estimate the normal level of directors' remuneration.

The findings complement the existing literature on earnings management in the following ways. Firstly, abnormal directors' remuneration is found to be positive correlated to abnormal cash flows from operations. There is evidence that directors use sales-based manipulation through temporarily delaying the realisation of sales to decrease earnings and to report a poor profit performance in order to create a large increase in earnings in the future. Moreover, it provides evidence that directors, in order to present a major improvement of performance move previous earnings to the current period by using production costs-based manipulation as the magnitudes of real activities manipulation through overproduction are low when directors receive abnormally high remuneration. In addition, it suggests that directors utilise accrual-based earnings management to present earnings flowing downward so that it looks worse than it is in order to show a better future earnings performance to pursue additional rewards for themselves, there is supporting evidence that directors in negative earnings firms have the incentive to manage discretionary accruals to report income-decreasing earnings as they want to present a greater growth of earnings in future. Besides, this study takes the consideration of 'highest paid director' and 'other emoluments' to conduct additional analysis to extend the results of whether directors have achieved any abnormal level of remuneration by using earnings management, and the results are consistent with the results reported in main analysis that directors are more likely to report a decline in performance through engaging in earnings management to manipulate earnings downwards to gain an excessive level of payment themselves.

1.4 Contributions

This study makes a contribution to earnings management literature compared with prior studies. First, analysis of this study commences by detecting earnings management by means of use of two major tools, accrual-based earnings management and real activities manipulation, thus the results will add to previous literature which has been carried out into the quality of reported earnings. Existing literature includes empirical studies in earnings management and earnings quality which examine multiple incentives, such as financial performance, financial reporting, tax and regulatory objectives for financial institutions. However, these studies typically undertook research by means of a single accounting choice. The literature includes empirical studies which examine multiple accounting choices to achieve a specific target via accrual-based earnings management and real activities manipulation, but are relatively limited. This study extends beyond the existing literature to provide a greater understanding for detecting earnings management by using accrual-based earnings management and real activities manipulation in the UK market.

Second, the current study contributes to the extant empirical research on the examination of accrual-based earnings management and real activities manipulation (i.e., Roychowdhury, 2006; Cohen and Zarowin, 2010; Gunny, 2010; Zang, 2012; Sohn, 2016, etc.). A large amount of prior literature has focused on their studies on accrual-based earnings management or real activities manipulation, whilst it still difficult to confirm that each earnings management method or its results is reliable. On the one hand it cannot be verified whether measures of discretionary accruals reflect proper expectations of management's opportunistic results as a variety of estimation models have been developed and may produce different results. On the other hand, it is unclear whether the three proxies of real activities manipulation actually measure the underlying theoretical constructs which the models are intended to measure. This study follows the Roychowdhury (2006) model, and provides supporting evidence that firms are more likely to engage in real activities manipulation to avoid loss, therefore it enriches the literature on detecting real earnings management, and confirms the validity of estimation models to some extent.

Third, the research detects earnings management using a different earnings benchmark (zero level of earnings, last year's earnings), as adoption of the earnings benchmark has a different impact on the ability to detect earnings management. A considerable amount of literature on the subject of accrual-based earnings management and real activities manipulation selects 'zero' level of earnings or previous earnings as an important earnings benchmark in order to meet

targets of avoiding losses or avoiding an earnings decrease. It is, thus, advisable for subsequent research studies not to focus too much on one single earnings benchmark in order to measure earnings management, as the different earnings levels may produce different conclusions as regards earnings management detection. This study enhances the literature with regard to examining earnings management that meet or beat different earnings benchmarks.

Fourth, the majority of prior research into earnings management investigates whether firms use accrual-based earnings management or real activities manipulation to manage earnings upwards and whether firms utilise earnings management tools to manipulate earnings downwards. The first set of this thesis employs a sample of firms with negative earnings to examine whether firms engage in earnings management, and finds new evidence that UK firms with negative earnings have more incentive to decrease their earnings or shift positive earnings to a negative level through accrual-based earnings management, manipulating discretionary expenses, or manipulating production costs, in order to report future better performance. This finding complements the existing literature that firms employ accrual-based earnings management and real activities manipulation not only to manage their earnings upwards but also downwards in the UK market.

Fifth, although earnings management has received considerable attention in the accounting literature, less attention is given to the earnings management incentives arising from directors' remuneration. Directors behave or act to improve firm performance in the best interests of shareholders as suggested by principal-agent theory, leading to a number of prior studies finding that directors' remuneration motivates directors to manage earnings upwards by using earnings management. However, the second part of the thesis evidences a negative relationship between directors' earnings management and their remuneration, There is a decline in firms' performance when directors adopt accrual-based or real earnings management to manipulate earnings downwards, therefore, these findings shed an insight into UK firm directors having incentives to gain personal benefits from managing earnings decreases through earnings management, It also enhances the literature which is relevant to earnings management and directors' remuneration.

Finally, the investigation into whether directors receive an excessive level of remuneration through utilising earnings management methods, builds a new model for measuring the amount of abnormal directors' remuneration, which takes account of profitability (sales revenue), firm performance (profit margin), financial risks (z-score), and firm size (number of employees). The abnormal level of directors' compensation indicates the extent to which directors engage

in earnings management to gain additional rewards and links it with abnormal levels of earnings management to produce evidence of how a relationship between directors' remuneration and earnings management varies with the degree of earnings management, type of earnings management and the level of directors' remuneration. Therefore, to the best of my knowledge, this is the first study into earnings management and directors' remuneration that presents a creative model to estimate the relationship between them and achieve the empirical results.

1.5 Structure of the Thesis

This chapter starts with a brief introduction of this thesis. It presents the overview of the first and second study parts respectively, followed by an explanation of the research background and motivation, an outline of the research aims and questions, a summary of the methodology and the findings. This chapter then defines the research contributions. The remainder of the thesis is structured as follows:

Chapter 2 reviews prior literature in the field of earnings management. In particular, it identifies the philosophy of earnings management and outlines the definition of different types of earnings management (accrual-based earnings management, real activities, classification shifting), the estimation models development used to test the hypotheses, and the models' limitations. It then reviews the prior research relating to earnings management and the association between earnings management and other practice issues. It explores the research within three important earnings benchmarks: zero earnings, last year's earnings, and analysts' forecast consensus, developing hypotheses of the first part of this thesis. It also provides a full understanding of directors' remuneration determination with regard to the second part of the thesis. Specifically, it describes the directors' remuneration, the remuneration committee, remuneration strategies, the components of the remuneration package and other issues; reviews three important theories in directors' compensation literature, namely the principal-agent theory, the tournament theory and the managerial power theory; then presents the empirical literature on the relationship between directors' pay and firm performance; more important, it expounds the relationship between the directors' compensation and earnings management, which is used to develop the hypotheses of the second part of the thesis, is then examined.

Chapter 3 focuses on the research methodology and hypotheses in this research. It starts with the development of hypotheses as found in the reviewed literature: 1. Firms which just meet or beat important earnings benchmarks are more likely to engage in earnings management: 2.

Directors have financial incentives to use earnings management methods to manipulate reported earnings. An overview of the data used in the estimation models is then provided. This describes the data sources, identifies sample selection criteria and clarifies the definitions of variables. Next, it explains the estimation models used to test earnings management and abnormal accruals-based earnings and abnormal real activities manipulation are clarified. Further, the chapter explains the research methods utilised as to how to test hypotheses.

Chapter 4 presents and discusses the empirical findings of the first part regarding whether firms manage reported earnings by using accrual-based earnings management and real activities manipulation which just meet or beat important earnings benchmarks ('zero' level of earnings, last year's earnings). It commences with the descriptive statistics for accrual-based and real earnings management of the full sample. Next, it presents an estimation of the normal level of discretionary accruals, cash flow from operations, discretionary expenses and production costs. It then shows the summary statistics of abnormal levels of one accrual-based earnings management activity and three real activities manipulation activities. This chapter then explains the correlation coefficients between different types of earnings management. In addition, it presents the tests and analysis of whether firms use earnings management to meet/beat different earnings benchmarks. Finally, this chapter produces an additional analysis regarding firms with negative earnings.

Chapter 5 devotes the empirical results of the second study regarding the relationship between directors' remuneration and earnings management. Firstly, this chapter describes the basic statistics of directors' remunerations for the full sample. Next, it presents descriptive statistics and correlation coefficients amongst variables, and estimates the normal level of directors' remuneration. It then presents the summary statistics of the normal level of directors' pay, accrual-based earnings management, and real activities manipulation and also analyses the correlation coefficients between these abnormal levels. In addition, the chapter explains the test results of the association between abnormal directors' remuneration and abnormal earnings management.

The thesis ends with the conclusion, Chapter 6. This chapter presents again the research background, research questions, and contributions to this research. It also briefly summarises the research hypotheses, methodology and empirical results which have been presented in the previous chapters. Based on these results, this chapter offers some academic and practical implications which may potentially enrich research and the practice of accrual-based earnings management, real activities manipulation, and directors' remuneration for the benefit of

researchers, regulators, policy makers, standard setters, the board of directors, and other practitioners. Finally, it highlights limitations in current research and provides recommendations for future research.

Chapter 2 Literature Review

2.1 Introduction

Earnings management, in accounting, is the act of intentionally processing financial reporting to obtain some private gains. It involves the alteration of financial reports to mislead stakeholders about the organisation's underlying performance, or to influence contractual outcomes which depend on reported accounting numbers (Healy and Wahlen, 1999). Earnings management has a negative effect on earnings quality and may reduce the credibility of financial reporting. In addition, the Securities and Exchange Commission chairman Levitt stated in a 1998 speech, that earnings management is widespread and pervasive, whilst the complexity of accounting rules and regulations can make earnings management difficult for individual investors to detect, however accounting researchers have proposed several methods to detect earnings management. The primary objective of this study is to examine whether any earnings management activities adopted by firms hit their specific target, therefore this chapter aims to provide the theoretical and empirical literature in the field of earnings management to help conduct hypotheses development, research methodology design, and empirical results analysis in the following chapters. This chapter mainly introduces three types of earnings management, namely accrual-based earnings management, real activities manipulation, and classification shifting earnings management. It outlines the definition of different types of earnings management, the estimation models development of them and the limitation of models. This chapter also investigates the issue of earnings benchmarks (zero earnings level, last year's earnings, analysts' forecasts), as it is closely linked in the context of earnings management. The directors may have incentives to use the earnings management method to achieve their more personal gains, this chapter thus reviews prior literature in this area. The remainder of this chapter is organised as follows: section 2.2 identifies the philosophy of earnings management; section 2.3 introduces accrual-based earnings management including accruals models and the limitations of estimation; section 2.3 describes the development of real activities manipulation; section 2.4 introduces the classification shifting earnings management; section 2.5 concerns additional research into earnings management; section 2.6 explores the research into earnings benchmarks; section 2.7 considers the relationship between directors' compensation and earnings management; section 2.8 presents the conclusion of this chapter.

2.2 Earnings Management

Earnings management is a significant accounting issue for both researchers and regulators. It has received significant attention in the study of earnings quality in recent decades (Dechow, et al., 2010b; Dichev, et al., 2013; Beyer, et al., 2019). One factor which drives research on the subject of earnings management is that there is widespread earnings management amongst public firms, and managers seek to meet capital market expectations by routinely engaging in opportunistic earnings management (e.g. Levit, 1998). This has encouraged researchers to study managers' responses to incentives provided by earnings targets (Dechow and Sloan, 1991; Ball and Shivakumar, 2008; Christensen, et al., 2008; Kross, et al., 2011; Alissa, et al., 2013; Lo, et al., 2017). The highly critical assertion of the auditing profession that managers seek to deceive the public, has acted as a spur for researchers to carry out research into the impact of earnings management on auditors' incentives. As a result, a number of researchers have investigated the relationship between auditing/regulating and earnings management (reviewed by Becker et al., 1998; DeFond and Subramanyam, 1998; Beneish, et al., 2005; Cohen, et al., 2008; Kim and Park, 2014; Alhadab and Clacher, 2018).

The ability to understand the extent to which earnings are manipulated by managers has significant implications for analysts, regulators, researchers, and other professionals (Beneish, 1999). With regard to analysts and investors, comprehension of the extent to which managers manipulate discretion in earnings offers support to the concept of examination of earnings quality. It is important and helpful for regulators, policy makers or standard-setters, to understand whether firms engage in earnings management and how they undertake this, as the impact of earnings management draws regulators or standard-setters attention to the limitations of accounting regulations and standards, and encourages them to implement improvements.

In order to detect earnings management in each case, a reliable measurement tool is essential. The introduction of the abnormal accruals model in Jones (1991) has helped fuel the growth of earnings management research. As a result, extensive earnings management literature largely focuses on accrual-based earnings management (e.g. DeFond and Jiambalvo, 1994; Fields et al., 2001; and Dechow, 1998, 2002, 2010a), and a variety of models, including the Jones (1991) model, and the Dechow et al. (1995) model, which are widely used to detect abnormal accruals. Latterly, two other relatively under-researched types of earnings management, real activities manipulation (e.g. Roychowdhury, 2006; Cohen, et al., 2008; Kim and Park, 2014, Cohen, et al., 2019) and classification shifting manipulation (e.g. McVay, 2006; Fan et al., 2010) have entered the field of earnings management studies, and their test models have become more

popular as researchers have realised that accrual-based models are insufficient for earnings management detection.

2.3 Accrual-Based Earnings Management

2.3.1 Accrual Models

The use of proxies to measure abnormal accruals is one of the most dramatic improvements in earnings management research. As shown by Dechow, et al. (2010b), abnormal accruals proxy is the most popular measurement method and is widely used in research to examine earnings management. It was the first measure adopted by Healy's (1985) investigation to test earnings management and in recent years a variety of accrual models have been adopted with continual innovations. Most measures which have been used to date in literature consist primarily of modified versions of the Jones (1991) model. Researchers who have based their research on the limitations of the Jones model response in order to develop modified models, have generally improved comprehension of the extent to which earnings are manipulated (e.g. DeFond and Jiambalvo, 1994; Dechow et al., 1995; Dechow and Dichev, 2002; Hribar and Collins, 2002; Kothari et al., 2005).

Abnormal accrual models have usually commenced with an estimation of discretionary accruals as total accruals, however later models have enabled total accruals to be divided into discretionary and nondiscretionary components. In most of these models, the nondiscretionary or normal accruals are measured by a linear regression of change in revenues and property, plant, and equipment on account of the parameters required for estimation of the industry and estimation period (e.g. year). The earliest study of earnings management which employed abnormal accruals as a proxy for measurement was that of the Healy (1985) Model. Healy (1985) divided his sample into three groups in accordance with partitioning variables, and compared the mean total accruals with the earnings management partitioning variable to examine whether managers exercise discretion in earnings. In the Healy model, the mean total accruals from the estimation period represent the measure of nondiscretionary accruals. A special version of the Healy model was developed by DeAngelo (1986), who adopted the previous total accruals to measure nondiscretionary accruals. The DeAngelo (1986) model examined earnings management by means of computing first differences in total accruals, and assumed the first differences to be that of the level of zero under the null hypothesis of no earnings management. Both the Healy (1985) model and the DeAngelo (1986) models were characterised by

employing total accruals in the estimation period as the proxy of expected nondiscretionary accruals. This characteristic is limited as the two models only work if accruals remain constant from period to period and there is a zero mean of discretionary accruals from the estimation period. Both models can prove inaccurate if nondiscretionary accruals keep changing over time. It is not possible, however, to assume nondiscretionary accruals remain constant as evidenced by Kaplan (1985) as the nature of the accrual accounting process dictates that the level of nondiscretionary accruals should change with the changes in economic circumstances.

Jones (1991) proposed a model to attempt to control the impact of nondiscretionary accruals which vary with economic circumstances, and reduction of the limitations of assuming constant nondiscretionary accruals. In the Jones model, nondiscretionary accruals were estimated as a linear function of a change in revenues, property, plant, and equipment. This model is currently applied to more broadly capture both intentional and unintentional factors which affect earnings quality, however, Jones (1991) also realised that assumption of revenues being nondiscretionary could cause her measuring earnings management model to be biased towards zero. Dechow, Sloan, and Sweeney (1995) developed a more powerful test, known as the 'modified Jones model', and sought to reduce the conjectured error limiting tendency of the Jones model to make mistakes in measuring discretionary accruals when earnings management is exercised over revenues. The modified model (Dechow et al. 1995) tests earnings management by adopting a change in cash revenues rather than changing total revenues as some credit sales may be discretionary. Compared with the original Jones (1991) model, this modified model adjusts the change in revenues to that of a change in receivables in the estimation periods. In accordance with the relationship between earnings and cash flows, Dechow and Dichev (2002) suggested a new measure of accruals quality including that of the quality of cash flows. This model focused on working capital accruals which are more tractable due to realizations of the cash flow which are relevant to the working capital which occurs within the same year. However, Dechow and Dechev (2002) also recognised that their approach lacked insight into the proper timing of the accruals with respect to cash flows, thus it cannot be used to decide whether to extend or capitalize R&D. A more recent study by Kothari et al. (2005), investigated the specification and power of tests based on performance-matched discretionary accruals (indicated by the performance of $ROA_{i,t}$ for firm i in year t) compared with tests which used the Jones (1991) model and modified models (e.g. Dechow and Dechiv (1995) model). This study suggested that the performance-matched discretionary accruals model is a viable alternative to the existing abnormal accruals model for application in earnings management research. Francis et al. (2005) conducted their own model to examine investors price accruals

quality in two ways. One method, as suggested by McNichols (2002), was that of measuring accruals quality through added growth in revenues to reflect performance and by adding PPE to broaden the measure; the other was to modify and extend the Dechow and Dechow (2002) model to measure accruals quality as the standard deviation of residuals from regressions which relate current accruals to cash flows. Table 2.1 gives an overview of the accrual models including Jones (1991) model, modified Jones model (Dechow et al., 1995), Dechow and Dichev (2002) approach, performance matched (Kothari et al., 2005), and discretionary estimation errors (Francis et al., 2005), which are widely used in literature.

2.3.2 Limitations of Accrual Models

The introduction of abnormal accrual models sheds light on earnings management measurement. Several studies have drawn attention to limitations of the discretionary accruals measure in terms of providing noisy and biased estimation (e.g. Dechow et al., 1995; Guay, 1996; McNichols, 2002; Dechow et al., 2010b). Dechow et al. (1995) argued that all models which relate to the Jones model result in mis-specified tests when samples of firm-year meet extreme financial performance, as in, for instance, if the earnings management partitioning variable correlates with the performance of a firm, and the power of these models is relatively low for economically plausible earnings management. Guay et al. (1996) determined that the high correlation between discretionary and nondiscretionary accrual components results in considerable imprecision and/or misspecification of the assumed earnings process, market efficiency, or managerial discretion. Dechow et al. (2010b) emphasized that firm-level estimation assumes time-invariant parameter estimates and typically imposes sample survivorship biases, though all of the accruals models can be estimated at firm level, which allows for variation across firms in the determinants of normal accruals. As a result, every model of abnormal accruals, such as the Jones (1991) model, the Dechow and Dechow (2002) model, the performance-matched model (Kothari et al., 2005), and the Francis et al. model, is controversial and only time will tell if they remain as resilient as the Jones model.

Table 2.1: Widely used accrual models

Accrual model	Main idea	Notes
<p>Jones (1991) model</p> $Accruals_t = \alpha + \beta_1 \Delta S_t + \beta_2 PPE_t + \varepsilon_t$	Accruals are a function of revenue growth and depreciation is a function of PPE. All variables are scaled by total assets.	Correlation or error with firm performance can bias tests. R^2 around 12%. Residual is correlated with accruals, earnings and cash flow.
<p>Modified Jones model (Dechow et al., 1995)</p> $Accruals_t = \alpha + \beta_1 (\Delta S_t - \Delta Rec_t) + \beta_2 PPE_t + \varepsilon_t$	Adjusts Jones model to exclude growth in credit sales in years identified as manipulation years	Provide some improvement in power in certain settings (when revenue is manipulated)
<p>Dechow and Dichev (2002) approach</p> $\Delta WC = \alpha + \beta_1 CFO_{t-1} + \beta_2 CFO_t + \beta_3 CFO_{t+1} + \varepsilon_t$	Accruals are modelled as a function of past, present, and future cash flows given their purpose to alter the timing of cash flow recognition in earnings.	$\sigma(\varepsilon_t)$ or absolute ε_t proxies for accrual quality as an unsigned measure of extent of accrual ‘errors’. Focuses on short-term accruals does not address errors in long-term accruals.
<p>Performance matched (Kothari et al., 2005)</p> $DisAcc_t - Matched\ firm's DisAcc_t^6$	Matches firm-year observation with another from the same industry and year with the closest ROA. Discretionary accruals are from the Jones model (or Modified Jones model).	Reduce power of test. Apply only when performance is an issue.
<p>Discretionary estimation errors (Francis et al., 2005)</p> $Accruals_t = \alpha + \beta_1 CFO_{t-1} + \beta_2 CFO_t + \beta_3 CFO_{t+1} + \beta_4 \Delta S_t + \beta_5 PPE_t + \varepsilon_t,$ $\sigma(\varepsilon_t) = \alpha + \lambda_1 Size_t + \lambda_2 \sigma(CFO)_t + \lambda_3 \sigma(S)_t + \lambda_4 \log(OperCycle)_t + \lambda_5 NegEarn_t + v_t$	Decomposes the standard deviation of the residual from the accruals model into an innate component that reflects the firm’s operating environment and a discretionary component ($v\varepsilon_t$) that reflects managerial choice.	Innate estimation errors are the predicted component from $\sigma(\varepsilon)_t$ regression.

Note to Table 2.1: This table displays the development of the models of estimated accruals at normal level, and they are the most widely used in literature. Abnormal accruals are measured by ‘Residuals’ from the models. Please see Appendix A for all variables descriptions.

⁶ The ‘normal’ level of accruals can be estimated as follows, $\frac{TACC_{i,t}}{A_{i,t-1}} = \pi_0 \frac{1}{A_{i,t-1}} + \pi_1 \frac{\Delta S_{i,t} - \Delta AR_{i,t}}{A_{i,t-1}} + \pi_2 \frac{PPE_{i,t}}{A_{i,t-1}} + \pi_3 ROA_{i,t-1} + \varepsilon_{i,t-1}$.

2.3.3 Challenges for Accrual Models

The accrual models have resulted in important advances in the literature for measuring earnings management, but there remain many challenges, the main challenge being that the inherent limitation suffered by all of the abnormal accrual models may be unable to validate the accuracy of the models' estimations. A researcher cannot be sure that the estimates of discretionary accruals result from the management's opportunistic accounting choices, or are simply an artefact. This is referred to as the construct validity problem, which means that there is doubt whether the proxies really measure the underlying theoretical constructs the model is intended to measure. The inferences relating to earnings management affect the researcher as to whether he or she is able to validate the accurately estimated discretionary accruals. As a result, the weak strength of accrual models estimating, leads to the results in such studies which use accrual models being debatable, as they often produce different results. Dechow et al. (2003) focused on investigating whether earnings management is a complete or a partial explanation of the kink as it lacks the ability to provide the evidence which confirms that boosting discretionary accruals is the key driver of this. Burgstahler and Dichev's (1997) findings, for instance, produced mixed results as to whether the kink is driven by earnings management.

2.3.4 Special Accruals

The aggregate discretionary accrual models, like the Jones (1991) model and the Dechow and Dechow (2002) model, lack information about the components of earnings management, and do not consider the discretionary variation in earnings as a result of revenues or expenses. McNichols (2002) declared that one direction of earnings management research is to focus on specific accruals rather than aggregate accruals, and that special accruals provide a more complete insight into the relationship between accruals and cash flows, thus potentially resulting in a better understanding of the role played by estimation error. Whilst both studies by Miller and Skinner (1998) and Schrand and Wong (2003) examined earnings management using the valuation allowance for deferred tax assets, the former study did not find much evidence of use of the residual from its aggregated model, whilst the latter established supporting evidence of use of the model with specifically designed accruals. Modelling specific accruals to study earnings management, is ideal for consideration in specific industries, discretion, and most earnings discretion which is available to firms, such as revenues, restructuring reserves, warranty liabilities, and loan loss reserves. Stubben (2010) employed discretionary revenues as a measure of earnings management, and the results indicated that

revenue models are less biased and better specified than commonly used accrual models and are more likely than accruals models to detect a combination of revenue and expense manipulation.

2.4 Real Activities Manipulation

2.4.1 Development of Real Activities Manipulation

‘Real activities’ manipulation, real earnings management or ‘transaction’ management, as a strategy of earnings management, appears to be relatively under-researched in academic accounting literature compared to research which investigates accrual-based earnings management. It has, however attracted greater interest in recent years due to increasing numbers of researchers turning their attention from accrual-based earnings management to real activities manipulation. Several studies have investigated the possibility that managers manipulate earnings not only through accounting estimates and methods but also via real transactions⁷. Several studies have investigated whether firms achieve earnings targets to manipulate R&D expenditure discretionary spending. Baber et al. (1991) produced evidence that firms choose to cut R&D expenditure when it jeopardizes the ability to report positive or increasing incomes. Dechow and Sloan (1991) provided evidence showing that CEOs in their final year of office report relatively less R&D spending to improve short-term earnings performance. Bens el al. (2002) declared that managers reduce R&D and capital expenditures during ESO exercises in order to repurchase stocks. Cheng (2004) also reported that compensation committees mitigate effective opportunistic reductions in R&D spending. The timing of asset sales provides an opportunity for real activities manipulation, as the gains of asset sales are reported in the financial report at the time the transaction occurs. Bartov’s findings (1993) are consistent with the timing of asset sales by managers in that the recognized accounting income from these sales smooths intertemporal earnings changes, and mitigate accounting-based restrictions in debt covenants. Herrmann, Inoue, and Thomas (2003) undertook research into the Japanese market and found evidence of managers’ use of income from the sale of assets to manage earnings. Sales manipulation is another method of achieving real activities manipulation due to some

⁷ Healy and Wahlen (1999) argued that earnings management occurs when managers use judgement in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the firm or to influence contractual outcomes that depend on reported accounting practices. Fudenberg and Tirole (1995), Healy and Wahlen (1999), and Dechow and Skinner (2000) posit that managers use acceleration of sales, alterations in shipment schedules, and delaying of research and development and maintenance expenditures as earnings management methods.

managers wishing to sacrifice long-term benefit in order to increase reported earnings in the current year by means of increasing sales. The sales can be increased by reducing prices near the end of the year from the next financial year to the current year (e.g. Jackson and Wilcox, 2000), and by manipulating cost of good sales (COGS). The manipulation of COGS is mainly the result of overproduction, as a larger number of products produced can spread fixed overheads, thus resulting in a reduction in the per unit cost. Thomas and Zhang (2002) pointed out that earnings management can be linked to a variation in production levels altering COGS by means of affecting the amount of fixed manufacturing overheads absorbed in each unit produced.

Real activities manipulation was not commonly known earlier and no one has presented a systematic overview of it. Graham et al. (2005) offered fundamental important evidence in real activities manipulation literature. They surveyed and interviewed more than 400 executives and concluded that the majority of earnings management results from manipulating real operating activities. According to Graham et al.'s survey, 78% of their sample executives admitted that, in order to hit the earnings benchmark, they are more reluctant to engage in within-GAAP accounting discretion (e.g. accrual earnings management), rather prefer to manage earnings via real economic actions such as delaying maintenance or advertising expenditure, or even by withdrawing from positive NPV projects. Concurring with the conclusions in Graham et al. (2005), Rochowdhury⁸ (2006) investigated a large sample from 1987-2001, and developed an empirical method. Rochowdhury (2006) determined that managers manipulate real operating activities to avoid reporting annual losses or achieve annual analyst forecasts by temporarily increasing sales and engaging in overproduction to report lower costs of goods sold and a reduction in discretionary expenditure. This was the first study to introduce a more comprehensive measure of real activities manipulation, now evident in later literature (e.g. Cohen et al., 2005; Gunny, 2010; Zang, 2012; Kim and Park, 2014; Cohen, et al., 2019).

⁸ To detect real activities manipulation to avoid losses, Roychowdhury (2006) investigated patterns in CFO, discretionary expenses, and production costs for firms close to the zero earnings benchmark. CFO represents cash flow from operations as reported in the statement of cash flows. Discretionary expenses are defined as the sum of advertising expenses, R&D expenses, and selling, general and administrative expenses. Production costs are the sum of COGS and change in inventory during the period. Roychowdhury (2006) used the model in Dechow et al. (1998) to derive normal levels of CFO, discretionary expenses and production costs for every firm-year. He focus on three manipulation methods and their effects on the abnormal levels of the three variables as followed: sales manipulation, that is, accelerating the timing of sales and/or generating additional unsustainable sales through increased price discounts or more lenient credit terms; reduction/cutting of discretionary expenses; overproduction, or increasing production to report lower COGS.

2.4.2 Subsequent Research into Real Activities Manipulation

More researchers in recent years have paid attention to real activities manipulation as an earnings management tool and have considered the consequences of it. Gunny (2010) showed that after controlling size, performance, and market-to-book, using real activities manipulation just met the earnings benchmarks (e.g. zero level earnings, prior year's earnings). This is positively associated with future performance compared with firms which do not adopt real activities manipulation. Eldenburg et al. (2011) documented a sample of 432 non-profit hospitals based on their real activities in order to provide evidence that managers in non-profit hospital settings also have more incentives to engage in earnings management because non-profit hospitals with pre-managed earnings slightly below zero appear to manage expenditure downwards in non-operating activities (e.g. curtailing spending to maintain or refurbish office space rented to physicians) and asset management. Kim and Park (2014) examined the relationship between auditors' client-retention decisions and real activities manipulation, and established that, with the exception of real activities manipulation through overproduction, clients' opportunistic operating decisions are positively associated with the likelihood of auditor resignations, especially in the event of meeting or hitting earnings benchmarks in auditors' client-retention decisions. Cheng, et al. (2016) explore how the internal governance affects the extent of real earnings management, and evidence that real earnings management was constrained by a strong internal governance. Li (2019) focused the study of real earnings management on the abnormal reduction in discretionary expenses, and found a negative relationship between real earnings management and firms' future performance.

On the other hand, a smaller number of research studies have focused on the development of real activities manipulation measures. Cohen et al. (2010a) focused on the special activities measure, created a unique database of monthly media advertising spending, and found strong evidence that firms engage in real activities management by reducing their advertising spending to meet two of their financial reporting objectives: avoidance of loss and decrease in earnings. A more recent study by Cohen et al. (2019), considered the limitations of traditional measures (i.e. Roychowdhury, 2006) used in real activities manipulation, and analysed alternative real activities manipulation measures based on performance matching. They eventually determined that, whilst performance-matched RAM measures are not well-specified in each and every setting (no RAM measure is), the weight of the evidence suggests that they will provide better-specified tests than the traditional real activities manipulation measures across a wide variety of settings.

A large body of previous literature on earnings management only focused on one earnings management strategy in settings where earnings manipulation is likely to be detected (Jones, 1991; Dechow et al., 1995; Roychowdhury, 2006; Stubben, 2010.). It is possible that firms use multiple strategies of earnings management simultaneously, and considerable research studies have investigated how managers use the different earnings management tools to achieve their objectives (for example, earnings management both through accrual-based earnings management and real activities manipulation). Cohen et al. (2008) documented both accrual-based and real changes in earnings management over the sample period of 1987-2005. They revealed that, whilst the level of accrual-based earnings management declined, the level of real earnings management activities increased significantly after the passage of SOX, and suggested that firms changed from using accrual-based management to that of real earnings management after SOX. Cohen and Zarowin (2010) presented important evidence that post-SEO operating underperformance is driven not just by accrual reversals, but also real activities manipulation decisions and suggested that firms' choices of real versus accrual-based earnings management activities around SEOs vary predictably with regard to a firm's ability to use accrual management and the costs of so doing. Badertscher (2011) suggested that the degree and duration of overvaluation affects managers' choice of alternative methods of managing earnings because managers engage in accruals management in the early stages of overvaluation before changing to real transactions management, in order to sustain their overvalued equity. A more recent significant study, Zang (2012) offered large-scale evidence that there is a substitution relationship between real activities manipulation and accrual-based earnings management and that their trade-off depends on their relative costs and managers adjusting the level of accrual-based earnings management according to the level of real activities manipulation realized. Sohn (2016) examined whether and how firms engage in opportunistic earnings management activities are affected by the degree of firms' accounting comparability with other firms, found that managers acted opportunistic behaviour to 'escape' from accrual-based earnings management from real activities manipulation.

2.4.3 Limitations of Real Activities Manipulation

In spite of the prevalence of real activities manipulation, the paucity of research in this area means that there is a lack of evidence showing how or whether, real activities manipulation impacts on the quality of earnings. On the one hand, real activities manipulation possibly results in a different conclusion. For example, as mentioned by DeFond (2010), real activities manipulation may likely result in sub-optimal investment decisions which harm shareholders.

However, Graham et al. (2005) suggested that real earnings management has the possibility to actually benefit shareholders, stating that ‘... given the reality of severe market (over-) reactions to earnings misses, the executives might be making the optimal choice in the existing equilibrium (by manipulating real activities).’

On the other hand, it is necessary to note that a large number of subsequent research studies have relied heavily on the validity of real activities manipulation proxies, especially Roychowdhury’s (2006) model, in order to detect real earnings management. However, no study has been carried out to date to ensure the validity of either model or their main findings. Moreover, some subsequent researchers have built their evidence around the use of real activities manipulation to meet the earnings benchmark and have conducted additional analysis, drawing the results directly from the original study, the validity of which critically depends on the original results. For example, Cohen and Zarowin (2010b) examined both real and accrual-based earnings management activities in terms of seasoned equity offerings (SEOs) based on the results of Cohen et al. (2008). In addition, Siriviriyakul (2013) analysed the uncertain validity of real earnings management proxies, re-examined the tests of real activities manipulation to avoid losses developed in Roychowdhury (2006) and failed to find consistent conclusions.

2.5 Classification Shifting

2.5.1 Motivation

A third and relatively new method of earnings management is called classification shifting, and was identified by McVay (2006) as ‘*the deliberate misclassification of items within the income statement*’. Managers using classification shifting to maximise reported performance simply move certain revenues, expenses, gains, or losses to different items on the income statement without actually altering net income. Classification shifting is different from accrual-based earnings management and real activities manipulation in several ways. First, whilst all three strategies of earnings management aim to raise expectations of future performance, or to hit specific targets, classification shifting misclassifies items on the income statement, such as moving recurring expenses to nonrecurring, in order to simply change the core earnings and make no change in bottom line earnings, in order that there is no impact on future earnings. By contrast, the two other methods of earnings management reduce earnings in future periods if they are manipulated to increase current earnings. Secondly, there is no ‘setting up’

consideration with regard to classification shifting as it does not change bottom line earnings, which indicates that using classification shifting greatly reduces the cost and therefore has a relatively low cost compared with the other two earnings management tools. In addition, no impact on net income indicates that classification shifting is potentially subject to limiting scrutiny by auditors and regulators (Nelson, et al., 2002). From the investors perspective, managers have greater incentives to engage in earnings management using classification shifting due to considerable evidence indicating that core earnings may be more attractive to market participants (Kinney and Trezevant, 1997; Bradshaw and Sloan, 2002; Gu and Chen, 2004), and that they receive higher valuation multiples than non-core earnings (Lipe, 1986; Hayn, 1995).

According to prior research, classification shifting is a valid tool in earnings management. On the one hand, managers are motivated to engage in manipulating presentation or the 'pro forma' of the income statement with the intention of influencing the trend of a financial performance without initially misclassifying items in the income statement. Kinney and Trezevant (1997) determined that special items are used by managers to influence the trend in reported earnings and to influence investor and analyst perceptions. They also offered evidence that income-decreasing special items are more likely to be presented as line items in income statements to emphasize their transitory nature with regard to income-increasing special items. Davis (2002) documented a sample of Internet firms and revealed that it is common for certain sectors of sample firms to engage in grossed-up and bartered revenue to achieve a higher return.

On the other hand, classification is informative about differences in the underlying economic events which offer the possibility of conducting manipulation actions. Fairfield et al. (1996) confirmed that disaggregation on the income statement is useful for forecasting future profitability and that these forecasting improvements extend beyond separating extraordinary items and discontinued operations from other earnings components. Dye (2002) presented a model, in which firms are motivated to engage in 'classification manipulation' in their attempts to secure the preferred accounting classification of both real transactions (such as operating versus capital leases) and income statement classifications (such as classifying transitory gains as ordinary income). Givoly (1999) examined the relationship between the measurement error information content of segment reporting and the results suggested that managers attempt to maximise expected firm value by means of moving income to the highest P/E segments. Weiss (2001) investigated the treatment of transitory earnings shocks associated with the 1993 increase in corporate tax rates, consistent with Kinney and Trezevant (1997), and found that managers are more likely to highlight the income-decreasing effects and offset current

transitory gains with income-decreasing special items in an attempt to maximize future core earnings. Gu and Chen (2004) declared that non-recurring items which analysts include in street earnings are more persistent and have higher valuation multiples than those items which they exclude from street earnings. In addition, supported by special items evidence, Elliott and Hanna (1996), concordant with claims made in the business press, established that management may be using special items (e.g. write-offs) to accomplish strategic earnings management objectives. Burgstahler et al. (2002) argued that special items are prominent in financial analysis and are assumed to have relatively straightforward implications for future earnings as special items are assumed to be largely transitory.

2.5.2 Development of Classification Shifting

Most previous studies have focused on earnings management using accrual-based or real activity management, whilst the relatively new tool of earnings management classification has been largely ignored to date. A few earlier studies simply offered a preliminary insight into earnings management using classification shifting, whereby managers have an incentive to misclassify operating expenses as non-recurring expenses to increase recurring income (i.e. core earnings) subtotals. Ronen and Sadan (1975) declared that managers have an incentive to engage in classification shifting if the smoothing object is any income subtotal other than the bottom line net income and managers use extraordinary items to smooth earnings before extraordinary items. Lipe (1986) showed that investors understand the future expected earnings implications of the different earnings components as reported in the income statement. Bradshaw and Sloan (2002) provided evidence of 'street earnings' (e.g. modified-GAAP earnings with noncash and non-recurring items excluded) replacing GAAP earnings as one of the primary determinants of stock price. Choi et al. (2007) presented evidence that incremental value and forecasting relevance tests suggest that the majority of management-specific adjustments reflect appropriate classification of earnings components by insiders.

McVay (2006) was one of the first to explicitly present a third potential type of earnings management, that of the deliberate misclassification of items in the income statement (as referred to in classification shifting), which develops a model of core earnings, examines the classification shifting between core expense (cost of goods and selling, general, and administrative expenses) and special items. She documented a sample of 76,901 firm-year observations from 1989 to 2003, and used an expectation model to separate core earnings, defined as operating income before depreciation and amortization, into expected and

unexpected components. She established that unexpected core earnings show an increase in special items in the year of the special item, and this unexpectedly high performance reverses in the following year, which is consistent with managers opportunistically shifting expenses from core expenses to special items (e.g. larger charges, such as those linked to restructuring or mergers, offering considerable latitude and camouflage). McVay (2006) also found classification shifting to be more pervasive when it allows managers to meet the analyst, as special items tend to be excluded from this earnings benchmark. As a result, McVay's findings show an insight into earnings management literature as classification shifting is a very attractive method of manipulating earnings. One drawback to the core earnings expectation model used by McVay (2006) is that of the use of accruals, including accruals linked to special items as a control of firm performance. The inclusion of special item accruals in the expectation model creates a potential bias in favour of her hypotheses. She acknowledged that reliance on an imperfect model is a limitation of her study.

Most subsequent research has adopted McVay's (2006) model of core earnings in order to study classification shifting in various settings. For instance, Fan et al. (2010) extended McVay's (2006) model and eliminated potential bias by using a core earnings expectations model which is not dependent on actual special items. They provided broad support evidence for McVay's (2006) conclusion, showed that classification shifting is more likely in the fourth quarter than in interim quarters, and found further evidence of classification shifting whereby the ability of managers to manipulate accruals appears to be constrained in meeting a range of earnings benchmarks. Barua et al. (2010) used a methodology similar to that employed by McVay (2006), and found there is a positive association between unexpected core earnings and discontinued operations in firms with losses from discontinued operations. Consistent with McVay's evidence, they also determined that firms who report income-decreasing discontinued operations use classification shifting to meet or overcome analyst forecasts. Athanasakou et al. (2011) adopted McVay's (2006) core earnings expectation model, and found that in the UK market that there is no reward for firms which meet analysts' forecasts through the use of classification shifting.

2.5.3 Limitations of Classification Shifting

Most subsequent research has followed McVay's (2006) approach and adopted her newly developed model of core earnings for investigating classification shifting (e.g. Fan et al., 2010; Barua et al., 2010; Athanasakou et al., 2011). Similar to real activities manipulation, these

studies relied heavily on the validity of the core earnings expectation model, whilst there is no confirmation of the validity of the model or the major results. McVay's (2006) model of core earnings was the first step towards document classification shifting and relies on the imperfect model. As she said, 'future research might also further explore the negative abnormal returns documented herein by perhaps focusing on incentives to shift or by examining whether these returns vary cross-sectional, for example with the sophistication of investors.

2.5.4 Estimation Models of Classification Shifting

Unlike accrual-based earnings management or real activities manipulation, classification shifting is performed by the deliberate misclassification of items within the income statement without changing bottom-line earnings and is not reversed in future periods or invites the same level of scrutiny by auditors and regulators. McVay (2006) developed a proxy to detect earnings management using classification shifting, and modelled it on the level of core earnings and anticipated unexpected core earnings (reported core earnings less predicted core earnings) in year t which are expected to increase with special items in year t , if firms employ classification shifting. The core earnings of each sample firm are expected to be overstated in the year the special item is recognized.

In order to investigate whether directors shift core expenses to special items, it is understood that core earnings can be unexpectedly high when a considerable increase in the discontinued operations or some other real economic events takes place. McVay (2006) also developed a model of the change in core earning to examine whether the improvement associated with special items in year t reverses in year $t + 1$, and to confirm whether the great boosting of unexpected core earnings is caused by real economic changes or firms' opportunistic behaviour. Thus, the results of the investigation have been expected to show an unexpected change in earnings from year t to year $t + 1$ to decline in special items in year t .

Following McVay (2006), the metrics to estimate the level of expected core earnings, and change in core earnings adopted by this research were computed as follows:

$$CE_{i,t} = \beta_0 + \beta_1 CE_{i,t-1} + \beta_2 ATO_{i,t} + \beta_3 ACCRUALS_{i,t-1} + \beta_4 ACCRUALS_{i,t} + \beta_5 \Delta S_{i,t} + \beta_6 NEG_ \Delta S_{i,t} + \varepsilon_{i,t},$$

$$\Delta CE_{i,t} = \phi_0 + \phi_1 CE_{i,t-1} + \phi_2 \Delta CE_{i,t-1} + \phi_3 \Delta ATO_{i,t} + \phi_4 ACCRUALS_{i,t-1} + \phi_5 ACCRUALS_{i,t} + \phi_6 \Delta S_{i,t} + \phi_7 NEG_ \Delta S_{i,t} + v_{i,t},$$

where

$CE_{i,t}$ = is core earnings (i.e. net incomes before special items and depreciation) deflated by lagged sales in firm i for year t , calculated by (sales – cost of goods sales – general, and administrative expenses) / Sales;

$\Delta CE_{i,t+1}$ = is the change in core earnings in firm i for year t measured as $CE_{t+1} - CE_t$; $\Delta S_{i,t}$ is percent change in sales in firm i for year, calculated by $(S_{i,t} - S_{i,t-1})/S_{i,t-1}$;

$NEG_AS_{i,t}$ = is percent changes in sales ($\Delta S_{i,t}$), if $\Delta S_{i,t}$ is less than 0, and 0 otherwise; $ACCRUALS_{i,t}$ is operating accruals important for firms with increasing large income special items in firm i for year t as these firms are more likely to change their operating strategies, calculated as (net income before extraordinary items – cash flow from operations)/sales; $ATO_{i,t}$ = is asset turnover ratio, defined as sales / average net operating assets, where net operating assets is the difference between operating assets and operating liabilities and is included to control the inverse relationship between asset turnover and profit margin;

$\Delta ATO_{i,t}$ = is change in asset turnover in firm i for year t , and measure as $ATO_{i,t} - ATO_{i,t-1}$; $MB_{i,t}$ is market-to-Book ratio, calculated as market value divided by book value in firm i for year t .

2.6 Other Earnings Management Research

In spite of the prevalence of the earnings management tool as one of the most studied areas in financial accounting research, considerable literature on earnings management has extended beyond original dimensions. A smaller stream of studies has examined the relationship between earnings management and market performance at Initial Public Offering. Teoh et al. (1998) focused on current working capital accruals and investigated the relationship between the long-run post-IPO return underperformance and IPO firms' earnings management. They determined that the discretionary current accruals act as proxies for earnings management which are under the control of management and are high in terms of the IPO relative to those of non-issuers. Ball and Shivakumar (2005), using the Basu (1997) tendency-to-reverse measure, based on the UK market, found that timely loss recognition is substantially less prevalent on average in private firms, compared with public firms, in spite of the groups being subject to equivalent regulatory rules. Subject to some concerns as shown in Ball and Shivakumar's (2005) model, they (2008) investigated earnings quality at the initial public offering. The evidence

demonstrated consistency in firms in the UK market as regards meeting the market demand for higher quality financials from public firms. In response to public-firm regulation, on average they improved their financial reporting quality prior to an IPO, because public investors typically faced higher information asymmetry than private investors. Sletten et al. (2018) explored the exact timing and motivation behind earnings management at IPO firms, they found that IPO firms manage their earnings in the quarter before and the quarter of the lockup expiration, though there has no earnings management activities engaged by firms in anticipation of the IPO issue date. In addition, several studies have started to consider the association between earnings management, as the price of a public firm is sensitive to earnings news, and is measured by stock recommendation. Abarbanell and Lehavy (2003) showed that, if firms rate a Sell (Buy) to engage more (less) frequently in extreme, income-decreasing earnings management, they have relatively stronger (weaker) incentives to take both earnings baths and to increase accounting reserves than other firms. However, if firms rate a Buy (Sell) they are more (less) likely to engage in earnings management which leaves reported earnings equal to or slightly higher than analysts' forecasts. Meanwhile, Brown, et al. (2016) surveyed 344 buy-side analysts from 181 investment firms, concluded that buy-side analysts' avoided to make a stock recommendation to invest in a firm with fraudulent financial statements because their concerns about financial misrepresentation (earnings manipulation) and financial reporting quality were consistent with their economic incentives.

2.7 Research into the Earnings Benchmark Beating

In the context of earnings management, accounting researchers have also investigated the issue of earnings benchmarks. Numerous accounting literature has held that firms engage in manipulate reported earnings through the use of different earnings management methods (i.e., accrual-based earning management, real activities manipulation, classification shifting), to meet or beat certain earnings benchmarks (also referred to as earnings targets such as (1) avoiding negative earnings ('zero' level earnings), (2) avoiding earnings decreases (compare with last year's earnings), (3) meeting or beating analysts' forecasts. There are a number of studies which employ the 'zero' level as their earnings benchmark to examine whether firms engage in manipulating earnings to hit specific targets, such as the avoidance of current losses (e.g. Dechow et al., 1995; Burgstahler and Dichev, 1997; Dechow et al., 2003; Roychowdhury, 2006; Cohen et al., 2009; Gunny, 2010, Mindak, et al., 2016). Some studies, however, have

sought to investigate whether earnings management is interpreted as a cause of the kink⁹. Hayn (1995) documented a kink picture whereby, because shareholders have a liquidation option, few firms report small losses and too many firms report small profits. Burgstahler and Dichev (1997a), based on empirical evidence on Hayn (1995), established that firms use cash flow from operations and changes in working capital to manipulate earnings, in order to show a ‘kink’ of unusually low frequencies of small decreases in earnings and small losses and unusually high frequencies of small increases in earnings and small positive income, specifically in cross-sectional distributions of earnings changes and earnings. Whilst Dechow et al. (2003) re-examined whether earnings management is a complete or partial explanation for the kink, built on prior research, they did not find consistent evidence that boosting discretionary accruals is the key driver of the kink.

In addition, the analyst earnings forecast provides a good incentive for firms to engage in the manipulation of earnings. Some researchers have investigated whether earnings management attempts to achieve the analysts’ forecast as analysts’ forecasts can also be achieved through either managing sales upwards or managing operating expense downwards. Graham et al. (2005) conducted a survey of more than 400 executives and found evidence that the analyst consensus estimate is one of the two most important earnings benchmarks because CFOs trust earnings which are the key metric considered by outsiders. Kross et al. (2011) examined whether firms’ are consistent in meeting or beating analysts’ earnings expectations (MBE), and presented evidence that firms, having achieved a string of meeting-or-beating MBE’s, strategically issue down-biased management earnings forecasts with the aim of maintaining the string. Mindak, et al. (2016) evidence that firms are more likely to use income-increasing earnings management that meet analysts’ expectation. By using classification shifting earnings management, McVay (2006) and several subsequent researchers (e.g. Fan et al., 2010; Barua, 2010) were able to confirm that it is more pervasive when firms tend to beat analyst forecasts. Burgstahler and

⁹ ‘Kink’ in the earnings distribution: too few firms report small losses, too many firms report small profits. According to Burgstahler and Dichev (1997a), a stronger result in support of earnings management was that cash flows increase for the small profit group relative to the small loss group. They evidence that the ‘earnings management to avoid a loss’ explanation for the kink predicts that firms with small (pre-managed) losses boost earnings to report a profit. This result in fewer firms than expected in the small loss group and more firms than expected in the small profit group, was indicating that small profit firms will have higher discretionary accruals than small loss firms. In addition, the earnings management explanation was directional: small loss firms manage earnings up to report a small profit. Therefore, it also implied that after removing from the earnings distribution firms that have positive discretionary accruals, one should see the kink decline. They also concluded five non-earnings management explanations for the kink in earnings, including: (i) managers taking real actions to improve performance; (ii) exchange listing preferences for profitable firms; (iii) the possibility that the kink is driven by denominator (market value) rather than the numerator (earnings) due to investors applying different valuation methods to loss versus profit firms; (iv) the role of accounting rules and conservatism; and (v) the role of financial assets.

Dichev (1997b) examined the association between firms' earnings management behaviour and earnings benchmarks, whilst avoiding earnings decreases and losses. They used distribution of earnings, assuming that discontinuities around zero earnings and zero changes in earnings to be evidence of managers manipulating earnings to report profits and to sustain previous year's earnings. Some following studies relevant to managers engaging in earning management to meet or beat earnings benchmarks, have replicated this methodology of investigating distribution of earnings with mixed results, casting doubts on the validity of using the distributions method to ascertain earnings management behaviour.

Alternatively, accounting literature remains unresolved on the issue of whether earnings management causes the beating of earning benchmarks, due to, on the one hand, the investigation being based on ex post reported earnings figures in order to assert that there is a causality relationship between earnings management and earnings benchmarks. However, real earnings management tends to hit earnings targets which results in improved firm performance and cannot be distinguished from apparent earnings management by examining reported earnings, in particular with regard to those firms which are on the margins of earnings benchmarks (Dechow, Richardson & Tuna, 2003). On the other hand, the distribution of firms 'normal' earnings level if without any earnings management is not defined, even though earnings distribution can be observed (Kerstein & Rai 2007). Managers try to meet or beat earnings benchmarks which are, in part at least, based on the nature of real earnings figures that actually are pre-managed earnings. Managers can boost earnings to meet benchmarks if pre-managed earnings are lower than the benchmarks. Managers can also decrease earnings if firms perform well and the real earnings are above the benchmarks to save some of the profits in order to beat benchmarks in future years (referred to as income smoothing, or 'cookie jar accounting'), or if real earnings are at a lower level in so far as that managerial discretion or effort is insufficient to meet benchmarks so that accruals are employed to deflate earnings (referred as 'big bath accounting'). Otherwise, econometric and measurement factors of what constitutes earnings management may also create problems in using earnings discontinuities to provide evidence of earnings management per se.

Burgstahler and Dichev (1997b), important literature of earnings management, presented two theories to offer evidence that firms manage reported earnings to avoid earnings decreases and losses. Based on stakeholder use of information-processing heuristics, they suggested that firms which report losses or decreased earnings tend to face higher transactions costs from the firms' stakeholders. According to prospect theory, regarding motivation for avoidance of earnings decreases and losses, losses and gains are assumed to be valued differently thus implying that

a firm may realise the largest value increase when it turns an expected loss into a profit. In addition, decreasing negative earnings affect firms' credit rating and their capital costs, resulting in a loss of firm value and implying further earning decreases in future.

Earnings benchmarks from the accounting perspective play an important role in earnings management in that managers who try to reduce fluctuation may employ accruals to increase or decrease current period reported earnings figure in order to meet a pre-managed earnings target and to maintain income at a smooth level. From another point of view, earnings benchmarks used as a target level are achieved by managers who engage in earnings management behaviour because managers, for the purpose of management incentives, are generally assumed to be wealth-maximisers who realise that their wealth can be adversely impacted when their firms' reported earnings fail to meet earnings benchmarks. Balsam (1998) found that CEO cash compensation is positively associated with discretionary accruals and the weight of such association is significantly greater only under the circumstance whereby positive discretionary accruals are used to meet earnings benchmarks and reduce or eliminate a loss. Healy (1985) conjectured that shareholders increase their monitoring when firms fail to hit their earnings benchmarks whilst Gaver, Gaver, and Austin (1995) showed that managers are punished in the form of reduced compensation and an increased probability of dismissal. The compensation committees can also employ benchmarks to distinguish between the components of earnings and reward managers such as rewards for when managers manipulate earnings to achieve the firms' targets. Ke (2001) examined the relationship between CEOs' compensation and earnings benchmark beating behaviour, and found that CEO compensation incentive formed one set of economic determinants as regards beating profit and last year's earnings behaviour. Matsunaga and Park (2001) declared that the compensation committee set earnings benchmarks as a signal of firms' management performances, and CEO compensation may be reduced when a firm misses its benchmark thus indicating a poor performance. Corporate earnings are perhaps the most widely used and studied figures in a firm's financial reports, because reported earnings figures and the circumstances relating to them can indicate whether the corporate business will be profitable and successful in the long run. As a key indicator of firms' business and management performance, most of the executive's review compares this year's earnings performance with previous' years' figures. The executive directors will be praised and rewarded when a firm that beats earnings benchmarks is outperformed, whilst they will be blamed and the board may elect a new director when a firm misses benchmarks and underperforms. This implies that meeting or beating earnings benchmarks matter in terms of managerial behaviour and provide strong incentives for earnings manipulation.

The incentive of firms' executive directors is to engage in manipulate earnings with the aim of meeting or beating earnings targets dependent on real earnings figures, or else it is unnecessary to take earnings management action when real earnings are sufficient for the achievement of benchmarks during the current period. Some researchers have modelled this conditionality about beating earnings benchmarks in circumstances leading to earnings management. Fundergerg and Tirole (1995) built a theory on income smoothing based on executive directors' concerns about keeping their position or avoiding interference, and managers' shifting earnings decisions based on the earnings performance of firms. Managers take actions which increase or decrease reported income in order to maintain current 'income smoothing' performances, based on the idea that current earnings performance receives more weight than past performances when one is assessing the future, and poor current income performance (high variable) may lead to a manager being dismissed. Payne and Robb (2000) investigated managers' incentives to increase reported earnings when the dispersion in analysts' forecasts is low and found that managers use income-increasing discretionary accruals to increase earnings to align with market expectations. Daniel, Denis, and Naveen (2008) presented evidence that CEOs have incentives to manage earnings upwards to avoid dividend cuts when they anticipate that unmanaged earnings will otherwise fall short of expected dividend levels (benchmarks) in dividend-paying firms whose CEOs receive higher dividends payments and have higher pay-performance sensitivities. Cohen, et al. (2010a) determined that managers tend to engage in reducing advertising spending to avoid losses and earnings decreases, and in the latter stages of a firm's life cycle, they increase advertising to meet financial reporting earnings benchmarks.

Managers employ multiple earnings management strategies to increase or decrease earnings to meet or beat earnings benchmarks, when accrual-based earnings management occurs within or after the fiscal year, and try to obscure or mask true economic performance, but with no cash flow consequence; real activities manipulation takes place during the fiscal year and alters the timing or structure of a real transaction, operation and investment in an effort to influence current-period earnings performance; classification shifting through shift of core expenses to special items tends to overstate core earning without a change in bottom-line earnings. Dechow et al. (2000) reported that executives use working capital and positive special items as a mechanism to achieve low profits and to meet analysts' forecasts. Phillips et al. (2003) found that deferred tax expenses are linked to benchmark beating behaviour of reporting profits and earnings increases, whereas total accruals are linked to benchmark beating behaviour of meeting analysts' earnings forecasts. Roychowdhury (2006) declared that real earnings management primarily aims to mislead certain stakeholders into believing that earnings

benchmarks have been met in the normal course of operations, thereby managers avoid reporting annual losses and negative earnings changes. Gunny (2010) noted that adopting real earnings manipulation to just meet earnings benchmarks (zero earnings and last year's earnings) is positively associated with future performance compared with firms which did not use real earnings management and missed the benchmarks. In addition, through using classification shifting earnings management to overstate 'core' earnings and no change of bottom-line earnings, McVay (2006) documented that the result is more significant when managers meet analyst the forecast benchmark as special items tend to be excluded from this earnings benchmark. Atieh and Hussain (2012) examined the earnings management and dividend payments, and evidence that non-dividend paying firms managed earnings upwards through manipulating discretionary accruals which aiming to avoiding reporting losses. Shattarat, et al. (2018) examined the relationship between earnings management (real activities manipulation) and firms' future operating performance, evidence that firms manipulate their earnings were positively associated with future performance when meeting/beating earnings benchmarks (i.e., zero earnings, last year's earnings). As can be seen, most studies documented firms that meet/beat their earnings benchmarks by managing earnings up. However, the study of Mindak, et al. (2016) focused on investigating at the firms-specific level whether firms manage earnings up or down to barely miss or meet/beat three common earnings benchmarks (i.e., analysts' forecasts, zero earnings and last year's earnings). They found that firms that were assigned to zero earnings and/or last year's earnings threshold targets were more likely to manage earning down as they would 'cookie jar' earnings to create reserves for future years, even though most firms which barely meet/beat their target did so by managing earnings up. Thus, given the scope of this study, and based on prior literature, the income-increasing earnings management do not apply to all firms when meeting/beating earnings benchmark, firms have incentives to manage their earnings downward to meet/beat targets by using different earnings management tool. The first part of this thesis is using two main earnings management methods (i.e., accrual-based and real earnings management) and linked different earnings benchmarks (i.e., zero earnings and last year's earnings) to estimate whether firms manage their earnings upwards or downwards.

2.8 Directors' Remuneration and Earnings Management

Directors referred to in this study specifically are executive directors, who are the senior operating officers or managers in a firm or organisation. This section documents the research background of the second empirical results (Chapter 5) by means of introducing directors' remuneration, reviewing prior theories and some empirical literature in the fields of directors'

compensation. It also presents the empirical literature on the relationship between directors' pay and firms' performance; the relationship between directors' remuneration and earnings management.

2.8.1 Directors' Remuneration

Directors, especially executive directors, who are at, or above, a senior position, are responsible for everything which happens in the firm, therefore, their role is related to the formation of the firm's strategic and operational decisions which could have long-term consequences, involving strategic planning, working with the Board of Directors, and operating with a budget. Directors' remuneration (also referred to as directors' compensation or directors' pay) is composed as the financial compensation and other non-financial awards received by directors for service or employment of their firm. Compensation which has become one of the main incentives for directors, as it typically includes a mixture of base salary, bonuses, any other economics benefits, such as shares of or call options on the firm stock, use of the firm's property and perquisites, is ideally designed to take into account government regulations, tax law, the desires of the firm or organisation and directors, and rewards for performance. Disclosure of directors' remuneration is more developed and transparent in practice in the UK market, and is regulated by the Companies Act 2006¹⁰ (the 2006 Act) which states that all medium and large-sized firms are required to make certain disclosures about the aggregate remuneration of the directors. Quoted firms, whose equity share capital is listed in the UK or another EEA state, are subject to considerably more onerous requirements which involve preparation of a directors' remuneration report including detailed information about each director's remuneration.

2.8.1.1 Remuneration Committee

In accordance with growing concern of shareholders about directors rewarding themselves large compensation packages in spite of poor profit performance, a number of reports into corporate governance have stated that controls are required to reduce this kind of risk and there have been investigations into these concerns. The Greenbury Report released in 1995 was the first to propose the establishment of a directors' remuneration committee on corporate governance by the United Kingdom Confederation of British Industry to control the level of directors'

¹⁰ The Companies Act 2006 (the 2006 Act) is the mainly part of Company Law in the UK, its part 15 (sections 380 to 474) sets out requirements for the preparation, distribution and filing of accounts and reports including the choice of accounting framework.

remuneration. The Greenbury Report¹¹ (1995) focused on providing a means of forming a committee of remuneration, in order to establish a balance between directors' remuneration and firm performance to try to restore shareholders' confidence in the firm.

The role of the remuneration committee¹² is to make an appropriate compensation policy that attracts, retains and motivates directors to achieve shareholders' long-term interests, and creates a balance between the opposing viewpoints of stakeholders. The members of the committee do not require expert knowledge, but must have a thorough understanding of their firm and the forces that shape directors' remuneration and the balance between remuneration and performance, because the levels of directors' remuneration can vary considerably from business to business. Remuneration committees take into account multiple factors, including business size, performance record and prospects, industry sector, global considerations (e.g., internationalisation, complexity, and innovation), cash flow and debt levels. Key performance measures are the most common issues which may have an influence in finalising remuneration packages, the committees present recommendations to their boards for remuneration consideration. In addition, they need to understand firm culture and values, current arrangements, stakeholder interests, and the market. These four factors enable the committee to make a decision on remuneration.

As recommended by the UK Corporate Governance Code¹³, the delegated responsibilities of remuneration committees include the setting and regular review of the framework, broader policy and specific terms for the remuneration and terms and conditions of employment of the chairman of the board and of executive directors. They determine targets for performance-related compensation or share schemes, the complete individual remuneration package of each executive director including, where appropriate, salary, bonuses, pension contribution, incentive payment and share scheme and recommend and monitor the level and structure of the remuneration of senior directors, ensure that the top directors such as executive directors and key managers are fairly rewarded for their individual contribution to the overall performance

¹¹ The Greenbury Report released in 1995 was the product of a committee established by the UK Confederation of British Industry on corporate governance. It addressed a growing concern about the level of directors' remuneration.

¹² According to practical law, remuneration committee can be explained as a board committee whose delegated responsibilities may include setting the policy for the remuneration of the executive management, determining targets for performance-related pay or share schemes and determining the total individual remuneration package of each executive director including, where appropriate, salary, bonuses, pensions, incentive payments and share schemes. The UK Corporate Governance Code recommends that the remuneration committee consists exclusively of independent non-executive directors.

¹³ The UK Corporate Governance Code is a part of UK company law with a set of principles of good corporate governance aimed at companies listed on the London Stock Exchange, it is overseen by the Financial Reporting Council and its importance derives from the Financial Conduct Authority's Listing Rules.

of the firm and establish pension provision policy for all board members, They also demonstrate to shareholders that the directors' pay is set by each other with no personal interest in the outcome of the committee's decisions, agree to pay any compensation for the loss of any executive directors, and ensure that provisions regarding disclosure of remuneration, including pensions, as required in the Directors' Remuneration Reporting Regulations 2002 and the Code, are fulfilled.

The remuneration committee is, and is seen as, independent from the board of directors and has independent access to its own external advice or consultants. This can be specified in several aspects, such as the committee constructing a clear remuneration policy that is well understood and has the support of shareholders. The committee designs the performance-related remuneration which is aligned with the long-term interests of shareholders and linked with relevant challenging targets. The remuneration report is presented in a clear, concise manner and gives the reader of the annual report a bird's-eye view of remuneration policy and the rationale behind it, covering the whole area of directors' pay and is created or restored through good governance and the use of the remuneration committee, thus helping to build greater trust between firms and their shareholders.

2.8.1.2 Directors' Remuneration Report and Remuneration Strategy

Remuneration is defined as a combination of the financial compensation and other-financial payments received by directors for services or employment from their firm. It includes base salary, any bonuses, share schemes and any other economic benefits which ideally is configured to consider factors such as regulations, tax law, rewards for performance, etc., received by employees or executives during employment. Firms and shareholders expect directors to be compensated in a way that reflects the directors' performance in delivering the firm strategy and maximises shareholder interests. The remuneration committee may wish to take into consideration disclosure of the facts when they have exercised their judgement in determining the extent to which the relevant objective has been satisfied, and to provide outsiders such as investors and analysts with sufficient insight to be able to assess the relationship between directors' pay and performance.

As regulated by Companies Law, all firms are required to make certain disclosures about the aggregate remuneration of directors, and listed firms must prepare a considerably more onerous directors' remuneration report. The directors' remuneration report may present more information or detail than required if the directors think it necessary, It consists of three parts,

including an annual statement (the chair of the remuneration committee providing the context to the report and explaining what decisions have been made during the year and the resultant changes), an annual report on remuneration (referred to as the annual remuneration report, a detailed report on remuneration paid in the financial year under view) and the directors' remuneration policy (the remuneration policy sets out the proposed approach to remunerating directors over the next three years). The annual remuneration report presents information showing remuneration paid to directors in the reported year, and contains a single total figure for the remuneration of each director in the reported year and previous year, and for each element of that remuneration package including pension benefits and variable pay with regard to share-based payments. It issues a statement explaining how the remuneration policy has been implemented in the reported year, including performance measure disclosures and targets and how performance-related awards will be calculated. In addition to the report dealing with historical remuneration, the remuneration policy report is subject to a binding shareholders vote and the firm will be in breach of the law if it pays additional compensation to directors outside the approved policy. The remuneration policy can be omitted when the shareholders do not bind on remuneration policy or firm does not propose a resolution to approve the remuneration policy, hence, the directors' remuneration report can be composed of just the annual statement and the annual report on remuneration in the omission years of remuneration policy.

An effective remuneration report is like a bridge of trust designed to help build a better connection between firms and their shareholders, as it helps increase the transparency of firm reports, helps to improve accountability to shareholders and helps to provide clearer evidence of the association between performance and compensation. As determinant of directors' remuneration, the remuneration committee will utilise multiple strategies to consider to motivate directors. For example, the committee tends to offer benefits in kind to those directors who receive a relatively lower basic salary including share options, in order to increase the total amount of compensation. The committee also provides other benefits such as additional holidays, holiday vouchers, a firm car scheme, use of firm property etc., non-cash motivators for all or some firm employees to increase their levels of satisfaction. The committee may utilise firm resources, such as a firm will choose to pay share options as an alternative compensation to directors if there is insufficient cash available to pay an annual bonus and the committee offer long-term market-orientated incentive schemes to encourage the long-term loyalty of executive directors, e.g. executive stock/share options purchase schemes.

The necessity of developing a remuneration strategy which links directors' compensation to performance is the greatest challenge faced by the remuneration committee, as there is critical

need to ensure the board of directors maximise their benefits motivated by a desire to strive to increase performance, adequately rewarded when performance is improved or targets are met, and paid appropriately for their efforts and success at market-based levels, not criticised for excessive compensation, Therefore, the remuneration strategy concerns the creation of a connection to corporate strategy as corporate strategy is the process through which performance is improved, and the extent to which the remuneration strategy achieves the connection with corporate strategy or how close this connection is, and is also a measure of the remuneration strategy's success.

2.8.1.3 Components of Remuneration Package

The regulations require that remuneration committee will need to analyse each element of the remuneration package for directors when in preparing firm's remuneration report and remuneration policy. The overall remuneration package tends to balance the rewards for the management performance and a share in the success or failure of the firm, which is also impact on the linkage between remuneration and the firm's strategy. Therefore, following the work of the remuneration committee, the firm should consider to provide a remuneration package which is needed to attract, retain and motivate executive directors of the quality required under the premise of avoiding pay more unnecessary fees. To determine the package of remuneration, firm should take a comparison with other firms and judge where to position its package among the industry, need to keep abreast of what competing firms are paying and should take account of performance relative to compensation. In addition, a firm should consider other issues when designing the remuneration package of directors, such as being sensitive to the pay and employment conditions elsewhere in the firm (especially when setting an increase in annual salary). In short, however the remuneration package is determined, its essential objective is to ensure that directors are compensated at a satisfactory level and they have a stake in doing a good job for shareholders. The design of each component of a remuneration package is aimed at providing incentives to improve performance and ensuring that the directors are focused on the firm's benefits. In the meantime it is more important that a balance is struck when a firm offers its package, for example, the level of remuneration package may be too small and hence demotivate directors leading to potential underachievement of performance, whilst if the level of the package is too large, it indicates that directors earn too easily without making sufficient effort for the firm.

Each component of the directors' remuneration package is designed to support the firm's short-term and long-term strategic objectives, including basic salary, performance-related

remuneration, pension, and benefit in kind. The setting of basic salary is based on the job itself, the skills of the directors in doing the job, directors' performance in the position, the overall contribution to firm strategy, and market rates for the same level of job. Comparing it with comparable firms may give some indication as to expectation of directors' performance because the upper percentage of salary generally suggests the directors are being paid a premium for their premium effort in the future. Pension-related compensation is generally based on salary, and requires a clear explanation, including the consideration of pension consequences, related costs to the firm of basic salary increases and the approach taken in making payments in lieu of retirement benefits or defined benefit arrangements. In addition to normal compensation such as basic salary, pension, benefits in kind, (also called perks), vary in the form of non-wage compensation provided to directors and employees, such as health care, firm property use, firm car or car parking, holidays, children vouchers, etc. In order to increase directors especially executive directors' loyalty and motivation, the remuneration committee may wish to provide other ancillary benefits concordant with their relevant position in the firm. All such benefits which could be offered to directors and how these benefits support the firm's strategy should be broadly presented in the remuneration report, and the description requires it to be broad and detailed enough to encompass all benefits which may be provided to directors during both the course of the remuneration policy period and those benefits not currently being paid.

The performance-related element of remuneration is defined as that compensation dependant on the achievement of some form of performance measures or target criteria and it usually forms a significant part of the total remuneration package. Performance-related remuneration can come in two main forms, short-term and long-term incentives, which are the usual approaches adopted by firms to support their goals or objectives. Short-term incentive is the amount (e.g. cash, shares, other assets) received or receivable as a result of a payment made in the reported year and the achievement of performance measures or targets within that year, where the performance period will generally be one year. For example, the short-term bonus is a common form of short-term incentive in that the award provided to directors is based on related performance measurement and the amount received at the end of the accounting year. Similarly, long-term incentive is the amount (e.g. cash, shares or other assets) received or receivable as a result of an award produced before the reported year and the achievement of performance measures or targets over a period that ends within that year (performance period is more than one-year), and comprises, for example, shares, rights to shares, options, etc. Executive share options are the most popular form of long-term incentive scheme and are market orientated. The share options give executives the opportunity to buy shares at the exercise price and sell

the share options at a profit if the share price rises above the exercise price. The remuneration committee sets the share options as part of an executive's compensation, most executives will exercise the share option when available to generate the profit that gives the executives the incentive to manage the firm in such a way as to increase the firm's share price. Share options are designed to align the firm's strategy and objectives with the shareholder's interests, from a theory perspective, the alignment between executive directors' personal goals and the firm's objectives helps to overcome the problem of the separation between ownership and control as when executives hold firm shares, they, in effect, become an owner of the firm. As required by the remuneration committee, the actual shares or share option incentives have to be approved by shareholders, preferably replacing an existing scheme or at least form part of a well-considered overall strategy, incorporating existing schemes. The reward provides that directors should be reliable and not behave excessively. Pay-outs or the grant of share options are subject to the challenging performance measurement criteria and indicate that the firm's goals and performance relate to a group of comparative firms in some key variables such as total shareholder return as the level of option profit depends on share prices, and the profit from options is phased rather than being awarded as a block payment. In addition, to determine share options as part of executive directors' remuneration, the firm, complying with the remuneration committee, has several considerations to take on board, such as to consider whether the directors are eligible for rewards under long-term schemes, to weigh traditional share option schemes against other types of long-term incentive schemes, to ensure that executive share options are not provided at a discount, to ensure that granted shares or other forms of deferred awards should not be vested and options should not be exercisable in less than three years, and to encourage directors to hold onto their shares for a further period after vesting or exercising, subject to the need to pay any costs of acquisition and related tax liabilities.

In conclusion, it is an important practical issue that the approach adopted by a firm's remuneration committee to design and determine directors' compensation package demonstrates flexibility, discretion and judgement. Firms and shareholders tend to wish directors to be compensated in such manner, that reflects the director's performance in delivering firm strategy to hit the firm's targeted objective to maximise shareholders' interests, and to meet directors' personal goals, Therefore, each element of a director's remuneration package is designed to ensure that the directors maintain their focus on the firm doing a good job and to be motivated to improve the firm performance.

2.8.1.4 Other Issues of Directors' Remuneration

In addition to understanding the role of the remuneration committee, the directors' remuneration report and strategy and the components of the remuneration package, the firm should consider a number of other issues associated with the directors' remuneration, including legal, ethical, competitive, and non-executive directors. The remuneration committee is instructed by Regulation (The UK Directors' remuneration Report Regulations 2002 by Practical Law), which presents the guidance that a firm should aim to avoid rewarding poor performance and carefully consider the compensation commitments, including pension contributions and all other elements of a remuneration package, relating to their directors' terms of appointment as would apply in the event of termination.

Currently the traditional view of the separation of ethics and business, is rarely accepted by corporations as firms or organisations become more aware of a rising consumer-based society showing concern for the environment, social causes, corporate responsibility and other social issues. They are increasingly demonstrating sensitivity in applying ethical practical issues into their commercial success, also known as business ethics. Business ethical is a system of moral and ethical beliefs which guides the values, behaviour and decisions of a business organisation and the individuals within that organisation. It helps maintain a certain basic level of trust which exists between consumers and various forms of market participants with businesses. Some ethical requirements for firms or organisations are codified into law, such as environmental regulations, the minimum wage, and restrictions against insider trading and collusion. They are the government setting minimum standards for business ethics. The commercial environment is progressively affected by the very ethical issues that firms are dealing with, therefore, the Companies Act (2006) in the UK states that directors have the legal requirement to act as 'good corporate citizens' and pay attention to the ethical effects when they make decisions. The public has required firms to change best practice disclosure requirements on board structure and executive pay and put pressure on them to change their board policies to be in line with accepted best practice. There has been a rise in perceptions of excessive pay in underperforming firms and privatised utilities. As a result, many leading firms are developing plans to incorporate business ethics into their management processes, directors' employment contracts and performance related remuneration systems.

As a competitive firm, it is very important that the firm should have a proficient, motivated board of directors working hard in the interest of shareholders and can attract, recruit and retain the individuals required for successful performance. However, the overall remuneration

package of directors has to strike a balance. It cannot be too small or the level of remuneration will result in failure to recruit the required calibre of individual being unattractive for potential new appointees, and which may cause potential underachievement as it is demotivating for existing directors. It also cannot be too large, as excessive remuneration will make it too easy for directors to earn compensation and shareholders will consider they are not getting ‘value for money’ in terms of performance. Moreover, there is an increasingly regulatory environment for firms to operate in and this in turn is placing greater demand on directors. For example, Regulations (2002) clearly require that directors must submit a remuneration report to members at the annual general meeting every year, the remuneration report must provide full details of each director’s remuneration, and the report should be clear, transparent and understandable to shareholders. In order for a firm to release an executive director to serve as a non-executive director elsewhere, the remuneration report should include a statement as to whether the directors will retain such remuneration and disclose it. The remuneration of the non-executive directors consists only of a basic salary with no other performance related benefits. The UK Corporate Governance Code (2010) regulates that the remuneration of non-executive directors should be determined within the scope of the firm’s constitution of association, in order to avoid a situation whereby the remuneration committee is solely responsible for determining the remuneration of the non-executive directors as the committee consists of non-executive directors. The main task of the non-executive directors is oversight of the performance of the executive directors and of the firm as a whole. They are best placed to play a role to exercise flexibility, discretion or judgement and to ensure a fair outcome in remuneration.

2.8.2 Determinant of Directors’ Remuneration

In many large UK firms, directors’ remuneration is set by a remuneration committee, and according to several predominant theories in directors’ compensation literature, executive directors’ compensation can be affected by many factors, including firm performance, shareholders interest or value, etc. The principal-agent theory predicts a positive relationship between directors’ compensation and firm performance, suggesting that performance related compensation offers financial incentives for executive directors to directly help to alleviate the interest-conflicts between directors and shareholders as it achieves alignment between executives’ interests and that of their shareholders’. The agency theory suggests that managerial compensation is related to performance measures. A simplified form of agency theory, the rank order tournament theory, thus provides a supplementary explanation of classical principal-agent theory in that the positional hierarchy of directors in the firm plays a role in the determination

of their compensation. However, the managerial power theory offers a contrary opinion of directors' remuneration, that executive directors are a party to the principal-agent relationship and the directors' compensation may be involved in the agency problem itself because executive directors have the possibility through their power to influence the determination of their remuneration. Although the managerial power theory takes an opposite view from the classical principal-agent theory and tournament theory, Bebchuk, Fried, and Walker (2002) stated that principal-agent theory could not be completely replaced by the managerial power approach and should be considered together to explain and solve compensation issues. In fact, these three major theories, the classical principal-agent theory, tournament theory and managerial power theory can be seen as complementary theories which complement each other in explaining the determinant of directors' pay. The classical principal-agent theory suggests that the directors' remuneration package is designed to be associated with performance measures, thus directors' compensation is tied to firm performance in order to offer incentives to maximise shareholders' interests, whilst directors' remuneration may not only be affected by performance and an optimal contract cannot be found to perfectly align the interests of managers and shareholders.

2.8.2.1 Principal-Agent Theory

Many previous studies investigated the relationship between shareholders and directors, and examine whether there is a relationship between directors remuneration and firm performance (e.g. Jensen and Meckling, 1990; Gibbons and Murphy, 1990; Cosh and Hugn, 1997; Bebchuk and Fried, 2004; Banks, et al., 2018; Gayle, et al., 2018). The one basic challenge is to design an incentive mechanism to encourage directors to manage the firm on the behalf of the shareholders and to act in the best interests of shareholders, whereas directors may work for themselves to pursue their personal interests. This conflict of interest is often explained as the principal-agent problem, whereby shareholders have difficulty in monitoring the executive directors and it is hard to ensure that directors are acting to maximise shareholder interests as shareholders do not usually have enough knowledge such as a firm's daily operation, production, marketing, etc. Hence, the principal-agent theory, in fact, is introduced to focus on the relationship between principal and agent (also known as principal-agent problem) as a result of the separation of ownership and control, and it plays a foundation and important role in directors' compensation literature. The principal-agent theory dates back to the 1970s deriving from the combined disciplines of economics and institutional theory. The most popular cited reference to this theory, comes from Jensen and Meckling (1976) who defined it as the principal-agent

relationship arising when a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf and which involves delegating some decision making or action - taking authority to the agent. The relationship between principal and agent is like a separation of ownership and control and can lead to a dilemma whereby agents are motivated to act in their own best interests which are contrary to those of their principals, and which also caused the moral hazard problem.

The principal-agent problem mainly occurs when the two parties have different interests and asymmetric information, and usually the agent has more information, so that the principal cannot directly control matters so that the agent is always working in their (the principal's) best interests, particularly when activities useful to the principal are costly to the agent, and where elements of what the agent does are costly for the principal to observe (Bebchuk and Fried, 2004). This kind of divergence from the principal's interest by the agent is referred to as agency costs, because the principal usually may be sufficiently concerned as to the possibility of being exploited by the agent in that they chose not to engage in the transaction when it would have been mutually beneficial that a suboptimal outcome, which causes a lower welfare overall (Bebchuk and Fried, 2004). Therefore, the existence of interest conflict between the principal and agent and the moral hazard problem caused by asymmetric information in the principal and agent relationship may lead to the problem of the agent not always performing to maximise the interests of the principals (Jensen and Meckling, 1976; Bedchuk and Fried, 2004). The principal tends to utilise appropriate incentives to motivate the agent through establishing reasonable monitoring mechanisms to regulate the aberrant behaviour of the agent, in order to mitigate the principal-agent problem (Jensen and Meckling, 1976). For example, the stock market may punish directors who fail to achieve a certain share price, as outside investors may be able to profit by taking over the firm, resulting in the management being replaced. For this reason, directors may be motivated to keep the share price at a certain level. Outside directors are considered to be sufficiently independent to act as a certain institution and group, and may therefore be able to monitor the top directors. As a result, according to principal-agent theory, the design of the remuneration package is essential to ensure that the directors always do their job in the best interests of their shareholders in order to align the interests of directors with those of shareholders, thus alleviating the conflict of interests between shareholders (the principals) and directors (the agents).

2.8.2.2 Tournament Theory

The classical principal-agent theory is important and is dominant in compensation literature, however, does not demonstrate sufficient empirical evidence that compensation schemes in hierarchical organisations influenced by the position hierarchy as some researchers have argued that compensation not only motivates the directors but also the employees of firms (Lazear and Rosen, 1981; Lazear, 1991; Lazear, 1995; Gibbs, 1995; Lambert et al., 1993; Ortin-Angel & Sales-Fumas, 1998). Due to the imperfection of the classical principal-agent theory that there is no optimal contract to perfectly align the interests of directors and shareholders, the compensation differences may not only be based on performance but may instead be based on relative differences between the positions of individuals in the firm. Researchers, therefore, have developed a supplementary theory named the tournament theory by considering the role of position hierarchy in explaining directors' compensation. The tournament theory was proposed by Edward Lazear and Sherwin Rosen in 1981, and suggests that employees can be rewarded by their rank in the firm, examples being directors at a higher position whose pay may be greater than their productivity, such that 'large payment to the directors' may be efficient under some circumstances and other employees who may put in enough effort to be promoted to the top positions. According to rank order tournament theory, it provides an efficient system of directors' compensation in that large compensation differences across the directors' position hierarchy within the same firm may require offering adequate incentives for directors, and suggests the internal remuneration plans of directors be operated as sequential tournaments whereby directors compete against others at a given hierarchical position in order to be promoted to a higher rank and gain more compensation related to the promotion (Rosen, 1986).

Eriksson (1999) and Conyon and Sadler (2001) found testable evidence relating to directors' remuneration, indicating that compensation is an increasing function of position within the firm, so that the higher payment applies to directors, in turn meaning that there is a loss of promotion opportunities to higher hierarchical positions. Executive directors at the top of the firm, as suggested by tournament theory, should be compensated more because they have no further promotion opportunities at the final stage of the game (Rosen, 1986). Therefore, the compensation level between top executive directors and managers at the next rank below them should have an extraordinarily wide difference compared with wage differences across other adjacent hierarchical levels within the firm (Lambert et al., 1993; Eriksson, 1999; Conyon and Sadler, 2001). In addition, under tournament theory, the lifetime output of an employee in the firm can be dictated by two aspects: chance and skills. The employee can control his lifetime output to achieve earnings through investing his skills at an early stage, such as attending

training sessions and achieving qualifications, whilst some part of his achievement is determined by chance (Lazear and Rosen, 1981). Therefore, tournament theory can be an efficient method of labour compensation when it is difficult or expensive to quantify output but easy to rank employees, as in tournament theory the opportunity, luck, or other random factors play a more important role as regards making contributions to output and it needs greater differential pay to substitute for the effort to reduce the effect of randomness (Eriksson, 1999). It is also effective as tournament theory provides opportunities for employees and incentives to make the best possible effort in order to attain or be promoted to coveted positions at the top for large rewards. In short, tournament theory indicates that the larger the compensation difference between top directors and managers results in a greater level of effort, so that it has a positive effect on firm performance (Eriksson, 1999; Chen et al., 2011).

2.8.2.3 Managerial Power Theory

The principal predominant theory in directors' compensation literature in the area of corporate governance, the classical principal-agent theory, suggests that directors' pay is positively associated with firm performance so that performance-related compensation creates financial incentives for executive directors to behave and act in the best interests of shareholders, as it helps to align the directors' interests with those of shareholders and to alleviate the conflict of interests between the ownership and control. Bebchuk and Fried (2004) argued that the principal-agent problem is that executive directors' pay is set through an arm's-length bargaining approach between directors and boards of directors, however, does not adequately account for directors' compensation in practice, rather the compensation can be explained once the managerial power theory is accepted. Managerial power theory holds an opposing view to classical principal-agent theory, arguing that executive directors' remuneration is often set at an excessive level compared with a hypothetical, economically efficient compensation package, whilst pay may not be linked to performance with high compensation earners not necessarily high performers. In managerial power theory, executive directors who control firm business are able to use the benefit of their power to influence their pay decision made by the remuneration committee (Murohy, 2002). Specifically, executives at the top of the firm have sufficient power to make decisions which take advantage of their power to obtain a higher compensation level which is not related to performance.

The missing link between ownership and control poses a risk that the interests of the agent who controls the firm may not align with the interests of the principal who owns the firm, and that this power imbalance between executive directors and shareholders can cause disconnection

between directors' remuneration and firm performance (Tosi et al., 1999). Finkelstein (1992) identified four types of executive power: structural power, ownership power, expert power and prestige power. Lambert et al. (1993) defined this power as executives being able to influence pay decisions made by the board of directors or the remuneration committee. Rundell and Gomez-Mejia (2002) used the researchers' work to build a managerial power model and argued that, although principal-agent theory implicitly acknowledges the existence of power in the relationship between directors and shareholders because directors are able to pursue their own interests to obtain higher compensation, agency theory focuses on the financial incentives perspective rather than behavioural hypotheses. Therefore, managerial power theory suggests that executives as top directors in high positions have an unequal bargaining power which may result an inefficient market and that they obtain an excessive level of compensation without any necessarily high performance., Directors pay, for instance, is determined by the board of directors or the remuneration committee, and an executive director can be a member of the board or committee, thus the executive director has the ability to leverage his/her power over the board or committee when deciding to pay him/her at a favourable higher compensation level.

In conclusion, the classical principal-agent theory argues that the directors are compensated on a performance-related basis, whilst managerial power theory holds the opposite view that directors' compensation may be part of the agency problem and does not correlate to performance. According to managerial power theory, a conflict of interest may create poor decision-making such as seeking short-term benefits regardless of long-term risk, because executives are able to use their power to obtain excessive compensation for themselves and avoid demonstrating higher performance. Hence, it is important that the compensation package of directors needs to be designed to align the interests of directors and shareholders, to ensure that directors behave and act in the best interests of the shareholders. The study attempts to use principal-agent theory to explain that directors' remuneration is mainly determined by performance such as earnings performance, sales growth, etc., although directors' pay may also be influenced by position hierarchy and managerial power.

2.8.3 Directors' Remuneration and Firm Performance

Much attention in the literature on directors' compensation is paid on the relationship between directors' remuneration and firm performance. Some empirical studies indicate that directors' pay is positively linked to firm performance (i.e., Jensen and Murphy, 1990; Main, et al., 1996; Cheng, et al., 2016; Elsayed and Elbardan, 2018), whilst others have suggested that the

relationship between directors' remuneration and performance is very weak, or even does not exist (i.e., Gregg, et al; 1993; Conyon, 1997; Brunello, et al., 2001). This section reviews previous studies on the relationship between the level of directors' compensation and firm performance.

Top directors' pay in the UK is typically determined by the remuneration committee which designs the compensation plans based on setting some performance targets and setting some kind of 'formula' to calculate the directors' annual bonus which is likely related to firm performance; although the firm size is indeed another very important factor in influencing determination of directors' remuneration. As discussed in section 2.8.2, there are three important theories in compensation literature, namely the classical principal-agent theory, the tournament theory and the managerial power theory. They offer supporting evidence as regards empirical studies on the relationship between directors' compensation and firm performance, in that directors' pay is positively dependent on firm performance, the role of position hierarchy in directors' compensation and the role of managerial power in influencing the remuneration committee to determine compensation packages, and the effectiveness of using equity-related compensation to improve firm performance.

Firms would frequently prefer to use profit improvement as the performance measurement, so that the objective of a firm is primarily to maximise its profit. Previous research suggested that directors make an effort to improve profit as they behave or act in the best interests of shareholders, however executive directors have incentives to focus on their own interests and adopt sales and asset improvement as the firm's objective to measure the performance (e.g., Baumol, 1959; McGuire, Chiu, and Elbing, 1962; Lewellen and Huntsman, 1970; Meeks and Wittington, 1975; Rosen, 1990;). Ciscel (1974) declared that directors' compensation is positively associated to both sales and profits, and the relationship between compensation and sales is stronger than the relationship between compensation and profits. Smyth, et al. (1975) and Ciscel and Carroll (1980) provided supporting evidence that directors' pay is influenced by firm performance and both are determined by sales and profits performance. In addition, Cosh (1975) suggested that profitability is an influential factor in executive directors' compensation determination, however used the natural logarithm of total assets as the measurement of firm size, and found that firm size plays a more important role in determining executive directors' remuneration than profitability. Therefore, firm performance is normally measured by profit, sales, and total assets and have an effect on compensation determination, however directors' pay may also be influenced by firm size.

Some later research argued that early studies employed accounting-based profitability such as sales and profits as firm performance measurements to estimate compensation and the performance relationship but errors and biased and misleading results occurred, because accounting-based profitability ignored unobserved individual or firm specific effects. Coughlan and Schmidt (1985) suggested that previous cross-sectional estimations of directors' pay and performance relationship relied on accounting-based profitability resulting in an omitted variables problem as it at the discretion of a firm's management. In recent decades, equity-based compensation became popular and relatively more prevalent, thus directors' compensation may be more relevant in market-based firm performance, in that directors' wealth varies with the market performance, which is indicated by stock price. Consequently, studies into directors' compensation and the performance relationship should also take account of the stock market factor, as equity-related compensation is a significant component of a compensation package. Jensen and Murphy (1990) produced an influential study on the pay-performance link. They found that the relationship between performance and executive directors' compensation tends to be relatively stronger when stock options and stockholdings are contained in the directors' remuneration package. Consistent with Jensen and Murphy's (1990) finding, Main, Bruce and Buck (1996) were among the first to investigate cash compensation and equity-based compensation (e.g. value of option holdings) and found that the aggregate compensation is more significantly linked to firm performance than compensation without equity-based pay. Hall and Liebman (1998) observed that CEO compensation is significantly positively associated with firm performance, and results in changes in the value of equity-related rewards which take a large proportion (98%) of total compensation. Murphy (1999) declared that the compensation-performance relationship is enhanced primarily by stock options and stock ownership and the association is doubled to 0.6% compared with a test in 1996 when equity-based compensation was not added to compensation plans.

However, some studies have found that the relationship between directors' remuneration and firm performance is weak. Jensen and Murphy (1990) only ascertained a minor relationship between CEOs' cash compensation and firm performance using US data. This was also indicated in the UK market. Gregg, Machin, and Szymanski (1993) adopted the difference estimator to investigate the pay-performance relationship and predicted that the highest paid director's cash compensation which has strong growth is weakly associated with firm performance, and the association between them even disappeared during the 1989 and 1991 recession period. They also stated that executive directors' high compensation is not relevant to both firm accounting-based performance and stock market-based performance. Conyon

(1997) did not find evidence of a relationship between the highest paid directors' remuneration and pre-dated shareholder returns. In addition, Brunello, Graziano and Parigi (2001) using survey data, provided evidence from the Italian market that there is a minor association of directors' incentive compensation to firm performance.

2.8.4 Directors' Remuneration and Earnings Management

The second part of this thesis is aimed to investigate whether and how the relationship between earnings management and directors' remuneration varies with the degree of earnings management, the method of earnings management, and the level of directors' compensation. Prior studies have conducted relevant investigations into the relationship between them. Healy (1985) evidenced that accrual policies of managers are related to income-reporting incentives of their bonus contracts, and changes in accounting procedures by managers are associated with adoption or modification of the executives' bonus plan. Cheng and Warfield (2005) examined the relationship between equity incentives and earnings management, and found that stock-based compensation and ownership can lead to incentives for earnings management as, if earnings management can increase short-term stock prices, managers can benefit from doing so by increasing the value of the shares they are going to sell. Dutta and Fan (2014) studied a two-period agency setting in which the manager shifted earnings across periods, in order to examine how the possibility of earnings manipulation affects managerial compensation contracts. They concluded that the manager increased his compensation by moving earnings from the period with low pay-performance sensitivity to the period with high pay-performance sensitivity. When earnings manipulation becomes more difficult, the optimal incentive contract induces more productive effort from the manager, who, in turn, requires a higher level of managerial compensation. Hou et al. (2015) showed that firms entering into performance commitment contracts did indeed manage earnings upwards to achieve the pre-specified performance targets to avoid paying default costs when actual performance falls short (such as debt and managerial compensation contracts), and that they responded to the specific terms stipulated in the contract with regard to choice of the method of earnings management. Habib and Bhuiyan (2016) investigated the association between the presence of problem directors (defined as involvement in financial failure and involvement in integrity indiscretions, such as particularly egregious managerial compensation packages) on the audit committee and financial reporting quality, and revealed that there is a positive association between the presence of problem directors on the audit committee and real earnings management.

In addition, a large body of previous studies have explored the notion of a positive relationship between directors' compensation and earnings management, as directors will often have a position on the board of the firm whose main responsibilities include developing and implementing high-level strategies, making major corporate decisions, managing the overall operations and resources of a firm, and acting as the main point of communication between the board of directors and the corporate operations. Balsam (1998) found that operating cash flows and non-discretionary and discretionary accruals are positively related to the CEO salary and bonus compensation after control of returns, and that the major association is with operating cash flows. The weight on positive discretionary accruals is significantly greater when accruals are used to reduce or eliminate a loss. Baber, Kang, and Kumar (1999) found a stronger relationship between salary and bonus compensation change and unexpected earnings in firms with more persistent earnings, whilst Nwaeze, Yang, and Yin (2006) documented that the weight placed on earnings relative to operating cash flows is lower for firms with lower earnings persistence, higher earnings variability, and higher total accruals. Gaver, Gaver, and Austin (1995) found that transitory gains are included in earnings for compensation purposes, whilst transitory losses are excluded. Cornett, et al. (2008) showed that the impact of CEO option compensation on performance disappears when reported profitability is adjusted with regard to the effect of earnings management. Recent research invariably has argued that CEOs have undesirable managerial incentives to manipulate earnings for personal gain (e.g. Dempsey et al., 1993; Hall and Murphy, 2003; Bartov and Mohanram, 2004; Cheng and Warfield, 2005; Bergstresser and Philippon, 2006; and Balachandran et al., 2008; Houmes and Skantz, 2010; Mande and Son, 2012). Dechow, Huson, and Sloan (1994) determined that compensation appears to be adjusted for non-recurring charges (e.g., restructuring charges). Dechow, Myers, and Shakespeare (2010) showed that compensation is as sensitive to highly discretionary securitization gains as it is to other components of earnings. Bushman, Chen, Engel, and Smith (2004) concluded that firms use more equity-based compensation when earnings are less informative, and their main proxy for earnings informativeness is timeliness. Cheng and Warfield (2005) presented evidence that stock-based compensation and ownership can lead to incentives for earnings management, and if earnings management can increase the short-term stock price, managers can benefit from doing so by increasing the value of the shares they are going to sell. Cheng and Farber (2008) found that the proportion of option-based compensation in a CEO's package declined following a restatement. Earlier evidence found variations in the weights placed on different components or properties of earnings. Laux and Laux (2009) analysed the board of directors' equilibrium strategies for setting CEO's incentive pay, overseeing financial reporting and their effects on the level of earnings management, and found

that an increase in CEO equity incentives does not necessarily increase earnings management because directors adjust their oversight effort in response to a change in CEO incentives. Ali and Zhang (2015) when examining the changes in the CEO's incentive to manage the firm's reported earnings during their tenure, found that discretionary accruals are significantly higher and abnormal discretionary expenses, such as R&D expenses, are significantly lower in the early years than in the later years of a CEOs' service. This indicates that new CEOs try to favourably influence the market's perception of their ability in their early years of service, when the market is more uncertain. Capalbo, et al. (2018) conducted an empirical test of the relationship between executive directors narcissism and earnings management, argued that firms with narcissistic executive directors engage in accruals earnings management to manipulate earnings positively, highlighting the important effect of executive directors' personality on accounting choices. Several research studies have invariably provided supporting evidence that CEOs have undesirable managerial incentives to manipulate earnings to gain more personal benefit (e.g. Dempsey et al., 1993; Hall and Murphy, 2003; Bartov and Mohanram, 2004; Cheng, and Warfield, 2005; Bergstresser and Philippon, 2006; and Balachandran et al., 2008; Houmes and Skantz, 2010; Mande and Son, 2012). In short, directors' remuneration is positively associated with their earnings management, they have incentives of achieving more compensation to engage in earnings management to manipulate earnings upward (income-increasing earnings management).

However, several more recent studies documented directors attempted to engage in earnings management activities to manage earnings downward, whereby directors' remuneration was negatively associated with their earnings management. For example, Cheng, et al. (2016) examined whether internal governance affects the extent of earnings management (real activities manipulation) by using directors' compensation, and found that CEOs presumably have incentives to manipulate earnings downward to reduce the exercise price of the option grants for their personal purpose if the effect of internal governance is weaker for firms with large forthcoming fixed-date option grants. Meo, et al. (2017) looked at the firms that just meet or marginally beat earnings benchmarks; and found a negative association between managerial entrenchment which was measured by firms' compensation mechanisms and both the opportunistic use of accrual-based earnings management and real activities manipulation. Buchholze, et al. (2019) examined directors' narcissism and its implications for accounting choice, they found evidence that highly narcissistic CEOs engaging in earnings management (i.e., accrual-based earnings management) not only for income-increasing but also for income-

decreasing earnings management, as it mainly served to help them cope with their trait and to be seen as selfish behaviour.

Further, some literature suggested that directors have incentives to report a decline of firm' performance through different earnings management tool, to achieve more compensation. For example, Cohen and Zarowin (2010) found that the post-SEO operating performance decline is driven not only by accrual-based earnings management, but also reflects the real activities manipulation undertaken to manage earnings at the time of the SEO. Kothari et al. (2016) also established the existence of a decline in firm performance, presenting evidence that earnings management is most closely and predictably linked with the post-SEO stock market under-performance when it is driven by real activities manipulation. Tahir et al. (2019) investigated the importance of the choice of performance measures in CEO bonus contracts was impacted by earnings management, and evidence that managing earnings decreasing by using accrual earnings management and real activities manipulation (discretionary expenses-based manipulation) takes place when financial-performance measures and nonfinancial-performance measures are adopted together to measure executive director's performance. As a result, the second part of this thesis aims to explore the association between directors' remuneration and their earnings management with the degree of earnings management, the method of earnings management, and the extent of directors' remuneration.

2.9 Summary

Earnings management as a significant accounting issue for both researchers and regulators, has received much attention in the field of earnings quality (Dechow et al., 2010b; Dichev, et al., 2013; Beyer, et al., 2019). This is because earnings management is believed to be widespread as it acts to change or alter the process of financial reporting leading to stakeholders misunderstanding the firm's underlying performance in order to seek to hit specific target. The ability to understand the extent of firms engaged in earnings management has significant implications for regulators, analysts, investors, and researchers. For analysts, investors, or other professionals, to understand the extent to which managers manipulate earnings provides supporting idea of examination of earnings quality. It also helps regulators, government, and policy setters to have a comprehensive understanding of whether firms engage in earnings management, how they undertake it, and also encourages them to implement improvements to prevent further impact on the limitations of accounting rules, regulations and standards.

This chapter reviews three important methods in the field of earnings management, namely accrual-based earnings management, real activities manipulation, and classification shifting earnings management. As a dominant method in earnings management, accrual-based earnings management occurs when managers present a given transaction in financial reporting to manipulate reported earnings by means of changing the accounting methods or estimates used, such as provisions for bad debt expenses, delaying asset write-offs and changing the depreciation method for fixed assets. It has been extensively studied by researchers (Jones, 1991; Defond and Jiambalvo, 1994; Dechow et al., 1995; Healy and Wahlen, 1999; Fields et al., 2001; Kothari et al., 2005). Accrual-based earnings management is widely estimated by a variety of models, including Jones' (1991) model, the modified Jones' model (Dechow et al., 1995), Dechow and Dichev's (2002) approach, the performance matched model (Kothari et al., 2005), and the discretionary estimation errors approach (Francis et al., 2005). Real activities manipulation has appeared more frequently in recent years in earnings management literature as more studies have presented evidence that managers manipulate reported earnings not only through accounting estimates and methods but also via real operating activities, although it is relatively under-researched compared with accrual earnings management (Cohen et al., 2008; Cohn and Zarowin, 2010; Gunny, 2010; Eldeberg et al., 2011; Zang, 2012, Cohen, et al., 2019). Graham et al. (2005) revealed that 80% of surveyed CFOs said they alter real transaction to manage earnings, such as by decreasing R&D, advertising expenses and maintenance expenditures and postponement of new projects. Roychowdhury (2006) was among the first to provide a comprehensive overview of the altering of real operational activities to manage earnings, and developed three proxies for detecting real activities manipulation, focusing on sales manipulation, reduction of discretionary expenses and overproduction. The third type of earnings management is less popular than the first two types and is named classification shifting. It is achieved by the deliberate misclassification of items within the income statement with no change of bottom line earnings. McVay (2006) found evidence that managers overstate 'core' earnings without changing bottom line earnings by shifting core expenses to special items.

This chapter has described the development of research on earnings management. It was established particularly in the literature review that firms that meet or just beat important earnings benchmarks have greater incentives to engage in earnings management activities (Roychowdhury, 2006; Gunny, 2010; Baderscher, 2011; Zang, 2012; Mindak, et al., 2016). As summarised in this chapter, important earnings benchmarks include (1) zero level of earnings (avoiding negative earnings), (2) last year's earnings (avoiding earning decreases), (3) meeting or beating analysts' forecasts. This chapter also reviewed the literature on the association

between directors' compensation and earnings management. A number of previous studies found that there is a positive relationship between directors' remuneration and earnings management (Balsam, 1998; Baber et al., 1998; Cheng and Wrfied, 2005; Dechow, Myers, and Sharespear, 2010; Tahir, et al., 2019). However, some studies did not ascertain any evidence of directors' pay being associated with earnings management (Cornett et al., 2008).

From the review of prior literature, there are some research gaps in the area of earnings management literature. Firstly, firms can manage earnings up or down; most firms that meet or beat earnings benchmarks did so by managing earnings upward, whereas firms also have incentives to manage earnings downward to meet/beat earnings targets (i.e., Big Bath, cookie jar reserves). This is not well investigated, thus, the primary objective of this thesis is to explore whether firms engage in earnings management activities (i.e., income-increasing earnings management, income-decreasing earnings management) to hit their specific targets; and the first part aims to investigate whether firms manage reported earnings through accrual-based and/or real earnings management that just meet or beat important earnings benchmarks (zero earnings or last year's earnings).

Secondly, it can be seen in this Chapter directors' remuneration are designed by remuneration commitment that takes account of firm's performance. A number literature provides evidence that directors' remuneration are positively associated with their earnings management as they through managing earnings upward to report an improvement of operating performance. However, accounting to the suggests from a few prior studies (i.e., Cohen and Zarowin, 2010b; Kothari et al., 2016; Tahir et al., 2019), directors attempt to present a decline in performance by using earnings management methods to manipulate earnings downward because they aim to achieve more compensation. This point is under-researched, and from prior literature it cannot find an efficient estimation model to measure whether directors receive abnormal remuneration from prior literature, therefore, the second part of this thesis is aiming to examine whether firm directors use accrual-based earnings management or real activities manipulation to achieve abnormally high remuneration by establishing a new model to estimation abnormal directors' remuneration. In short, the findings of this thesis will help develop accounting literature on earnings management when firms just meet or beat different earnings benchmarks, and shed light on the relationship between directors' compensation and earnings management.

Chapter 3 Hypotheses, Data, and Methodology

3.1 Introduction

The primary objective of this study was to examine whether firms in the UK market engage in earnings management through accruals earnings management, sales-based manipulation, discretionary expenses-based manipulation and production costs-based manipulation to hit specific target. The first empirical study aimed to measure any accrual-based and real earnings management activities when firms just meet or beat important earnings benchmarks: zero level of earnings and last year's earnings whilst the second empirical study investigated whether firm directors utilise earnings management methods to obtain abnormal compensations. Chapter 2 reviewed related literature in the field of earnings management, and the aim of this chapter is to develop hypotheses, and present the sample data selection and methodology for this thesis. Sample firms were selected from all shares listed on the Financial Times Stock Exchange (FTSE All-share) over a period from 2009 to 2015. The variables definition and estimation models of different types of earnings management applied to this thesis are introduced in detail, and relevant statistical methods for both empirical studies explained.

The remainder of this chapter is organised as follows: Section 3.2 consists of hypotheses of this study developed according to background and theoretical and empirical literature which has been discussed and reviewed in previous chapters; Section 3.3 consists of a selected sample and data collection; Section 3.4 describes the research methodology of the first empirical study, regarding how to investigate firms engaged in earnings management which meet or just beat important earnings benchmarks; section 3.5 explains the estimation model which explores the relationship between directors' remuneration and earnings management; Section 3.6 presents the conclusion of this chapter

3.2 Hypotheses Development

As can be seen in the literature review chapter, earnings management is a significant accounting issue for both researchers and practitioners, as it increases the possibility of opportunistic behaviour, particularly providing the opportunity for a firm to manipulate discretion in earning

to hit certain objectives. The object of this research is to examine the quality of earnings reported in UK market and to explore whether firms engage in any earnings management activities to achieve specific targets. Analysis of this research is divided by two factors: whether firms engage in accrual-based earnings management and real activities manipulation which just beat or meets earnings benchmarks ('zero' level of earnings and last year's earnings); alternatively, whether directors who receive abnormal remuneration are associated with earnings management activities.

3.2.1 Hypotheses Development of Earnings Management Just Beat/Meet Earnings Benchmarks

Earnings benchmarks play an important role in earnings management studies as firms attempting to reduce fluctuation may seek to employ earnings management methods in order to manipulate the current period earnings figure upwards or downwards to meet pre-managed earnings targets to maintain earnings at a steady level. Prior literature on earnings management provides evidence that firm managements have greater incentives to manage earnings upward to avoid falling short of important earnings benchmarks when earnings are around the benchmarks considered to be significantly relevant to stakeholders or investors. Burgstahler and Dicheve (1997b) and Degeorge et al. (1999) argued that firm stakeholders, such as boards of directors, equity investors and creditors may suggest that, earnings benchmarks can be used as reference points or heuristics for the evaluation of a firm's performance. Alternatively, executive directors subject to compensation incentives from the board of directors are wealth-maximisers who realise their wealth can be adversely impacted by their firm's reported earnings failure to meet earnings targets. As a result, earnings benchmarks can be seen as the target level to be achieved by executive directors engaged in earnings manipulation behaviour.

According to Graham et al.'s (2005) survey and interview of over 400 executives established that financial executives attach a high importance to meet or beat the following earnings benchmarks: some of last year quarter, analyst consensus forecast, zero earnings and previous quarter earnings per share. Consistent with this, a number of accounting researchers (Hayn, 1995; Burgstahler and Dichev, 1997b; Bartov et al., 2002; Jacob and Jorgensen, 2007; Gunny, 2010; Zang, 2012; Mindak, et al., 2019) documented that firms engage in managing reported earnings through the use of different earnings management methods (accrual-based earnings management, real activities manipulation) to just meet or beat certain earnings benchmarks (also referred to as earnings targets), including (1) around 'zero' level earnings (avoiding

negative earnings), (2) comparison with last year's earnings (avoiding earnings decreases), (3) meeting or beating analysts' forecasts. They found that firms, whose earnings are right at or just above benchmarks use upward earnings management to meet or beat the important earnings benchmarks. Burgstahler and Dichev (1997b) through using earnings distribution, held the view that discontinuities at around 'zero' level of earnings and zero changes in earnings were evidence of firms engaging in manipulating earnings to report profits and sustain previous year's earnings, and that there was an association between firm earnings management behaviour and earnings benchmarks: 'zero' level of earnings (avoiding earnings losses) and last year's earnings (avoiding earnings decreases). Kross et al. (2011) presented evidence that analysts' earnings forecast offers a good incentive for firms to engage in earnings management, because firms strategically issue down-biased management earnings forecasts with the aim of maintaining the string of meeting or beating MBE's. Mindak et al. (2016) examine whether firms manage earnings to meet or beat different earnings threshold targets, namely, analysts' forecasts, 'zero' level earnings, and last year's earnings, and they find that the meet/beat earnings benchmark premium does not apply to all firms because rewards firms that managed earnings down (i.e. created a cookie jar of reserves) for some purposes to barely meet/beat their target, even most firms which barely meet/beat target did so by managing earnings up.

More recent literature on earnings management showed that firms engaging in earnings management activities to meet or beat various earnings benchmarks are more likely to adopt real activities manipulation and enhance the strength of these tests to detect real activities manipulation which lies around important earnings benchmarks. Graham et al. (2005) reported that 80% of surveyed CFOs are willing to use real earnings management activities including cutting discretionary spending on advertising, research and development (R&D), and maintenance expenses to meet their short-term earnings targets. Roychowdhury (2006) set 'zero' level as the earnings benchmark to investigate whether firms use real activities manipulation to meet their specific targets, such as avoidance of reporting annual losses. Gunny (2010) examined earnings management using real activities manipulations with regard to firms just meeting two earnings targets (zero earnings and last year's earnings), and established that real activities manipulation is positively associated with firms just meeting earnings benchmarks. Zang (2012) offered evidence of firms just meeting important earnings benchmarks: zero level of earnings, last year's earnings, and that analysts' earnings forecasts all had abnormally high real activities manipulation and accrual-based earnings management. Al-Shattarat et al. (2018) examined the relationship between real activities manipulation and firms' subsequent operating performance, and evidence firms that manipulate their earnings by using real earnings

management (accrual-based earnings management as well) are positively related to future performance when meeting or beating earnings benchmarks (i.e. zero earnings, last year's earnings). This study explored the two commonest earnings benchmarks for detecting earnings management suspects which a firm with earnings tends to meet or beat due to data access limitations, 'zero' level of earnings and last year's earnings. This thesis thus has formulated the following hypothesis:

Hypothesis 1: *Firms that just meet or beat earnings benchmarks ('zero' level of earnings and last year's earnings) are more likely to engage in real activities manipulation.*

Real activities manipulation is an activity whereby management alters the executive of a real transaction which takes place during the fiscal year to manipulate reported earnings upwards or downwards, which is achieved by changing the timing or structure of an operation, investment, or financing a transaction in an effort to optimise the output of business consequences. Roychowdhury (2006) offered a comprehensive overview of real earnings management of operational activities, and developed empirical methods to detect real activities manipulation that widely applied by the most subsequent literature on real earnings management. They focused on following three primary methods of real activities manipulation to manage earnings upwards: sales-based manipulation, reduction in discretionary expenses and overproduction.

Sales-based manipulation. Accelerates the timing of sales and/or generating additional unsustainable sales through increased price discounts or more lenient credit terms. Firms attempt to generate more sales or accelerate a sales shift from the next fiscal year into the current year by offering limited-time price discounts. These increased sales volumes as a result of discounts are temporary, and are reversed when the firm re-sets the previous prices. Total earnings in the current period are higher as they boost sales by offering price discounts but margins are lower, hence the cash inflow from operations is lower. As a result production costs relative to sales are abnormally high. In addition, offering more lenient credit terms are, in essence, price discounts which temporarily boost sale volumes to increase earnings leading to a lower cash inflow during the sales boosting. As a rule, sales-based manipulation will lead to abnormally low cash flows from operations and abnormally high production costs (Roychowdhury, 2006).

Reduction in discretionary expenses. Managing earnings upward can be achieved by reducing or cutting discretionary expenditure, such as research & development (R&D), advertising, selling, general and administrative (SG&A) expenses. The discretionary expenses will be

unusually low if firms reduce or cut discretionary expenditure to boost their current earnings. The cash flow from operations in a current period will be abnormally low if discretionary expenses are paid in the form of cash. However, abnormal CFO possibly runs the risk of being reversed in the future. (Roychowdhury, 2006).

Overproduction. Firms produce more goods than necessary to meet expected demand, with the fixed overhead costs spread over a larger number of units, thus lowering the cost of goods sold (COGS) and increasing the operating margin, with earnings reported upwards. However, firms may incur additional holding costs for overproduced goods if they are not recovered at the same time through sales. This leads to cash flows from operations being lower than that of the normal sales level, and production costs are abnormally high relative to sales (Roychowdhury, 2006).

Therefore, these expectations regarding real activities manipulation methods can be expressed as the following three subsidiary hypotheses to H1:

Hypothesis 1a: *Firms which just meet or beat earnings benchmarks ('zero' level of earnings and last year's earnings) exhibit unusually low cash flows from operations.*

Hypothesis 1b: *Firms which just meet or beat earnings benchmarks ('zero' level of earnings and last year's earnings) exhibit unusually low discretionary expenses.*

Hypothesis 1c: *Firms which just meet or beat earnings benchmarks ('zero' level of earnings and last year's earnings) exhibit unusually high production costs.*

A further type of managing earnings by manipulation of accruals, referred to as accrual-based earnings management, has been widely discussed in earnings management research. Unlike real activities manipulation, whereby actions affect the underlying activities and cash flows, accrual-based earnings management is a purposeful action which changes the accounting methods or estimates used when presenting a given transaction in the financial statements. Changing the depreciation method for fixed assets and the estimate of provision for bad debt expenses can bias reported earnings upwards or downwards without changing the real transactions and there are no direct cash flow consequences. Discretionary accruals which have been utilised to measure earnings management in this research, are defined as the difference between reported annual earnings and annual operating cash flows. The firm-years above and below the two earnings benchmarks (zero earnings level and last year's earnings) should present differing levels of discretionary accruals. Hence, this hypothesis is based on the premise that firms engage in manipulating earnings upwards to meet earnings benchmarks as followed:

Hypothesis 2: *Firms that just meet or beat earnings benchmarks ('zero' level of earnings and last year's earnings) are more likely to engage in accrual-based earnings management.*

3.2.2 Hypotheses Development of the Relation between Directors' Remuneration and Earnings Management

The disclosure of directors' compensation is more developed and transparent at present. The UK Firms Act 2006 (The 2006 Act) set out detailed regulations, including requirements for the disclosure of directors' remunerations. All firms, except for those which are small, are required to make certain disclosures about the aggregate remuneration of the directors. All quoted firms with more than 250 employees are subject to considerably more onerous requirements about the preparation of a directors' remuneration report including full detailed information of each director's remunerations, and the report should be clear, transparent and understandable to shareholders. Directors' remuneration is defined as payment or compensation received for services or employment and includes base salary, fees, bonuses and any other economic benefits which an employee or executive receives during the course of their employment. Directors' remuneration is a part of corporate strategy which creates and develops an association between rewards and firm performance. The directors' remuneration package is determined to be attractive, retained, comparable, and to ensure that directors will do a good job to maximise the interests of shareholders. Each element of the remuneration package is designed as an incentive to ensure directors concentrate on the firm and are motivated to improve performance and to maximise the value of the firm.

The theoretical foundation for the literature on the subject of directors' compensation is based on three important theories, namely the principal-agent theory, tournament theory and managerial power theory. It can be viewed as a complementary association between these three theories, which are linked to the relationship between directors' pay and firm performance, the effect of rank on directors' remuneration plans, the role of the remuneration committee in determining directors' compensation, and the effectiveness of the remuneration package in improving firm performance. The principal-agent theory separates ownership and control, and suggests a relationship between directors' pay and firm performance in that directors, especially executive directors, are motivated by the compensation because their interests (rewards) are aligned with those of shareholders and alleviate the interest-conflicts between the principal (shareholders) and agent (directors). According to this theory, directors' remuneration may

depend on shareholders' interest, thus directors may have incentives to perform better and maximise firm benefit. Some studies have investigated the relationship between directors' pay and firm performance and explored whether directors have incentives to increase shareholder value (Jensen and Murphy, 1990, Gibbons and Murphy, 1990). According to the principal-agent theory, remuneration packages are assumed to be optimally determined and are designed to ensure directors perform well to maximise shareholder value, because directors' compensation may depend on shareholder interest and they have incentives to improve firm performance and to pursue a benefit-maximising strategy for the firm. However, the principal-agent theory does not offer sufficient insight into the opinion that compensation does not only motivate the directors but also the other firm employees. Bechuk et al. (2002) argued that no optimal contract can be found in practice to perfectly align the interests of directors and shareholders. Lazer and Eosen (1981) developed the Tournament theory, which looked at performance related pay, and suggested that compensation differences are based not on marginal productivity but rather on relative differences between the levels or positions of the employees. According to tournament theory, employees may work hard to be promoted to a higher position as their rewards are determined by their rank in the firm; thus, directors receive a bigger compensation package, as this overpayment is treated as a 'prize' for those who put in sufficient effort to garner a higher position. Managerial power theory which focuses more on top directors or executive compensation, provides an alternative perspective to explain directors' compensation as being that directors pay is not linked to performance and directors may utilise their managerial authority to extract additional rewards (Bebchuk and Fried, 2003). According to the managerial power theory, directors usually in a top position are able to take advantage of their power to influence both the level and structure of compensation (Murphy, 2002).

According to these three theories, directors' remuneration can be determined by firm performance, firm size, shareholders' value, etc. In large firms such as those which are listed, directors' pay is more tied to firm performance targets in order to offer them incentives. However, directors have an incentive to utilise their accounting discretion by adopting reporting methods and estimates which do not accurately reflect firms' underlying economics to maximise wealth for themselves. Some researchers have investigated the relationship between directors' compensation and earnings management, and have provided substantial proof that directors are able to use accounting earnings management methods to achieve a higher salary and bonus compensation (e.g., Balsam, 1998; Healy and Wahlen, 1999; Cheng and Warfield, 2005; Shuto, 2007; Ali and Zhang, 2015; Capalbo, et al., 2018). For example, Healy (1985) declared that managers have the income-reporting incentives of their bonus contracts to engage

in accrual-based earnings management activities because changes in accounting procedures by managers are linked to adoption or modification of executives' bonus compensation plans. Cheng and Warfield (2005) explored the relationship between equity incentives and earnings management, establishing that directors used earnings management to gain the benefit of selling increasing in value shares to enlarge their stock-based compensation and ownership. Dutta and Fan (2014) offered evidence regarding how the possibility of earnings manipulation activities affect managerial compensation contracts.

Numerous prior studies have tended to ascertain a positive relationship between directors' remuneration and earnings management, and found evidence that directors' remuneration motivates directors to manage earnings upwards by using earnings management activities. Balsam (1998) declared that operating cash flows and non-discretionary and discretionary accruals are positively linked to executive directors' compensation after controlling returns, and the extent of positive discretionary accruals is significantly greater when the accruals are used to reduce or eliminate a loss. Nwaeze, Yang, and Yin (2006) stated that the weight placed on earnings relative to operating cash flows is lower for firms with lower earnings persistence, higher earnings variability, and higher total accruals. Cornett et al. (2008) documented that the impact of CEO option compensation on performance disappears when reported profitability is adjusted for earnings management effect. Capalbo et al. (2018) provided evidence that firms with narcissistic CEOs engage in accruals management to manage earnings positively as they lead and expend considerable effort to achieve their own goals. On the contrary, literature into the relationship between directors' earnings management and their remuneration shows fewer of them tend to find a negative relationship (e.g., Cohen and Zarowin, 2010; Kothari et al., 2016; Meo, et al., 2017; Tahir, et al., 2019). Cohen and Zarowin (2010) found that the post-SEO operating performance decline is driven not only by accrual reversal (accrual-based earnings management), but also reflects the real consequences of operational decisions (real activities manipulation) undertaken to manage earnings at the time of the SEO. Kothari et al. (2016) also established the existence of a decline in firm performance, presenting evidence that earnings management is most closely and predictably linked with the post-SEO stock market under-performance when it is driven by real activities manipulation. Tahir et al. (2019) examined whether the choice of performance measures in directors bonus contracts were constrained by earnings management both through accruals and real earnings management, evidence that less income-increasing earnings management by using accrual earnings management and real activities manipulation (discretionary expenses-based manipulation) takes place when financial-performance measures and nonfinancial-performance measures are adopted together

to measure executive director's performance. These ideas offer an insight into this research study as to whether directors tend to engage in earnings management activities to manipulate earnings downwards for the purpose of maximising their personal gains. Therefore, this expectation can be expressed as the following hypothesis:

Hypothesis 3: *Directors' remuneration is negatively associated with their earnings management.*

3.3 Sample and Data

The research was conducted in terms of the UK market. The investigation sample covered the period from 2009 to 2015 and included FTSE All shares. It started in 2009 because firstly managers had strong incentives through engaging in earnings management activities to increase or decrease earnings to avoid the negative effects of the global financial crisis of 2007-2008; secondly, the period followed the introduction of the disclosure requirement of sections 420 to 421 of the Firms Act 2006 that in all financial years the directors' remuneration report must include details of the actual remuneration of the directors (referred as Annual report on remuneration). This study was implemented by using a large range of accounting data. Due to the limitations of database, such as a few key accounting data (e.g. directors' remuneration) was not available to download until 1-2 years after their financial year, some variables (i.e. change of assets, change of sales, etc.) were calculated manually which required the data for the next year of the sample period; also in order to include available firms as many as possible, the sample period ended in 2015 as it was the most recent fiscal year-end available for all accounting data. All accounting financial and market data between 2009 and 2015 was collected from the database, namely FAME Bureau van Dijk Electronic Publishing (FAME). Initially, the sample included all active firms listed on the London Stock Exchange (LSE) ,and included in Financial Times Stock Exchange indexes (FTSE indexes) containing FTSE 100, FTSE 250, FTSE 350, and FTSE All-share. In accordance with UK SIC (2007) 5-digit codes, 17 main industry activities were identified, comprising 5,058 firm-years and 562 firms over the period of 2009-2015.

Table 3.1 shows the sample set out based on selection criteria used for testing accrual-based earnings management, real activities manipulation in the first empirical study, and abnormal directors' remuneration in the second empirical study. In the first stage, the sample selection

was made using a type of Boolean search¹⁴ to choose firms, which combined four criteria with sufficient financial and market data available in FAME database, including: 1. All active firms not in receivership nor dormant and not unknown in the UK market (164,360 firms), 2. FTSE indexes: FTSE 100, FTSE 250, FTSE 350, FTSE ALL-Share (566 firms), 3. All UK SIC (2007) codes (193,768 firms), 4. All major sectors (191,260 firms), a result of Boolean search 1 and 2 and 3 and 4, there are 562 firms, and 3,934 firm –year observations. At the later stage, the sample ruled out all firms in financial, insurance activities industries (UK SIC 5-digit codes between 64110 and 66300), and the real estate activities industry (UK SIC 5-digit codes between 68100 and 68320). The sample contained 177 firms and 22 firms, respectively, because firms from such industries (i.e., bank, real estate, insurance) have regulations and incentives in terms of earnings management which differ from those of firms from other industries. Some variables of these firms were abnormal which could impact on the test results of earnings management. This is also consistent with prior studies on earnings management (Burgstahler and Dichev, 1997b; Roychowdhurt, 2006; MacVay, 2006; Cohen et al., 2008; Burgstahler, 2010; Zang, 2012, Cohen, et al., 2019), beyond this stage, there were 363 firms. Due to the earnings management detection models for normal or expected discretionary accruals, cash flow from operations, discretionary expenses, and production costs were estimated every year and in every industry, at least 15 firm-year observations were required for each year-industry grouping (including 7 years and 17 main industries), and, as with prior research, those whose year-industry was less than 15 firm-years were excluded from the sample. Extreme observations were truncated at 1% and 99%, therefore, imposing all the data-availability requirements yields, 2,513 firm-year observations over the year from 2009 to 2015, including 11 main industries and 359 individual legal firms (shown in Table 3.1, the list of sample firms has displayed in Appendix B).

Panel B of Table 3.1 presents the distribution of the sample firms from different classified industries based on the UK SIC (2007) 5-digit code. As with prior research for detecting earnings management (Roychowdhury, 2006; Cohen et al., 2008; Cohen and Zarowin, 2010; Burgstahler, 2010; Zang, 2012), both accrual-based earnings management and real activities manipulation were estimated on across-sectional regressions for each industry and each year with at least 15 firm-year observations. The classification of industry in this study was initially based on the UK SIC (2007) five-digit code, the current Standard Industrial Classification (SIC)

¹⁴ Boolean search is a type of search allowing users to combine keywords with operators (or modifiers) such as AND, NOT, and OR to further produce more relevant results. For example, the Boolean search in this study could be ‘All active firms’ AND ‘FTSE indexes: FTSE 100, FTSE 250, FTSE 350, FTSE All-share’ AND ‘UK SIC (2007)’ AND ‘All major sectors’. This would limit the search results to only those firms containing the four criteria.

(2007) used in classifying business establishments and other statistical units by the type of economic activity that they are engaged in. The condensed list of SIC 5-digit codes was provided by Firms House with a description of the firm's business. As the UK SIC (2007) 5-digit classifies firms' business in great detail and the distribution of the firms across the classifications of industry is highly unbalanced between larger units of economics activities, the industries were summarised as main industries according to the UK SIC (2007) code. As can be seen from panel B in Table 3.1, at the end, the sample firms are involved in 11 main industries, covering 6 major business sectors: mining, manufacture, construction, wholesale trade, retailer, communication, and services (the list of the main industry has listed in Appendix C).

Table 3.1: Characteristics of Sample Firms

Panel A: Sample selection criteria for using to test hypotheses

Part 1				
Step	Sample selection criteria	Step result: Firm No.	Search result: Firm No.	No. of Firm- year
1	All active firms (not in receivership nor dormant) and firms with unknown situation	164,360	164,360	1,150,520
2	FTSE indexes: FTSE 100, FTSE 250, FTSE 350, FTSE ALL-Share	566	566	3,962
3	All UK SIC (2007) codes	193,768	565	3,955
4	All Major Sectors	191,260	562	3,934
	Boolean search: 1 and 2 and 3 and 4		562	3,934
Part 2				
Less	Bank, insurance firms	177	385	2,695
	Other financial and real estate industry	22	363	2,541
	less than 15 firm-year observations industry	4	359	2,513
Final	Full sample that used to test hypotheses		359	2,513

Panel B: Distribution of the sample firms classified by industry

Main Industry	UK SIC (2007) 5-digit code	Major Sector	Firms No.	Firm-year No.
Mining, Quarrying (inc extraction of petroleum and gas)	05101-09900	Mining	28	196
Manufacture coke, petroleum, chemicals, pharmaceuticals	10110-12000, 19100-21200		28	196
Manufacture machinery, vehicle, transport	26110-27900, 28110-30990	Manufacture	20	140
All other Manufacturing	13100-15200, 16100-18203, 22110-25990, 31010-32990		26	182
Construction	41100-43999	Construction	40	280
Wholesale and retail, motor vehicle repair, sale of fuel	45111-47990	Wholesale and retail	55	385
Transportation and Storage	49100-53202	Transport, Post and telecommunications	20	140
Information and Communication	58110-63990		34	238
Business services	64110-82990		67	469
Government administrative functions, Education, Health	35110-39000, 84110-88990	Services	18	126
Other Service activities	55100-56302, 90010-99999		23	161
Total			359	2,513

Table 3.2 reports the distribution characteristic of sample firm-year observations by year (Panel A) and by main industry (Panel B). It can be seen in Panel A, that the distribution of sample firms is over 7 years for the period between 2009 and 2015, and the number of firms is very evenly distributed in each year, 359 firms are included in each year, and no significant variation from year to year, thus, all years (2009, 2010, 2011 2012, 2013, 2014, 2015) have the same percentages of firms per year (14.3%). Panel B displays the basic statistics of firm-year observations distribution by industry. The sample of this study consisted of 359 firms from year 2009 to 2015, and 2,513 firm-years observation from 11 main industries involved a variety of business sectors: mining, manufacture, construction, wholesale, retail, transport, post, communications, and service, which is classified by UK SIC (2007) 5-digit code. The service sector is the most highly distributed of industries, with in total, 763 firm-year observations (the number of firm-years in business service; government administrative functions, education, health; and other service activities are 469, 126, and 168, respectively) included in the sample (30.4% of 2,513 observations). The second largest represented industries are that of manufacturing with 518 firm-year observations (20.6%). The following presented in order are the wholesale and retail sector (385 observations, 15.3%), the communications sector (378 observations, 15.04%), the construction sector (280 observations, 11.14%), and the mining sector (196 observations, 7.8%).

Table 3.2: Descriptive statistics of industry and year distributions for sample firms from 2009 to 2015

Panel A: Distribution of observations by year

Year	Frequency	Percent	Cum. Percent
2009	359	14.3	14.3
2010	359	14.3	28.6
2011	359	14.3	42.9
2012	359	14.3	57.2
2013	359	14.3	71.5
2014	359	14.3	85.7
2015	359	14.3	100
Total	2,513	100	

Panel B: Distribution of firm-year observations by industry

Main industry	Firm No.	Frequency	%	Cum. %
Mining, Quarry (inc extraction of petroleum and gas)	28	196	7.8	7.8
Manufacture coke, petroleum, chemicals, pharmaceuticals	28	196	7.8	15.6
Manufacture machinery, vehicle transport	20	140	5.6	21.2
All other Manufacturing	26	182	7.2	28.4
Construction	40	280	11.1	39.6
Wholesale and retail, motor vehicle repair, sale of fuel	55	385	15.3	54.9
Transportation and storage	20	140	5.6	60.4
Information and Communication	34	238	9.5	69.9
Business service	67	469	18.7	88.6
Government administrative functions, Education, Health	18	126	5.0	93.6
Other service activities	23	161	6.7	100
Total	359	2,513	100	

3.4 Estimation Models

3.4.1 Accrual-Based Earning Management

Accruals are defined as the difference between reported annual earnings and annual operating cash flows. Firms can utilise the accruals-based earnings management method to manage earnings upwards or downwards. This is achieved by changing the accounting methods or estimated used when presenting a given transaction in the financial statements (Zang, 2012). Firms can, by changing the depreciation method for fixed assets and the estimate for provision for doubtful accounts, bias reported current period earnings in a particular direction with no change of the underlying transactions. As can be seen, firms engage in accrual-based earnings

management attempts to obscure or mask true economic performance, as it is not implemented by changing the underlying operating activities of the firm but through altering the choice of accounting methods adopted to present those activities. Therefore, accrual-based earnings management has no cash flow consequences as it manage earnings by exercising discretion inherent in the accrual method of accounting.

A large amount of research into earnings management has indicated that firms have incentives to use accrual-based earnings management to hit their specific targets (i.e., Jones, 1991; Dechow and Sloan, 1991; Dechow et al. 1995; Fields et al. 2001; Cohen and Zarowin, 2010; Zang, 2012, Mindak, et al., 2016). As noted in Chapter 2 ,the literature has shown that firms have incentives to manage earnings increasing or decreasing through the accrual-based earnings management method, such as firms who just meet or beat the earnings benchmarks around zero and last year's earnings, the 'big bath'¹⁵ purpose, or firm directors gaining a higher level of compensation. As in previous literature, for those who provide evidence of the validity of using discretionary accruals to detect accrual-based earnings management activities, this study has adopted discretionary accruals as the proxy for accrual-based earnings management. Thus, the abnormal discretionary accruals in this study indicated by the residuals from the estimation model represent the measure of accrual-based earnings management activities.

3.4.1.1 The Normal Level of Discretionary Accruals

Discretionary accruals were adopted to measure whether firms engage in accrual-based earnings management activities, and calculated as the difference between firms' actual level and normal level of accruals. The normal level of discretionary accruals is expressed as a linear function of change in sales and gross property, plant, and equipment in the current period following the modified Jones' (1991) model. Some recent research, such as Roychowdury (2006), Cohen and Zarowin (2010), Zang (2012), employed the modified Jones' (1991) model to estimate discretionary accruals to detect accrual-based earnings management (an estimation model identified by Kothari, et al. (2005) was one of the most widely used accruals models, shown in Appendix D). In order to estimate this model, this study used a cross-sectional regression to calculate discretionary accruals for each industry and each year for all firms

¹⁵ A 'big bath' is an accounting term defined by a management team's strategy of manipulating a company's income statement to make poor results look even worse to make future results better. It is often implemented in a bad year so that a company can enhance the next year's earnings in an artificial manner.

contained in FTSE All Shares, where every industry is classified by the UK 5-digit SIC code. As a result, the normal level of discretionary accruals is estimated as follows:

$$\frac{Accruals_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \alpha_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \alpha_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}, \quad (1)$$

where

$Accruals_{i,t}$ = is calculated as the earnings before extraordinary items and discontinued operations minus the operating cash flows reported in the statement of cash flows in year t for firm i ;

$\Delta S_{i,t}$ = is equal to $S_{i,t} - S_{i,t-1}$, the change in sales, is the difference between sales revenue at the end of year t for firm i and the sales revenue at the beginning of year t for firm i ;

PPE_t = is the gross property, plant, and equipment in year t for firm i ;

$A_{i,t-1}$ = is the total assets at the beginning of year t for firm i ;

$\varepsilon_{i,t}$ = is the error term.

All variables were scaled by lagged total assets consistent with prior research in accrual-based earnings management (the definitions of all used variables have showed in appendix A). The estimated coefficients α_0 , α_1 , α_2 , and α_3 from equation (1) were used to estimate the normal level of discretionary accruals ($Normal_Accruals_{i,t}$). Therefore, the estimated abnormal discretionary accruals ($Abn_Accruals_{i,t}$) were computed as the accrual value of discretionary accruals ($Accruals_{i,t}/A_{i,t-1}$) minus the normal level of discretionary accruals ($Normal_Accruals_{i,t}$), which is expressed as $Abn_Accruals_{i,t} = Accruals_{i,t}/A_{i,t-1} - Normal_Accruals_{i,t}$. The abnormal discretionary accruals ($Abn_Accruals_{i,t}$) indicate the magnitude of accrual-based earnings management. To be specific, positive abnormal discretionary accruals imply income-increasing earnings management, whilst negative abnormal discretionary accruals imply income-decreasing earnings management, and zero abnormal discretionary accruals imply the firm's current accruals are the same as predicted so that no accruals earnings management are engaged in.

3.4.2 Real Activities Manipulation

Real activities manipulation is defined as ‘management actions which deviate from normal business practices, motivated by a managers’ desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations (Roychowdhury, 2006). Following Roychowdhury’s (2006) study, firms can focus on three real activities manipulation methods to manage earnings upward or downward, including sales manipulation, which involves accelerating the timing of sales or generating additional unsustainable sales through increased price discounts and more lenient credit terms; cutting or reducing discretionary expenses containing advertising, research and development, and selling, general and administrative expenses; overproduction, or increasing production to report a lower cost of goods sold. These actions alter the executive’s real transaction activities taking place during the fiscal year and affect the firm’s cash flow from operations, discretionary expenditures, and production costs, resulting in their departure from their normal activity levels. Both sales-based manipulation and overproduction lead to abnormally high production costs as they are linked to goods sales, and cutting or reduction of discretionary expenses will generate abnormally low discretionary expenses relative to sales. On the other hand, there is a lack of validation for Roychowdhury’s (2006) findings, because the three proxies to examine real activities manipulation may have indicate an ambiguous effect on cash flow from operations. For instance, explanation given on the measure of cash flow from operations should be paid attention to, as both sales-based manipulation and overproduction relative to sales, influence abnormal current-period cash flow from operations negatively for a given level of sales, whilst the reduction of discretionary expenses affects abnormal current-period cash flows from operations positively.

This thesis has aimed to investigate whether firms have strong incentives to use real activities manipulation to hit specific targets, as observed in contexts where the literature has shown that such firms which just meet or beat important earnings benchmarks around zero level of earnings and last year’s earnings, and directors receive a higher level of compensation. This research has utilised four measures to detect real activities manipulation based on Roychowdhury’s (2006) study and some other research studies which have provided valid evidence on real earnings management measurement (e.g., Cohen et al., 2008; Cohen and Zarowin, 2010; Gunny, 2010; Zang, 2012). The following four measures have been adopted to examine real activities manipulation in this research: the abnormal level of cash flow from operations (*Abn_CFO*), the abnormal level of discretionary expenditures (*Abn_DISEXP*), and the abnormal level of production costs (*Abn_PROD*), the sum of abnormal cash flow from operations, abnormal

discretionary expenses, and abnormal production costs (*RAM*). Therefore, these abnormal levels have been measured as residuals which deviated from estimation models of normal levels

3.4.2.1 The Normal Level of Cash Flow from Operations

The first proxy to examine real activities manipulation is the abnormal cash flow from operations, also referred to as sales manipulation. Roychowdhury (2006), defined it as sales manipulation which accelerates the timing of sales and/or generates additional unsustainable sales through increased price discounts and more lenient credit terms. Hence, there is a temporary increase in sales volume, which helps boost current period earnings. Sales-based manipulation leads to a lower current-period operation of cash flows for a given level of sales because the price discounts and more lenient credit terms temporarily accelerate the sales volume in the next period and the margins are assumed to be positive. However, once the firm sets the price back to the original level, the increased sales and temporary boosted earnings are likely to disappear. Therefore, a firm can adopt real activities manipulation to manage earnings upwards through sales-based manipulation by accelerating the time of sales or generating more unsustainable sales (Roychowdhury, 2006).

The abnormal level of cash flow from operations (*Abn_CFO*), models the normal level of cash flow from operations as a linear function of sales and change in sales in the current year by using the model developed by Dechow et al. (1998) and implemented in Roychowdhury (2006). In order to estimate the model of the normal level of cash flow from operations, this study generated the following cross-sectional regression for each every industry and year for all firms included in FTSE all shares, where the industry is defined by the UK five-digit SIC code:

$$\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}, \quad (2)$$

where

$CFO_{i,t}$ = is cash flow from operations for firm i in the year t , defined as cash flow from operations divided by lagged total assets;

$A_{i,t-1}$ = is the total assets at the beginning of year t for firm i ;

$S_{i,t}$ = is the total sales revenue during the year t for firm i ;

$\Delta S_{i,t} = S_{i,t} - S_{i,t-1}$, is the difference between sales revenue at the end of year t for firm i and the sales revenue at the beginning of year t for firm i ;

$\varepsilon_{i,t}$ = is the error term.

All variables in this study are deflated by lagged total assets (the definitions of all variables have displayed in Appendix A), because Easton and Sommers (2003) suggested that variables deflating by lagged assets will bring several potential advantages to the estimation as follows: a large reduction of scale difference; for a specific firm, the risk differences become smaller through time than for the other firms; limiting the estimation error, if without deflating the biases in coefficients on leverage and size is inconsequential. Barth and Clinch (2009) mentioned that using the simulating data can have scale effects and market capitalisation more effectively mitigates the scale effects compared with the other potential deflators such equity book value, lagged price, returns, lagged market capitalisation, lagged total assets and lagged total sales. Concordant with prior literature on earnings management (Dechow et al., 1998; Roychowdhury, 2006; Cohen, et al., 2008; Gunny, 2010; Zang, 2012), the estimation model in order to control the size as recommended, adds a scaled intercept, $(1/A_{i,t-1})$, which helps to avoid artificial correlation between cash flow from operations and sales revenue resulting from the difference in the total assets. An unscaled intercept, α_0 , has also been added to all the estimation models of the normal level of cash flow from operations, discretionary expenses, production costs, and discretionary accruals, to ensure that the means of abnormal CFO , abnormal discretionary expenses, abnormal production costs, and abnormal discretionary accruals are equal to zero for every industry and every year.

Thereafter, in equation (2), the estimated coefficients α_0 , α_1 , β_1 , and β_2 have been used to estimate the normal level of cash flow from operations ($Normal_CFO_{i,t}$) for all firms contained in FTSE All Shares for every industry-year. Thus, in each firm-year, abnormal cash flow from operations ($Abn_CFO_{i,t}$) is the actual cash flow from operations ($CFO_{i,t}/A_{i,t-1}$) minus the normal level of cash flow from operations ($Normal_CFO_{i,t}$) calculated by using estimated industry-level coefficients and the firm-year's sales and lagged assets from the model (2), where is $Abn_CFO_{i,t} = CFO_{i,t}/A_{i,t-1} - Normal_CFO_{i,t}$.

3.4.2.2 The Normal Level of Discretionary Expenses

The second proxy to detect real activities manipulation is the abnormal decrease in the amount of discretionary expenditure. According to previous research, managers tend to cut or reduce

discretionary expenses (i.e., the sum of research and development, advertising, selling, general and administrative expenditures) in order to manage earnings upwards. Graham et al. (2005) in a survey of CFOs found that 80 percent of surveyed CFOs would like to engage in real activities manipulation through delaying discretionary spending to achieve an earnings target. Hence, firms can reduce reported expenses, and increase current-period earnings, by cutting or reducing discretionary expenses including advertising, R&D, selling, general and administrative expenses. However, discretionary expenses manipulation possibly may cause a negative effect to cash flows in the future, as if outlays on discretionary expenses are generally in the form of cash, reducing such expenses lowers cash outflow and has a positive effect on abnormal cash flow from operations in the current period, thus the risk of lower cash flows may occur in the future (Roychowdhury, 2006).

Similar to Roychowdhury's (2006) study, this study used the metric to estimate the discretionary expenses-based manipulation and abnormal discretionary expenses. A several studies following Roychowdhury (2006) apply the estimation model of discretionary expenses to detect real activities manipulation (e.g., Cohen, 2008; Cohen and Zarowin, 2010; Badertscher, 2011; Zang, 2012). However, both Roychowdhury (2006) and Cohen and Zarowin (2010) reported that the normal level of discretionary expenses when estimated as a function of sales for the current year t , will lead to problems if firms boost sales to manage reported earnings upward during any year, and unusually lower level residuals from running a linear regression of use of current sales in that year t , even when they do not reduce discretionary expenses. To address this issue, consistent with prior research (Roychowdhury, 2006; Badertscher, 2011; Zang, 2012), this study drew the estimation model of discretionary expenses as a linear regression of lagged sales. Therefore, the normal levels of discretionary expenses ($Normal_DISEXP_{i,t}$) should be estimated as a linear function of sales at the beginning of year t for all firms listed on the FTSE, and the regression within each industry by year is as follows:

$$\frac{DISEXP_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta \left(\frac{S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}, \quad (3)$$

where

$DISEXP_{i,t}$ = is the discretionary expenses in year t for firm i , it is the sum of research and development (R&D), advertising, and selling, general, and administrative expenses for firm i in year t ;

$A_{i,t-1}$ = is the total assets at the beginning of year t for firm i ;

$S_{i,t-1}$ = is the total sales revenue at the beginning of year t for firm i , given that firms with higher sales revenue generally have higher expenses, the coefficients on lagged sales should be positive.

For every firm-year, the abnormal level of discretionary expenses ($Abn_DISEXP_{i,t}$) is the actual discretionary expenses ($DISEXP_{i,t}/A_{i,t-1}$) minus the normal level of discretionary expenses ($Normal_DISEXP_{i,t}$) using the estimated coefficient from equation (3), in which $Abn_DISEXP_{i,t} = DISEXP_{i,t}/A_{i,t-1} - Normal_DISEXP_{i,t}$ (all used variables have defined in Appendix A).

3.4.2.3 The Normal Level of Production Costs

The third proxy for real activities manipulation is abnormally high inventory production, referred to as production costs-based manipulation, which produces a maximum level of units for a given level of fixed manufacturing overhead costs for each product unit. Thus, managers can produce more goods than necessary to meet expected demand in order to spread over a larger number of units, lower costs of goods sold by allocating more fixed manufacturing overhead to the inventory with higher production levels to manipulate earnings upwards. This implies that there is a lower level of reported costs of goods sold, so that firm reports have better operating margins. However, for managers engaged in overproduction, it only works if the reduction in reported product costs offsets the inventory holding costs that the firm has to recognise in the current period. In fact, the reduction of production and holding costs on the over produced goods are difficult to recover in the same period through sales. Thus, the cash flow from operations have been expected to be lower than normal levels (Roychowdhury, 2006).

Later studies on earnings management, such as those of Cohen and Zarowin (2010), Gunny (2010), Badertscher (2011), and Zang (2012), follow Roychowdhury's (2006) production costs model to measure the amount of abnormal production costs to detect real activities manipulation. As in Roychowdhury's (2006) study, the production costs are defined as the sum of costs of goods sold and changed in the inventory during the year, therefore, the normal level of production costs can be estimated as a linear function of contemporaneous sales, involving the variables of sales revenue ($S_{i,t}/A_{i,t-1}$), change in sales revenue ($\Delta S_{i,t}/A_{i,t-1}$), and lagged change in sales revenue ($\Delta S_{i,t-1}/A_{i,t-1}$), within each industry by year as follows:

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \beta_3 \left(\frac{\Delta S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}, \quad (4)$$

Following Roychowdhury (2006), the model for normal level of cost of goods sold in year t for firm i is following:

$$\frac{COGS_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}, \quad (5)$$

The model for ‘normal’ inventory growth in year t firm i as follows:

$$\frac{\Delta INV_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}, \quad (6)$$

where

$PROD_{i,t}$ = is production costs, in year t for firm i , it is the sum of the cost of goods sold in year t for firm i ($COGS_{i,t}$) and the change in inventory from year $t - 1$ to year t for firm i ($\Delta INV_{i,t}$);

$COGS_{i,t}$ = is the cost of goods sold in year t for firm i ;

$\Delta INV_{i,t}$ = is the change in inventory from period year $t - 1$ to year t for firm i ;

$A_{i,t-1}$ = is the total assets at the beginning of year t for firm i ;

$S_{i,t}$ = is the sales revenue in the year t for firm i ;

$\Delta S_{i,t} = S_{i,t} - S_{i,t-1}$, is the change in sales revenue from year $t - 1$ to year t ;

$\Delta S_{i,t-1}$ = is the change in sales revenue at the beginning of year t for firm i .

The abnormal production costs ($Abn_PROD_{i,t}$) is calculated as the actual value of production costs ($PROD_{i,t}/A_{i,t-1}$) minus the normal levels of production costs ($Normal_PROD_{i,t}$) which is predicted from the equation (5), express as $Abn_PROD_{i,t} = PROD_{i,t}/A_{i,t-1} - Normal_PROD_{i,t}$ (all used variables have defined in Appendix A).

3.4.2.4 Aggregate Real Activities Manipulation

As developed by Bartov and Cohen (2007), Cohen et al. (2008), and Badertscher (2011), in order to capture the total effects of real earnings management, this study aggregated the three measures of real activities manipulations (abnormal cash flow from operations, abnormal discretionary expenses, and abnormal production costs) into an overall variable of *RAM* proxies

as a single measure of real activities manipulation by taking the sum of them ($Abn_CFO_{i,t}$, $Abn_DISEXP_{i,t}$, $Abn_PROD_{i,t}$). Consistent with Cohen and Zarowin (2010) and Zang's (2012) development, prior to summing up, both abnormal cash flow from operations ($Abn_CFO_{i,t}$) and abnormal discretionary expense ($Abn_DISEXP_{i,t}$) were multiplied by -1 as both of them have an adverse effect on earnings upwards, so that higher levels of $Abn_CFO_{i,t}$ and $Abn_DISEXP_{i,t}$ are proxies for higher amounts of using *RAM*. It was unnecessary to multiply abnormal production costs ($Abn_PROD_{i,t}$) by -1 as higher $Abn_PROD_{i,t}$ implied higher levels of *RAM*. Therefore, the aggregate of real activities manipulation is expressed as $RAM = Abn_CFO * (-1) + Abn_DISEXP * (-1) + Abn_PROD$ (all used variables have defined in Appendix A).

3.5 Earnings Management Suspect Firm-years

3.5.1 Selection of Suspect Firm-years

In order to enhance the power of those tests to detect earnings management, prior literature suggested that suspect firm-years such as those with earnings right at or just above any benchmarks are likely to manage earnings to meet these important benchmarks (Hayn, 1995; Burgstahler and Dichev, 1997b; Degeorge et al. 1999; Bartov et al., 2002; Jacob and Jorgensen, 2007; Gunny, 2010). Graham et al. (2005) who surveyed and interviewed more than 400 executives found that managers want to meet or beat the following most important earnings benchmarks: a quarter last year, analyst consensus forecast, zero earnings, and previous quarter earnings per share (EPS).

Moreover, as discussed in section 2.6, both theoretical and empirical studies have found evidence that managers use different type of earnings management to meet or beat three major earnings benchmarks. These include avoid negative earnings ('zero' level earnings), earnings decreases (compared with last year's earnings), and meet or beat analysts' forecasts. Roychowdhury (2006) provided evidence consistent with managers engaging in real activities manipulation around earnings thresholds commonly discussed in the literature, in particular, that of the zero threshold (avoid reporting annual losses). He concentrated on suspect firm-years in the intervals, based on net income scaled by total assets to the immediate right of zero, as this would increase the power to test whether there is real activities manipulation. Concentrating on these suspect firm-years for avoiding loss, however may cause two potential problems. The first is where managers have to pre-commit to some earnings management activities before the

end of the fiscal year, especially real activities manipulation, because real activities manipulation alters the executive of a real transaction only taking place during the fiscal year. When firms aim to meet zero earnings targets through different earnings management method, especially real activities manipulation, they probably are not the only ones as firms just want to hit 'zero' level of earnings, thus, it would restrict the testing power if the focus is only on firm-years in the short interval to that of zero level. The second is the interval in earnings just right of zero may include firm-years with downward earnings management, as those firms, which do not engage in earnings management, possibly have an incentive to manipulate earnings downward to report profits that are simply slightly above to zero as their earnings are substantially right to zero level.

As a result, two common earnings benchmarks have been adopted to define earnings management suspects as firm-years with earnings which tend to meet or beat, and are zero level of earning, and the last year's earnings. Consistent with the previous literature, the same assumption was employed to identify the sample of suspect firm-years which engage in earnings management to meet or beat benchmark targets. To meet/beat zero level earnings targets, according to Roychowdhury¹⁶ (2006), the suspect firm-years is defined as firm-years in the interval to the immediate right of zero level, as they increase the detecting power, so suspect firm-years have net income scaled by total assets which is greater than or equal to zero but less than 0.005. For meeting/beating last year's earning benchmark. In addition, based on Gunny¹⁷ (2010), this research identified suspect firm-years with a change in net income before extraordinary items from last year between 0 and 0.01.

3.5.2 Suspect Firm-years just Beating/Meeting Important Earnings Benchmarks

A sample of earnings management suspect firm-years has been used to test the hypotheses about managers' earnings management through different method (accrual-based earnings management, real activities manipulation), and the relationship between real activities manipulation and accrual-based earnings management, in order to increase the power of my tests. As suggested by prior research carried out by Roychowdhury (2006), Gunny (2010), and Zang (2012), Al-Shattarat, et al. (2018), this study employed firm-years just beating or meeting

¹⁶ To increase the power of tests to detect real activities manipulation to avoid losses, Roychowdhury (2006) concentrated on firm-years in the interval to the immediate right of zero, the suspect firm-years. Suspect firm-years have net income scaled by total assets that was greater than or equal to zero but less than 0.005.

¹⁷ To identify firms that just meet last year's earnings, Gunny (2010) grouped firm-years into intervals based on the change in net income divided by total assets at the beginning of the year. Then he constructed categories of scaled changes in earnings for widths of 0.01. The firms to the immediate right of zero have earnings scaled by total assets that are greater than or equal to zero, but less than 0.01.

important earnings benchmarks as a situation in which earnings management was more likely to occur, thus zero level of earnings and last year's earnings have been considered in this study. As undertaken by Roychowdhury (2006), just beating or meeting the zero benchmark have been defined as firm-years with earnings before extraordinary items over lagged total assets between 0 and 0.005. To measure suspects just beating or meeting last year's earnings, Gunny (2010) carried out research in firm-years presenting change in net income excluding extraordinary items from last year between 0 and 1 cents. Therefore, the Fama-MacBeth¹⁸ (1973) approach was used to examine whether suspect firm-years are more likely to manage reported earnings compared with non-suspect firm-years and are less likely to engage in earnings management. To test the hypotheses, it can be estimated the following regression, developed by Rocychowdhury (2006) and Zang (2012), as a comparison of suspect firm-years with the rest of the sample from 2009 to 2015:

$$Y_t = \beta_0 + \beta_1 \text{LnMVE}_{t-1} + \beta_2 \text{MTB}_{t-1} + \beta_3 \text{ROA}_t + \beta_4 \text{Suspect firm - years}_t + \text{Year Indicators} + \varepsilon_t, \quad (7)$$

where the dependent variables, Y_t , were measures of accrual-based earnings management (*Abn_Accruals*), real activities manipulation (*RAM*), and classification shifting earnings management (*Abn_CE*, *Abn_change_in_CE*). Each dependent variable (earnings management) was run separately with a similar set of independent and control variables. *Suspect firm - years* is an indicator variable set to equal to 1 if the firm-years belonging to just beats or meets one of the earnings benchmarks, and 0 if it clearly missed or beat all the benchmarks. This is because firm-years may still have incentives to manage earnings upwards when they close. Durtschi and Easton (2005, 2009) presented evidence that discontinuity around zero earnings as an artefact of the data can be caused by the deflator because it is significantly lower in firms just below zero than at zero because small profitable firms are on average more highly valued than small loss firms. This research thus defined firm-years that clearly meet or beat all earnings benchmarks as those which meet or beat zero earnings by 2.5 percent of lagged total assets, and last year's earnings by more than 5 cent. In line with prior studies, if suspect firm-years engage

¹⁸ Fama-Macbeth regression is a traditional approach to deal with panel data, the greatest advantage of Fama-Macbeth regression is that it excludes the influence of residual cross-sectional correlation on standard errors. The residuals here have a high correlation on the cross-section, so the correction is crucial to accurately calculate the standard error. Now there has a big killer like GMM, which can conveniently handle various correlations of residuals, so it may not necessary to use Fama-Macbeth. But Fama-Macbeth was raised nearly 10 years earlier than GMM. In the absence of GMM or other more advance methods, Fama-Macbeth regression cleverly eliminated the influence of residual cross-section correlation through the idea of 'regression first, then mean' in the cross-section regression, which has been widely recognised and used by the research of earnins management and has a far-reaching impact.

in earnings management (e.g., real activities manipulation, accrual-based earnings management), these firm-years have abnormal cash flows from operations and abnormal discretionary expenses which should be lower, abnormal production costs and abnormal accruals which should be higher, on average, compared to the rest of the sample. In addition, *Year Indicators* , are added to equation (7), as suggested by Gunny (2010) and Zang (2012), to control general economy conditions in each year. The full sample consisted of 2513 firm-years over the period 2009-2015; during the sample period there were 43 firm-years just beating/meeting the zero level benchmark and 65 firm-years just beating/meeting last year's earnings benchmark.

In accordance with prior literature (e.g., Roychowdhury, 2006; Zang, 2012), this study added three control variables to the model which are linked to different types of earnings management, which include firm growth opportunities, firm size, and firm performance. This was in order to control systematic variation in earnings management (e.g., abnormal production costs, abnormal discretionary expenditures, abnormal accruals) which might include potential sample bias (estimation errors) which are correlated with such firm characteristics. This study included the natural logarithm value of market value of equity ($LnMVE_{t-1}$) to the model to control the potential impact of the relative firm size effect in the industry. Firms' growth opportunities may cause measurement errors, which could be controlled by market-to-book ratio (MTB_{t-1}) in the model, and it was calculated by the market value of equity divided by the book value of equity. In addition, return on assets (ROA_t) is included as a control variable for current-period firm performance, computed using net income before extraordinary items divided by lagged total assets. The measurement method of these three control variables was considered individually as they are independently, and all needed to be measured as deviations from industry-year means because the dependent variables were measured in this way. However, due to the evidence regarding the relationship between these three controlled variables was mixed, the coefficient sign from the regression will thus not be predicted (all used variables have defined in Appendix A).

3.6 The Relation between Directors' remunerations and Earnings management

3.6.1 Empirical Model of Directors' Remuneration

As noticed in section 2.8, all firms in UK, except those which are small, are required to make certain disclosures about the aggregate remuneration of the directors, especially publicly traded firms. Their accounting procedures for financial reporting are heavily regulated by the UK Financial Conduct Authority (FCA). Therefore, publicly traded firms are subject to considerably more onerous requirements involving preparation of a directors' remuneration report including detailed information about each director's remuneration, because shareholders have concerns about the large compensation directors award themselves in spite of poor profits. However, UK firm directors are likely to manage earnings figures to present a better performance, in order to achieve greater personal gain. A number of prior studies have documented substantial evidence that directors have incentives to receive higher compensation by engaging in different earnings management activities (e.g., Balsam, 1998, Guidry, Leone, and Rock, 1999; Healy, 1985; Shuto, 2007, Cornett et al., 2008, Dechow, Myers, and Shakespeare, 2010, etc.)

Directors' remuneration (*DSB*) is the payment or compensation received for service or employment, and thus the measure of directors' remuneration includes different type of rewards that a director earns during employment. There are four main elements of a directors' remuneration package, including basic salary (basic directors' fees), pension contribution (mostly pensioned on basic salary), performance-related compensation (e.g., bonus, share options, etc.), benefit in kind (also referred to as perks, various non-wage compensations, e.g., health insurance, firm car scheme, etc.). Each component of directors' remuneration is designed to ensure that the directors remain focused on the firm's operation and help to motivate improvement in firm performance. Directors' remuneration is closely linked to firms' operating performance, business conditions, such as firm size, profitability, financial risk, and are directly determined by how much remuneration directors' will have received.

Whether directors receive any excessive level of compensation is measured by abnormally high directors' remuneration (referred to as abnormal directors' remuneration, *Abn_DSB*) by utilising accounting choices to present a better performance, such as growth in sales, expended in number of employees, lower financial risks, and strong profitability. Directors' remuneration

is defined as the total value of each individual element of directors' remuneration package (e.g., directors' fees, pension contribution, and other emoluments) in order to capture the total effects of compensations. Based on the analysis of prior studies, the level of directors' compensation is linked to firm performance (i.e., better performance firms, such as profit growing, production capacity expanding, paying extra reward to directors), and firm size (i.e., larger firms pay higher directors' compensation). This study built a new model to estimate the amount of abnormal directors' remuneration (Abn_DSB), whereby the variables included sales revenue, profit margin, z_score , and number of employees employed to estimate the normal levels of directors' remunerations (detailed analysis in Chapter 5). Therefore, the normal level of directors' remuneration can be expressed as a linear function for all firms listed on FTSE All-share cross-sectionally for each industry and year as follows,

$$DSB_{i,t} = \alpha_i + \beta_1 SALES_{i,t} + \beta_2 Prof. Margin_{i,t} + \beta_3 z_score_{i,t} + \beta_4 No. Empl_{i,t} + \varepsilon_{i,t}, \quad (8)$$

where the dependent variable, $DSB_{i,t}$, is total value of directors' remuneration by aggregated directors' fees, pension contributions, and other emoluments for firm i in year t . $Sales_{i,t}$ is total sales revenue in year t for firm i ; $z_score_{i,t}$ ¹⁹ is from Altman (1968) to indicate the risk of bankruptcy in year t for firm i (definition see appendix A); $No. Empl_{i,t}$ is number of employees in year t for firm i ; $Prof. Margin_{i,t}$ is the profit margin, calculated by net income divide sales revenue in year t for firm i (all used variables have defined in Appendix A).

The abnormal level of directors' remuneration for every firm ($Abn_DSB_{i,t}$) was calculated as the difference between the actual level of directors' remuneration ($DSB_{i,t}$) and the normal level of directors' remuneration ($Normal_DSB_{i,t}$) using the estimated coefficient from equation (8) as follows,

$$Abn_DSB_{i,t} = DSB_{i,t} - Normal_DSB_{i,t}. \quad (9)$$

¹⁹ The prediction of distress and turnaround. This method is successful in predicting the status of financial distress in any firm. Altman z-score can help in measuring the financial health of a business organization by the use of multiple balance sheet values and corporate income. The value of the Altman z-score is generally around - 0.25 for firms that have the highest probability of going bankrupt. On the other hand, for firms having the least probability of facing a bankruptcy, the value of Altman z-score value is as high as + 4.48. The Altman z-score formula is helpful for investors to determine if they should consider buying a stock or sell some of the stocks they have. Generally, the Altman z-score below 1.8 denotes that the firm is under the chance of getting into bankruptcy. On the other hand, the firms with Altman z-score above 3 are deemed to be less likely to go bankrupt. So an investor can decide to buy a stock if the Altman z- score is closer to value 3 and similarly they can decide to sell a stock if the value is closer to 1.8.

3.6.2 Estimation Model of Directors' Remuneration Associate to Earnings Management

Earnings management is the use of accounting techniques adopted by some firms or organisations to produce financial reports which do not accurately reflect firms underlying economic performance to achieve their specific targets. Accruals-based earnings management activities are achieved by changing the accountings methods or estimates used when presenting given transactions in the financial statements. Real earnings management activities are achieved by affecting the underlying operating activities and cash flow by the executive altering a real transaction undertaken during the fiscal year (sales-based manipulation, discretionary expenses-based manipulation, and production costs-based manipulation). On the other hand, from the opportunistic perspective, firm directors, especially executive directors, who have the right to exercise their accounting discretion, do not maximise the value of the firm, however, tend to transfer wealth, strive for more additional personal gains, and make themselves better off at the cost of other parties by using accounting choices and methods (i.e., accrual-based earnings management, real activities manipulation) which misrepresent or disguise their firms' real economic values. Prior literature under the bonus-maximisation hypothesis provided substantial evidence that directors have greater incentives to engage in earnings management activities to search and maximise the amount of their compensations (e.g., Healy, 1985; Cheng and Warfield, 2005; Bergstresser, and Philippon, 2006).

Moreover, directors and shareholders do have information asymmetry, thus providing opportunities to directors to engage in accounting activities to maximise their own wealth at the expense of shareholder benefit. Directors engage in real activities manipulation as real transaction manipulation activities which deviate from normal business practices, motivated by directors' desire to mislead some stakeholders into believing certain financial reporting goals have been met in the normal course of operations (Roychowdhury, 2006). Executive directors, may under pressure from other more powerful directors and shareholders, be more likely to utilise material earnings management methods to present a better firms' performance, as they are in a position to strongly influence accounting choices and activities.

In this study, in order to analyse whether directors can increase their personal gain by manipulating accounting information dependant on the benefits of earnings management, this study conducted a regression model to estimate the relationship between directors' remuneration and different types of earnings management (e.g., accrual-based earnings management, real activities manipulation) (there are two early versions of the estimation

models of the relationship between directors remuneration and earnings management that discussed in Appendix E). This model was estimated with a pooled ordinary least squares²⁰ (OLS time series cross sectional) regression linked to abnormal directors remuneration (Abn_DSB , calculated as residuals from Equation 8) as the dependent variables. Abnormal discretionary accruals ($Abn_accruals$), abnormal cash flows from operating (Abn_CFO), abnormal discretionary expenses (Abn_DISEXP), and abnormal production costs (Abn_PROD) as independent variables, computed t-statistics follow the Fama and MacBeth (1973) approach, and run cross-sectionally for each of the seven years from 2009 to 2015,

$$Abn_DSB_{i,t} = \alpha_i + \beta_1 Abn_accruals_{i,t} + \beta_2 Abn_CFO_{i,t} + \beta_3 Abn_DISEXP_{i,t} + \beta_4 Abn_PROD_{i,t} + u_{i,t}, \quad (10)$$

where the dependent variable, $Abn_DSB_{i,t}$, is the abnormal level of directors' remuneration, the actual level of directors' remuneration ($DSB_{i,t}$) is estimated minus the normal level of directors' remuneration ($Normal_DSB_{i,t}$). The following set of independent variables, $Abn_Accruals_{i,t}$, is the abnormal level of discretionary accruals as a proxy for accrual-based earnings management, and is the difference between actual level of accruals and normal level of accruals, in accordance with the modified Jones' (1991) model (see equation (1) in section 3.4.1). $Abn_CFO_{i,t}$, $Abn_DISEXP_{i,t}$, and $Abn_PROD_{i,t}$ are the three measures of real activities manipulation; $Abn_CFO_{i,t}$ is the abnormal level of cash flow from operations and measures sales-based manipulation, calculated as actual level of cash flows from operations minus the normal level of cash flows from operations (see equation (2) in section 3.4.2); $Abn_DISEXP_{i,t}$ is the abnormal level of discretionary expenses and measures whether firms manipulate discretionary expenditure such as R&D expenses, advertising costs, equal to actual levels of discretionary deduction of normal levels of discretionary expenses (see equation (3) in section 3.4.2); $Abn_PROD_{i,t}$ is the abnormal level of production costs and measures whether firms engage in abnormally high inventory production (overproduction), is equal to the difference between actual level of production costs and the normal level of production costs (see equation (4) in section 3.4.2).

²⁰ The analysis of this research is based on the cross-sectional data, the OLS would be the main approach (the most used in the area of earnings management) to measure the relationship between directors' remuneration and earnings management, because the other statistical modelling techniques, such as Fixed/Random Effects, GMM etc, that are related to 'time' and are not able to be applied in the sample of this study.

3.7 Summary

This research has been based on the UK market, and aimed to investigate whether firms manage earnings through utilising accrual-based earnings management activities and real activities manipulation activities to meet specific targets, such as meeting or just beating different earnings benchmarks: zero level of earnings and last year's earnings, and whether directors obtain higher level of compensation. Two major hypotheses categories have been developed in accordance with the review of theoretical and empirical prior literature, One is firms in the UK market that just meet or beat earnings benchmarks to avoid loss (zero earnings level) or avoid earnings fall (last year's earnings) are more likely to engage in accrual-based earnings management or real activities manipulations; the other concerns the relationship between earnings management and directors' remuneration, to be specific, firms directors having incentives to manage earnings by using accruals-based or real earnings management method to achieve abnormally high remuneration. The sample covered the period between 2009 and 2015 and firms included in FTSE All-share. In accordance with sample selection criteria, 2,513 firm-year observations including 11 main industries and 359 individual legal firms were applied to test the objectives of this research. All the accounting and financial data are available to extract from the FAME database. This chapter also explained estimation models for detecting earnings management. The measure of accrual-based earnings management has followed the modified Jones' (1991) model, and three measures of real activities manipulation were consistent with Roychowdhury's (2006) study. In addition, this chapter discussed the research methodology to test suspect firms that just beat or meet important earnings benchmarks in the first empirical study. A new model was identified to measure abnormal directors' remuneration, in order to examine the relationship between abnormal compensation and abnormal earnings management. The next two chapters present the empirical results of testing the hypotheses developed and use estimation models discussed in this chapter.

Chapter 4 Earnings Management just beating/meeting

Earnings Benchmarks

4.1 Introduction

This chapter presents the first part of empirical results by using both univariate and multivariate analyses. The aim is to examine whether UK firms meet or just beat important earnings benchmarks (e.g., avoiding loss, avoiding earnings decrease) through engaging in accrual-based earnings management and/or real activities manipulation. The analysis covers the measurement of abnormal levels of earnings management but concentrates mainly on the estimation of suspect firm-years just beating or meeting earnings benchmarks. The chapter is divided into several sections as follows: Firstly, section 4.2 reports descriptive statistics of accrual-based and real earnings management activities of the full sample. In section 4.3, estimation of the normal level of discretionary accruals, cash flows from operations, discretionary expenses, and production costs is presented. Section 4.4 gives the summary statistics of abnormal level of accrual-based earnings management and real activities manipulation. Moreover, the correlation coefficients between abnormal accrual-based and real earnings management are shown in section 4.5. Section 4.6 and 4.7 present the tests and analysis of whether firms use earnings management that just meet or beat earnings benchmarks ('zero' level earnings and last year's earnings). In addition, this study has conducted an additional analysis in section 4.8 concerning firms with negative earnings. Finally, the chapter then concludes with an overview of the results.

4.2 Descriptive Statistics for Real Activities Manipulation and Accrual-based Earnings Management

Table 4.1 commences with a direct comparison of firm characteristics and earnings management proxies for the suspect firm-years to the full sample. Suspect firm-years, in order to just meet/beat earnings benchmarks (e.g., avoiding losses, avoiding earnings decrease), are more likely to be utilised in earnings management, whether through real activities manipulation or accrual-based earnings management. There are two comparison groups: Panel A in Table 4.1

presents summary statistics of the full sample, including 2,513 firm-year observations in total between 2009 and 2015 comparing suspect firm-years just meeting or beating zero level of earnings. There are 43 suspect firm-years and 2,470 non-suspect firm-years; Panel B presents descriptive statistics comparing the suspect firm-years just meeting or beating last year's earnings to the full sample, and includes 65 suspect firm-years, 2,448 non-suspect firm-years. In addition, non-suspect firm-years are also included for comparison with suspect firm-years and a full sample, for the purpose of maintaining completeness and comparability with the original comparisons.

Panel A of Table 4.1 compares suspect small profit firm-years just beating or meeting zero levels of earnings to all other firm-years. Suspect firm-years are intended to hit a zero level of earnings benchmark which implies a small profit, on average, and are of smaller size and have lower growth opportunities than other firm-years. Whilst it is interesting that the mean market capitalisation of suspect firm-years, at round £7.013 billion, is not lower but unexpectedly is 62% higher than the rest of the sample, £4.4 billion, meanwhile the mean total assets (£67.6 billion) of the suspect firm-years are much larger than the sample of all other firm-years (£7 billions), which is nine times the rest of the sample. This, implies that suspect firm-years if tending to meet zero level of earnings (avoiding loss), on average, are relatively higher than the rest of sample. On account of the difference in market capitalisation and total assets, suspect firm-years have a significantly lower mean ratio of market equity than non-suspect firm-years (0.98 and 3.83, respectively) at less than 1%. This indicates that firm-years which just beat or meet zero level of earnings have fewer growth opportunities than all the other firm-years engaging in earnings management. Similarly, the mean market capitalisation (£7.5 billion) of suspect firm-years, in Panel B, is significantly 73% greater than the mean market capitalisation of non-suspect firm-years at, at least, at 1% level, and the mean total assets of suspect firm-years are higher than those of all other firm-years (£9.2 billion and £8.1 billion, respectively) at a significant 1% level. As a result, the mean ratio of market value of equity to book value of equity for suspect firm-years are lower than the overall sample (1.34 and 2.14, respectively), meaning that suspect firm-years if last year's earnings is set as their target, have on average lower growth opportunities than non-suspect firm-years.

From the perspective of firm operating performance, the mean net income of suspect firm-years which is in order to avoid losses in panel A, at round £1,455 million, is nearly twice as large as all the other firm-years at £742 million, however, after scaling net income by total assets, the mean value of suspect firm-years is only 4.8% which is lower than the mean of non-suspect firm-year, 15.1%, and is significantly less than 1%. This implies that the sample of small profit

firm-years (suspect firm-years) have less efficient management than those of other firm-years which use their assets to generate firm earnings. Therefore, *suspect_zero* firm-years with lower profitability and worse firm performance are more likely to engage in earnings management when they are just beating or meeting the zero level earnings benchmark compared with non-suspect firm years. Alternatively, if the suspect firm-years try to compare with last year's earnings, their mean net income from Panel B, at round £1114 million, is 67% higher than the mean value of all other firm-years, at £744.5 million, and significantly at 1%, however, mean lagged net income divided by total assets is similar for suspect firm-years and the rest of the sample (15% and 14.8%, respectively), and is not significantly different.

According to prior research (e.g., Roychowdhury, 2006; Cohen et al., 2008; Gunny, 2010; and Zang, 2012; Mindak, et al., 2016; Al-Shattarat, et al., 2018) and the earnings management hypothesis, firms have incentives to employ a variety of methods, including real activities manipulation (e.g., cutting discretionary expenses, sales manipulation, and overproduction), and accrual-based earnings management, to beat or meet earnings benchmarks (e.g., avoiding loss, avoiding earnings decrease). Thus, whether just beating or meeting the zero_level earnings benchmark or last year's earnings, suspect firm-years should have lower cash flows from operations (*CFO*), lower discretionary expenses, higher production costs, and higher accruals than non-suspect firm-years. Consistent with the researcher's hypothesis, suspect firm-years in Panel A have a significantly lower mean *CFO* as a percentage of total assets at 1%. The mean scaled *CFO* is 5% for suspect firm-years around the zero level of earning, versus 12.2% for the rest of the sample. The mean of scaled discretionary expenses by total assets for suspect firm-years of around zero earnings are lower than the mean for those other firm-years (26.5% and 43.2%, respectively) and significantly those at the 1 % level. Mean production costs scaled by total assets of suspect firm-years which set zero earnings as the benchmark, are also lower compared with the rest of the sample (38.7% and 63.9%) although they are not significant. Mean accruals scaled by total assets are close both for suspect firm-years around zero level earnings and for non-suspect firm-years (-4% and -1.3%, respectively), and they are not significantly different. However, suspect firm-years around last year's earnings in Panel B, mean scaled *CFO*, mean scaled discretionary expenses and mean scaled production costs, are all lower as a percentage of total assets by around 11.6%, 31.4%, and 45%, respectively than the mean for non-suspect firm-years (12.1%, 43.2%, and 64.1%, respectively), though all of them are not significant. By contrast, mean accruals scaled by total assets of suspect firm-years achieved last year's earnings and have a higher mean than the mean for non-suspect firm-years. (-0.9% and -2%, respectively).

Table 4.1: Descriptive statistics of suspect firm-years vs non-suspect firm-years**Panel A:** Descriptive statistics by suspect_zero_level firm-years vs non-suspect_zero_level firm-years

Variables	Full Sample			Suspect_zero firm-years			Non-Suspect_zero firm-years			Differences in	
	N	Mean	Median	N	Mean	Median	N	Mean	Median	Means	t test
MVE (£ million)	2,513	4,451.674	1,008.268	43	7,013.085	1,154.429	2,470	4,402.873	1,007.433	2,610.212	1.467
MTB	2,513	3.772	2.157	43	0.983	1.869	2,470	3.825	2.179	-2.841	-3.608***
ROA	2,513	0.136	0.119	43	0.048	0.039	2,470	0.137	0.121	-0.090	-6.526***
Total Assets (£million)	2,513	8,147.169	1,021.800	43	67,637.376	2,384.500	2,470	6,979.096	1,014.430	60,658.280	2.198**
Total Sales (£ million)	2,513	4,922.305	767.350	43	9,494.325	703.000	2,470	4,833.405	768.321	4,660.920	-0.316
EBITDA (£ million)	2,513	755.285	117.940	43	1,455.383	124.600	2,470	741.507	117.780	713.875	-0.418
CFO (£ million)	2,513	578.736	88.150	43	1,126.747	71.836	2,470	568.120	88.300	558.627	0.914
EBITDA/TA	2,513	0.149	0.129	43	0.048	0.037	2,470	0.151	0.131	-0.102	-6.937***
CFO/TA	2,513	0.121	0.102	43	0.050	0.048	2,470	0.122	0.103	-0.073	-3.867***
PROD/TA	2,513	0.635	0.403	43	0.387	0.135	2,470	0.639	0.410	-0.252	-1.458
DISEXP/TA	2,513	0.429	0.265	43	0.265	0.085	2,470	0.432	0.268	-0.167	-3.229***
Accruals/TA	2,513	-0.020	-0.020	43	-0.040	-0.045	2,470	-0.019	-0.020	-0.021	-1.109

Panel B: Descriptive statistics by *Suspect_last_year* firm-years vs *Non-suspect_last_year*

Variables	Full Sample			Suspect_last firm-years			Non-Suspect_zero firm-years			Differences in	
	N	Mean	Median	N	Mean	Median	N	Mean	Median	Means	t test
MVE (£ million)	2,513	4,451.674	1,008.268	65	7,524.295	1,999.973	2,448	4,354.419	989.988	3,169.875	2.795***
MTB	2,513	3.772	2.157	65	1.343	2.692	2,448	3.848	2.143	-2.505	-0.481
ROA	2,513	0.136	0.119	65	0.139	0.125	2,448	0.136	0.118	0.003	0.919
Total Assets (£ million)	2,513	8,147.169	1,021.800	65	9,177.140	1,778.000	2,448	8,116.289	1,016.000	1,060.852	2.917***
Total Sales (£ million)	2,513	4,922.305	767.350	65	6,232.518	975.000	2,448	4,882.453	763.300	1,350.065	1.428
EBITDA (£ million)	2,513	755.285	117.940	65	1,114.054	304.000	2,448	744.503	116.591	369.551	2.950***
CFO (£ million)	2,513	578.736	88.150	65	782.397	128.200	2,448	572.565	87.000	209.833	2.281**
EBITDA/TA	2,513	0.149	0.129	65	0.150	0.135	2,448	0.148	0.128	0.001	0.788
CFO/TA	2,513	0.121	0.102	65	0.116	0.104	2,448	0.121	0.102	-0.005	-0.796
PROD/TA	2,513	0.635	0.403	65	0.450	0.284	2,448	0.641	0.410	-0.191	-0.546
DISEXP/TA	2,513	0.429	0.265	65	0.314	0.195	2,448	0.432	0.269	-0.119	-1.572
Accruals/TA	2,513	-0.020	-0.020	65	-0.009	-0.013	2,448	-0.020	-0.020	0.010	-0.152

*Significant at the 10% level. **Significant at the 5% level. ***significant at the 1% level.

Note to Table 4.1: This full sample spans 2009-2015 and includes 2,513 firm-years. *Suspect_zero* firm-years are the 43 firm-years with reported income before extraordinary items between 0% and 0.5% of scaled by total assets in Panel A. *Suspect_last* firm-years are the 65 firm-years with reported change in net income before extraordinary items from the last year between 0% and 1% in Panel. The numbers in parentheses are t-statistics from t-tests for the differences in means (unequal variances). Please see Appendix A for all variables descriptions.

4.3 Estimation of Normal Level of Cash Flows from Operations, Discretionary Expenditures, Production Costs, and Accrual-based Earnings Management

This section concerns estimation of normal levels through relevant models (discussed in Chapter 3) to determine real activities manipulation and accrual-based earnings management, which are indicated by abnormal levels of cash flows from operations (*Abn_CFO*), discretionary expenditure (*Abn_DISEXP*), production costs (*Abn_PROD*), and discretionary accruals (*Abn_Accruals*). As discussed in Chapter 3.4, consistent with Roychowdhury's (2006) research there are three empirical proxies which estimate whether firms engage in real activities manipulation (e.g., abnormal cash flows from operations, abnormal discretionary expenses, abnormal production costs), which are involved in increasing earnings by reducing the cost of goods sold by means of an overproduction inventory, and cutting discretionary expenditures, such as research & development, advertising, and selling, general, and administrative expenditure. In addition, discretionary accruals in this study are a measure of accrual-based earnings management, and are the difference between firms' actual accruals and the normal level of accruals, where the normal level of accruals is estimated by using the modified Jones' (1991) model. Abnormal levels of cash flows from operations, discretionary expenses, production costs, and discretionary accruals (e.g., *Abn_CFO*, *Abn_DISEXP*, *Abn_PROD*, *Abn_Accruals*) are used to measure earnings management, and they are estimated by the residuals (also referred to as error terms) from relevant estimation models (e.g., equation (1), (2), (3), (4) in Chapter 3.4). Higher values of abnormal production costs (*Abn_PROD*) and discretionary accruals (*Abn_Accruals*) indicated more real activities manipulation through overproduction and more accrual-based earnings management, respectively. Both abnormal cash flows from operations and abnormal discretionary expenses were multiplied by (-1), such that their higher values indicate a higher extent of real activities manipulation through boosting sales and cutting discretionary expenditure.

Table 4.2 presents the regression coefficients for some of the key regressions used to estimate normal levels of cash flow from operations, discretionary expenses, production costs, and discretionary accruals. All of these models were estimated cross-sectionally for every industry and every year, and by using the entire sample of 2,513 firm-years over the period 2009-2015. UK five-digit SIC codes (2007) were used to define industries, and 11 major industries are included in the sample. Each model was estimated for industry-years, on average, having at least 1,155 observations with fewer than 15 firms eliminated from the sample (there are 77

separate industry-years from 2009 to 2015). All variables were scaled by previous year's total assets ($A_{i,t-1}$), and all estimation models winsorized at the top and bottom 1 percent to avoid extreme observations due to noisy estimation. The reported coefficients in Table 4.2 are the mean value of the coefficients across all industry-years. t -statistics (in parentheses) were calculated using the standard error of the mean coefficients across all industry-years (Fama and Macbeth, 1973). The adjust R square (number of observations) is the mean adjust R square (number of observations) across industry-years in Table 4.2.

All the mean coefficients of the three real activities manipulation models (Abn_CFO , Abn_DISEXP , Abn_PROD) and accrual-based earnings management model ($Abn_Accruals$) calculated in this chapter differed significantly from zero (0.08, 0.1622, -0.1819, and -0.0234, respectively), and all were general consistent with those in Roychowdhury's (2006) results (which are 0.0308, 0.1524, -0.1715, and -0.0311, respectively) with several exceptions both in terms of the sign and magnitudes. The coefficient in scaled sales at the beginning of year t ($S_{i,t}/A_{i,t-1}$) in cash flows from the operations model and production cost model should be positive, as firms with higher sales typically have greater expenses. The mean coefficient both of scaled CFO and scaled production costs on $S_{i,t}/A_{i,t-1}$ is statistically significant and positive (0.0386 and 0.6768, respectively), consistent with those reported in Roychowdhury's (2006) and Zang's (2012) results. The net income is assumed to be completely determined by contemporaneous sales and is independent of sales in the previous period. As a result the mean coefficient of changed sales ($\Delta S_{i,t}/A_{i,t-1}$) on the abnormal CFO model is positive (0.0298) and of a similar magnitude to the coefficient of scaled changed sales on the abnormal accruals model (-0.0026), although they are insignificant. As with the Roychowdhury (2006) and Zang (2012) research study, the mean coefficient of scaled accruals on property, plant, and equipment ($PPE_{i,t}/A_{i,t-1}$) at the beginning year of t is significantly negative (-0.0901). Otherwise, the mean coefficients of $1/A_{i,t-1}$ both in cash flow from the operations and accruals models are significant with positive signs.

In addition, the mean adjusted R squares across the industry-year are also similar to Roychowdhury's (2006) and Zang's (2012) results with 23% for the CFO model, 19% for the discretionary expenses model, 61% for the production cost model, and 18% for the accrual-based earnings management model. Consistent with previous literature, it indicated that these estimation models have a reasonable and certain degree of explanatory power with regard to earnings management.

Table 4.2: Measurement of Real Activities Manipulation and Accrual-based Earnings Management

Estimation of the Normal Levels of Cash Flow from Operation, Discretionary Expenditures, Production Costs, and Discretionary Accruals

$CFO_{i,t}/A_{i,t-1}$		$DISEXP_{i,t}/A_{i,t-1}$		$PROD_{i,t}/A_{i,t-1}$		$Accruals_{i,t}/A_{i,t-1}$	
Intercept	0.0800*** (11.2715)	Intercept	0.1622*** (7.2274)	Intercept	-0.1819*** (-6.7660)	Intercept	-0.0234*** (-3.6681)
$1/A_{i,t-1}$	4.8846** (2.4562)	$1/A_{i,t-1}$	-3.1049 (-0.6533)	$1/A_{i,t-1}$	10.8366 (1.0704)	$1/A_{i,t-1}$	3.1327* (1.7344)
$S_{i,t}/A_{i,t-1}$	0.0386*** (5.0912)	Mean Adj. R^2	0.1926	$S_{i,t}/A_{i,t-1}$	0.6768*** (21.5853)	$\Delta S_{i,t}/A_{i,t-1}$	-0.0026 (-0.1908)
$\Delta S_{i,t}/A_{i,t-1}$	0.0298 (0.9855)	No. of Industry-years	77	$\Delta S_{i,t}/A_{i,t-1}$	0.0088 (0.0695)	$PPE_{i,t}/A_{i,t-1}$	-0.0901*** (-2.8682)
Mean Adj. R^2	0.2311	No. of Observations	2,113	$\Delta S_{i,t-1}/A_{i,t-1}$	-0.1586 (0.4205)	Mean Adj. R^2	0.1821
No. of Industry-years	77	Avg. No. of Obs	27.442	Mean Adj. R^2	0.6092	No. of Industry-years	77
No. of Obs.	1,811			No. of Industry-years	77	No. of Obs.	1,830
Avg. No. of Obs.	23.519			No. of Obs.	1,621	Avg. No. of Obs.	23.766
				Avg. No. of Obs.	21.052		

*Significant at the 10% level. ** Significant at the 5% level. *** Significant at the 1% level.

Note to Table 4.2: All the following (ordinary least square) regression models are estimated across-sectionally for each industry and each year over the period of 2009-2015. UK five-digit codes (2007) were used to define industries. Industry-years with fewer than 15 firms were eliminated from the sample. There were 77 separate industry-years over the sample period. All variables were scaled by the previous year's total assets ($A_{i,t-1}$), and all estimation models winsorized at the top and bottom 1 percent to avoid extreme observations due to high estimation. The reported coefficients are the mean value of the coefficients across all industry-years. t -statistics (in parentheses) were calculated using the standard error of the mean coefficients across all industry-years (Fama and Macbeth, 1973). The adjust R square (number of observations) is the mean adjust R square (number of observations) across industry-years. Please see appendix A for all variables descriptions.

Table 4.2 (Continued)

Real activities manipulation

Consistent with the Roychowdhury (2006) model, the first proxy for real activities manipulation is the abnormal cash flow from operations (Abn_CFO), and is the difference between actual level of cash flow from operations and normal levels of cash flow from operations. It was modelled on the normal cash flow from operations as a linear function of sales and change in sales in the current year. The normal level of cash flow from operations from a sample of UK firms was estimated as the following cross-sectional regression for each every industry and year:

$$\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t},$$

where $CFO_{i,t}$ is cash flow from operations for firm i in the year t . In each firm-year, abnormal cash flow from operations (Abn_CFO) is the actual CFO minus the ‘normal’ level of CFO calculated by using estimated industry-level coefficients and the firm-year sales and lagged assets from the above model. $A_{i,t-1}$ is the total assets of firm i at year $t - 1$, $S_{i,t}$ is the total sales during year t for firm i , $\Delta S_{i,t}$ and is equal to $S_{i,t}$ minus $S_{i,t-1}$, $\varepsilon_{i,t}$ is the error term.

The second proxy of real activities manipulation concerns the abnormal decrease in the amount of discretionary expenses, for every firm-year. Abnormal discretionary expenses (Abn_DISEXP) is the actual $DISEXP$ minus the estimated ‘normal’ level of $DISEXP$. In accordance with Roychowdhury (2006), the normal level of discretionary expenses should be expressed as a linear function of contemporaneous sales, and the regression within each industry by year then would be:

$$\frac{DISEXP_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta \left(\frac{S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t},$$

Where $DISEXP_{i,t}$ is the discretionary expenses in year t , it is sum of research and development expenses (R&D), advertising, and selling, general, and administrative expenses (SG&A) for firm i in year t .

The third proxy is abnormal high inventory production (Abn_PROD), it is the difference between the actual production cost and the normal level of production cost. Based on Roychowdhury (2006), the normal level of production costs within each industry by year can be estimated as:

$$\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \beta_3 \left(\frac{\Delta S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t},$$

Where $PROD_{i,t}$ is production costs for year t , it is the sum of the cost of goods sold in year t ($COGS_t$) and the change in inventory from year $t - 1$ to t (ΔINV_t).

Accrual-based earnings management

Accrual-based earnings management is measured by discretionary accruals, are the difference between firms’ actual accruals and the normal level of accruals. As followed by the modified Jones (1991) model, the normal level of actuals is following as

$$\frac{Accruals_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \alpha_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \alpha_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t},$$

Where $Accrual_{i,t}$ is the earnings before extraordinary items and discontinued operations minus the operating cash flow reported in the statement of cash flow in year t for firm i , $PPE_{i,t}$ is the gross property, plant, and equipment in year t for firm i .

4.4 Summary Statistics Abnormal Level of Real Activities Manipulation and Accrual-based Earnings Management

The estimated residuals (e.g., error term, $\varepsilon_{i,t}$) from the relevant regression models have measured the abnormal cash flows from operations, discretionary expenses, production costs and the discretionary accruals level. Abnormal *CFO* and abnormal discretionary expenses are required to multiply (-1), so that higher values of them indicate more real activities manipulation through acceleration of the timing of sales, and reduction in discretionary expenses. Abnormal production costs do not require multiplication by (-1), as higher abnormal production costs imply a greater amount of real activities manipulation by overproduction. *RAM* aggregates the three real activities manipulation measures ($-Abn_CFO$, $-Abn_DISEXP$, Abn_PROD) in an overall proxy, so that higher values indicate greater use of *RAM* to manage earnings. Otherwise, a higher abnormal level of discretionary accruals indicates additional accrual-based earnings management. Table 4.3 presents descriptive statistics on abnormal levels of real activities manipulation and accrual-based earnings management, including mean, median, 25th Percentile, 75th Percentile, skewness, and kurtosis for each estimation model separately. Total real activities manipulation (*RAM*) is different from zero, which is around 0.0096: all the other mean amounts of abnormal earnings management levels (e.g., $Abn_accruals$, Abn_CFO , Abn_DISEXP , Abn_PROD , $-Abn_CFO$, $-Abn_DISEXP$) are equal to zero, indicating that the regression lines of them are the best fitting and the sum of the residuals always equals zero. Overall, the descriptive statistics for UK market have been generally consistent with findings documented in prior research for the US market. Means of abnormal discretionary expenses and abnormal production costs are both equal to zero in Gunny's (2010) study. This is also similar to Badertscher's (2011) results, with the mean of accrual-based earnings management proxy and real activities manipulation proxies at around zero.

The median of abnormal cash flows from operations is weakly negative, -0.0072% of total assets in the UK, because cash flow from operations are lower at the given sales level if firms accelerate the timing of sales through price discounts and more lenient credit terms, according to Roychowdhury (2006). This research found that the median of abnormal discretionary expenses was negative, at -0.0362% of total assets, similar to Gunny's (2006), findings and indicating that reducing such advertising, R&D, and SG&A discretionary expense can boost current earnings. On the contrary, the median of abnormal production cost is 0.0195% of total assets in UK firms, implying that firms through producing more goods than necessary to meet

expected demand, the fixed overhead costs are spread over a larger number of units, lowering fixed cost per unit and thereby increasing their operating margins (Roychowdhury, 2006). On average, the median of total real activities manipulation proxy (*RAM*) is positive, 0.0639% of total assets, consistent with the result reported in Zang's (2012) study. Moreover, the median of abnormal discretionary accruals level is similar to the findings of previous literature (e.g., Cohen, 2008; Badertscher, 2011; Zang, 2012; Al-Shattarat, et al., 2018), at 0.0009% of total assets. As a result, UK firms tend to use accrual-based earnings management to increase their earnings.

In addition, according to Gunny (2010), in order to exhibit the distribution of the residuals is followed by normal distribution: both skewness and kurtosis of sample distribution are documented in this study. Skewness measures the degree of distortion from the symmetry. The skewness data of the residuals distributions are all relatively near to zero level, indicating that the distribution of abnormal earnings management levels are symmetrically distributed. Kurtosis is used to describe the distribution and measures whether distribution is heavy-tailed or light-tailed relative to normal distribution. The kurtosis data for all residuals' distribution is relatively high due to firms engaging in real activities manipulation through sales manipulation, reduction of discretionary expenditure, overproduction, and engaging in accrual-based earnings management. Thus, the distribution of abnormal values tends to have heavier tails than that of normal distribution.

Table 4.3: Summary statistics for abnormal levels of real activities manipulation and accrual-based earnings management

Variable	N	Mean	Median	Std. Dev	25%	75%	Skewness	Kurtosis
<i>Abn_CFO</i>	1,811	0.0000	-0.0072	0.1002	-0.0461	0.0358	0.7501	13.2708
<i>Abn_DISEXP</i>	2,113	0.0000	-0.0362	0.3926	-0.1839	0.1509	1.9465	13.3189
<i>Abn_PROD</i>	1,621	0.0000	0.0195	0.3581	-0.1508	0.1667	-1.1945	9.1770
<i>-Abn_CFO</i>	1,811	0.0000	0.0072	0.1002	-0.0358	0.0461	-0.7501	13.2708
<i>-Abn_DISEXP</i>	2,113	0.0000	0.0362	0.3926	-0.1509	0.1839	-1.9465	13.3189
<i>RAM</i>	1,608	0.0096	0.0639	0.7423	-0.2945	0.3760	-1.4534	10.8191
<i>Abn_Accruals</i>	1,830	0.0000	0.0009	0.0648	-0.0284	0.0326	-0.9825	7.2011

Note to Table 4.3: This table shows properties of the abnormal levels of various variables for 2,513 firm-years over the period of 2009-2015, including the mean, median, standard deviation, the 25th quintiles' 75th quintiles, skewness, and kurtosis. Please see appendix A for descriptions of variables. *RAM* aggregates the three real activities manipulation measures (*-Abn_CFO*, *-Abn_DISEXP*, *Abn_PROD*) in an overall proxy, where defined as follows, $RAM = Abn_CFO * (-1) + Abn_DISEXP * (-1) + Abn_PRO$. Please see Appendix A for all variables descriptions.

4.5 Correlation Coefficients Among Real Activities Manipulation and Accrual-based Earnings Management

This section presents correlation coefficients between various variables, in order to measure the extent to which one variable and another variable change together. Table 4.4 presents the results of both the Pearson correlation coefficients (Upper Triangle) and the Spearman correlation coefficients (Lower Triangle) amongst real activities manipulation measures, accrual-based earnings management measures, and relevant variables for the entire sample of 2,513 firm-years between 2009 and 2015. The Pearson correlation is also known as the 'product moment correlation coefficient', suitable only for metric variable, and used for evaluation of the linear relationship amongst three proxies of real activities manipulation, accrual-based earning management, and ratio variables in this study. The Spearman rank correlation coefficient is based on the ranked values of each variable rather than the raw data, and was also employed as

an additional correlation test to assess monotonic relationships between various variables, because the variables tend to change together but not necessarily at a constant rate in a monotonic relationship.

Accruals as a percentage of total assets are highly positively correlated with both discretionary expenses and production costs of total assets (Pearson 100% and 99.5%, respectively), however, similar to prior studies (Dechow and Dichev, 2002; Kothari, et al., 2005; Roychowdhury, 2006), accruals and cash flows from operations (*CFO*) as a percentage of total assets for UK firms display a strong negative correlation, with a significant correlation coefficient of Pearson -1 and Spearman -41.6%. This is due to any change in accruals having to be offset by a reverse change on *CFO*. Net income (referred to as earnings before extraordinary items) of total assets is highly positively correlated with accruals, discretionary expenditures, and production costs (Pearson 100%, 100%, and 99.5%, respectively), whilst only in the Spearman correlation is net income significantly positively correlated with the *CFO* of total assets (75.4%). As expected, *CFO* as a percentage of total assets is highly negative correlated with both discretionary costs and production costs (-100% and -99.5%, respectively), because higher cash inflows from operation implies higher amounts of money being spent in the operation and production in firms. The discretionary expenses are always positively correlated with the production costs (99.5%), as both are very highly correlated with sales. The correlations between the total level and abnormal levels of various variables are usually positive, as abnormal levels of variables are estimated as deviations from the predicted normal values from industry-year regressions. The correlation coefficients between *CFO* and abnormal *CFO*, between discretionary expenses and abnormal discretionary expenses, between production costs and abnormal production costs, between discretionary accruals and abnormal discretionary accruals are all highly positive significantly at 64.6%, 75.1%, 46.7%, and 76.2%, respectively.

According to prior studies (Roychowdhury, 2006; Zang, 2012; Al-Shattarat, et al., 2018), the measure of total real activities manipulation and three measures of real activities manipulation (*Abn_CFO*, *Abn_DISEXP*, and *Abn_PROD*) are mechanically and highly correlated. This is because total real activities manipulation (*RAM*) is an overall proxy to aggregate abnormal levels of the three real earnings management earnings proxy together. Therefore, the correlation coefficients between *RAM* and abnormal cash flow from operations, and between *RAM* and abnormal discretionary expenses are negative and statistically significant (Pearson correlations: -22.7%, and -95.3%, respectively), and (Spearman correlation: -28%, and -93.2%, respectively). The negative correlations are due to before taken from the sum total, both abnormal cash flow

from operations and abnormal discretionary expenses are multiplied by (-1), so that higher values of them indicate high use of real activities manipulation. The high correlations between them imply that a greater amount of real activities manipulation can be achieved by increasing price discounts and more lenient credit terms to accelerate the timing of sales to help boost current period earnings, or reducing such discretionary expenses to maintain current period earnings at a higher level. On the other hand, it is unnecessary to multiply abnormal production costs by -1, as a higher abnormal value of production costs imply more real activities manipulation. Thus, there is a significant positive correlation between RAM and abnormal production costs (96.3% in Pearson, and 93% in Spearman, respectively). This highly correlation coefficient between them indicates that UK firms engage in real activities manipulation to manage earnings upwards (or downwards) through producing more (or less) goods than necessary to meet expected demand fixed overhead costs are spread over a larger number of units, lowering fixed cost per unit, thereby increasing operating margin (Roychowdhury, 2006).

The abnormal cash flow from operations is positively correlated with abnormal discretionary expenditure (Pearson correlation of 3.4%, and Spearman correlation of 7.6%, respectively). This suggests that when firms tend to use real activities manipulation which may lead to abnormally high sales manipulation at the same time as they are engaging in reduction of discretionary expenditure, both aimed at boosting current period earnings. The correlation coefficient between abnormal cash flows from operations and abnormal production costs are significantly negative (Pearson correlation of -17.2%, and Spearman correlation of -23.6%, respectively). This also indicates the common goal is that managers engage in real activities manipulation leading to acceleration of the timing of sales to manage earnings upwards and abnormally high production costs to simultaneously increase the operating margin. The correlation coefficient between abnormal discretionary expenses and abnormal production costs is highly negative and statistically significant (Pearson correlation of -86.2%, and Spearman correlation of -79.2%, respectively). This is consistent with Roychowdhury's (2006) findings, that the high correlation implies that UK firms engage in real activities manipulation through cutting discretionary expenditures, and overproduction at the same time in order to achieve a higher earnings level.

In addition, abnormal discretionary accruals measure the extent of accrual-based earnings management. This study found that the correlation coefficient between abnormal discretionary accruals and abnormal cash flows from operations is positive and significant both in the Pearson correlation of -1.83% and Spearman correlation of -28.3%. As indicated by Roychowdhury (2006), this probably can be explained in two ways (a) UK firms manage earnings upwards by

using accrual-based earnings management and real activities manipulation at the same time, and (b) three proxies of real activities manipulations have different impacts on abnormal discretionary accruals, for instance overproduction has a positive effect while it has a negative effect on abnormal cash flow from operations. The correlation coefficient between abnormal discretionary accruals and abnormal discretionary expenses is also significantly negative (Pearson correlation of -4.1%, and Spearman correlation of -6.2%, respectively). Similar to correlation between abnormal accruals and abnormal *CFO*, this is likely as managers engage in accrual earnings management and discretionary expenditure manipulation at the same time with reduction of discretionary expenses having a negative effect on abnormal discretionary accruals. Similar to the above interpretation, abnormal discretionary accruals and abnormal production costs are positively correlated (Pearson correlation of 2.1%, and Spearman correlation of 1.4%). Due to the fact that overproduction possibly has a positive effect on abnormal accruals, there is an indication that firms in the UK market tend to use both manipulating discretionary accruals and the production of more goods to boost reported earnings. As a result, there is a significantly positive correlation between abnormal discretionary accrual and the aggregate proxies of real activities manipulation (Pearson correlation of 6.4%, and Spearman correlation of 8.1%, respectively). The positive correlation between *AM* and *RAM* is consistent with the hypothesis, suggesting that firms in the UK have incentives to employ both accrual-based earnings management and real activities manipulation to report earnings upwards or downwards (Roychowdhury, 2006; Cohen et al., 2008; Cohen and Zarowin, 2010; Badertscher, 2011; Zang, 2012; Mindak, et al., 2016; Al-Shattarat, et al., 2018).

Table 4.4: Pearson (Upper Triangle) and Spearman (Lower Triangle) correlations among real and accrual-based earnings management

Variable	EBITDA/TA	Accruals/TA	CFO/TA	DISEXP/TA	PROD/TA	Abn_CFO	Abn_DISEXP	Abn_PROD	RAM	AM
EBITDA/TA	1	1.000***	-1.000***	1.000***	0.995***	0.479***	0.023	-0.113***	-0.112***	0.140***
Accruals/TA	0.075***	1	-1.000***	1.000***	0.994***	-0.152***	-0.043*	0.024	0.071***	0.762***
CFO/TA	0.754***	-0.416***	1	-1.000***	-0.995***	0.646***	0.024	-0.134***	-0.149***	-0.129***
DISEXP/TA	0.259***	-0.178***	0.322***	1	0.995***	0.023	0.751***	-0.651***	-0.714***	-0.042*
PROD/TA	0.082***	0.030	0.071***	-0.199***	1	-0.124***	-0.474***	0.467***	0.498***	-0.014
Abn_CFO	0.528***	-0.288***	0.682***	0.073***	-0.063**	1	0.034	-0.172***	-0.227***	-0.183***
Abn_DISEXP	0.003	-0.052**	0.010	0.601***	-0.626***	0.076***	1	-0.862***	-0.953***	-0.041*
Abn_PROD	-0.191***	0.023	-0.191***	-0.568***	0.550***	-0.236***	-0.792***	1	0.963***	0.021
RAM	-0.172***	0.093***	-0.194***	-0.631***	0.617***	-0.280***	-0.932***	0.930***	1	0.064**
AM	0.097***	0.722***	-0.281***	-0.070***	-0.028	-0.283***	-0.062***	0.014	0.081***	1

*Significant at 10% level. **Significant at the 5% level. ***Significant at the 1% level.

Note to Table 4.4: This table reports the pooled Pearson (Upper Triangle) and Spearman correlation (Lower Triangle) for the entire sample of 2,513 firm-years in the period 2009-2015 between various variables as follows: earnings before extraordinary items as a percentage of total assets, discretionary accruals as a percentage of total assets, cash flow from operations as a percentage of total assets, discretionary expenditure as a percentage of total assets and production costs as a percentage of total assets. Abnormal cash flows from operations, abnormal discretionary expenditure, and abnormal production costs are estimated using regression models developed by Dechow et al. (1998) and implemented by Roychowdhury (2006). *RAM* aggregated the three real activities manipulation measures (*Abn_CFO*, *Abn_DISEXP*, and *Abn_PROD*) into an overall proxy, by taking the three measures sum. Before the summing up, both abnormal cash flows from operations and abnormal discretionary accruals were multiplied by (-1) showing levels of *Abn_CFO* and *Abn_DISEXP* proxy for higher amounts through the use of *RAM*. Abnormal production costs are unnecessary for multiplication by -1 as higher *Abn_PROD* implies higher levels of *RAM*. Abnormal discretionary accruals measure the accrual-based earnings management, whereby estimated residuals use the modified Jones's (1991) model. Please see Appendix A for all variables descriptions.

4.6 Suspect Firm-years Just Beating/Meeting ‘Zero’ Earnings Benchmark

This section (Table 4.5) used five measures of abnormal earnings management including four measures of abnormal real earnings management and one measure of abnormal accrual-based earnings management as dependent variables from the estimation model (Equation (7)) in section 3.5.2). This presents the results for suspect firm-years just beating or meeting zero earnings and last year’s earnings level in UK market. The reported coefficients are the mean values of the coefficients from the five annual across-sectional regressions over the period of 2009-2015 from the Fama and Macbeth (1973) approach.

In order to test the hypotheses about whether firm directors engage in real activities manipulation or accrual-based earnings management to hit their targets. This study used a sample of earnings management suspect firm-years to increase power. In accordance with prior research, this research considered firm-years just beating or meeting important earnings benchmarks (e.g., ‘zero’ level of earnings, last year’s earnings) and situations in which earnings management is more likely to occur. Further to Roychowdhury (2006), suspect firm-years aim to avoid losses and just beating or meeting the zero level of earnings benchmark is defined as firm-years with earnings before extraordinary items over lagged assets between 0 and 0.005. This study measured suspect firm-years just beating or meeting last years’ earnings as firm-years following Gunny’s (2010) research with a change in net income from the last year between 0 and 0.01. During the sample period, 43 firm-years just beat or met the ‘zero’ level of earnings benchmark; 65 firm-years just beat or met last year’s earnings level, respectively.

In Table 4.5, the mean coefficients on control variables are statistically significant partially, and most are similar to results in previous literature albeit with some exceptions. Panel A reported the estimation results of a model (Equation (7) in section 3.5.2) with suspect firm-years just beating or meeting the zero earnings benchmark. When abnormal cash flows from operating activities measure is employed the coefficient on *Suspect_zero* as the dependent variable as Roychowdhury’s (2006) model is positive (0.01294) but it is not significantly different from zero. The insignificant coefficient appears in firms which do not just meet the zero level of earnings benchmark nor are associated with an abnormally increase in sales volume in order to boost current period earnings. This result is inconsistent with Roychowdhury’s (2006) findings that firm-years prefer to engage in earnings management using sales-based manipulation (abnormal cash flow from operations) and, in turn, indicates that UK firm-years just beating or

meeting zero earnings do not report upward earnings and lower cash flow in the current period through boosting sales by offering more price discounts and more lenient credit facilities.

The second column in Table 4.5 (Panel A) provides evidence of the hypothesis: UK firm-years which just beat or meet the earnings benchmark around the zero level of earnings are more likely to engage in real activities manipulation. Specifically, when the dependent variable in regression (7) (see section 3.5.2) has abnormal discretionary expenses, the coefficient in *Suspect_zero* is positive (0.05129) and significant at a 5% level ($t=1.66852$). The coefficient indicates that suspect firm-years (*Suspect_zero*) have abnormal discretionary expenses which are higher on average by 5.1% of assets compared to the rest of the sample, which means that the higher the residuals, greater reduction of such discretionary expenses including advertising, R&D, and SG&A expenses can boost current period earnings. In addition, this result is consistent with the findings in prior studies (Roychowdhury, 2006; Gunny, 2010; Zang, 2012; Al-Shattarat, et al., 2018) provided supporting evidence that firm-years just beating or meeting zero level of earnings benchmarks engage more in real activities manipulation through discretionary expenses based manipulation. This in turn indicates that a reduction in discretionary expenses results in a boost of reported earnings in the current period, as well as generating a higher cash flow in the current period.

The positive and statistically significant coefficient in suspect firm-years just beating or meeting zero level earnings (*Suspect_zero*) presents evidence of the hypothesis which assumes that firms that just meet or beat earnings benchmarks around zero earnings are more likely to use real earning management activities in the UK market. The third column in Table 4.5 (Panel A) presents the results from the estimation model (Equation (7) in section 3.5.2) where the dependent variable is set equal to abnormal production costs. The results imply that abnormal production costs are unusually high in UK suspect firm-years (*Suspect_zero*) when they just beat or meet the zero earnings benchmark. The coefficient on *Suspect_zero* is positive (0.09867) and significant at 5% level ($t=3.11589$) in the abnormal production costs regression and this significantly positive coefficient indicates that the mean abnormal production costs of suspect firm-years (*Suspect_zero*) are greater by 9.87% of assets compared to the mean across the rest of the sample. Thus, the higher the residuals (error term, $\varepsilon_{i,t}$), more goods than necessary meet expected demand are produced, and lower fixed costs per unit as fixed overhead costs are spread over a larger number of units, thereby greatly increasing the operating margin. This result is consistent with the findings in prior literature (Roychowdhury, 2006; Gunny, 2010;

Zang, 2012; Al-Shattarat, et al., 2018) presented evidence that firm-years just beat or meet zero earnings have more incentives to engage in real earnings manipulation through overproduction.

In order to capture the total effects of real activities manipulation, this study aggregate the three real activities manipulation measures into one proxy, *RAM*, by drawing on their sum. Both abnormal cash flow from operations (*Abn_CFO*) and abnormal discretionary expenses (*Abn_DISEXP*) are multiplied by -1, so that higher values indicate a greater extent of real activities manipulation by acceleration of the timing of sales and cutting expenses. Alternatively, higher values of abnormal production costs indicate real activities manipulation through overproduction. The sum of abnormal *CFO*, abnormal discretionary expenses, and abnormal production costs is a measurement of the total level of real activities manipulation. The fourth column in Table 4.5 (Panel A) presents results that the higher amount of these aggregate measures (*RAM*) implies that suspect firm-years are more likely to apply in real activities manipulation in the UK to boost current period reported earnings. When Y_t is set equal to the aggregate proxy, *RAM*, in regression (7), the sign of the coefficient on *Suspect_zero* is positive ($t=0.19525$) and significant at a 5% level ($t=2.36285$). The coefficient indicates that the mean of the total real activities manipulation (*RAM*) of suspect firm-years are larger by 19.53% of assets than the mean across the rest of the sample. Consistent with prior literature (Cohen and Zaro, 2010; Zang, 2012), this result provides supporting evidence that managers in suspect firm-years just beat or meet an earnings benchmark around zero level and are more likely to engage in real activities manipulation by using sale-based manipulation, reducing or cutting discretionary expenses, and simultaneous overproduction than non-suspect firm-years. UK firm-years tend to focus on three real activities manipulation methods such as acceleration of the timing of sales, reduction in discretionary expenses, and overproduction at the same time, to manage current period earnings upwards.

The fifth column in table 4.5 (Panel A) gives the results of the estimation model (Equation (7)) using the abnormal accruals measures as the dependent variable to predict whether suspect firm-years just beat or meet the earnings benchmark around zero earnings by using accrual-based earnings management. Similar to when the dependent variable is set equal to abnormal cash flow from operations, the coefficient in *Suspect_zero* is negative but is not significantly different from zero. This result indicates that UK firm-years which just beat or meet the zero level of earnings benchmarks are not engaged in accrual-based earnings management through abnormally high accruals to boost current period years.

In addition, *EM* is the proxy of total earnings management, which is the sum of real activities manipulation and accrual-based earnings management which helps to capture the overall effect of all earnings management activities. The results in the final column in Table 4.5 (Panel A) show that a large number of the total earnings management measure implies that suspect firm-years are more likely to be engaged in both real activities manipulation and accrual-based earnings management to boost current period earning by using *EM* as the dependent variable in the estimation model (Equation 10). The coefficient sign in *Suspect_zero* is positive (0.18797) and significant at the 1% levels ($t=1.94538$). The positive coefficient indicates that the mean of total earnings management, *EM* of suspect firm-years (*Suspect_zero*) is higher by 18.8% of assets than the mean across the rest of the sample. These results provide supporting evidence that directors in suspect firm-years just beat or meet an earnings benchmark around zero earnings thus indicating higher levels of earnings management measures by directors engaging in real activities manipulation such as cutting discretionary expenses and overproduction, and accrual-based management activities at the same time. In short, UK firms have incentives to adopt real activities manipulation and accrual-based earnings management together to increase reported earnings.

To summarise, the reported results in Table 4.5 (Panel A) provide supporting evidence as regards the hypothesis that UK suspect firm-years just beat or meet zero level of earnings benchmarks and engage more in real activities manipulation through reducing or cutting discretionary expenses to boost current period earnings, whilst producing more goods than necessary to meet expected demand with a reduced fixed cost, thereby increasing the operating margin. Furthermore, suspect firm-years tend to use sales-based manipulation, reduction in discretionary expenses, and overproduction at the same time to manage earnings upwards. However, it appears suspect firm-years which just meet the zero earnings benchmarks are not associated with abnormal cash flow from operations and abnormal accruals. In addition, suspect firm-years engage in using real activities manipulation and accrual-based earnings management together to beat or meet the zero level of earnings benchmark.

4.7 Suspect Firm-years Just Beating/Meeting Last Year's Earnings Benchmarks

Table 4.5 (Panel B) presents the estimation results in the following five columns setting each of the five measures of earnings management (e.g., *Abn_CFO*, *Abn_DISEXP*, *Abn_PROD*, *RAM*, *Abn_Accruals*) as dependent variables for suspect firm-years just beating or meeting

last year's earnings from the regression model (7). There are 43 suspect firm-years (*Suspect_last*) for the abnormal cash flow from operations, abnormal discretionary expenses, abnormal production costs, and abnormal accruals. The mean coefficients in control variables in Table 4.5 (Panel B) are not statistically significant and are not similar to those reported in previous studies, with one exception. When the dependent variable is set equal to abnormal discretionary expenses in regression (7), the coefficient on *Suspect_last* is positive (0.03041) and significant at the 5% level ($t=1.55263$), confirming the hypothesis that UK firms are more likely to engage in real activities manipulation through a reduction in discretionary expenses to boost reported earnings in order to meet or beat last year's earnings benchmark. The positive coefficient indicates that suspect firm-years have abnormal discretionary expenses which are higher on average by 3.04% of assets compared to the rest of the sample, so that the higher the level of abnormal discretionary expenses, the larger the amount of reducing or cutting discretionary expenses, thereby increasing current period reported earnings. In addition, it is similar to previous studies. (Gunny, 2010; Zang, 2012; Al-Shattarat, et al., 2018) predicted that firm-years which just beat or meet the earnings benchmark around last year's earnings engage more in earnings management by using discretionary expenses based manipulation, as cutting or reducing discretionary expenses results in upward reported earnings in the current period, as well as generating higher current period cash flows.

However, when the abnormal cash flows from operations is the dependent variable, the mean coefficient on *Suspect_last* is negative (-0.00937) and insignificant ($t=-1.28008$). It appears that firm-years which just beat/meet the earnings benchmark around last year's earnings are not associated with the real earnings management method through a temporary increase in the sales volume (sales-based manipulation). Similarly, the coefficient (0.01926) in *Suspect_last*, when abnormal production costs is the dependent variable, is not significantly different from last year's earnings benchmark ($t=0.60723$), indicating that UK firm-years around last year's earnings are not associated with more actual real activities manipulation regarding over production to increase current reported earnings. A positive coefficient of 0.0327 ($t=0.56343$) in *Suspect_last* is not significant when the aggregate measure of three real activities manipulation methods (abnormal *CFO*, abnormal discretionary expenses, abnormal production costs), *RAM*, is a dependent variable. It indicates that UK firm-years which just beat or meet last year's earnings benchmark are not more likely to engage in real activities manipulation through both sales-based manipulation, reduction discretionary expenses, and overproduction at the same time. The results of accrual-based earnings management when last year's earning is just beaten or met is similar to when earnings benchmark is around the zero level. The

coefficient in *Suspect_last* when the dependent variable is abnormal results in accruals being negative (-0.00309) and insignificant ($t=-0.83443$). Thus firm-years in the UK market which just beat or meet the earnings benchmark around last year's earnings are not associated with more actual accrual-based earnings management. As a result, the coefficient of the aggregate measure of total earnings management, *EM*, is insignificant, meaning that suspect firm-years are not engaged in real activities manipulation and accrual-based earnings management together to beat or meet last year's earnings benchmark.

To summarise, this section has provided evidence that UK firm-years which exhibit unusually lower discretionary expenses are likely to engage more in real activities manipulation to manage earnings upwards when just beating or meeting last year's earnings benchmark. This research could not find sufficient evidence to prove suspect firm-years which are just around last year's earnings are associated with abnormal cash flows from operations, abnormal production costs, *RAM*, and abnormal accruals. This in turn shows that firms in the UK market are not involved in managing earnings upwards by using sales-based earnings management, overproduction, and accrual-based earnings management, rather they are involved more in real activities manipulation through reduction or cutting of discretionary expenses when just meeting last year's earnings benchmark. The results indicate that with UK firm directors who manage earnings upwards are more likely to opportunistically adopt real activities manipulation to meet earning targets, as some directors tend to utilise earnings management to hit the earnings benchmark in order to release a signal predicting a firm's better performance in the future to the capital market.

Table 4.5: Comparison of suspect firm-years just beating/meeting earnings benchmarks with the rest of the sample

Panel A: Comparison of suspect firm-years just beating/meeting zero level of earnings with the rest of the sample

Variable	Abn_CFO	Abn_DISEXP	Abn_PROD	RAM	AM	EM
Intercept	0.0007 (0.706)	-0.0056*** (-4.928)	-0.0023 (-0.961)	0.0004 (0.089)	-0.0005 (-1.012)	-0.0006 (-0.133)
LnMVE	-0.0070*** (-3.513)	-0.0103** (-1.987)	-0.0114** (-2.234)	-0.0258** (-2.401)	0.0017*** (3.905)	-0.0242** (-2.275)
MTB	0.0001 (0.154)	0.0001 (0.260)	0.0002 (0.174)	0.0003 (0.130)	0.0000 (0.176)	0.0004 (0.202)
ROA	-0.4679*** (-6.815)	-0.0740* (-1.527)	-0.5922*** (-6.471)	-1.1120*** (-6.318)	0.0711*** (4.260)	-1.0408*** (-5.544)
Suspect_zero	0.0129 (0.688)	0.0513** (1.667)	0.0987** (3.116)	0.1953** (2.363)	-0.0070 (-0.579)	0.1880* (1.945)
Year Indicator	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.	2,513	2,513	2,513	2,513	2,513	2,513
Adjusted R²	0.401	-0.008	0.023	0.018	0.030	0.015

(The table is continued in next page)

Panel B: Comparison of suspect firm-years just beating/meeting last year's earnings level with the rest of the sample

Variable	Abn_CFO	Abn_DISEXP	Abn_PROD	RAM	AM	EM
Intercept	0.0010 (0.999)	-0.0061*** (-3.908)	-0.0027 (-0.907)	-0.0001 (-0.028)	-0.0005 (-1.160)	-0.0010 (-0.210)
LnMVE	-0.0068*** (-3.369)	-0.0104** (-2.017)	-0.0118** (-2.357)	-0.0261** (-2.419)	0.0018*** (3.940)	-0.0243** (-2.277)
MTB	0.0001 (0.159)	0.0001 (0.200)	0.0002 (0.188)	0.0003 (0.127)	0.0000 (0.167)	0.0004 (0.198)
ROA	-0.4685*** (-6.775)	-0.0770* (-1.605)	-0.6008*** (-6.625)	-1.1294*** (-6.489)	0.0715*** (4.171)	-1.0590*** (-5.685)
Suspect_last	-0.0094 (-1.280)	0.0304** (1.553)	0.0193 (0.607)	0.0327 (0.563)	-0.0031 (-0.834)	0.0281 (0.460)
Year Indicator	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.	2,513	2,513	2,513	2,513	2,513	2,513
Adjusted R²	0.400	-0.007	0.023	0.017	0.028	0.014

*Significant at 10% level. **Significant at the 5% level. ***Significant at the 1% level.

Note to Table 4.5: This table presents the results of Fama-Macbeth regressions, over a period of seven years from 2009 to 2015. The total sample includes 2,513 observations. The regressions being estimated are of the form:

$$Y_t = \beta_0 + \beta_1 \text{LnMVE}_{t-1} + \beta_2 \text{MTB}_{t-1} + \beta_3 \text{ROA}_t + \beta_4 \text{Suspect firm - years}_t + \text{Year Indicators} + \varepsilon_t.$$

Each column presents the results of the above regression for a different variable, whose name appears at the top of the respective column. T-statistics are calculated using the standard errors of the mean across seven years. They are reported in parentheses. The table also reports the average number of annual observations and mean adjusted R square.

The dependent variable, Y_t , refers to one of the four measures for abnormal real earnings management activities (Abn_CFO , Abn_DISEXP , Abn_PROD , and RAM) and one abnormal accrual-based earnings management activity (AM): Abnormal CFO is measured as deviations from the predicted values from the corresponding industry-year regression $\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$; abnormal discretionary expenses are measured as deviations from the corresponding industry-year regression $\frac{DISEXP_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta \left(\frac{S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$; abnormal production costs are measured as deviations from the predicted

values from the corresponding industry-year regression $\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \beta_3 \left(\frac{\Delta S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$; *RAM* is the sum of *Abn_CFO* multiplied by (-1), *Abn_DISEXP* multiply by (-1), and *Abn_PROD*; abnormal discretionary accruals are measured as deviations from the predicted values from the corresponding industry-year regression $\frac{Accruals_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \alpha_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \alpha_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$; *EM* is the sum of real activities manipulation and accrual-based earning management, which is equal to *RAM* + *AM*.

There are three control variables: *LnMVE*_{*t*-1} is the log value of market value of equity in year *t* - 1; *MTB*_{*t*-1} is the ratio of market value of equity to book value of equity in year *t* - 1; and *ROA*_{*t*} is the net income before extraordinary items are divided by lagged total assets in year *t*. These three independent variables are measured a deviations from the corresponding industry-year means. *Suspect firm-years* is an indicator variable for suspect firm-years just beating or meeting important earnings benchmarks. Each panel reports the estimation results using a different definition of suspect firm-years as discussed below. Panel A reports results for suspects just beating or meeting the zero earnings, which are firm-years with earnings before extraordinary items over lagged assets between 0 and 0.005. Panel B reports results for suspects just beating or meeting last year's earnings, which are firm-years with a change in net income from the last year between 0 and 0.01. All regressions include year indicators. Both abnormal cash flows and abnormal discretionary expenses are multiplied by (-1) to allow real and accrual earnings management measures to have the same interpretation. Please see Appendix A for all variables descriptions.

4.8 Additional Analysis

This section undertakes additional analysis to extend the results of firms that meet earnings benchmarks through using accrual-based earnings management and real activities manipulation. Section 4.8.1 groups the firm-years with negative earnings, and conducts the examination of whether those *loss* firm-years engage in any earnings management methods to hit their specific targets.

4.8.1 Firms with Negative Earnings

A variety of accounting literature has found that firms engage in manipulation of reported earnings by using different earnings management methods (accrual-based earnings management, real activities manipulation), to meet or beat certain earnings targets such as avoiding negative earnings ('zero' level earnings) (e.g. Dechow et al., 1995; Burgstahler and Dichev, 1997; Dechow et al., 2003; Roychowdhury, 2006; Cohen et al., 2009), and avoiding earnings decreases (last year's earnings) (e.g. Gunny, 2010; Zang, 2012; Mindak, et al., 2016; Al-Shattarat, et al., 2018). Some studies, however, have sought to explore whether firms engage

in earnings management activities designed to depress reported income effects and/or produce poor results in a current period in order to show a better future performance (e.g. Kirscheneiter, and Melumad, 2002; Sevin, and Schroeder, 2005; Shuto, 2007; Nieken, and Sliwka, 2015). The latter is also referred to as ‘Big Bath’, whereby firms use earnings management strategy to make poor results look even worse so that future performance appears better. This is because the compensation of executive directors may be associated with firm performance, thus they have an incentive to engage in earnings management activities to move earnings from the present to the future, to ensure executives maintain both their earnings targets and external reputations. Some new executive directors, sometimes take big bath action in order to blame the firms’ poor performance on previous executives, and take credit for improvements in the future.

In this subsection, this study performed a series of tests to examine whether firms utilise different earnings management method to decrease reporting earnings or shift positive earnings to negative earnings, for complete comparability with the analysis in previous sections which suggested that firms use earnings management methods to meet or beat earnings benchmarks. This study commenced with a direct comparison of the magnitude of earnings management proxies for negative earnings firms with other firms, the idea being that negative earning firms do not avoid loss or avoid earnings decreases rather they may aim to decrease current earnings to present a poor performance in order to show a future better performance.

Table 4.6 reports the results of the test, the full sample of which included 2,513 firm-year observations from 2009 to 2015, with 169 suspect firm-years presenting earnings less than zero level. Panel A gives basic statistics comparing the negative earnings suspect firm-years to the rest of the sample. The mean abnormal cash flows from operations of *Loss* firm-years, is at around -0.048, and lower than the mean for the rest of the sample, 0.003, a statistically significant level of 1%. Both mean abnormal discretionary expenses and mean abnormal production costs (0.043, and 0.108, respectively) are significantly higher than the rest of the sample (-0.003, and -0.008, respectively). In addition, similar to abnormal cash flows from operations, *Loss* firm-years have lower abnormal accruals (-0.046) than the other firms (0.004). The mean net income scaled by total assets, for *Loss* firm-years, similar to return-on-asset, is negative, at around -0.111, and significantly less than the mean value of the rest of the sample, 0.124. This indicates that suspect *loss* firm-years with lower profitability compared to non-suspect firm-years are more likely to engage in real earnings management. *Loss* firm-years have a smaller mean market to book a value ratio (*MTB*) compared with the mean market to book a value ratio of the rest of the sample (3.4, and 3.5, respectively). The difference in *MTB* between

the two groups is not statistically significant. The log value of market capitalisation for negative earnings firm-years, expressed as a deviation from the corresponding industry-year mean, on average, is not smaller than the rest of the sample, at a significant level of 1% (7.27, and 6.96, respectively). This means that the sample size of *Loss* firm-years may be greater than the sample of *non – loss* firm years, on average. Scaling *CFO* by total assets is similar to abnormal *CFO*, as abnormal value is measured as deviations from the predicted values from the corresponding industry-year regression, with a positive correlation coefficient of 65% between them. *Loss* firm-years have a lower mean *CFO* as a percentage of assets: mean scaled *CFO* is -0.007 for *Loss* firm-years, versus 0.131 for the whole sample. Mean discretionary expenses scaled by total assets are similar for *loss* firm-years and *non – loss* firm-years (42.8% and 43%, respectively), and are not significantly different. The mean scaled production costs of the *Loss* firm-years (48.5% of total assets) are significantly lower than the mean for the full sample (65.7% of total assets). Similar to scaled *CFO*, accruals as a percentage of total assets are negative, because they are measured by income, thus, *loss* firm-years have lower mean scaled accruals compared with *non – loss* firm-years (-8.5% and -1.4%, respectively). In addition, total sales scaled by total assets of *loss* firm-years are around 0.79, less than the rest of the sample (1.14), on average, with a statistically significant difference of 1%.

To examine whether the findings in the previous section also extend to negative earnings, this study commenced the analysis by repeating the original tests, however, suspect firm-years were identified as firms with earnings less than zero level. Specifically, the test was run by the following regression (Equation 7 in section 3.5.2):

$$Y_t = \beta_0 + \beta_1 \ln MVE_{t-1} + \beta_2 MTB_{t-1} + \beta_3 ROA_t + \beta_4 \text{Suspect firm – years}_t + \text{Year Indicators} + \varepsilon_t,$$

where Y_t are the earnings management proxies (e.g. *Abn_CFO*, *Abn_DISEXP*, *Abn_PROD*, *Abn_Accruals*); and indicator variable ‘*Loss*’ is equal to one when the net income before extraordinary items scaled by lagged total assets is negative, and is equal to zero otherwise.

The coefficients of the above regression are estimated in the cross-section every year. Panel B of Table 4.6 shows the time-series means of the coefficients from the seven annual cross-sectional regressions over the period 2009-2015, along with the corresponding t-statistics from Fama and MacBeth approach (1973). The results for suspect firm-years show negative earnings from the model estimation when five measures of earnings managements as dependent variables are used. The second column in Panel B provide evidence that abnormal discretionary expenses

are unusually low for *loss* firm-years. When the dependent variable in estimation regression is abnormal discretionary expenses, the coefficient on *Loss* on average is negative (-0.0436) and statistically significant at a 5% level ($t=-2.76879$). *Loss* firm-years have abnormal discretion which is lower on average by 4.4% of assets compared to the rest of the sample. UK firm-years thus aim to create better future performances and so decrease current period earnings and engage more in real earnings management activities through discretionary expenses-based manipulation. The coefficient on *Loss* when abnormal production costs is the dependent variable is 0.07347 and significant at a 5 percent level ($t=3.25726$). The coefficient indicates that the mean abnormal production costs of suspect firm-years are greater by 7.3% of assets than the mean across the rest of the sample. The results for production costs suggest that firm-years engage in real activities manipulation of over producing goods to use the effects of managerial turnover. Therefore, it appears that firms are likely to engage in two types of real earnings management activities, that of reducing discretionary expenses and overproduction, in order to achieve a better future operating performance. In addition, when Y_t is set equal to abnormal accruals in the above regression and the coefficient on *Loss* is negative (-0.04483) and statistically significant at the 1% level ($t=-8.22045$). It indicates that suspect firm-years have abnormal accruals which are lower by 4.5% of assets on average compared with the rest of the sample, thus the higher the residuals, the lower the amount of discretionary accruals. The results imply that firm-years are likely to engage in accrual-based earnings management activities by adjusting the discretionary accruals to negative for an incentive to reduce income in the current period and to improve future performance.

To summarise, a large number of studies have focused on firms using earnings management methods to increase earnings, whilst some firms engage in earnings management activities which aim to decrease earnings in order to present a future better performance. This section examines whether firms use different earnings management methods to decrease earnings or shift positive earnings to negative levels. The results in Table 4.6 suggest that some UK firms in order to achieve future better performance are likely to decrease their earnings or shift positive earnings to negative earnings to engage in earnings management activities through discretionary expenses based manipulation, production costs based manipulation, and accrual-based earnings management.

Table 4.6: Firm characteristics and earnings management proxies for *loss* firms compared to all other firms

Panel A: Descriptive statistics by *Loss* firm-years versus the rest of sample

Variable	Loss Firm-years			All Other Firm-years			Differences	
	N	Mean	St. Dev	N	Mean	St. Dev	Means	t statistic
Abn_CFO	119	-0.048	0.063	1,692	0.003	0.101	-0.051	-6.130***
Abn_DISEXP	145	0.043	0.327	1,968	-0.003	0.397	0.046	-8.110***
Abn_PROD	108	0.108	0.265	1,513	-0.008	0.363	0.115	1.605*
Abn_Accruals	132	-0.046	0.092	1,698	0.004	0.061	-0.050	4.250***
Net Income	169	-0.111	0.193	1,981	0.124	0.156	-0.234	-15.357***
MTB	116	3.398	5.087	1,619	3.470	4.900	-0.072	-0.148
LnMVE	117	7.268	0.668	1,618	6.962	0.586	0.306	4.829***
CFO	161	-0.007	0.200	1,974	0.131	0.145	-0.138	-8.552***
DISEXP	169	0.434	0.520	1,968	0.428	0.523	0.005	0.129
PROD	135	0.485	0.746	1,826	0.657	0.866	-0.172	-2.552***
Accruals	169	-0.085	0.155	1,981	-0.014	0.075	-0.070	-5.846***
Total Sales	145	0.790	0.868	1,981	1.140	0.984	-0.350	-4.649***

Panel B: Comparison of *loss* firms with other firms

Variable	Abn_CFO	Abn_DISEXP	Abn_PROD	RAM	AM
Intercept	0.0011 (0.861)	-0.0024** (-3.352)	-0.0055* (-1.888)	-0.0010 (-0.179)	0.0022** (2.978)
LnMVE	-0.0069*** (-3.595)	-0.0104* (-2.002)	-0.0112** (-2.128)	-0.0252** (-2.258)	0.0015*** (3.455)
MTB	0.0001 (0.157)	0.0002 (0.328)	0.0000 (0.030)	0.0003 (0.125)	0.0001 (0.967)
ROA	-0.4726*** (-6.515)	-0.1015* (-1.949)	-0.5387*** (-5.623)	-1.0991*** (-5.467)	0.0451** (2.937)
Loss	-0.0087 (-1.194)	-0.0436** (-2.769)	0.0735** (3.257)	0.0504 (1.071)	-0.0448** (-8.220)
Year Indicator	Yes	Yes	Yes	Yes	Yes
No. of Obs.	2,513	2,513	2,513	2,513	2,513
Adjusted R²	0.40051	-0.00712	0.02434	0.01727	0.05366

*Significant at 10% level. **Significant at the 5% level. ***Significant at the 1% level.

Note to Table 4.6: 1. The sample period spans 2009-2015 and includes 2,513 firm-years. Loss making firms are firm-years with reported net income before extraordinary items of total assets of less than 0%, 169 suspect firm-years. Other firms in Panel A include all firm-years which are not loss making firms.

2. The Test statistic in Panel A is based on a difference in means across the sample (t -test) with p -value reported in the column next to it. Specifically, the test statistic is calculated as follows:

$t(\bar{x}_1 - \bar{x}_2) = (\bar{x}_1 - \bar{x}_2) / \sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}$, where \bar{x}_i is the mean of sample group i , σ_i^2 is the variance of sample group i , N_i is the number of observations in group i . Degree of freedom of t -statistics = $N_1 + N_2 - 2$.

3. Panel B reports the results of Fama-MacBeth regressions, the regressions being estimated are the same as the previous section of the form:

$$Y_t = \beta_0 + \beta_1 \text{LnMVE}_{t-1} + \beta_2 \text{MTB}_{t-1} + \beta_3 \text{ROA}_t + \beta_4 \text{Suspect firm - years}_t + \text{Year Indicators} + \varepsilon_t.$$

Each column presents the results of the above regression for a different variable, whose name appears at the top of the respective column. T-statistics were calculated using the standard errors of the mean across seven years. They have been reported in parentheses. The table also reports the average number of annual observations and mean adjusted R square.

4. Variable definitions: Abnormal CFO is measured as deviations from the predicted values from the corresponding industry-year regression $\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}}\right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}}\right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}}\right) + \varepsilon_{i,t}$; abnormal discretionary expenses are measured as deviations from the corresponding industry-year regression $\frac{DISEXP_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}}\right) + \beta \left(\frac{S_{i,t-1}}{A_{i,t-1}}\right) + \varepsilon_{i,t}$; abnormal production costs are measured as deviations from the predicted values from the corresponding industry-year regression $\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}}\right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}}\right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}}\right) + \beta_3 \left(\frac{\Delta S_{i,t-1}}{A_{i,t-1}}\right) + \varepsilon_{i,t}$; RAM is the sum of Abn_CFO multiply by (-1), Abn_DISEXP multiply by (-1), and Abn_PROD ; abnormal discretionary accruals are measured as deviations from the predicted values from the corresponding industry-year regression $\frac{Accruals_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}}\right) + \alpha_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}}\right) + \alpha_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) + \varepsilon_{i,t}$; $Net Income$ is income before extraordinary items scaled by lagged total assets; MTB is the ratio of market value of equity to book value of equity, expressed as deviation from the corresponding industry-year mean; $LnMVE$ is the log value of market value of equity, and is the deviation from the corresponding industry-year. CFO is the cash flow from operations scaled by lagged total assets; $DISEXP$ is the discretionary expenses scaled by lagged total assets; $PROD$ is the production costs, the sum cost of goods sold and change in inventory scaled by lagged total assets; Accruals is the net income before extraordinary items and discontinued operations minus the operating cash flows and scaled by lagged by total assets; total sales is scaled by the total assets. Please see Appendix A for all variables descriptions.

4.9 Summary

This chapter has presented the empirical results of the investigation of whether UK firms engage in earnings management activities through manipulating discretionary accruals, sales-based manipulation, cutting discretionary expenses, and overproduction to just meet or beat a 'zero' level of earnings and last year's earnings. The findings complement the existing literature on earnings management in the following ways. Firstly, the chapter has provided evidence that UK suspect firm-years are likely to engage more in real activities manipulation to boost earnings by cutting discretionary expenses and producing more goods when just beating or meeting the earnings benchmark around the 'zero' level. They seek to attempt to make earnings upwards through reductions in discretionary expenses and overproduction simultaneously. However, it was not possible to find evidence that suspect firm-years use sales-based manipulation and accrual-based earnings management to beat or meet the 'zero' level of earnings management. Secondly, this chapter offered evidence that UK suspect firm-years have unusually lower discretionary expenses, suggesting they are likely to engage more in real activities manipulation only through reducing or cutting discretionary expenses to boost earnings when just beating or meeting last year's earnings benchmark. It was also ascertained that suspect firm-years are not involved in managing earnings upwards by using sales-based manipulation or overproduction and accrual-based earnings management when comparing earnings with that of the previous year. In addition, this chapter found new evidence that UK firms with negative earnings have incentives to further decrease their earnings or shift positive earnings to negative through accrual-based earnings management, manipulating discretionary expenses, or manipulating production costs, in order to report a future better performance.

In conclusion, the findings presented in this chapter contribute to literature on earnings management, suggesting that firms would like to engage in accrual-based and real earnings management to achieve their targets, and that some are engaged in earnings management activities to manage earnings upwards, whilst others are likely to use the earnings management method to lower earnings.

Chapter 5 Directors' Remuneration and Earnings Management

5.1 Introduction

This chapter presents the empirical results of second part of the thesis. The aim of this chapter has been to investigate whether firm directors achieve any abnormal remunerations by engaging in accrual-based and/or real earnings management activities. The study introduces a new regression model to measure the abnormal level of directors' remuneration and conducts analysis of the relationship between abnormal directors' remunerations and abnormal earnings management. The empirical results, using both univariate and multivariate analysis, have been organised as follows. Firstly, in section 5.2, characteristics of directors' remunerations for the whole sample are presented. Secondly, descriptive statistics and correlation coefficients of variables are given, and the normal level of directors' remunerations estimated. Section 5.4 shows the summary statistics abnormal level of directors' remunerations, accrual-based earnings management, and real activities manipulation. Correlation coefficients of abnormal directors' remunerations, accrual-based and real earnings management are provided in section 5.5. Moreover, test results of the association between abnormal directors' remunerations and abnormal earnings management are also presented in section 5.6. In addition, section 5.7 takes account of 'highest paid director' and 'other emoluments' to undertake additional analysis to explore whether they are associated with earnings management. Finally, an overview of the results is given.

5.2 Descriptive Statistics of Directors' Remuneration

Previous researchers have provided substantial evidence that executive directors are able to increase their remuneration by using accounting earnings management (e.g., Holthausen, Lareker, and Sloan, 1995; Balsam, 1998; Guidry, Leone, and Rock, 1999; Healy, 1985; Shuto, 2007). Firm directors in the UK market may have incentives to manipulate earnings in order to present a better future performance and achieve a higher level of compensation. In the UK market, directors' remuneration is defined as the process by which directors of a firm received

payment or compensation for services or employment, either through fees, base salary, any bonuses and any other economic benefits such as use of firm property, children's vouchers, firm car scheme, additional holidays which an employee or executive receives during employment with the approval of the shareholders and board of directors. The process of directors' remuneration arose when shareholders were able to agree to or reject fees paid to firm directors as shareholders had become concerned that directors were rewarding themselves large salaries in spite of presenting a poor performance (e.g. low profit or revenue). The shareholders set an upper limit to be paid to the board of directors, in order to reduce the risk of abnormal large amounts being paid to directors. In turn the board of directors determine the allocation of these payments and benefits to the directors. Directors' remuneration is part of the employment contract between directors and firms, thus the board of directors decides the amount of salaries and relevant bonuses paid to directors, including the general directors, resulting in the remuneration agreement being directly controlled by the board of directors. Meanwhile, in order to prevent the board of directors paying abnormal excessive amounts which exceed the agreed payment to directors or pay a disproportionately large amount of profits instead of distributing it to stockholders as dividends to directors, shareholders reserve the right to sue directors.

Firms wish to determine a directors' remuneration package, which is essential to ensure that the directors have a stake in achieving a good performance for the shareholders, and each component of a director's remuneration package is designed to ensure that the director concentrates on the firm and is motivated to improve firm performance. The design of the remuneration package should ensure that the package is provided to attract, retain and motivate executive directors of the quality required, but avoids paying more than is necessary. It is judged where the position of the remuneration package is relative to other firms clearly taking into account how much comparable firms are paying and relative performance whilst taking note of the wider firm sensitivity (such as conditions of pay and employment elsewhere in the firm, especially when the increase of annual pay has been confirmed).

The directors' remuneration package has four main components: basic salary, performance-related elements of remuneration, pension contributions and benefits in kind. Basic salary for directors, is subject to the content of the job, the skills of the director delivering the job, the performance during the job, overall contribution to firm strategy, and average market rates for such type of work, set at basic level by firms. As firm directors are paid upper quartile salaries, the peer groups generally may offer indications of expectation of directors' performance when setting basic salary, in order to ensure directors deliver a premium effort in the future. A performance-related element is a significant part of the total directors' remuneration package

which is defined as being dependant on the achievement of some form of performance-based measurement criteria. Some directors are entitled to receive a performance-related short-term bonus at the end of the financial year and this performance-related bonus could be based on measures of accounting numbers or ratios. Stock options are the most common and popular performance-related directors' remuneration as a long-term market-orientated incentive scheme. Stock option contracts allow executive directors to buy firm stocks at a fixed price or exercise price, whilst permitting them to sell the stocks at a profit if the stock price rises above the exercise price. Most executive directors will exercise the stock option when they generate a profit, as stock options are part of executive directors' remuneration. Performance related remuneration is usually given as stock options, offering executive directors the incentive to manage the firm in such a manner that stock prices rise. Thus, stock options are deemed to align executive directors' goals with those of the shareholders. Pension contributions are a fixed amount and associated only with basic salary. The pension contributions are important to directors especially those close to retirement, because the relevant pension consequences, relevant costs to the firms' basic salary increases, and any relevant changes in pensionable remuneration may impact on directors' remuneration when they no longer work for the firm. The other element of the remuneration package is that of benefits in kind (also known as 'perks'). This contains all the other non-wage compensations given to directors in addition to their normal salaries, such as health insurance, firm car scheme, free car parking space, additional holidays etc. These additional ancillary benefits help to improve the expectation of the position of executive directors and increase directors loyalty and motivation to contribute successfully to the firm.

Table 5.1 presents the basic characteristics of directors' remuneration packages. The full sample covers the period from 2009 through 2015, including 2,513 firm-year observations, from 359 firms, is listed on the FTSE All-share excluding the financial and real estate sectors. Directors' remuneration (*DSB*) is the sum of directors' fees, pension contribution, and other emoluments. There are 2,207 firm-year observations for disclosure of total directors' compensation, where the mean of total directors' remuneration is £4.3 million, with a median of about £2.8 million, and a standard deviation of £5.5 million. The first and third quartiles of total directors' remuneration range from £1.8 million to £4.9 million. Both skewness and kurtosis of directors' compensation are positive, about 10 and 201, respectively. Directors' fees are the basic salary level of directors, set by firms. The mean of directors' fees for the sample is about £1.5 million with a median of about £1.2 million, and standard deviation is £3.3 million. The lower and upper quartile of directors' fees has ranged from £0.9 million to £1.7 million. The skewness

and kurtosis are 35 and 1,444, respectively. As can be seen, the mean level of directors' fees is 36% of total directors' remuneration, because directors are generally paid a higher amount for greater effort in the future and accordingly the setting of directors' fee may give some indication of expectation of directors' future performance. The mean of the pension contribution is relatively low as it is pensioned on basic salary, around £264 thousand, the median of pension contribution is about £264 thousand, and with a standard deviation is £457 thousand. The lower and upper quartiles of pension contributions are £87 thousand and £306 thousand, respectively. The skewness of pension contribution is 13, and Kurtosis is 263. The nature of the pension contribution is mainly linked to change in basic salary and some other changes in pensionable remuneration and the mean pension contribution is only 6% of total directors' remuneration. Other emoluments represent all the other compensations directors receive in addition to the basic salary and pension contribution, which consist of two main elements: performance-related remunerations (e.g., bonus, share options, etc.), and benefits in kind (e.g., health insurance, firm property scheme, firm car scheme, children's voucher, additional holiday, etc.). The other emoluments entail a significant component of directors' remuneration, the mean other emoluments for the firm-years is £2.6 million, which is around 62% of mean total directors' remuneration, and which account for a high proportion of total directors' remuneration. Changes to other emoluments may have a great impact on directors' compensation. The median of other emoluments is about £1.4 million and the standard deviation is £3.9 million. The first and third quartile of other emoluments range from £0.7 million to £2.9 million. The skewness and kurtosis of other emoluments are 5 and 44, respectively.

In addition, total assets and sales, from a certain perspective, both indicate the operating performance of a firm, because total assets as economic value are expended over time to yield a benefit for the firm, and sales are a reflection of the total amount of revenue business can bring to the firm. In Table 5.1, scaling directors' remuneration (*DSB*) by total assets is similar to measuring directors' remuneration relative to sales, as total assets and sales are highly positively correlated as discussed in the previous chapter. The mean-scaled total directors' remuneration accounted for a small proportion of total assets, only 0.0061. Total directors' remuneration contains all remuneration elements, thereby each element of the remuneration package is a smaller part of total assets compared with total directors' compensation. The mean scaled directors' fees, mean scaled pension contribution, mean scaled other emoluments of total assets are 0.0028, 0.0004, and 0.0031, respectively. The ratios of directors' remuneration and its elements to total assets are as low as expected, however this does not indicate whether directors' remuneration is associated with total assets and sales. Details of the highest paid

director are also reported, meaning that details of the amount the director receiving the highest level of compensation from the firm is given. The mean of the highest paid director is about £1.7 million, with a median of £1.1 million and standard deviation is £2.3 million. The lower and upper quartiles of highest paid directors are £0.7 million and £2 million, respectively. The mean percentage of highest directors pay to total directors' remuneration is 42%, with a median of about 41% and standard deviation is 13%. The first and third quartiles of highest directors pay to directors' remuneration range from 32% to 50%. This indicates that the highest paid directors (usually executive directors) earn a high proportion of the total of directors' remuneration paid by the firm. It also can be seen that the highest paid directors may have a greater incentive to engage in earnings management as they want to present a better performance in order to receive the highest amount of compensation.

Table 5.1: Descriptive statistics of Directors compensations

Variables	N	Mean	Median	Std. Deviation	25%	75%	Skewness	Kurtosis
Directors' Remunerations £th	2,207	4,237.2532	2,793	5,451.9126	1,786	4,868	10.0361	201.0381
Directors' Fees £th	2,183	1,515.2988	1,188	3,347.9346	860	1,741	35.4183	1444.2788
Pension Contribution £th	1,714	263.7167	169.5	456.6271	87	306	13.1426	263.0870
Other Emoluments £th	2,130	2,618.0432	1,412	3,876.1166	695	2,916.75	5.1300	43.9214
Highest Paid Director £th	2,173	1,728.0704	1,095	2,341.0788	690.5	1967	8.8971	132.1976
DSB/TA	2,134	0.0061	0.0029	0.0128	0.0012	0.0064	11.9712	250.6095
Directors Fees/TA	2,114	0.0028	0.0011	0.0089	0.0005	0.0029	27.4869	1019.5238
Pension Contribution/TA	1,666	0.0004	0.0002	0.0009	0.0001	0.0004	15.4257	310.5926
Other Emoluments/TA	2,068	0.0031	0.0013	0.0072	0.0005	0.0030	8.4849	99.9047
Highest Directors Pay/DSB	2,173	41.82%	40.855	12.61%	32.36%	50.23%	0.5160	0.6631

Note to Table 5.1: This table presents the descriptive statistics for components of the directors' remuneration package for the full sample of all firms listed on FTSE All-share. The sample covers the period between 2009 and 2015, and includes 2,513 firm-year observations from 359 firms. Directors' remuneration (*DSB*) is the sum of directors' fees, pension contribution, and other emoluments. Directors' fees represent the basic salary level of directors, usually set by firms; pension contribution is pensioned on basic salary; other emoluments include all the other compensations of directors in addition to the basic salary and pension contribution. There are two main elements: performance-related remunerations (e.g., bonus and share options), and benefits in kind (e.g., health insurance, children's vouchers, additional holidays, firm car scheme, firm property, etc.). The relevant number of observations, mean, median, standard deviation, 25th percentile, 75th percentile, skewness, and kurtosis are reported. The variables are all defined in Appendix A.

5.3 Measurement of Abnormal Level of Directors' Remunerations

5.3.1 Descriptive Statistics and Correlation Coefficients of Variables

Table 5.2 (Panel A) shows descriptive statistics of dependent and independent variables for the empirical test as to whether directors have achieved an excessive level of compensations in all firms in the FTSE in each industry over a period from 2009 to 2015, with 2,513 firm-year observations from 359 firms. Panel B presents the Pearson correlation coefficients of variables to the full sample.

In Table 5.2 (Panel A), as the dependent variable, total directors' remuneration includes basic salary, pension contribution, and other bonuses, at the mean level of around £4,237 thousand, the median being about £2,793 thousand, with a standard deviation of £5,452 thousand. The lower and upper quartiles of total directors' remuneration range from £1,786 thousand to £4,868 thousand and measure the variability around the median value of directors' remuneration. Sales revenue, as a crucial measure of firm performance, is the amount of income brought into the firm by its business activities, usually from the sale of goods and services to customers. The sample mean of total sales revenue is about £4,922.3 million, with the median at about £767.3 million. The relevant standard deviation is high, at £20,492.6 million. The first quartile and third quartile of total sales revenue is £278.9 million, and £2,286.9 million, respectively. Total assets represent the economic resources of a firm and indicate the capacity to create or increase the firm's value and benefit to the firm's operations, therefore, the total directors' remuneration after scaled by total assets is at a mean level of 0.006, the median is about 0.003 and the standard deviation is around 0.013. The lower and upper quartiles range from 0.001 to 0.006. The mean scaling total sales revenue by total assets is around 1.116, with a median of about 0.918 and the standard deviation of scaled total sales is 0.981. The 25% and 75% quartiles are 0.519 and 1.39, respectively.

In addition, profit margin is the percentage of sales turned into profits, and is a common indicator of a firm's profitability by gauging the degree to which a firm's business activities generate profits. UK firms achieve a 10% profit margin at the mean level, meaning that firms had a net profit of £0.1 for each pound of sales generated during the sample period between 2009 and 2015. The median of profit margin is about 8%, with the standard deviation at about 17%, and the lower and upper quartiles range from 3% to 15%. Altman's (1967) z-score helps to measure the financial health of a firm by the use of multiple corporate income and balance sheet values to predict the status of a firm's financial distress in the next two years. The mean

of z-score is about 10.9, with the median at about 2.6 and the standard deviation of z-score is 198.5. There are 192,967 mean number of employees for firm-year observations, with 4,451 of employees per the median number, and the standard deviation of the number of employees is about 544,24. The 25% and 75% quartiles of number of employees are 1,194 and 14,688, respectively.

Table 5.2 (Panel B) provides information about the Pearson correlation coefficients of all variables in the estimation model (Equation (8)) of abnormal directors' remuneration for the entire sample of 2,512 firm-year observations. Total directors' remuneration is significantly positively correlated with total sales (32.7%), thus indicating that directors tend to present a higher amount of sales revenue as better firm performance for the purpose of gaining extra compensation. A higher level of sales revenue is an indicator of a firm's performance improvement and can be seen from two perspectives: in one the bigger number of total sales revenue implies a larger firm size, and so larger sized firms pay directors more; in the other total sales may be relatively large compared with that of the previous year and an increase of sales indicates an improvement in firm operating performance. The correlation coefficient between total directors' remuneration and profit margin is significantly positive (11.1%). This positive correlation provides additional evidence that directors' remuneration is linked to firm profit performance as profit margin measures the degree to which a firm's business activities generate profits. The higher percentage of sales revenue indicates better firm performance, as a result, the firm directors may have the opportunity to achieve more rewards. The independent variable, z-score, measures the financial health of a firm, only negligibly associated with total directors' remuneration (0.2%), which suggests that the amount of remuneration received by firm directors has no significant impact on the firm's status or financial distress. A significantly positive correlation exists between total directors' remuneration and number of employees, at 25.4%, meaning a greater number of employees and higher level of directors' remuneration. This is due to both firm performance and firm size and is indicated by the number of employees, improvement in firm performance and the growth of the firm size implying that increasing production capacity, requires a larger number of employees.

Moreover, under the relationship between each independent variable, sales have no, or only a slightly correlation with profit margin (-2.7%), whilst the sales after being scaled by total assets is significantly negative when associated with profit margin (-12.8%). The correlation coefficient between sales and z-score is significantly negative (-5.7%), indicating that sales revenue is affected by the financial health of firms, and sales will be reduced by the higher probability of a firm's bankruptcy. Total sales have a significantly positive correlation with the

number of employees (2.839%), as a higher level of sales requires a larger number of employees. Similar to total sales, profit margin is significantly positively associated with z-score (22%), indicating that the firm's status of financial distress will influence firm profitability: in other words, a certain level of profitability gained through firm business activities also depends on the status of the firm's financial health. The correlation coefficient between profit margin and number of employees is significantly negative (-5.7%), the negative correlation probably indicating that too many employees increase the cost of production and operation, and less net income is generated from firm sales, although at the same time the number of employees implies production capacity and business vitality. Z-score and number of employees have a negative correlation, at significant level (-9.3%), also implying that a firm will cut the number of employees where there is a risk of bankruptcy.

Table 5.2: Descriptive statistics and correlation coefficients of variable

Panel A: Descriptive statistics of variables

Variable	N	Mean	Median	Std. Dev	25%	75%
DSB £ th	2,207	4,237.253	2,793	5,451.913	1,786	4,868
DSB/TA	2,134	0.006	0.003	0.013	0.001	0.006
Sales th GBP	2,202	4,922,305	767,350	20,492,603	278,920	2,286,900
Sales/TA	2,126	1.116	0.918	0.981	0.519	1.390
Profit Margin %	2,127	10.079	7.920	17.275	2.920	15.450
z – score	2,230	10.893	2.567	198.486	1.717	3.827
No. of empl	2,185	192,967	4,451	54,424	1,194	14,688

Panel B: Correlation coefficients of variables

Variable	DSB	DSB/TA	Sales	Sales/TA	Profit Margin	z – score	No. of empl
DSB	1						
DSB/TA	0.265***	1					
Sales	0.327***	-0.120***	1				
Sales/TA	-0.118***	0.245***	0.015	1			
Profit Margin	0.111***	0.070***	-0.027	-0.128***	1		
z – score	0.002	0.020	-0.057***	0.161***	0.220***	1	
No. of empl	0.254***	-0.150***	0.289***	0.037	-0.057***	-0.093***	1

*Significant at 10% level. **Significant at the 5% level. ***Significant at the 1% level.

Note to Table 5.2: Panel A presents the descriptive statistics for the dependent, independent, and some other variables of the full sample. Panel B presents correlations coefficients between variables and the full sample. This full sample of firm-year observations over the period from 2009-2015, consists of 2,513 firm-year observations, for 359 firms. *DSB* is the total directors' remuneration aggregating directors' fees, pension contribution and other emolument; *DSB/TA* is total directors' remuneration scaled by previous year's total assets; *Sales* is sale revenues; *Sales/TA* is sales scaled by previous year's total assets; *Profit Margin* is a ratio for measuring profitability looking at net incomes as a percentage of total sales; *z – score* measures the financial health of firms, designed by Altman (1968); *No. of employees* is the number of employees in firms. Within Panel A are the number of valid firm-year observations, the mean, median, standard deviations, and 25% and 75% quartile for every variables. In Panel B are Pearson correlation coefficients. Please see Appendix A for all variables descriptions.

5.3.2 Measurement of Abnormal Directors' Remuneration

This section examines the magnitude of abnormal directors' remuneration, as firm directors have incentives to adopt some accounting choices to present a better operating performance in order to achieve an excessive level of compensation. As discussed in section 3.2.1, this study built a new regression model to estimate the normal level of directors' remuneration, the independent variables including total sales revenue, profit margin, Altman's (1968) z-score, and number of employees, where abnormal directors' remuneration is estimated as deviation from the predicted values from the regression model. In order to capture the different effects of abnormal directors' remuneration, based on different definition of variables, a second model was run, based on model 1 (Equation (8)). In Model 1, the total directors' remuneration as the dependent variable, sales revenue, profit margin, z-score and No. of employees are set as independent variables. However, in Model 2, the dependent variable, directors' remuneration is lagged by total assets for the year $t - 1$, one independent variable, sales revenue, is also lagged by total assets for the year $t - 1$, and the definition of all other variables' is the same as Model 1. The signs and the absolute value of the error terms (also referred to as residuals) for both Model 1 and Model 2 can be used to evaluate the abnormal level of directors' remuneration. A positive sign of the error term indicates that directors probably have utilised any accounting choices to gain abnormally high compensation from their firms, and a negative sign, otherwise, indicates that firms' directors gained abnormally low rewards as they were likely to engage in accounting strategy activities.

Table 5.3 reports the estimation results of the regression models to estimate the normal levels of directors' remuneration through Model 1 and Model 2 (Based on Equation (8)) to measure the abnormal level of directors' remunerations. The estimation models are estimated cross-sectionally for every industry and every year in the period between 2009 and 2015. Both models had a sample of 2,513 firm-years observations, and the sample defines 11 major industries according to five-digit UK SIC codes (2007). The reported coefficients in table 6.3 are the mean value of the coefficients across all industry-years (77 industry-years). The parametric test, t-statistics (in parentheses), using the Fama and MacBeth (1973) approach, have been calculated using the standard error of the mean coefficients across industry-years. The adjust R square is also computed as the mean adjust R square across industry-years.

Directors' remuneration is now initiated by shareholders aiming to establish a balance between salary and firms' performance, as shareholders are concerned about the large salaries' directors awarded themselves whilst presenting a poor operating performance. Therefore, each

component of a directors' remuneration package is designed to ensure that the directors focus on the firm and are motivated to improve performance. Given that firms reporting a good performance generally guarantees directors receive a higher amount of compensation, the coefficients in the model of abnormal directors' remuneration on performance related variables, such as turnover, profit margin, should be positive. In Model 1, all the mean coefficients of this regression are significantly different from zero with one exception. The mean coefficient on $Sales_{i,t}$ is statistically significant and positive (0.0006), because a higher sales revenue means a higher amount realized by a firm from the sale of goods or services, which implies that a larger sized firm is able to pay more to directors. The mean coefficient on Model 1 of abnormal directors' remuneration on profit margin is, like sales revenues, significantly positive at 1% level (67.43153). Profit margin measures the profitability performance of a firm, and the positive sign of mean coefficient on profit margin implies that directors have the opportunity to gain additional rewards as they help the firm meet better profits target. However, the mean coefficient of the regression model on z-score is statistically significant with a negative sign (-126.998). The mean coefficients on a number of employees is insignificant with a positive sign (0.00188).

On the other hand, estimated coefficients in the Model 2 of abnormal directors' remuneration are mostly consistent with those reported in Model 1. The mean coefficients on sales revenue scaled by the total assets at the beginning of year t is significant with positive sign (0.00132). The mean coefficient of the Model 2 on the number of employees is significantly positive (0). However, the mean coefficient on profit margin is significantly slightly negative (-0.00004), because the impact of both the dependent variable directors' remuneration and independent variable sales revenue are scaled by the total assets at the beginning of year t . The mean coefficient of the Model 2 on z-score is significantly positive (0.00119), inconsistent with the result in Model 1. The z-score is a prediction of a firm's' distress and turnaround, the higher the score indicating a healthier firm finance and good sales value in the eyes of those interested in buying the firm. (e.g., z-score above 2.99 recommends buying the stock), thus directors' remuneration is positive associated to z-score.

Finally, the mean adjusted R squares across industry- year is 42 percent of abnormal directors' remuneration for Model 1 and 32 percent for Model 2. Therefore, it indicates that both models have reasonably substantial explanatory power.

Table 5.3: Measurement of abnormal directors' remuneration

Estimation of the normal level of directors' remuneration

Model 1: DSB		Model 2: DSB/TA	
Intercept	2297.4064*** (14.304)	Intercept	0.0013*** (3.206)
Sales	0.0006*** (5.368)	Sales/TA	0.0013*** (2.464)
Profit Margin	67.4315*** (7.174)	Profit Margin	-0.0000* (-1.365)
z – score	-126.9984*** (-2.787)	z – score	0.0012*** (4.666)
No. of empl	0.0019 (0.172)	No. of empl	0.0000*** (-7.381)
Adjusted R²	0.419	Adjusted R²	0.318

*Significant at 10% level, **Significant at the 5% level; ***Significant at the 1% level.

Note to Table 5.3: The following (ordinary least squares) regressions are estimated cross-sectionally for each industry and each year for the period from 2009 and 2015. UK five-digit SIC codes (2007) are used to define industries. There are 77 separate industry-years over the sample period. The reported coefficients are the mean value of the coefficients across the industry-years. T-statistics (in parentheses) are calculated using the standard errors of the coefficients across industry-years (Fama and Macbeth, 1973). The table also reports the mean adjusted *R* square across each industry and each year for each of the following regressions. All variables are winsorized at the top and bottom 1% of their distributions to avoid the impact of outliers.

Model 1

Abnormal directors' remunerations are the difference between the actual level of directors' remuneration and the normal level of directors' remuneration, estimated as being deviations from the predicted values from the following industry-year regression from a sample of UK firms:

$$DSB_{i,t} = \alpha_i + \beta_1 SALES_{i,t} + \beta_2 Prof. Margin_{i,t} + \beta_3 z_score_{i,t} + \beta_4 No. Empl_{i,t} + \varepsilon_{i,t},$$

where the dependent variable, $DSB_{i,t}$, is total directors' remuneration including director's fees, pension contribution, and other emoluments in year t for the firm i . Independent variables: $Sales_{i,t}$ is total sales revenue in year t for the firm i ; $Prof. Margin_{i,t}$ is profit margin which measures the profitability and performance, equal to the net income as a percentage of total sales in year t for the firm i ; $z_score_{i,t}$ is a measurement of the financial health of the firm and calculated by using multiple corporate income and balance sheet values in year t for the firm i ; $No. Empl_{i,t}$ is the number of employees in year t for the firm i ; $\varepsilon_{i,t}$ is the error term.

Model 2

Similar to Model 1, abnormal directors' remunerations are the difference between actual directors' remunerations and normal directors' remuneration, estimated as the deviation from the predicted values from the following industry-year regression for a sample of UK firms:

$$\frac{DSB_{i,t}}{TA_{i,t-1}} = \alpha_i + \beta_1 \frac{SALES_{i,t}}{TA_{i,t-1}} + \beta_2 Prof. Margin_{i,t} + \beta_3 z_score_{i,t} + \beta_4 No. Empl_{i,t} + \varepsilon_{i,t},$$

where the dependent variable, $\frac{DSB_{i,t}}{TA_{i,t-1}}$, defined as total directors' remunerations divided by lagged total assets; $TA_{i,t-1}$ is the total assets at the beginning of year t for the firm i ; $\frac{Sales_{i,t}}{TA_{i,t-1}}$ is the total sales revenue during the year t for the firm i ; $Prof. Margin_{i,t}$ is the net income as a percentage of total sales in year t for the firm i ; $z_score_{i,t}$ is a use of multiple corporate income and balance sheet values in year t for the firm i to measure the status of the firm's financial distress; $No. Empl_{i,t}$ is the number of employees in year t for the firm i ; $\varepsilon_{i,t}$ is the error term. Please see Appendix A for all variables descriptions.

5.4 Summary Statistics Abnormal Level of Directors' Remuneration, Accrual-based Earnings Management, and Real Activities Manipulation

Table 5.4 presents descriptive statistics of the abnormal level of directors' remuneration, accrual-based earnings management, and real activities manipulation including mean, median, 25th percentile, 75th percentile, skewness and kurtosis for each relevant model separately. Abn_DSB_1 is abnormal directors' remuneration, the estimated residuals (error term, $\varepsilon_{i,t}$) from the regression model 1 of normal level of directors' remuneration, Abn_DSB_2 is also the abnormal directors' remuneration, but calculated as deviations from estimation model 2 of normal level of directors' remuneration so that higher abnormal directors' remuneration implies an excessive amount of compensation gained by directors. $Abn_Accruals$ represents the abnormal level of discretionary accruals, calculated as the residuals from the proxy of accrual-based earnings management, higher abnormal level of accruals indicates more accrual-based earnings management. Abn_CFO , Abn_DISEXP , and Abn_PROD are abnormal cash flows from operating, abnormal discretionary expenses, and abnormal production costs, respectively the three measures of real activities manipulation. Both Abn_CFO and Abn_DISEXP require the need to multiply -1, so that the higher value of them indicates a greater extent of real earnings management by sales-based manipulation and the cutting of discretionary expenses respectively, whereas higher values of abnormal production costs directly indicate more real earnings management through overproduction. RAM aggregates the three real activities manipulation measures into one proxy, so that higher values indicate greater use of real earnings

management; *EM* captures the total effects of accrual-based earnings management and real activities manipulation, so that a higher amount of *EM* indicates higher engagement in earnings management (further details in Chapter 4).

The mean of abnormal directors' remuneration from Model 1 and Model 2 are both equal to zero, as they are estimated based on the *OLS* regression model in that the sum of all differences between the fitted values (which are on the regression line) and the actual values of remunerations which are above the fitted line is exactly equal to the sum of all differences between the regression line and all values below the line. The median of directors' remuneration from Model 1 is -385.4 with the standard deviation is about 3,203.2, and the lower and upper quartiles range from -1,259.2 to 742.8; whereas as regards Model 2, the median directors' remuneration is around -0.001 and the standard deviation is 0.006, the 25% and 75% quartiles are -0.003 and 0.001, respectively. The difference of median standard deviation values between Model 1 and Model 2 are due in Model 2 to total directors' remuneration and sales revenue in Model 2 with both scaled by the total assets at the beginning of year t , while Model 1 adopts the raw data without any scaling. Standard skewness and standard kurtosis are similar between Model 1 and Model 2 with regard to abnormal directors' remuneration, in that standard skewness in both models is around 3.7, and standard kurtosis in both models is around 36. The skewness data for the distributions of abnormal directors' remuneration are relatively and slightly above zero (positive), suggesting the tail on the right side of the distribution of abnormal values is longer or fatter than the tail on the left side. The relatively large positive kurtosis data for the distribution of abnormal directors' remuneration from Model 1 and Model 2 exhibits that tail data exceeds the tails of the normal distribution, suggesting that directors in UK firms will gain an excessive level of compensations at some stages.

In addition, as with abnormal directors' remuneration, the means of abnormal accruals, abnormal cash flows from operating, abnormal discretionary expenses, and abnormal production costs are equal to zero, as they are estimated from the *OLS* regressions and the best fitting lines from those regressions are those which make the means residuals equal to zero. However, the means of *RAM* and *EM* equal to 0.01 and 0.009, respectively, are not around zero, because they are directly estimated from the regression models. The median of abnormal accruals, abnormal cash flows from operating, abnormal discretionary expenses, abnormal production costs, *RAM*, and *EM* are 0.001, -0.007, -0.036, 0.02, 0.064, and 0.59, respectively, consistent with previous research studies (e.g., Rochowdhury, 2006; Cohen et al., 2008; Gunny, 2010; Zang, 2012). They implied that firms are engaged in earnings management to varying

degrees and by different methods, such as accrual-based earnings management, real activities manipulation, or the use of accrual-based earnings management and real activities manipulation together (more detailed discussion in section 4.4). Moreover, the skewness and kurtosis for these abnormal values about earnings management are at a relatively low level, as compared to abnormal directors' remuneration, skewness data being close to zero, kurtosis all between 7 and 13.

Table 5.4: Summary statistics of abnormal directors' remuneration and earnings management

	N	Mean	Median	Std. Dev	25%	75%	Skew	Kurt
Abn_DSB_1	2,041	0.00	-385.41	3,203.23	-1,259.17	742.81	3.75	35.51
Abn_DSB_2	1,987	0.00	-0.001	0.006	-0.003	0.001	3.74	35.86
Abn_Accruals	1,830	0.00	0.001	0.07	-0.03	0.033	-0.98	7.20
Abn_CFO	1,811	0.00	-0.01	0.10	-0.05	0.036	0.75	13.27
Abn_DISEXP	2,113	0.00	-0.04	0.39	-0.18	0.15	1.95	13.32
Abn_PROD	1,621	0.00	0.02	0.36	-0.15	0.17	-1.20	9.18
RAM	1,608	0.01	0.06	0.74	-0.29	0.38	-1.45	10.82
EM	1,603	0.01	0.06	0.75	-0.31	0.38	-1.42	10.42

Note to Table 5.4: This table reports characteristics of the abnormal level of directors' remuneration, accrual-based earnings management, real activities manipulation for 2,513 firm-year over the period between 2009 and 2015. *Abn_DSB_1* is the abnormal directors' remuneration estimated from Model 1; *Abn_DSB_2* is the abnormal directors' remuneration estimated from Model 2; *Abn_Accruals* is abnormal discretionary accruals and represents the proxy of accrual-based earnings management; *Abn_CFO* is the abnormal cash flows from operating and a measure of real activities manipulation; *Abn_DISEXP* is the abnormal discretionary expenditure and a measure of real activities manipulation; *Abn_PROD* is the abnormal production costs and a measure of real activities manipulation; *RAM* is the total real activities manipulations and aggregate of the three measures, calculated as following,

$$RAM = Abn_CFO * (-1) + Abn_DISEXP * (-1) + Abn_PRO;$$

EM represents the total earnings management, sum of accrual-based earnings management and real activities manipulation. Reported are the mean, median, standard deviation, the lower and upper quintiles, skewness and kurtosis. Please see Appendix A for all variables descriptions.

5.5 Correlation Coefficients among Abnormal Directors' Remuneration, Accrual-based Earnings Management, and Real Activities Manipulation

Table 5.5 provides information about the Pearson product moment correlation coefficients (Upper Triangle) and the Spearman rank correlation coefficients (Lower Triangle) between the abnormal directors' remunerations and different earnings management measures (e.g., accrual-based earnings management, real activities manipulation) for the entire sample of 2,513 firm-year observations covering the period 2009 to 2015. Abnormal directors' remuneration (*Abn_DSB_2*), is estimated residuals using regression model 2, which is modified based on Model 1 in section 6.3.2, therefore it is strongly positive correlated with abnormal directors' remuneration (*Abn_DSB_1*) from Model 1 (Pearson correlation of 15.4%, and Spearman correlation of 14.8%, respectively).

In table 5.5, the main correlations of interest for hypothesis are the correlations between the magnitudes of abnormal directors' remunerations (e.g., *Abn_DSB_1*, *Abn_DSB_2*) and different measures of earnings management (e.g., *Abn_Accruals*, *Abn_CFO*, *Abn_DISEXP*, *Abn_PROD*, *RAM*, *EM*). The abnormal directors' remuneration estimated from Model 1 is significantly negatively associated with the measure of accrual-based earnings management, abnormal discretionary accruals (Pearson -3.7%, and Spearman -4.6%), indicating accrual-based earnings management has a reverse impact on the amount of compensation directors received in that abnormally low discretionary accruals on the firm may cause directors to acquire additional rewards. This is because directors' remuneration is determined by firm size and performance and directors, especially executive directors, in order to receive abnormally high remuneration, may embark on a strategy of manipulating firm earnings to make poor results look even worse so that future results look better. This is usually implemented in a bad year so that the directors can enhance next year's earnings and present a better future profit performance through management of discretionary accruals to reduce earnings in the current year. Section 4.7 provides supporting evidence that those firms with negative earnings are likely to adopt the accrual-based earnings management method to manage earnings downwards and produce a poor current year profitability, to be replaced by better profit performance in the future, which consistent with the findings from Buchholze, et al. (2019). However, the correlation coefficient between abnormal directors' remuneration, *Abn_DSB_2*, and sales-based real earnings management, abnormal cash flows from operations (*Abn_CFO*), is significantly positive (Pearson 9.3% and Spearman 11.6%, respectively). Sales-based

manipulation is one measure of real earnings management as firms seek to temporarily boost sales through offering price discounts or more lenient credit facilities, and the current-year operating cash flows are expected to be lower. Hence, the positive correlation coefficient between abnormal directors' remunerations and abnormal *CFO* means that firms may tend to hold back boosting sales and report a loose profit performance, so that directors have the opportunity to present improving future profit to shareholders. Similar to abnormal cash flows from operations, there is a significantly positive correlation coefficient between abnormal directors' remunerations (*Abn_DSB_1*) and abnormal discretionary expenses (Pearson 4.3% and Spearman 7.9%, respectively). Higher value of abnormal discretionary expenses indicates a greater degree of a cut in discretionary expenses (e.g., advertising, R&D, etc.), to achieve a reduction in firm earnings. Therefore, the positive correlation implies that directors engage in making abnormal discretionary expense activities and provide poor results to ensure future results look better, for the purpose of gaining abnormally high remunerations. Otherwise, abnormal production costs (*Abn_PROD*) and abnormal directors' remunerations (*Abn_DSB_1*) have a significantly negative association (Pearson -7% and Spearman -12.4%, respectively), similar to abnormal accruals, indicating that directors may, through production costs-based manipulation report a worse profit margin, aiming to show a greater growth in profit margin in a subsequent period.

In addition, the aggregate proxy of the three real activities manipulation measures, *RAM*, is negatively correlated with abnormal directors' remunerations, *Abn_DSB_1* (Pearson -8.1% and Spearman -12.9%, respectively), consistent with the meaning of abnormal cash flows from operations, abnormal discretionary expenses, and abnormal production costs. Directors, especially from negative earnings firms, are likely to use real earnings management activities to achieve a worse earnings performance in order to show greater profits in the future as directors' compensation is determined by firm performance. *EM*, takes the total effects of both accrual-based earnings management and real activities manipulation, and has a negative association with abnormal directors remunerations, *Abn_DSB_1* (Pearson -8.4% and Spearman -13.1%, respectively). This shows that directors tend to accept additional gains so that they utilise both accrual-based earnings management and three methods of real earnings management simultaneously.

Alternatively, abnormal directors' remunerations, *Abn_DSB_2*, are estimated residuals of the modified model, which concerns variables scaled by total assets at the beginning of the year; similar to abnormal directors' remunerations (*Abn_DSB_1*), the correlation coefficient between

abnormal directors remunerations (*Abn_DSB_2*) and abnormal discretionary accruals are significantly negative (Pearson -7.7% and Spearman -5.1%, respectively). This supports the assumption that the higher value of abnormal directors' pay indicates a greater amount of earnings reduced through accrual-based earnings management activities. The abnormal directors' remunerations (*Abn_DSB_2*) are significantly negatively correlated with abnormal cash flows from operations (Pearson -4.4%), and inconsistent with the result of *Abn_DSB_1*, which means, in turn, that firms temporarily boost their sales to enhance higher earnings and, as a result, directors may receive excessive rewards. Abnormal directors' remunerations (*Abn_DSB_2*) are negatively associated with abnormal discretionary expenses as well (Pearson -5.4%), because directors may tend to cut discretionary expenses to achieve a higher level of earnings, report a better performance so they can potentially create some additional benefits for themselves. Abnormal production costs, *RAM*, and *EM* are positively associated with abnormal directors' remunerations (*Abn_DSB_2*) but are not significant, which suggests that there is no major problem of multicollinearity between them .

Finally, the correlation coefficients among accrual-based earnings management and real activities manipulation have been explained in detail in section 4.5. *RAM* as the aggregate proxy of real activities manipulation, are mechanically and highly correlated with abnormal cash flows from operations, abnormal discretionary expenses, and abnormal production costs (Pearson correlation: -22.7%, -95.3%, and 96.5%, respectively). Abnormal cash flows from operations are positively related to abnormal discretionary expenses, but are negatively related to abnormal production costs. Abnormal discretionary expenses and abnormal production costs are negatively correlated suggesting that firms may utilise the three measures of real activities manipulation at the same time. Abnormal discretionary accruals are significantly negatively associated with both abnormal cash flows from operations and abnormal discretionary expenses (Pearson -18.3%, and -4.1%, respectively); the *RAM* and abnormal discretionary accruals are, therefore, positively correlated (Pearson 6.4%); indicating firms engage in accrual-based earnings management and real activities manipulation can take place simultaneously.

Table 5.5: Pearson (Upper Triangle) and Spearman (Lower Triangle) correlations coefficients among all abnormal directors' remunerations and earnings management

	Abn_DSB_1	Abn_DSB_2	Abn_DSB_1/TA	Abn_Accruals	Abn_CFO	Abn_DISEXP	Abn_PROD	RAM	EM
Abn_DSB_1	1	0.154***	0.335***	-0.037*	0.093***	0.043**	-0.070***	-0.081***	-0.084***
Abn_DSB_2	0.148***	1	-0.022	-0.077***	-0.044**	-0.054***	0.000	0.017	0.009
Abn_DSB_1/TA	0.829***	0.068***	1	0.016	0.108***	0.065***	-0.030	-0.058**	-0.056**
Abn_Accruals	-0.046**	-0.051**	-0.042*	1	-0.183***	-0.041**	0.021	0.064***	0.148***
Abn_CFO	0.116**	0.019	0.096***	-0.283***	1	0.034*	-0.172***	-0.227***	-0.245***
Abn_DISEXP	0.079***	-0.005	0.077***	-0.062***	0.076***	1	-0.862***	-0.953***	-0.948***
Abn_PROD	-0.124***	-0.038*	-0.100***	0.014	-0.236***	-0.792***	1	0.963**	0.956**
RAM	-0.129***	-0.016	-0.116***	0.081***	-0.280***	-0.932***	0.930***	1	0.996***
EM	-0.131***	-0.021	-0.117***	0.175***	-0.298***	-0.925***	0.917***	0.993***	1

*Significant at 10% level. **Significant at the 5% level. ***Significant at the 1% level.

Note to Table 5.5: This table reports Pearson (Upper Triangle) and Spearman (Lower Triangle) correlations for the sample of 2,513 firm-years observations of all residuals variables over the period between 2009 and 2013 as follows: Abnormal directors' remunerations (e.g., *Abn_DSB_1*, *Abn_DSB_2*), are estimated deviations from Model 1 and Model 2, respectively (Detailed discussion in Section 5.3); Abnormal discretionary accruals (*Abn_Accruals*), the proxy of accrual-based earnings management, is estimated residuals using modified Jones's (1991) model; abnormal cash flows from operations (*Abn_CFO*), abnormal discretionary expenses (*Abn_DISEXP*), abnormal production costs (*Abn_PROD*), three measures of real activities manipulation, are estimated residuals from Roychowdhury's (2006) model; *RAM* aggregates *Abn_CFO*, *Abn_DISEXP*, and *Abn_PROD* into one proxy of real activities manipulation, where $RAM = Abn_CFO * (-1) + Abn_DISEXP * (-1) + Abn_PROD$; *EM* takes the sum of accrual-based earnings management and real activities manipulation to capture the total effects of earnings management activities, where $EM = Abn_Accruals + RAM$. Please see Appendix A for all variables descriptions.

5.6 Empirical Results of the Relation between Abnormal Directors' Remuneration and Accrual-based Earnings Management/Real Activities Manipulation

Previous research studies have provided evidence that firms tend to beat or meet earnings benchmarks (e.g., avoiding loss, avoiding earnings decrease) to utilise different types of earnings management activities to manage earnings upwards: expanding earnings by using discretionary accruals, boosting the time of sales through increasing price discounts or more lenient credit facilities: cutting or reducing discretionary expenses including research and development: advertising expenses: selling, general and administrative spending: and finally reducing the reported cost of goods sold through overproduction (Roychowdhury, 2006; Gunny, 2010; Zang, 2012; Al-Shattarat, et al., 2018). From the perspective of firm directors, they are working hard to present a better future firm performance as they are seeking to achieve more compensation. Directors, especially executive directors, have incentives to employ different methods of earnings management (accrual-based earning management and/or real activities manipulation) to hit their specific targets.

This chapter examines the relationship between directors' compensations and different types of earnings management (e.g., abnormal discretionary accruals, abnormal cash flow from operations, abnormal discretionary expenses, abnormal production costs), to explore whether directors receive any abnormal high remunerations through achieving the benefits of earnings management to manipulate accounting earnings. Therefore, the estimation model is run with the ordinary least squares regression linked to abnormal directors' remunerations as the dependent variable; abnormal discretionary accruals, abnormal cash flows from operations, abnormal discretionary expenses, and abnormal production costs as independent variables. The regression results are presented in Table 5.6, which reports mean coefficients and Fama-MacBeth *t* statistics from the cross-sectional regression throughout the sample period of 2009-2015 include 2,513 firm-year observations. In order to capture a comprehensive analysis of the association between abnormal directors' remunerations and earnings management, the results in Table 5.6 not only report the dependent variable and abnormal directors' remunerations as residuals estimated by Model 1 and Model 2, respectively, and also abnormal directors' remunerations from Model 1 scaled by total assets for the current year *t*. Each column in Table 5.6 presents the results of the regression for different dependent variables, whose name appears at the top of the respective column. T-statistics (in parentheses) are calculated using standard errors corrected for autocorrelation using the Newey-West procedure.

The abnormal levels of earnings management (accrual-based and real earnings management) are estimated residuals from the relevant estimation models, including abnormal discretionary accruals, abnormal cash flows from operations, abnormal discretionary expenses, and abnormal production costs. Higher value of abnormal discretionary accruals (*Abn_Accruals*) and production costs (*Abn_PROD*) indicate more accrual-based earnings management and real activities manipulation through overproduction, respectively. Abnormal cash flows from operations (*Abn_CFO*) and abnormal discretionary expenses should have a negative impact on current period earnings, both of which being multiplied by -1, so that higher values of them indicate a greater extent of real activities manipulation by means of sales manipulation and the cutting of expenses, respectively. The abnormal level of directors' remunerations is similar, higher values indicating a greater amount of rewards received by directors. When the dependent variable and abnormal directors' remunerations in the regression model are estimated as residuals of Model 1 (first column), this provides evidence that the abnormal directors' remunerations are unusually low for abnormal cash flows from operations, because the coefficient on *Abn_CFO* is positive (3911) and significant at the 1% level ($t=4.10$). Firm directors, especially executive directors, are under pressure to improve earnings growth and performance as their compensations are determined by the firm's profitability and performance, and they have incentives to move earnings from the current year to a future year because their compensations do not change if they miss the earnings target by a little or a lot. Directors can shift firm earnings forwards by using the earnings management method, so that they increase the chances of gaining larger rewards in the following year. The significantly positive coefficient on abnormal *CFO* implies that directors may employ sales-based manipulation by temporarily delaying the realisation of sales to achieve poor profit results in a current year to achieve a large rise in earnings in future. This is consistent with the result in section 5.4, that abnormal directors' remunerations are significantly positively associated with abnormal cash flows from operations (9.3%).

When the dependent variable is set equal to abnormal directors' remunerations scaled by total assets in the estimation model (third column), *Abn_DSB_1/TA* the coefficient on *Abn_Accruals* is positive (0.00718) and significant at the 5% level ($t=2.10$). However, the coefficient correlation between abnormal directors' remunerations and abnormal accruals in Table 5.5 is insignificantly positive. In the strict sense, strong evidence was not found to show that directors achieve abnormal rewards by engaging in accrual-based earnings management. As with the first column, the coefficient on *Abn_CFO* is positive (0.01232) and significant at the 1% level ($t=5.2$), which means directors engage sales-based manipulation in order to help

them achieve abnormal remunerations which are higher on average by 1.23% of the normal level. This indicates that directors gain more compensation because they use real activities manipulation through sales-based earnings management to delay or limit boosting sales to decrease current period earnings. The impact of abnormal discretionary expenses is negative to earnings, the coefficient on *Abn_DISEXP* is positive (0.0034) and significant at the 1% level ($t=3.2$). The coefficient means that directors use real activities manipulation by cutting or reducing large amounts of discretionary expenses to present lower earnings to achieve greater improvements in future and directors gain the opportunity to obtain more bonuses. The coefficient on *Abn_PROD* is positive (0.00298) and significant at the 5% level ($t=2.6$), whereas Table 5.5 reports that the coefficient correlation between abnormal directors' remunerations and abnormal production costs is insignificant. This provides poor evidence that directors may use real activities manipulation by overproduction to increase their compensation.

When dependent variable is equal to abnormal directors' remuneration, *Abn_DSB_2* is estimated as residuals from Model 2 (second column), the coefficient on *Abn_Accruals* is negative (-0.01085) and significant at the 1% level, with a different direction of relevant coefficients in the third column. It appears that directors attempt to manage discretionary accruals to make downward earnings look worse to take credit when reporting an improvement in future earnings performance the following year in order to gain abnormally high remunerations, consistent with the results in chapter 4.8 that directors of UK firms with negative earnings have more incentives to engage in accrual-based earnings management to manipulate firms' earnings downwards in order to produce an income statement showing a loss and help directors report a big rise in future earnings. The coefficients in *Abn_CFO* and *Abn_DISEXP* are both negative (-0.00517 and -0.00211, respectively) and significant at the 1% level ($t=-2.93$ and $t=-2.67$, respectively), indicating that directors receive additional rewards by using real activities manipulation through sales-based manipulation and by cutting discretionary expenses to boost earnings. This conflicts with previous evidence that directors adopt accrual-based earnings management to lower earnings, which may be due to there being no strong correlations for abnormal accruals and abnormal *CFO* and for abnormal accruals and abnormal discretionary expenses, and they are not in the same group of firms, thereby the results between them are inconsistent. The coefficient on *Abn_PROD* is negative (-0.00217) and at the 5% significant level ($t=-2.5$), which indicates that the extent of real activities manipulation through overproduction is low when directors' remunerations are abnormally high as directors shift previous earnings to the current period to make the performance look better.

Table 5.6: Regression analysis of abnormal directors' remuneration impacted by accrual-based and real earnings management

	Abn_DSB_1	Abn_DSB_2	Abn_DSB_1/TA
Intercept	74.2035 (0.89760)	-0.0001 (-0.4083)	-0.0014*** (-6.5769)
Abn_Accruals	-658.8840 (-0.4775)	-0.0109*** (-4.2555)	0.0072** (2.0967)
Abn_CFO	3911.1805*** (4.0951)	-0.0052*** (-2.9274)	0.0123*** (5.2010)
Abn_DISEXP	295.5993 (0.6933)	-0.0021*** (-2.6739)	0.0034*** (3.2116)
Abn_PROD	-195.7478 (-0.4166)	-0.0022** (-2.5005)	0.0030** (2.5549)
Adjust R²	0.0150	0.0137	0.0189

*Significant at 10% level. **Significant at the 5% level. ***Significant at the 1% level.

Note to Table 5.6: This table reports the results of Fama-Macbeth regression, the entire sample consists of 2,513 firm-year observations (359 firms listed on FTSE All-share) for the period between 2009 and 2015. The table contains the results of the following regressions:

$$Abn_DSB_{i,t} = \alpha_i + \beta_1 Abn_accruals_{i,t} + \beta_2 Abn_CFO_{i,t} + \beta_3 Abn_DISEXP_{i,t} + \beta_4 Abn_PROD_{i,t} + u_{i,t}.$$

Each column presents the results of the above regression for a different variable definition, whose name appears in the first respective column. *T*-statistics are reported in parentheses and calculated using standard errors corrected for autocorrelation using the Newey-West procedure. The adjusted *R* squares are also reported on the above table.

The dependent variable, $Abn_DSB_{i,t}$ refers to the measure of the abnormal level of directors' remuneration, estimated as the difference between actual level of directors' remuneration and normal level of directors' remuneration. Abnormal directors' remuneration, Abn_DSB_1 , is estimated as the residuals from the predicted values from industry-year regression Model 1: $DSB_{i,t} = \alpha_i + \beta_1 SALES_{i,t} + \beta_2 Prof.Margin_{i,t} + \beta_3 z_score_{i,t} + \beta_4 No.Empl_{i,t} + \varepsilon_{i,t}$; abnormal directors' remuneration, Abn_DSB_2 is estimated as the residual from the predicted values from industry-year modified regression Model 2: $\frac{DSB_{i,t}}{TA_{i,t-1}} = \alpha_i + \beta_1 \frac{SALES_{i,t}}{TA_{i,t-1}} + \beta_2 Prof.Margin_{i,t} + \beta_3 z_score_{i,t} + \beta_4 No.Empl_{i,t} + \varepsilon_{i,t}$, where $DSB_{i,t}$ and $Sales_{i,t}$ are scaled by total assets at the beginning of year *t* for firm *i*; Abn_DSB_1/TA is defined as the abnormal directors' remuneration from Model 1 scaled by total assets.

The independent variables: $Abn_Accruals_{i,t}$ refers to the abnormal level of discretionary accruals in year *t* for firm *i*, as the proxy of accrual-based earnings management, is measured as deviations from the predicted values from the corresponding industry-year regression:

$\frac{Accruals_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \alpha_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \alpha_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$; $Abn_CFO_{i,t}$ is the abnormal level of cash flows from operations in year t for firm i , as one proxy of real earnings management, is measured as deviations from the predicted values from the corresponding industry-year regression: $\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$; $Abn_DISEXP_{i,t}$ is the abnormal level of discretionary expenses of year t for firm i , as one measure of real earnings management, is estimated as residuals from the predicted values from the corresponding industry-year regression: $\frac{DISEXP_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta \left(\frac{S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$; $Abn_PROD_{i,t}$ measures the abnormal level of production costs in year t for firm i , as one proxy of real earnings management, is calculated as deviations from the predicted values from the corresponding industry-year regression: $\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \beta_3 \left(\frac{\Delta S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$. Please see Appendix A for all variables descriptions.

5.7 Additional Analysis

This Chapter uses a new model to estimate the degree of abnormal directors' remuneration (Abn_DSB), reports the empirical results of whether directors receive any abnormally high level of directors' remuneration by adopting accounting choices, and finds that directors utilise different type of earnings management (accrual-based earnings management, real activities manipulation) to manipulate earnings downwards or upwards, for the purpose of gaining excessive level of compensation. According to the analysis of prior studies in Chapter 2, the level of compensation received by directors can be determined by firm performance (i.e., improved performance firms, indicated by such as profit growth, production capacity expending, would pay an extra reward to directors). However, directors' remuneration is used to undertake the main analysis in this chapter that includes the performance-related compensation and non-performance-related payment which is the total value of each element of directors' remuneration package (the sum of directors' fee, pension contribution, and other emoluments) in order to capture the total effects of compensation, and in fact, directors have more incentives to gain more performance-related remuneration (i.e., stock options, bonus, etc.) through engaging in earnings management to manipulate reported earnings because those other emoluments in addition to non-performance-related compensation (i.e., basic fees, pension contribution) are determined by firm performance. Therefore, 'other emoluments', and 'highest paid directors', respectively, are employed in the current section to conduct additional analysis to extend the results of whether directors have received any excessive level of compensation by using earnings management methods.

As discussed in Chapter 5.2, other emoluments (*OTEM*) represent all the other compensation directors receive in addition to the basic salary and pension contribution, which mainly consist of performance-related compensation. The other emoluments entail a significant component of directors' remuneration, the mean other emoluments for the firm-years is £2.6 million, which is around 62% of mean total directors' remuneration, and which account for a high proportion of total directors' remuneration (shown in Table 5.1). This indicates that changes to other emoluments may have a great impact on directors' compensation. In addition, highest paid director (*HPD*) is meaning that details of the amount the director receiving the highest level of remuneration from the firm is given. As seen from Table 5.1, the mean of the highest paid director is about £1.7 million, with a median of £1.1 million and standard deviation is £2.3 million, and the mean percentage of highest directors pay to total directors' remuneration is 42%, with a median of about 41% and standard deviation is 13%. This implies that the highest paid directors (usually those directors at a top position) earn a high proportion of the total of directors' remuneration paid by the firm, which means the highest paid director may have a greater incentive to engage in earnings management as they want to present a better performance in order to receive the highest amount of remuneration.

Following the method used in main analysis, the normal levels of both other emoluments (*OTEM*) and highest paid directors (*HPD*) are estimated by using the same regression model (equation 8 in section 3.6.1) to measure abnormal directors' remuneration, where the variables include sales revenue, profit margins, z-score and number of employees. Table 5.7 reports the magnitude of abnormal other emoluments (*Abn_OTEM*) and abnormal highest paid director (*Abn_HPD*), as firm directors have incentives to adopt different type of earnings management to manipulate earnings to gain an excessive level of payment. Panel A displays the estimation results of the regression model to estimate the normal level of highest paid director to measure the abnormal level of highest paid director. Consistent with the estimation results of abnormal directors' remuneration (*Abn_DSB*, see in section 5.3), the mean coefficient on *Sales* is positively significant at 1% level (0.0002, $t=4.033$), which means that director at a top position is able to receive more payment as higher sales revenue implies a higher amount realised by the firm from the sale of goods sold. *Profit margin* as an indicator of a firm's profitability performance, and its mean coefficient on the estimation model of *Abn_HPD* is also statistically significant and positive (29.7767, $t=6.544$), it implies that the highest paid director performs a good job as he/she reports an improvement of firm's profit performance and he/she may achieve abnormally high remuneration. Panel B shows the measurement of abnormal other emoluments (*Abn_OTEM*). Same as the results reported in Table 5.3, the mean coefficients both on *Sales*

and *Profit margin* are significantly positive (0.005 and 58.419, respectively) at the 1% level, and the mean coefficient of the estimation model on *z – score* is statistically significant with a negative sign (-93.2782), which indicates that firms whose the highest paid director gains an abnormal remuneration have a lower risk of bankruptcy.

Following section 5.6, this section adopts the same model (equation (10) in section 3.6.2) to examine the relationship between highest paid director/other emoluments between different types of earnings management (accrual-based earnings management, real activities manipulation), where the estimation is run with the OLS regression related to abnormal highest paid director (*Abn_HPD*) or abnormal other emoluments (*Abn_OTEM*), as the dependent variable; abnormal accruals (*Abn_Accruals*), abnormal cash flow from operations (*Abn_CFO*), abnormal discretionary expenses (*Abn_DISEXP*), and abnormal production costs (*Abn_PROD*), as independent variables. Panel C presents the results of the regression to evidence whether directors receive any excessive level of remuneration by utilising accounting choices to manipulate earnings. Each column in Panel C displays the estimation results for different dependent variables, whose name presents at the top of the respective column.

The results shown in the first two-column are the dependent variables that relevant to abnormal highest paid director, and they are consistent with the regression results of when dependent variable is equal to abnormal directors' remuneration (see in Table 5.6). When dependent variable is equal to *Abn_HPD*, the coefficient on *Abn_CFO* is significantly positive (1,336.03) at the 5% level ($t=2.984$), and it means abnormal highest paid director are unusually low for abnormal cash flow from operations. This implies that highest paid director has incentive to present a decline in firm performance through engaging in sales-based manipulation to manage earnings downwards, in order to gain abnormally high payment.

The second two-column in Panel C displays the estimation results where the dependent variables are related to abnormal other emoluments, and similar to abnormal highest paid director, the results of abnormal other emoluments as the dependent variable are consistent with the report on Table 5.6. When the dependent variable is set equal to *Abn_OTEM* (the third column) the coefficient on *Abn_Accruals* is negative (-1658.92) and significant at the 10% level ($t=-1.43$), and the coefficient on *Abn_CFO* is positive (2390.51) and significant at the 5% level ($t=2.515$). These indicate that directors deliberately cut reported earnings by managing discretionary accruals and manipulating sales revenue for gaining abnormally high other emoluments in addition to basic fees and pension.

To summarise, the results of the conducted additional analysis are consistent with the results of main analysis, they provide the supporting evidence that directors have incentive to engage in different type of earnings management to manipulate earnings downwards and report a decline in performance, in order to achieve more remuneration.

Table 5.7: Measurement of abnormal other emoluments, abnormal highest paid directors, and the relation between abnormal directors remuneration and earnings management

Panel A: Estimation of the normal level of highest paid director

<i>HPD</i>		<i>HPD/TA</i>	
<i>Intercept</i>	898.1853*** (11.469)	<i>Intercept</i>	0.0005*** (2.657)
<i>Sales</i>	0.0002*** (4.033)	<i>Sales/TA</i>	0.0005** (2.170)
<i>Profit Margin</i>	29.7768*** (6.544)	<i>Profit Margin</i>	0.0000 (-0.146)
<i>z_score</i>	-0.0271 (-0.001)	<i>z_score</i>	0.0005*** (4.656)
<i>No. of empl.</i>	0.0014 (0.256)	<i>No. of empl.</i>	0.0000*** (-7.720)
<i>Adjusted R²</i>	0.328	<i>Adjusted R²</i>	0.295

Panel B: Estimation of the normal level of other emolument

<i>OTEM</i>		<i>OTEM/TA</i>	
<i>Intercept</i>	1172.1149*** (8.337)	<i>Intercept</i>	0.0006* (1.828)
<i>Sales</i>	0.0005*** (4.660)	<i>Sales/TA</i>	0.0002 (0.487)
<i>Profit margin</i>	58.4190*** (6.410)	<i>Profit margin</i>	0.0000 (-0.110)
<i>z_score</i>	-93.2782** (-2.187)	<i>z_score</i>	0.0008*** (4.883)
<i>No. of empl</i>	-0.0027 (-0.284)	<i>No. of empl</i>	0.0000*** (-5.888)
<i>Adjusted R²</i>	0.319	<i>Adjusted R²</i>	0.262

Panel C: Regression analysis of abnormal highest paid director and abnormal other emolument impacted by accrual-based and real earnings management

	<i>Abn_HPD</i>	<i>Abn_HPD/TA</i>	<i>Abn_OTEM</i>	<i>Abn_OTEM/TA</i>
Intercept	34.0287*** (4.0100)	-0.0001** (-2.701)	61.8374** (2.643)	0.0000 (-1.3400)
Abn_Accruals	-89.6227 (-0.152)	-0.0064*** (-3.338)	-1658.9249* (-1.483)	-0.0087*** (-5.180)
Abn_CFO	1336.0344** (2.984)	-0.0036* (-1.513)	2392.5060** (2.515)	-0.0029 (-1.078)
Abn_DISEXP	209.8464 (1.278)	-0.0013*** (-4.234)	136.6600 (0.483)	0.0007 (0.644)
Abn_PROD	-11.5284 (-0.058)	-0.0012*** (-4.261)	-206.9420 (-0.693)	0.0007 (0.663)
Adjusted R²	0.001	0.031	0.002	0.023

*Significant at 10% level. **Significant at the 5% level. ***Significant at the 1% level.

Note to Table 5.7: This table (Panel C) reports the results of Fama-Macbeth regression, the entire sample consists of 2,513 firm-year observations (359 firms listed on FTSE All-share) for the period between 2009 and 2015. The table contains the results of the following regressions:

$$Y_{i,t} = \alpha_i + \beta_1 Abn_accruals_{i,t} + \beta_2 Abn_CFO_{i,t} + \beta_3 Abn_DISEXP_{i,t} + \beta_4 Abn_PROD_{i,t} + u_{i,t}.$$

Each column presents the results of the above regression for a different variable definition, whose name appears in the first respective column. *T*-statistics (in parentheses) are reported in parentheses and calculated using standard errors corrected for autocorrelation using the Newey-West procedure. The adjusted *R* squares are also reported on the above table.

The dependent variable, $Y_{i,t}$, refers to the measure of the abnormal level of highest paid director (results reported in Panel A) and other emolument (results reported in Panel B), respectively, estimated as the difference between their actual level and normal level. Abnormal highest paid director, *Abn_HPD*, is estimated as the residuals from the predicted values from industry-year regression

$$: \quad HPD_{i,t} = \alpha_i + \beta_1 SALES_{i,t} + \beta_2 Prof.Margin_{i,t} + \beta_3 z_score_{i,t} + \beta_4 No.Empl_{i,t} + \varepsilon_{i,t};$$

abnormal highest paid director, *Abn_HPD/TA* is estimated as the residual from the predicted values from industry-year modified regression Model: $\frac{HPD_{i,t}}{TA_{i,t-1}} =$

$$\alpha_i + \beta_1 \frac{SALES_{i,t}}{TA_{i,t-1}} + \beta_2 Prof.Margin_{i,t} + \beta_3 z_score_{i,t} + \beta_4 No.Empl_{i,t} + \varepsilon_{i,t},$$

where $HPD_{i,t}$ and $Sales_{i,t}$ are scaled by total assets at the beginning of year *t* for firm *i*; *Abn_HPD/TA* is defined as the abnormal highest paid director scaled by total assets (shown in Panel A). Abnormal other emolument, *Abn_OTEM*, is estimated as the residuals from the predicted values from industry-year regression : $OTEM_{i,t} = \alpha_i + \beta_1 SALES_{i,t} + \beta_2 Prof.Margin_{i,t} + \beta_3 z_score_{i,t} + \beta_4 No.Empl_{i,t} + \varepsilon_{i,t}$; abnormal other emolument, *Abn_OTEM/TA* is estimated as the residual from the predicted values from industry-year modified regression model:

$\frac{OTEM_{i,t}}{TA_{i,t-1}} = \alpha_i + \beta_1 \frac{SALES_{i,t}}{TA_{i,t-1}} + \beta_2 Prof. Margin_{i,t} + \beta_3 z_score_{i,t} + \beta_4 No. Empl_{i,t} + \varepsilon_{i,t}$, where $OTEM_{i,t}$ and $Sales_{i,t}$ are scaled by total assets at the beginning of year t for firm i ; Abn_OTEM/TA is defined as the abnormal other emolument scaled by total assets (shown in Panel B); $Prof. Margin_{i,t}$ is profit margin which measures the profitability and performance, equal to the net income as a percentage of total sales in year t for the firm i ; $z_score_{i,t}$ is a measurement of the financial health of the firm and calculated by using multiple corporate income and balance sheet values in year t for the firm i ; $No. Empl_{i,t}$ is the number of employees in year t for the firm i ; $\varepsilon_{i,t}$ is the error term.

The independent variables: $Abn_Accruals_{i,t}$ refers to the abnormal level of discretionary accruals in year t for firm i , as the proxy of accrual-based earnings management, is measured as deviations from the predicted values from the corresponding industry-year regression: $\frac{Accruals_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \alpha_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \alpha_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$; $Abn_CFO_{i,t}$ is the abnormal level of cash flows from operations in year t for firm i , as one proxy of real earnings management, is measured as deviations from the predicted values from the corresponding industry-year regression: $\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$; $Abn_DISEXP_{i,t}$ is the abnormal level of discretionary expenses of year t for firm i , as one measure of real earnings management, is estimated as residuals from the predicted values from the corresponding industry-year regression: $\frac{DISEXP_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta \left(\frac{S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$; $Abn_PROD_{i,t}$ measures the abnormal level of production costs in year t for firm i , as one proxy of real earnings management, is calculated as deviations from the predicted values from the corresponding industry-year regression: $\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \beta_3 \left(\frac{\Delta S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$. Please see Appendix A for all variables descriptions.

5.8 Summary

To summarise, accrual-based earnings management and real activities manipulation are key strategies or methods that directors' especially executive directors adopt to manage earnings upwards or downwards to hit their specific targets. This chapter used both univariate and multivariate analysis to examine the relationship between abnormal directors' remuneration and abnormal accrual-based earnings management or abnormal real activities manipulation. The findings complement the existing literature on earnings management in the following ways. First, abnormal directors' remunerations are positively correlated to abnormal cash flows from operations, evidence that directors use sales-based manipulation through temporarily delaying the realisation of sales to report a poor profit performance to manage earnings downwards to achieve a large rise in earnings in the future. Moreover, it provides evidence that directors, in order to present a great improvement of performance shift previous period earnings to the current period by using production costs-based manipulation as the magnitudes of real activities

manipulation through overproduction are low when directors receive abnormally high remuneration. Furthermore, it suggests that directors utilise accrual-based earnings management to lower earnings making earnings performance look worse at current and to present a better earnings performance in the future in order to acquire additional rewards for themselves, where consistent with the findings of Meo, et al. (2017), Buchholze, et al.'s (2018), and Tahir, et al. (2019). There is supporting evidence that directors in negative earning firms have incentives to manage discretionary accruals to report income-decreasing earnings as they want to present a higher level of growth of earnings in the future. In addition, this study undertakes additional analysis to explore (a). the relationship between highest paid director and earnings management, and (b). the relationship between directors' other emoluments and their earnings management; and finds that directors deliberately report a decline in performance through utilising earnings management methods to manipulate earnings downwards as they tend to gain abnormally high remuneration.

Chapter 6 Conclusions

6.1 Introduction

Earnings management in accounting is the behaviour by some firms or organisations to intentionally affect the process of financial reporting in order to achieve specific targets, which involves alteration of financial reports to misrepresent stakeholders about the firms' underlying performance, or to change contractual results that depend on reported accounting figures. It has been the focus of many studies as exploring the issue of earnings management has a significant meaning, both for accounting research and practitioners. Three different types of earnings management can be adopted by firms to manage reported earnings: accrual-based earnings management, real activities manipulation, and classification shifting.

The primary aim of this thesis is to examine the quality of earnings reported by UK markets and explore whether firms manipulate reported earnings figures to hit specific target. The analysis of this thesis is commencing by detecting earnings management using accrual-based earnings management and real activities manipulation which both involve within GAAP and have been relatively widely researched on literature. Also, much research evidence that firms engage in earnings management motivated by meeting or beating different earnings benchmark. Thus, the first empirical study of the thesis aims to investigate whether firms manage reported earnings by utilising accrual-based and real earnings management which just meets or beats important earnings benchmarks (zero earnings and last year's earnings). In addition, directors have the incentive to use earnings management to gain additional compensation for themselves. Therefore, the second part of this thesis is to examine the relationship between directors' remuneration and their earnings management.

The remainder of this chapter is structured as follows. At first is presented the summary of the research question, hypotheses development, and key findings for each empirical study. Secondly, the chapter summarises its contribution to knowledge, then discusses the implications of this research from theoretical and academic, and policy and practical perspectives. Moreover, it explains the potential limitations of this study, and gives some recommendations for future research.

6.2 Summary of Research Questions, Hypotheses, Key Findings

As derived from the formulated conclusion of previous chapters, this section restates the aims of the study, answers the main research questions, and presents the empirical results of testing hypotheses for each study set.

6.2.1 Earnings Management just Meeting or Beating Earnings Benchmarks

This section of the thesis is aimed at examining whether firms in the UK market manage reported earnings by utilising accrual-based earnings management and real activities manipulation which just meet or beat important earnings benchmarks ('zero' level of earnings, last year's earnings). The research questions in this study are stated as follows, based on a defined aim:

- Do firms engage in real activities manipulation which just meet/beat the earnings benchmarks ('zero' level of earnings and last years' earnings)?
- Do firms use sales-based manipulation which just meet/beat the earnings benchmarks ('zero' level of earnings and last year's earnings)?
- Do firms cut or reduce discretionary expenses, which just meet/beat the earnings benchmarks ('zero' level of earnings and last year's earnings)?
- Do firms overproduce goods which just meet/beat the earnings benchmarks ('zero' level of earnings and last year's earnings)?
- Do firms engage in accrual-based earnings management which just meet/beat the earnings benchmarks ('zero' level of earnings and last year's earnings)?

Table 6.1 presents a list of hypotheses which have been developed in Chapter 3 and the summary of empirical findings related to the hypotheses. According to Roychowdhury's (2006) study, firms can focus on three real activities manipulation methods to boost earnings by means of sales-based manipulation which accelerates the timing of sales or generates additional unsustainable sales through increased price discounts and more lenient credit terms; discretionary expenses-based manipulation which cuts or reduces discretionary expenses including that of advertising, R&D, sales and general and administrative expenses; production-based manipulation which overproduces or increases production to report lower costs of goods sold. The first four research questions in this study are about whether firms engage in real

activities manipulation (*RAM*, *Abn_CFO*, *Abn_DISEXP*, *Abn_PROD*) to meet or beat earnings benchmarks (zero earnings, last year's earnings). The first hypothesis set (**H1**, **H1a**, **H1b** and **H1c**) tests whether firms in the UK market which just meet or beat earnings benchmarks around zero level of earnings and last's year's earnings are more likely to engage in real activities manipulation. The tests comprised a sample of firms contained in the FTSE All-share cover the period of 2009-2015, and employed the Fama-Macbeth approach. It found that UK suspect firm-years just beat or meet the zero level of earnings benchmark and engage more in real activities manipulation through reducing/cutting discretionary expenses to boost current period earnings and produce more goods than necessary to meet expected demand with a reduced fixed cost, thereby increasing the operating margin (supported both **H1b** and **H1c**). Furthermore, suspect firm-years tend to use sales-based manipulation, reduction in discretionary expenses, and overproduction at the same time to manage earnings upwards when meeting the earnings benchmark at around zero level (supported **H1**). However, the results show that suspect firm-years that just meet the zero earnings benchmarks are not associated with abnormal cash flow from operations (unsupported **H1a**). In addition, the results reveal that firms in the UK market are not involved in managing earnings upwards by using real activities manipulation via sales-based earnings management and overproduction, and are more involved in real activities manipulation through reduction or cutting of discretionary expenses when just meeting last year's earnings benchmark.

The final research question related to the second hypothesis (**H2**) shown in Table 6.1. As noted in Chapter 3, discretionary accruals are used to measure whether firms engage in accrual-based earnings management in this study. The amount of abnormal discretionary accruals (*Abn_Accruals*) indicated the extent of accrual-based earnings management. Hypothesis 2 (**H2**) predicted that firms which just meet/beat earnings benchmarks around zero earnings and last year's earnings exhibit unusually high discretionary accruals. However, this hypothesis is not supported as empirical results suggest that UK firms which just meet or beat earnings around zero level and last year's earnings are not using an accrual-based earnings management tool (unsupported **H2**).

Finally, in addition to test the identified hypotheses, this study undertook additional analysis to extend the results of firms which meet earnings benchmarks by using accrual-based earnings management and real activities manipulation, this analysis provided some distinguished evidence from other previous studies. The majority of prior literature focused on firms using earnings management methods to manipulate earnings upwards, whilst some firms have an incentive to engage in earnings management to make earnings downwards for a better further

performance as it found that the Loss-making firm are more likely to using accrual-based earnings management to manipulate earnings downwards ('Big Bath' action). The empirical results of whether firms use earnings management to decrease earnings further or shift positive earnings to a negative level show that, in order to achieve future better performance, some UK firms are likely to decrease their earnings or shift positive earnings to negative earnings to engage in earnings management activities through discretionary expenses based manipulation, production costs based manipulation, and accrual-based earnings management.

Table 6.1: List of hypotheses and empirical results related to Part I

Hypothesis	Earnings management tool	Results: zero earnings	Results: last year's earnings
H1: Firms which just meet/beat earnings benchmarks ('zero' level of earnings and last year's earnings) are more likely to engage in real activities manipulation.	Real activities Manipulation	Supported, significant relation	Not supported, no significant relation
H1a: Firms which just meet/beat earnings benchmarks ('zero' level of earnings and last year's earnings) exhibit unusually low cash flows from operations.	Sales manipulation	Not supported, no significant relation	Not supported, no significant relation
H1b: Firms which just meet/beat earnings benchmarks ('zero' level of earnings and last year's earnings) exhibit unusually low discretionary expenses.	Discretionary expenses manipulation	Supported, significant relation	Supported, significant relation
H1c: Firms which just meet/beat earnings benchmarks ('zero' level of earnings and last year's earnings) exhibit unusually high production costs.	Production costs manipulation	Supported, significant relation	Not Supported, no significant relation
H2: Firms which just meet/beat earnings benchmarks ('zero' level of earnings and last year's earnings) are more likely to engage in accrual-based earnings management.	Accrual-based earnings management	Not supported, no significant relation	Not Supported, no significant relation

6.2.2 The Relation between Directors' Remuneration and their Earnings Management

The aim of second part of the thesis was to investigate whether and how the relationship between earnings management and directors' remuneration varied with the extent of earnings management, the methods of earnings management, and the level of directors' remuneration. Based on the objective, the study focused on the following related question:

- Whether there is a relationship between firms which engage in accrual-based or real earnings management and directors' remuneration?

Prior literature in earnings management predicted that directors have incentives to engage in earnings management by using accrual-based and real earnings management methods, in order to achieve an improvement of performance. However, only a few studies found that directors have an incentive to present a decline in performance by utilising different types of earnings management to manage earnings downwards for the purpose of gaining personal benefits themselves. Cohen and Zarowin (2010) found that the post-SEO operating performance decline is driven not only by accrual reversal (accrual-based earnings management), but also reflects the real consequences of operational decisions (real activities manipulation) made to manage earnings in the time of the SEO. Kothari et al. (2016) also found a decline in firms' performance, showing that earnings management is most closely and predictably linked with post-SEO stock market under-performance when it is driven by real activities manipulation. Tahir, et al. (2019) also evidence that less income-increasing earnings management through discretionary expenses and accruals take places when directors' remuneration measured by firm performance. These ideas offer an insight into this research as to whether directors tend to engage in earnings management activities to manipulate earnings downward for the purpose of maximising their personal gains. Therefore, further to the research question, one hypothesis (**H3**) of this study was developed and predicted that there is a relationship between directors' remuneration and earnings management (accrual-based earnings management and real activities manipulation).

In order to conduct a test of this hypothesis, this study employed abnormal directors' remuneration ²¹ (*Abn_DSB*) to measure whether directors gain an excessive level of compensation by engaging in earnings management. A new model was created to estimate the degree of abnormal directors' remuneration, whereby the variables included sales revenue, profit margin, *z_score*, and the number of employees used to estimate the normal level of

²¹ Abnormal directors' remuneration (*Abn_DSB*) is calculated as the actual level of directors' remuneration minus the normal level of directors' remuneration.

directors' remuneration. The empirical results found that abnormal directors' remuneration positively correlated to abnormal cash flow from operations, suggesting that directors use sales-based earnings management such as by means of temporarily delaying the realisation of sales to manipulate earnings downwards in order to provide a decline in performance and so gain a greater improvement in performance in future. The results have revealed that directors present overstated earnings in the current period by using production costs-based manipulation as the magnitude of real activities manipulation through overproduction is at a lower level when directors receive abnormally high remuneration. Moreover, the results have found that directors utilise accrual-based earnings management to manage earnings downwards to pursue additional rewards for themselves. In addition, this study employs 'highest paid director' and 'other emoluments' to conduct additional analysis, and provides supporting evidence that directors have the incentive to report a decline in performance by using a different type of earnings management to manipulate earnings downwards to achieve abnormally high remuneration for themselves. Thus, the hypothesis has been supported by these empirical results, as there is a negative relationship between directors' remuneration and their earnings management through discretionary accruals, and directors have incentives to use different earnings management methods to manipulate earnings upwards and downwards.

6.3 Summary of Contributions

As noted in Chapter 1, the following presents a brief summary of this thesis's contributions to the existing literature in earnings management from different aspects.

The first contribution of this study is that it has examined earnings management by using the two most common tools: accrual-based earnings management and real activities manipulation. This study provides empirical results showing that, on the one hand firms in the UK market are more likely to engage in real activities management than accrual-based earnings management when meeting or beating the earnings benchmarks at around zero earnings and last year's earnings; on the other hand, firm directors have the incentive to use accrual-based earnings management and real activities manipulation to manage earnings upwards and downwards. Thus, this thesis extended the existing literature which has been carried out into the earnings quality, and provides a greater comprehension of detecting earnings management.

Secondly, numerous researchers in earnings management focused on accrual-based earnings management and real activities manipulation, whereas few studies confirm that each earnings

management tool or their results are reliable. This study utilised a modified Jones' (1995) model to measure accrual-based earnings management, and especially followed Roychowdhury's (2006) three proxies to detect real activities manipulation. Similar results were ascertained, thus, it provides supporting evidence to confirm the validity of estimation.

Thirdly, adoption of the earnings benchmark has a different impact on the ability to detect earnings management. This study has examined whether firms engage in accrual-based earnings management and real activities manipulation which meet or beat the earnings benchmark at around zero level or last year's earnings. Empirical results have indicated that UK firms are more likely to engage in real activities manipulation through using reduction in discretionary expenses and overproduction to manage earnings in order to avoid losses (zero level of earnings benchmark). However, firms are engaging in real activities manipulation only by reducing discretionary expenses to manipulate earnings when just meeting last year's earning benchmark, thus the different levels of earnings produces a different conclusion as regards earnings management detection. This study enhances extant literature and is recommended for subsequent research studies into the measuring of earnings management which meets or beats different earnings benchmarks.

Most prior literature on earnings management shows that firms use different types of earnings management to manipulate earnings upwards to hit their specific targets, however fewer studies examine whether firms use earnings management to manipulate earnings downwards. This study has creatively grouped a sample of firms with negative earnings, and determined that firms in the UK with negative earnings have greater incentives to manipulate discretionary accruals, manipulate discretionary expenses, and manipulate production costs to manage their earnings downwards or shift positive earnings to a negative level to report a better future performance. These new findings complement the existing literature which states that firms use accrual-based earnings management and real activities manipulation not only to increase their earnings but also to decrease earnings for their specific purposes in the UK market.

In addition, previous literature pays less attention to examining whether earnings management incentives arise from directors' remuneration, although the study of earnings management has been highly investigated. This study conducted an investigation into the relationship between directors' remuneration and their earnings management in the UK market and found that there is a decline in firm performance when directors utilise accrual-based earnings management and real activities manipulation to manage earnings downwards. It presents new evidence and enhances the literature which is relevant to earnings management and directors' remuneration.

Finally, in order to examine whether directors have received an excessive level of remuneration through using different earnings management tools, this study built a new model for measuring the amount of abnormal directors' remuneration. The abnormal directors' remuneration measured the degree of additional rewards received by directors, and linked it to the abnormal level of earnings management to produce relevant results. Therefore, to the best of my knowledge, it is the first study which builds a new model to measure abnormal directors' remuneration in order to investigate the relationship between abnormal directors' remuneration and abnormal earnings management.

6.4 Policy and Practical Implications

This study primarily aimed at examining the quality of reported earnings and explored whether firms manipulate reported earnings figures to achieve specific targets therefore, as indicated in empirical findings, this study presents several important policy and practical implications. First, earnings quality as defined by Dechow et al. (2010b), indicated that higher quality earnings provide more information about the features of a firm's financial performance, which are relevant to a specific decision made by a specific decision-maker. However, earnings management has a negative effect on earnings quality, and may weaken the credibility of financial reporting, as it functions in some firms or organisations to obtain specific targets and misrepresent or disguise their true economic performance. Thus, it is a significant accounting issue for both researchers, regulators, and other practitioners. Firms have incentives to engage in accrual-based earnings and real activities manipulation to manage earnings in order to avoid earnings loss or avoid earnings decrease, whilst directors have incentives to acquire personal benefits for themselves by utilising earnings management. In the opinion of this research, these results suggest that focusing on one single method of earnings management does not fully reflect earnings management activities, that firms are more likely to use different type of earnings management simultaneously, and earnings management is not only used to increase earnings but also to decrease earnings. With regard to regulators, the implication is that there is a greater need for increasing scrutiny or constraints on accounting discretions in order to eliminate earnings management activities and to ensure firms disclose quality earnings information.

Second, the ability to understand the extent to which earnings are manipulated by managers has significant implications for analysts, regulators, researchers, and other professionals. With regard to analysts and investors, understanding the extent to which managers manipulate

discretion in earnings offers support to the idea of examination of earnings quality. It is important and helpful for regulators, policy makers or standard-setters, to understand whether firms engage in earnings management and how they undertake this, as the impact of earnings management draws the attention of regulators or standard-setters to the limitations of accounting regulations and standards, and encourages them to implement improvements.

Third, higher audit quality should provide greater credibility to the financial statement. The highly critical assertion of the auditing profession that managers seek to deceive the public has acted as a spur for researchers to carry out research into the impact of earnings management on auditors' incentives. This study has investigated earnings management which meets important earnings benchmarks, and the relationship between directors' remuneration and earnings management, therefore it potentially suggests the necessity for a closer scrutiny by auditors and regulators, so that financial reports are more reliable.

Finally, this study has identified important implications for boards of directors, remuneration committees, investors, shareholders, and other practitioners who are involved in directors' remuneration practices. Directors who work with the Board of Directors, are responding directly to the board and carrying out the board's decisions, and are responsible for everything that happens in the firm, such as strategic planning and operating within a budget. Directors' remuneration set by the remuneration committee can be affected by many factors, according to the principal-agent theory, directors' pay is positively related to firm performance in order to provide directors financial incentives as it is linked to the interests of directors and shareholders and alleviates a conflict of interests. This study provides the opposite result that directors' remuneration is negatively related to firm performance, as they act in the best interests of themselves when engaging in earnings management. It motivates the board and remuneration committee to improve the ability to design a remuneration plan to ensure that directors have a stake in performing well to maximise the interests of their shareholders.

6.5 Limitations

Nothing is perfect and this thesis has many limitations. It has, however identified several research gaps through reviewing a wide range of literature, and intended to fill research gaps by developing a series of hypotheses based on various empirical studies. An attempt was made to design the most appropriate research methods, and provide some significant and informative

empirical results and important implications for policy and market practitioners This section has identified some limitations from the different perspectives in this study.

One of the limitations of this study is that it has detected earnings management by only selecting the most two commonly types: accrual-based earnings management and real earnings management, both of which are relatively extensively researched. In order to detect earnings management the third method referred to as classification shifting can be used, performed by the deliberate misclassification of items within the income statement without changing bottom line earnings and is less costly than engaging in accrual-based and real earnings management, although it has been largely ignored to date.

Secondly, this study investigated whether firms engage in earnings management to gain specific targets which just meet or beat earnings benchmarks around zero level of earnings and last year's earnings. However, earnings benchmarks in reality apply to earnings management which not only avoids loss and avoids an earnings decrease, and many other factors also offer incentives to earnings management, such as aligning with the management's forecast earnings, hitting the analysts' forecasts consensus.

The third limitation in this study relates to the estimation models used to detect earnings management. It has examined accrual-based earnings management by adopting the modified Jones'(991) model, using abnormal discretionary accruals to measure the extent of accrual earnings management, whilst a range of accrual models has been developed and is widely used in literature, such as the Dechow and Dichev (2002) approach, performance-matched models, and discretionary estimation errors. This study followed Roychowdhury's (2006) three proxies to detect real activities manipulation via sales-based manipulation, reducing discretionary expenses, and overproduction, but real earnings management can also be measured through other less common operating activities such as stock repurchases.

This study used the abnormal level of directors' remuneration to measure the number of directors who gain an excessive level of compensation, estimated by a newly designed model. The amount of abnormal directors' remuneration was examined as the estimated residual from the creative regression for normal level of directors' remuneration, where variables only included sales revenue, profit margin, z-score, and the number of employees. A limitation is that the estimation model is too simple, directors' remuneration can be affected by many factors not only limited to these four variables, but also may include a return on assets, market to book value, leverage, etc. In addition, this study has been based on the UK market and the sample of

firms was drawn from firms within FTSE All-share in order to detect whether firms engage in earnings management, and does not include those firms quoted on the Alternative Investment Market.

6.6 Future Studies

This study also provided the following recommendations for future research.

First, the study focused on two major tools of earnings management: accrual-based earnings management and real activities manipulation, whilst the third tool detected earnings management using classification shifting, which has been largely ignored to date. Future studies may wish to explore earnings management by means of these three methods together, in order that it will have a comprehensive overview of how firms manage their earnings as different types of earnings management result in different conclusions.

Second, it suggests future research take account of another important earnings benchmark which is that of meeting the analysts' forecast consensus, as it is observed by many investors and plays an important role in measuring the appropriate valuation of a stock. Unlike earnings benchmarks around zero earnings level and last year's earnings, earnings forecasts are based on analysts' expectations of firm growth and profitability, and most analysts build financial models to predict earnings which estimate prospective revenues and costs. Thus, firms have strong incentives to engage in earnings management by using different types of it, for example, classification shifting tends to be more pervasive when it allows the manager to meet the analyst forecast.

Third, this study included executive directors in order to investigate the relationship between earnings management and directors' remuneration. Some executive directors, who in a top position and have more power of decision-making in firms, such as the CEO or CFO, may have more incentives to engage in earnings management. Thus, an interesting topic for future researchers could be to examine the relationship between top directors and their earnings management.

Fourth, in recent decades, equity-based compensation became popular and relatively more prevalent, thus directors' compensation may be more relevant to market-based firm performance, in that directors' wealth varies with market performance, as indicated by stock

prices. Therefore, in future studies, it may be of value to investigate whether directors engage in earnings management are motivated by equity-based compensation.

Fifth, according to Zang's (2012) study, managers engage in a trade-off between real activities manipulation and accrual-based earnings management based on their relative costs and adjust the level of accrual-based earnings management by means of the level of realized real activities manipulation. Thus future researchers may also wish to explore the existence of a trade-off relationship between accrual-based earnings management, real activities manipulation, and classification shifting.

Appendices

Appendix A Variables Used for my Analysis and Corresponding Definitions

Variable	Definition
<i>S</i>	Total sales revenue.
$\Delta S, \Delta Rve$	Change in sales, difference between sales revenue at the end of year and the sales revenue at the beginning of year.
<i>PPE</i>	The gross property, plant and equipment.
ΔRec	Change in receivables.
ΔWC	Change in working capital.
<i>Size</i>	Firm's size, calculated as log of total assets.
<i>OperCycle</i>	Operating cycle.
<i>NegEarn</i>	Incidence of negative earnings over the past 10 years.
<i>A, TA, TACC</i>	Total assets.
<i>NI</i>	Net income
<i>HPD</i>	Highest paid director
<i>OTEM</i>	Other emolument
<i>EBITDA</i>	Earnings before interests, tax, depreciation and amortization, a measure of a firm's operating performance.
<i>Accruals</i>	Discretionary accruals, earnings before extraordinary items and discontinued operations minus the operating cash flows reported in the statement of cash flows.
<i>Normal_Accruals</i>	Normal level of discretionary accruals, is estimated for every industry and year by the model: $\frac{Accruals_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \alpha_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \alpha_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$.
<i>Abn_Accruals</i>	Abnormal level of discretionary accruals, is equal to actual level of discretionary accruals ($Accruals_{i,t}/A_{i,t-1}$) minus normal level of discretionary accruals ($Normal_Accruals_{i,t}$),
<i>CFO</i>	Cash flows from operations.
<i>Normal_CFO</i>	Normal level of cash flows from operations, is calculated by using estimated industry-level coefficients and the firm-year's sales and lagged assets from the model: $\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$.
<i>Abn_CFO</i>	Abnormal level of cash flows from operations, is equal to actual cash flows from operations ($CFO_{i,t}/A_{i,t-1}$) minus the normal level of cash flows from operations ($Normal_CFO_{i,t}$).
<i>DISEXP</i>	Actual discretionary expenses; the sum of research and development (R&D), advertising, selling, general and administrative expenses

	(SD&A); R&D and advertising are set to zero if they are missing or not available.
<i>Normal_DISEXP</i>	Normal level of discretionary expenses, is estimated for each industry and year by the model: $\frac{DISEXP_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta \left(\frac{S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$.
<i>Abn_DISEXP</i>	Abnormal level of discretionary expenses, is equal to actual discretionary expenses ($DISEXP_{i,t}/A_{i,t-1}$) minus normal level of discretionary expenses ($Normal_DISEXP_{i,t}$).
<i>PROD</i>	Actual production costs, the sum of cost of goods sold and change in inventory.
<i>Normal_PROD</i>	Normal level of production costs, is estimated for every industry and year by the model: $\frac{PROD_{i,t}}{A_{i,t-1}} = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_1 \left(\frac{S_{i,t}}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta S_{i,t}}{A_{i,t-1}} \right) + \beta_3 \left(\frac{\Delta S_{i,t-1}}{A_{i,t-1}} \right) + \varepsilon_{i,t}$.
<i>Abn_PROD</i>	Abnormal level of production costs, is equal to actual production costs ($PROD_{i,t}/A_{i,t-1}$) minus normal level of production costs ($Normal_PROD_{i,t}$).
<i>COGS</i>	Costs of goods sold.
<i>INV</i>	Inventories.
ΔINV	Change in inventory of Firm <i>i</i> from year <i>t</i> – 1 to year <i>t</i>
<i>Suspect firm – year</i>	An indicator variable for suspect firm-years just beating/meeting important earnings benchmarks.
<i>Suspect_zero</i>	An indicator variable that is set equal to one if firm <i>i</i> 's net income before extraordinary items scaled by lagged total assets is between 0 and 0.005, and is set equal to zero otherwise, based on Roychowdhury's (2006) criteria to identify suspect firm-years.
<i>Suspect_last</i>	An indicator variable that is set equal to one if firm <i>i</i> 's change in net income before extraordinary items from the last year is between 0 and 0.01, and is set equal to zero otherwise, based on Gunny's (2006) criteria to identify suspect firm-years.
<i>ROA</i>	Rate of return on assets, calculated as net income divided by lagged total assets.
<i>MTB</i>	Market value to book value ratio, indicates the firms' growth opportunities.
<i>LnMVE</i>	Logarithm of the market value of equity of firm <i>i</i> , measured at the beginning of year <i>t</i> , indicates the potential impact of the relative firm size effect in the industry.
<i>Loss</i>	An indicator variable that is set equal to one if firm with negative earning, and is set equal to zero otherwise.
<i>No. Empl</i>	Number of employee.
<i>Prof. Margin</i>	Profit margin, calculated by net income divide sales revenue in year <i>t</i> for firm <i>i</i> .
<i>DSB</i>	Total directors' remuneration, sum of salary, pension contribution, and other emoluments.

<i>Normal_DSB</i>	Normal level of directors' remuneration, is estimated for every industry and year by the model: $DSB_{i,t} = \alpha_i + \beta_1 SALES_{i,t} + \beta_2 Prof. Margin_{i,t} + \beta_3 z_score_{i,t} + \beta_4 No. Empl_{i,t} + \varepsilon_{i,t}$.
<i>Abn_DSB</i>	Abnormal level of directors' remuneration, is equal to actual directors' remuneration ($DSB_{i,t}$) minus normal level of directors' remuneration ($Normal_DSB_{i,t}$).
<i>z - score</i>	Altman's z-score, the prediction of distress and turnaround; calculated by the model: $Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$, where X_1 = net working capital / total assets (measure of liquidity), X_2 = retained earnings/ total assets (measures of cumulative profitability), X_3 = EBIT/ total assets (measure of return on assets), X_4 = market value of equity / book value of total liabilities (measure of market leverage), X_5 = sales / total assets (measure of sales generating potential of assets). The formula may be used to predict the probability that a firm will go into bankruptcy within two years. z-score is used to predict corporate defaults and an easy-to-calculate control measure for the financial distress status of companies in academic studies. The z-score uses multiple corporate income and balance sheet values to measure the financial health of a company. This method is successful in predicting the status of financial distress in any firm. Altman z-score can help in measuring the financial health of a business organization by the use of multiple balance sheet values and corporate income. The value of the Altman z-score is generally around - 0.25 for firms that have the highest probability of going bankrupt. On the other hand, for firms having the least probability of facing a bankruptcy, the value of Altman z-score value is as high as + 4.48. The Altman z-score formula is helpful for investors to determine if they should consider buying a stock or sell some of the stocks they have. Generally, the Altman z-score below 1.8 denotes that the firm is under the chance of getting into bankruptcy. On the other hand, the firms with Altman z-score above 3 are deemed to be less likely to go bankrupt. So an investor can decide to buy a stock if the Altman z-score is closer to value 3 and similarly they can decide to sell a stock if the value is closer to 1.8.

Appendix B List of Sample Firms

Firm name	Primary UK SIC (2007) code	Industry code	Main industry
4imprint Group PLC	46760	12	Wholesale and retail, motor vehicle repair, sale of fuel
A.G. Barr PLC	11070	5	Manufacture food, drink, tobacco
AA PLC	94990	17	Other service activities
Acacia Mining PLC	08990	2	Mining, Quarry (inc extraction of petroleum and gas)
Acal PLC	27900	7	Manufacture computer, electronic, light electrical
Aggreko PLC	28140	7	Manufacture machinery, vehicle transport
Amec Foster Wheeler PLC	70100	15	Business service
Anglo American PLC	08990	2	Mining, Quarry (inc extraction of petroleum and gas)
Antofagasta PLC	08990	2	Mining, Quarry (inc extraction of petroleum and gas)
AO World PLC	47540	12	Wholesale and retail, motor vehicle repair, sale of fuel
Ascential PLC	82301	15	Business service
Ashmore Group PLC	70229	15	Business service
Ashtead Group PLC	77390	15	Business service
Associated British Foods PLC	46390	12	Wholesale and retail, motor vehicle repair, sale of fuel
Assura PLC	41100	11	Construction
Astrazeneca PLC	21100	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Auto Trader Group PLC	58142	14	Information and Communication
Aveva Group PLC	62020	14	Information and Communication
Avon Rubber PLC	22190	9	All other Manufacturing
B&M European Value Retail SA	47190	12	Wholesale and retail, motor vehicle repair, sale of fuel
Babcock International Group PLC	84220	16	Government administrative functions, Education, Health
BAE Systems PLC	30300	7	Manufacture machinery, vehicle transport
Balfour Beatty PLC	41100	11	Construction
Barratt Developments PLC	41201	11	Construction
BBA Aviation PLC	52230	13	Transportation and storage
Bellway PLC	41100	11	Construction
Berendsen PLC	96010	17	Other service activities
Bgeo Group PLC	64205	15	Business service
BHP Billiton PLC	08990	2	Mining, Quarry (inc extraction of petroleum and gas)
BIG Yellow Group PLC	52103	13	Transportation and storage
Bloomsbury Publishing PLC	58110	14	Information and Communication
Bodycote PLC	71129	15	Business service
Booker Group PLC	46390	12	Wholesale and retail, motor vehicle repair, sale of fuel
Bovis Homes Group PLC	41202	11	Construction

BP PLC	06100	2	Mining, Quarry (inc extraction of petroleum and gas)
Braemar Shipping Services PLC	50200	13	Transportation and storage
Brewin Dolphin Holdings PLC	66120	15	Business service
British American Tobacco PLC	12000	5	Manufacture food, drink, tobacco
British Land Company PLC	41100	11	Construction
Britvic PLC	11070	5	Manufacture food, drink, tobacco
BT Group PLC	61900	14	Information and Communication
BTG PLC	72190	15	Business service
Bunzl PLC	52243	13	Transportation and storage
Burberry Group PLC	14132	9	Manufacture textiles, leather
Cairn Energy PLC	06100	2	Mining, Quarry (inc extraction of petroleum and gas)
Cambian Group PLC	85310	16	Government administrative functions, Education, Health
Cape PLC	43999	11	Construction
Capita PLC	70229	15	Business service
Capital & Counties Properties PLC	41100	11	Construction
Carclo PLC	22290	9	All other Manufacturing
Card Factory PLC	47190	12	Wholesale and retail, motor vehicle repair, sale of fuel
Carillion PLC	41201	11	Construction
Carnival PLC	50100	13	Transportation and storage
Carpetright PLC	47530	12	Wholesale and retail, motor vehicle repair, sale of fuel
Carr's Group PLC	10611	5	Manufacture food, drink, tobacco
Centamin PLC	07290	2	Mining, Quarry (inc extraction of petroleum and gas)
Centrica PLC	35220	16	Utilities, sewerage, waste and recycling
Charles Taylor PLC	70221	15	Business service
Chemring Group PLC	20510	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Cineworld Group PLC	59140	14	Information and Communication
Circassia Pharmaceuticals PLC	72110	15	Business service
Clarkson PLC	52290	13	Transportation and storage
CLS Holdings PLC	41100	11	Construction
Cobham PLC	61900	14	Information and Communication
Communis PLC	18129	9	All other Manufacturing
Compass Group PLC	56210	17	Other service activities
Computacenter PLC	62020	14	Information and Communication
Connect Group PLC	46499	12	Wholesale and retail, motor vehicle repair, sale of fuel
Consort Medical PLC	32500	9	All other Manufacturing
Costain Group PLC	42990	11	Construction
Cranswick PLC	46390	12	Wholesale and retail, motor vehicle repair, sale of fuel
Crest Nicholson Holdings PLC	41201	11	Construction
CRH PLC	70100	15	Business service

Croda International PLC	20590	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Cybg PLC	66110	15	Business service
Daejan Holdings PLC	41100	11	Construction
Dairy Crest Group PLC	10511	5	Manufacture food, drink, tobacco
DCC PLC	70100	15	Business service
De LA Rue PLC	18129	9	All other Manufacturing
Debenhams PLC	47190	12	Wholesale and retail, motor vehicle repair, sale of fuel
Dechra Pharmaceuticals PLC	75000	15	Business service
Derwent London PLC	41100	11	Construction
Devro PLC	10110	5	Manufacture food, drink, tobacco
DFS Furniture PLC	47599	12	Wholesale and retail, motor vehicle repair, sale of fuel
Diageo PLC	11010	5	Manufacture food, drink, tobacco
Dialight PLC	26110	7	Manufacture computer, electronic, light electrical
Dignity PLC	96030	17	Other service activities
Diploma PLC	46690	12	Wholesale and retail, motor vehicle repair, sale of fuel
Direct Line Insurance Group PLC	66220	15	Business service
Dixons Carphone PLC	47421	12	Wholesale and retail, motor vehicle repair, sale of fuel
Domino's Pizza Group PLC	56101	17	Other service activities
Drax Group PLC	35110	16	Utilities, sewerage, waste and recycling
DS Smith PLC	47789	12	Wholesale and retail, motor vehicle repair, sale of fuel
Dunelm Group PLC	47599	12	Wholesale and retail, motor vehicle repair, sale of fuel
Easyjet PLC	51102	13	Transportation and storage
EI Group PLC	56302	17	Other service activities
Electrocomponents PLC	46520	12	Wholesale and retail, motor vehicle repair, sale of fuel
Elementis PLC	20140	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Enquest PLC	06100	2	Mining, Quarry (inc extraction of petroleum and gas)
Entertainment One Ltd	59131	14	Information and Communication
Equiniti Group PLC	82990	15	Business service
Essentra PLC	22210	9	All other Manufacturing
Euromoney Institutional Investor PLC	58142	14	Information and Communication
Evraz PLC	24100	9	All other Manufacturing
Exova Group PLC	74909	15	Business service
Experian PLC	82990	15	Business service
FDM Group (Holdings) PLC	78200	15	Business service
Fenner PLC	25620	9	All other Manufacturing
Ferrexpo PLC	07100	2	Mining, Quarry (inc extraction of petroleum and gas)
Fidessa Group PLC	82990	15	Business service
Findel P.L.C.	47910	12	Wholesale and retail, motor vehicle repair, sale of fuel

Firstgroup PLC	49319	13	Transportation and storage
Flybe Group PLC	51101	13	Transportation and storage
Fresnillo PLC	07290	2	Mining, Quarry (inc extraction of petroleum and gas)
Fuller Smith & Turner PLC	56302	17	Other service activities
G4S PLC	80100	15	Business service
Galliford Try PLC	41201	11	Construction
Game Digital PLC	47540	12	Wholesale and retail, motor vehicle repair, sale of fuel
Gem Diamonds Ltd	08990	2	Mining, Quarry (inc extraction of petroleum and gas)
Genus PLC	72110	15	Business service
GKN PLC	29320	7	Manufacture machinery, vehicle transport
Glaxosmithkline PLC	21100	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Glencore PLC	08990	2	Mining, Quarry (inc extraction of petroleum and gas)
Goodwin PLC	28290	7	Manufacture machinery, vehicle transport
Grafton Group PLC	70100	15	Business service
Grainger PLC	41100	11	Construction
Great Portland Estates PLC	41100	11	Construction
Greencoat UK Wind PLC	35110	16	Utilities, sewerage, waste and recycling
Greencore Group PLC	82990	15	Business service
Greene King PLC	56302	17	Other service activities
Greggs PLC	10710	5	Manufacture food, drink, tobacco
Gulf Marine Services PLC	50200	13	Transportation and storage
GVC Holdings PLC	92000	17	Other service activities
Halfords Group PLC	30920	7	Manufacture machinery, vehicle transport
Halma PLC	32990	9	All other Manufacturing
Hammerson PLC	41100	11	Construction
Hays PLC	78109	15	Business service
Headlam Group PLC	47530	12	Wholesale and retail, motor vehicle repair, sale of fuel
Helical PLC	41100	11	Construction
Henry Boot PLC	41100	11	Construction
Hikma Pharmaceuticals PLC	21100	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Hill & Smith Holdings PLC	47520	12	Wholesale and retail, motor vehicle repair, sale of fuel
Hochschild Mining PLC	07290	2	Mining, Quarry (inc extraction of petroleum and gas)
Hogg Robinson Group PLC	79110	15	Business service
Homeserve PLC	43220	11	Construction
Howden Joinery Group PLC	47599	12	Wholesale and retail, motor vehicle repair, sale of fuel
HSS Hire Group PLC	46740	12	Wholesale and retail, motor vehicle repair, sale of fuel
Hunting PLC	25620	9	All other Manufacturing
Ibstock PLC	23320	9	All other Manufacturing
Imagination Technologies Group PLC	63990	14	Information and Communication
IMI PLC	28120	7	Manufacture machinery, vehicle transport
Imperial Brands PLC	12000	5	Manufacture food, drink, tobacco

Inchcape PLC	45111	12	Wholesale and retail, motor vehicle repair, sale of fuel
Indivior PLC	21100	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Informa PLC	73200	15	Business service
Inmarsat PLC	61300	14	Information and Communication
Intercontinental Hotels Group PLC	55100	17	Other service activities
International Consolidated Airlines Group	51101	13	Transportation and storage
Interserve PLC	70229	15	Business service
Intertek Group PLC	71200	15	Business service
ITE Group PLC	82301	15	Business service
ITV PLC	60200	14	Information and Communication
J D Wetherspoon PLC	56302	17	Other service activities
J Sainsbury PLC	47110	12	Wholesale and retail, motor vehicle repair, sale of fuel
James Fisher And Sons PLC	50200	13	Transportation and storage
JD Sports Fashion PLC	47640	12	Wholesale and retail, motor vehicle repair, sale of fuel
Jimmy Choo PLC	47721	12	Wholesale and retail, motor vehicle repair, sale of fuel
John Laing Group PLC	70229	15	Business service
John Menzies PLC	47620	12	Wholesale and retail, motor vehicle repair, sale of fuel
John Wood Group PLC	70100	15	Business service
Johnson Matthey PLC	24410	9	All other Manufacturing
JRP Group PLC	66290	15	Business service
Just Eat PLC	56103	17	Other service activities
Kainos Group PLC	62020	14	Information and Communication
KAZ Minerals PLC	46720	12	Wholesale and retail, motor vehicle repair, sale of fuel
Kcom Group PLC	62020	14	Information and Communication
Keller Group PLC	71129	15	Business service
Kier Group PLC	41201	11	Construction
Kingfisher PLC	47520	12	Wholesale and retail, motor vehicle repair, sale of fuel
Ladbrokes Coral Group PLC	92000	17	Other service activities
Laird PLC	82990	15	Business service
Lamprell PLC	09100	2	Mining, Quarry (inc extraction of petroleum and gas)
Land Securities Group PLC	41100	11	Construction
Laura Ashley Holdings PLC	47190	12	Wholesale and retail, motor vehicle repair, sale of fuel
London Stock Exchange Group PLC	66110	15	Business service
Lonmin PLC	07290	2	Mining, Quarry (inc extraction of petroleum and gas)
Lookers PLC	45111	12	Wholesale and retail, motor vehicle repair, sale of fuel
LOW & Bonar PLC	32990	9	All other Manufacturing
Macau Property Opportunities Fund Ltd	41100	11	Construction
Man Group PLC	66190	15	Business service

Marks And Spencer Group PLC.	47190	12	Wholesale and retail, motor vehicle repair, sale of fuel
Marshalls PLC	23610	9	All other Manufacturing
Marston's PLC	56302	17	Other service activities
Mcbride PLC	20411	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Mccarthy & Stone PLC	41100	11	Construction
Mccoll's Retail Group PLC	47260	12	Wholesale and retail, motor vehicle repair, sale of fuel
Mears Group PLC	43390	11	Construction
Mediclinic International PLC	86101	16	Government administrative functions, Education, Health
Meggitt PLC	30300	7	Manufacture machinery, vehicle transport
Merlin Entertainments PLC	93210	17	Other service activities
Micro Focus International PLC	62090	14	Information and Communication
Millennium & Copthorne Hotels PLC	55100	17	Other service activities
Mitchells & Butlers PLC	56302	17	Other service activities
Mitie Group PLC	86900	16	Government administrative functions, Education, Health
MJ Gleeson PLC	41201	11	Construction
Mondi PLC	17211	9	All other Manufacturing
Moneysupermarket.Com Group PLC	47910	12	Wholesale and retail, motor vehicle repair, sale of fuel
Morgan Advanced Materials PLC	20130	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Morgan Sindall Group PLC	41100	11	Construction
Moss Bros Group PLC	47710	12	Wholesale and retail, motor vehicle repair, sale of fuel
Mothercare PLC	47789	12	Wholesale and retail, motor vehicle repair, sale of fuel
N Brown Group PLC	47910	12	Wholesale and retail, motor vehicle repair, sale of fuel
Nanoco Group PLC	72110	15	Business service
National Express Group PLC	49319	13	Transportation and storage
National Grid PLC	46719	12	Wholesale and retail, motor vehicle repair, sale of fuel
NCC Group PLC	74909	15	Business service
Next PLC	47190	12	Wholesale and retail, motor vehicle repair, sale of fuel
NMC Health PLC	84120	16	Government administrative functions, Education, Health
Norcros PLC	23310	9	All other Manufacturing
Northgate PLC	77110	15	Business service
Nostrum Oil & GAS PLC	06100	2	Mining, Quarry (inc extraction of petroleum and gas)
Novae Group PLC	66220	15	Business service
Ocado Group PLC	47110	12	Wholesale and retail, motor vehicle repair, sale of fuel
On The Beach Group PLC	79110	15	Business service
Ophir Energy PLC	06100	2	Mining, Quarry (inc extraction of petroleum and gas)
Oxford Biomedica PLC	21200	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Oxford Instruments PLC	25730	9	All other Manufacturing

Pagegroup PLC	78109	15	Business service
Paypoint PLC	62090	14	Information and Communication
Pearson PLC	58190	14	Information and Communication
Pendragon PLC	45111	12	Wholesale and retail, motor vehicle repair, sale of fuel
Pennon Group PLC	36000	16	Utilities, sewerage, waste and recycling
Persimmon PLC	41100	11	Construction
Petra Diamonds Ltd	08990	2	Mining, Quarry (inc extraction of petroleum and gas)
Petrofac Ltd	06100	2	Mining, Quarry (inc extraction of petroleum and gas)
Petropavlovsk PLC	07290	2	Mining, Quarry (inc extraction of petroleum and gas)
Pets At Home Group PLC	47760	12	Wholesale and retail, motor vehicle repair, sale of fuel
Photo - ME International PLC	77210	15	Business service
Picton Property Income Ltd	41100	11	Construction
Playtech Ltd	62011	14	Information and Communication
Polymetal International PLC	07290	2	Mining, Quarry (inc extraction of petroleum and gas)
Polypipe Group PLC	20160	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Porvair PLC	23440	9	All other Manufacturing
Premier Foods PLC	10890	5	Manufacture food, drink, tobacco
Premier Oil PLC	06100	2	Mining, Quarry (inc extraction of petroleum and gas)
Prudential PLC	66190	15	Business service
Puretech Health PLC	72110	15	Business service
PZ Cussons PLC	20420	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Qinetiq Group PLC	84220	16	Government administrative functions, Education, Health
R P S Group PLC	82990	15	Business service
Randgold Resources Ltd	08990	2	Mining, Quarry (inc extraction of petroleum and gas)
Raven Russia Ltd	41100	11	Construction
Reckitt Benckiser Group PLC	17220	9	All other Manufacturing
Redrow PLC	41202	11	Construction
Relx PLC	58142	14	Information and Communication
Renewi PLC	96090	17	Other service activities
Renishaw P L C	26511	7	Manufacture computer, electronic, light electrical
Renold PLC	28150	7	Manufacture machinery, vehicle transport
Rentokil Initial PLC	82990	15	Business service
Ricardo PLC	71122	15	Business service
Rightmove PLC	62090	14	Information and Communication
RIO Tinto PLC	08990	2	Mining, Quarry (inc extraction of petroleum and gas)
Robert Walters PLC	78109	15	Business service
Rolls-Royce Holdings PLC	30300	7	Manufacture machinery, vehicle transport
Rotork P.L.C.	28150	7	Manufacture machinery, vehicle transport
Royal Dutch Shell PLC	06100	2	Mining, Quarry (inc extraction of petroleum and gas)

Royal Mail PLC	53100	13	Transportation and storage
RPC Group PLC	22220	9	All other Manufacturing
RSA Insurance Group PLC	66220	15	Business service
Safestore Holdings PLC	52103	13	Transportation and storage
Saga PLC	86210	16	Government administrative functions, Education, Health
Schroders PLC	66300	15	Business service
SDL PLC	62012	14	Information and Communication
Segro PLC	41100	11	Construction
Senior PLC	30300	7	Manufacture machinery, vehicle transport
Sepura PLC	26110	7	Manufacture computer, electronic, light electrical
Serco Group PLC	70229	15	Business service
Servelec Group PLC	62020	14	Information and Communication
Severfield PLC	25110	9	All other Manufacturing
Severn Trent PLC	37000	16	Utilities, sewerage, waste and recycling
Shire PLC	21200	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
SIG PLC	43290	11	Construction
SKY PLC	60200	14	Information and Communication
Smith & Nephew PLC	21100	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Smiths Group PLC	26511	7	Manufacture computer, electronic, light electrical
Smurfit Kappa Group PLC	70100	15	Business service
Soco International PLC	06100	2	Mining, Quarry (inc extraction of petroleum and gas)
Softcat PLC	62090	14	Information and Communication
Sophos Group PLC	62012	14	Information and Communication
Spectris PLC	26511	7	Manufacture computer, electronic, light electrical
Speedy Hire PLC	77390	15	Business service
Spirax-Sarco Engineering PLC	28131	7	Manufacture machinery, vehicle transport
Spire Healthcare Group PLC	86101	16	Government administrative functions, Education, Health
Spirent Communications PLC	61900	14	Information and Communication
Sports Direct International PLC	47640	12	Wholesale and retail, motor vehicle repair, sale of fuel
SSE PLC	84130	16	Government administrative functions, Education, Health
SSP Group PLC	56103	17	Other service activities
ST Ives PLC	18110	9	All other Manufacturing
ST. James's Place PLC	84110	16	Government administrative functions, Education, Health
Stagecoach Group PLC	49319	13	Transportation and storage
Standard Life PLC	66220	15	Business service
Sthree PLC	78200	15	Business service
Stobart Group Ltd	49410	13	Transportation and storage
Stock Spirits Group PLC	11010	5	Manufacture food, drink, tobacco
STV Group PLC	60200	14	Information and Communication
Supergroup PLC	47710	12	Wholesale and retail, motor vehicle repair, sale of fuel

Synthomer PLC	20130	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Talktalk Telecom Group PLC	61900	14	Information and Communication
Target Healthcare Reit Ltd	41100	11	Construction
Tarsus Group PLC	73110	15	Business service
Tate & Lyle PLC	46390	12	Wholesale and retail, motor vehicle repair, sale of fuel
Taylor Wimpey PLC	41202	11	Construction
Ted Baker PLC	47710	12	Wholesale and retail, motor vehicle repair, sale of fuel
Telecom Plus PLC	61900	14	Information and Communication
Tesco PLC	47110	12	Wholesale and retail, motor vehicle repair, sale of fuel
The Berkeley Group Holdings PLC	41100	11	Construction
The Go-Ahead Group PLC	49100	13	Transportation and storage
The Gym Group PLC	93130	17	Other service activities
The Rank Group PLC	92000	17	Other service activities
The Restaurant Group PLC	56302	17	Other service activities
The Sage Group Plc.	70229	15	Business service
Thomas Cook Group PLC	79110	15	Business service
Topps Tiles PLC	46730	12	Wholesale and retail, motor vehicle repair, sale of fuel
Travis Perkins PLC	47789	12	Wholesale and retail, motor vehicle repair, sale of fuel
Trifast PLC	46180	12	Wholesale and retail, motor vehicle repair, sale of fuel
Trinity Mirror PLC	58130	14	Information and Communication
TT Electronics PLC	61900	14	Information and Communication
Tullow Oil PLC	09100	2	Mining, Quarry (inc extraction of petroleum and gas)
Tyman PLC	25720	9	All other Manufacturing
U And I Group PLC	41100	11	Construction
UBM PLC	58190	14	Information and Communication
UDG Healthcare PLC	46460	12	Wholesale and retail, motor vehicle repair, sale of fuel
UK Commercial Property Trust Ltd	41100	11	Construction
Ultra Electronics Holdings PLC	84220	16	Government administrative functions, Education, Health
Unilever PLC	46900	12	Wholesale and retail, motor vehicle repair, sale of fuel
United Utilities Group PLC	36000	16	Utilities, sewerage, waste and recycling
Vectura Group PLC	72190	15	Business service
Vedanta Resources PLC	08990	2	Mining, Quarry (inc extraction of petroleum and gas)
Vesuvius PLC	24540	9	All other Manufacturing
Victrex PLC	20160	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
Vodafone Group PLC	61200	14	Information and Communication
Volution Group PLC	27900	7	Manufacture computer, electronic, light electrical
VP PLC	77390	15	Business service
Weir Group PLC	71129	15	Business service

WH Smith PLC	46499	12	Wholesale and retail, motor vehicle repair, sale of fuel
Whitbread PLC	55100	17	Other service activities
William Hill PLC	92000	17	Other service activities
Wincanton PLC	49410	13	Transportation and storage
Wizz Air Holdings PLC	51102	13	Transportation and storage
WM Morrison Supermarkets PLC	47110	12	Wholesale and retail, motor vehicle repair, sale of fuel
Wolseley PLC	46740	12	Wholesale and retail, motor vehicle repair, sale of fuel
Workspace Group PLC	41100	11	Construction
Worldpay Group PLC	82990	15	Business service
WPP PLC	73110	15	Business service
WS Atkins PLC	71129	15	Business service
Xaar PLC	26110	7	Manufacture computer, electronic, light electrical
XP Power Ltd	35120	16	Utilities, sewerage, waste and recycling
Zotefoams PLC	20160	5	Manufacture coke, petroleum, chemicals, pharmaceuticals
ZPG PLC	63120	14	Information and Communication

Appendix C Main Industry

Main Industry	Identified code	No. of Firms
Agriculture, Forestry, Fishing, Veterinary	1	0
Mining, Quarrying (inc extraction of petroleum and gas)	2	28
Manufacture food, drink, tobacco	3	11
Manufacture textiles, leather	4	1
Manufacture coke, petroleum, chemicals, pharmaceuticals	5	17
Manufacture computer, electronic, light electrical	6	8
Manufacture machinery, vehicle, transport	7	12
Machinery repair excluding motor vehicles	8	0
All other Manufacturing	9	25
Utilities, sewerage, waste and recycling	10	7
Construction (including development of real estate)	11	40
Wholesale and retail,motor vehicle repair,sale of fuel	12	55
Transportation and Storage	13	20
Information and Communication	14	34
Business services	15	67
Government administrative functions, Education, Health	16	11
Other Service activities	17	23

Appendix D Other of Estimation Models of Discretionary Accruals

Chapter 3.4.1.1 The Normal Level of Discretionary Accruals

Alternatively, there is another widely used estimation model that is identified by Kothari, et al. (2005), discretionary accruals follow a cross-sectional version of the modified Jones (1991) model after controlling for previous performance, thus the ‘normal’ level of accruals can be estimated as follows

$$\frac{TACC_{i,t}}{A_{i,t-1}} = \pi_0 \frac{1}{A_{i,t-1}} + \pi_1 \frac{\Delta S_{i,t} - \Delta AR_{i,t}}{A_{i,t-1}} + \pi_2 \frac{PPE_{i,t}}{A_{i,t-1}} + \pi_3 ROA_{i,t-1} + \varepsilon_{i,t-1},$$

where

$TACC_{i,t}$ = is the total accruals in year t for firm i ;

$\Delta AR_{i,t}$ = is equal to the change in accounts receivables from year t to year $t - 1$ for firm i ;

$ROA_{i,t}$ = measures the rate of return on assets in year t for firm i ;

$\Delta S_{i,t}$ = is $S_{i,t} - S_{i,t-1}$, the change in sales, is the difference between sales revenue at the end of year for firm i and the sales revenue at the beginning of year t for firm i ;

PPE_t = is the gross property, plant, and equipment in year t for firm i ;

$A_{i,t-1}$ = is the total assets at the beginning of year t for firm i ;

$\varepsilon_{i,t}$ = is the error term.

Appendix E Other of Estimation Models of the Relationship between Directors' Remuneration and Earnings Management

Early versions of models to estimate the relation between directors' remuneration and earnings management

Model 1:

The following regression of directors' remuneration is on the abnormal level of earnings management and a set of control variables including return on asset, market value of equity, market-to-book ratio, leverage, and sales growth.

$$DSB_{i,t} = \alpha_i + \beta_1 EM_{i,t} + \beta_2 ROA_{i,t} + \ln MVE_{i,t} + \beta_3 MTB_{i,t} + \beta_4 LEV_{i,t} + \beta_5 GROWSALE_{i,t} + u_{i,t},$$

where

the dependant variable, $DSB_{i,t}$ equals to directors remuneration which is sum of directors' fees, pension contribution, and other emolument, for firm i in year t lagged by total asset;

the independent variable, $EM_{i,t}$, indicates the six measures of earnings management, including one proxy of accrual-based earnings management, $Abn_Accruals$, four measures of real activities manipulation (Abn_CFO , Abn_DISEXP , Abn_PROD , RAM) and sum of accrual based earnings management (AM) and real activities manipulation (RAM).

control variables are related to firms performance, which may affect the level of directors' compensation, $ROA_{i,t}$ is return on assets for current-period firm performance, calculated as net income divided by lagged assets for firm i in year t ;

$\ln MVE_{i,t}$ is the natural logarithm value of market value of equity for firm i in year t , indicates the potential impact of the relative firm size effect in the industry;

$MTB_{i,t}$ is market to book ratio for firm i in year t to control measurement errors which may be caused by firm's growth opportunities, calculated by market value of equity divided by book value of equity;

$LEV_{i,t}$ is leverage for firm i in year t to control the risk of bankruptcy, calculated as total liabilities divided by the value of total equity;

$GROWSALE_{i,t}$ is growth rate of sales for firm i in year t for growth opportunities, calculated by $(S_{it} - S_{i,t-1})/S_{i,t-1}$.

Model 2:

The following regression of directors' compensations is on the absolute value of discretionary accruals and a set of control variables including the non-discretionary accruals, net cash flows from operations, market-to-book ratio as a proxy of growth opportunities, leverage, and sales growth.

$$y_{i,t} = \alpha_i + \beta_1 x_{i,t} + \beta_2 x_{i,t} \times D_{i,t} + D_{i,t} \quad ,$$

where

the dependent variable, $y_{i,t}$, can be a proxy for earnings management for firm i in year t , such as $Abn_Accruals$, Abn_CFO , Abn_DISEXP , Abn_PROD , RAM , EM ;

The independent variable, $x_{i,t}$, is a proxy for directors remuneration, sum of directors' fees, pension contribution, and other emoluments lagged by total asset for firm i in year t ;

$D_{i,t}$ is the dummy variable for firm i in year t .

Appendix F Coefficients from Many Separate Regressions

Table 5.5: Panel A Comparison of suspect firm-years just beating/meeting zero level of earnings with the rest of the sample

Year	Intercept	LnMVE	MTB	ROA	Suspect_zero
2010	-0.00164	0.00095	0.00035	0.00003	0.04285
2011	-0.00112	0.00185	0.00046	0.07716	-0.02940
2012	0.00138	0.00196	-0.00039	0.07828	-0.04000
2013	0.00077	0.00048	0.00020	0.06032	0.00361
2014	-0.00134	0.00133	-0.00041	0.12472	-0.00117
2015	-0.00117	0.00351	-0.00005	0.08598	-0.01765

$$AM_t = \beta_0 + \beta_1 \text{LnMVE}_{t-1} + \beta_2 \text{MTB}_{t-1} + \beta_3 \text{ROA}_t + \beta_4 \text{Suspect firm} - \text{years}_t + \text{Year Indicators} + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Suspect_zero
2010	0.00433	-0.00355	0.00118	-0.67691	0.08632
2011	0.00164	0.00014	-0.00028	-0.65436	-0.03370
2012	0.00151	-0.00665	-0.00118	-0.32949	-0.01366
2013	-0.00257	-0.00730	-0.00052	-0.33172	0.04364
2014	-0.00081	-0.01268	0.00041	-0.31276	0.01897
2015	0.00000	-0.01175	0.00073	-0.50217	-0.02395

$$\text{Abn_CFO}_t = \beta_0 + \beta_1 \text{LnMVE}_{t-1} + \beta_2 \text{MTB}_{t-1} + \beta_3 \text{ROA}_t + \beta_4 \text{Suspect firm} - \text{years}_t + \text{Year Indicators} + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Suspect_zero
2010	-0.00681	0.00229	0.00110	-0.02072	0.10655
2011	-0.00589	-0.00591	-0.00195	-0.20035	0.13584
2012	-0.00956	-0.00124	0.00045	-0.09169	0.07179
2013	-0.00550	-0.00438	0.00094	-0.14778	-0.06242
2014	-0.00121	-0.02550	0.00047	-0.11873	-0.01508
2015	-0.00436	-0.02697	-0.00029	0.13544	0.07105

$$\text{Abn_DISEXP}_t = \beta_0 + \beta_1 \text{LnMVE}_{t-1} + \beta_2 \text{MTB}_{t-1} + \beta_3 \text{ROA}_t + \beta_4 \text{Suspect firm} - \text{years}_t + \text{Year Indicators} + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Suspect_zero
2010	-0.00575	-0.00415	0.00163	-0.67935	0.21292
2011	0.00765	-0.00863	-0.00285	-0.86991	
2012	-0.00924	0.00479	-0.00267	-0.73019	0.06137
2013	-0.00228	-0.00814	0.00224	-0.51704	0.09162
2014	-0.00422	-0.02364	-0.00038	-0.53731	0.02424

2015	0.00017	-0.02874	0.00312	-0.21959	0.10319
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$$Abn_PROD_t = \beta_0 + \beta_1 LnMVE_{t-1} + \beta_2 MTB_{t-1} + \beta_3 ROA_t + \beta_4 Suspect\ firm - years_t + Year\ Indicators + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Suspect_zero
2010	0.00200	-0.00103	0.00411	-1.34876	0.48833
2011	0.02122	-0.01516	-0.00566	-1.74683	
2012	-0.01065	0.00126	-0.00618	-1.19279	0.04677
2013	-0.00050	-0.02495	0.00561	-0.89325	0.24065
2014	-0.00482	-0.05695	-0.00072	-1.01611	0.03505
2015	-0.00484	-0.05795	0.00451	-0.47429	0.16543

$$RAM_t = \beta_0 + \beta_1 LnMVE_{t-1} + \beta_2 MTB_{t-1} + \beta_3 ROA_t + \beta_4 Suspect\ firm - years_t + Year\ Indicators + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Suspect_zero
2010	-0.00051	0.00044	0.00465	-1.28189	0.53601
2011	0.02134	-0.01250	-0.00510	-1.73864	
2012	-0.00839	0.00249	-0.00625	-1.06911	-0.01265
2013	-0.00025	-0.02497	0.00599	-0.83192	0.22343
2014	-0.00754	-0.05543	-0.00114	-0.96152	0.03587
2015	-0.00838	-0.05514	0.00449	-0.36155	0.15717

$$EM_t = \beta_0 + \beta_1 LnMVE_{t-1} + \beta_2 MTB_{t-1} + \beta_3 ROA_t + \beta_4 Suspect\ firm - years_t + Year\ Indicators + \varepsilon_t.$$

Table 5.5: Comparison of suspect firm-years just beating/meeting last year's earnings level with the rest of the sample

Year	Intercept	LnMVE	MTB	ROA	Suspect_last
2010	-0.00154	0.00113	0.00035	-0.00208	0.00761
2011	-0.00074	0.00197	0.00045	0.07830	-0.00997
2012	0.00118	0.00209	-0.00039	0.07973	-0.00320
2013	0.00046	0.00045	0.00021	0.05974	0.00842
2014	-0.00121	0.00131	-0.00042	0.12509	-0.01001
2015	-0.00125	0.00364	-0.00005	0.08831	-0.01139

$$AM_t = \beta_0 + \beta_1 LnMVE_{t-1} + \beta_2 MTB_{t-1} + \beta_3 ROA_t + \beta_4 Suspect\ firm - years_t + Year\ Indicators + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Suspect_last
2010	0.00515	-0.00294	0.00118	-0.68468	0.00149

2011	0.00201	0.00025	-0.00029	-0.65283	-0.01012
2012	0.00167	-0.00650	-0.00118	-0.32862	-0.00759
2013	-0.00198	-0.00725	-0.00050	-0.33371	-0.00186
2014	0.00027	-0.01245	0.00041	-0.31318	-0.04397
2015	-0.00095	-0.01173	0.00072	-0.49789	0.00585

$$Abn_CFO_t = \beta_0 + \beta_1 LnMVE_{t-1} + \beta_2 MTB_{t-1} + \beta_3 ROA_t + \beta_4 Suspect\ firm - years_t + Year\ Indicators + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Suspect_last
2010	-0.00695	0.00234	0.00091	-0.01320	0.05013
2011	-0.00731	-0.00642	-0.00194	-0.20952	0.05190
2012	-0.00847	-0.00113	0.00046	-0.09645	-0.00149
2013	-0.01101	-0.00474	0.00091	-0.14904	0.10711
2014	-0.00147	-0.02572	0.00045	-0.11696	-0.00732
2015	-0.00157	-0.02681	-0.00026	0.12338	-0.01788

$$Abn_DISEXP_t = \beta_0 + \beta_1 LnMVE_{t-1} + \beta_2 MTB_{t-1} + \beta_3 ROA_t + \beta_4 Suspect\ firm - years_t + Year\ Indicators + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Suspect_last
2010	-0.00509	-0.00325	0.00162	-0.69471	0.03938
2011	0.00629	-0.00919	-0.00285	-0.86352	0.02452
2012	-0.01304	0.00294	-0.00244	-0.74683	0.08732
2013	-0.00630	-0.00842	0.00206	-0.53794	0.10704
2014	-0.00266	-0.02337	-0.00040	-0.53415	-0.09365
2015	0.00473	-0.02924	0.00315	-0.22776	-0.04904

$$Abn_PROD_t = \beta_0 + \beta_1 LnMVE_{t-1} + \beta_2 MTB_{t-1} + \beta_3 ROA_t + \beta_4 Suspect\ firm - years_t + Year\ Indicators + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Suspect_last
2010	0.00428	0.00141	0.00409	-1.39052	0.07312
2011	0.01923	-0.01598	-0.00566	-1.73745	0.03602
2012	-0.01583	-0.00112	-0.00588	-1.21398	0.11532
2013	-0.00847	-0.02529	0.00525	-0.93863	0.22175
2014	-0.00190	-0.05655	-0.00076	-1.00862	-0.18461
2015	0.00186	-0.05883	0.00455	-0.48692	-0.06539

$$RAM_t = \beta_0 + \beta_1 LnMVE_{t-1} + \beta_2 MTB_{t-1} + \beta_3 ROA_t + \beta_4 Suspect\ firm - years_t + Year\ Indicators + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Suspect_last
2010	0.00199	0.00311	0.00462	-1.32767	0.08040
2011	0.02024	-0.01296	-0.00510	-1.73345	0.01993
2012	-0.01369	0.00027	-0.00596	-1.08809	0.11122

2013	-0.00875	-0.02552	0.00562	-0.87769	0.22919
2014	-0.00442	-0.05501	-0.00119	-0.95327	-0.19780
2015	-0.00142	-0.05586	0.00453	-0.37401	-0.07444

$$EM_t = \beta_0 + \beta_1 \text{LnMVE}_{t-1} + \beta_2 \text{MTB}_{t-1} + \beta_3 \text{ROA}_t + \beta_4 \text{Suspect firm} - \text{years}_t + \text{Year Indicators} + \varepsilon_t.$$

Table 5.6: Comparison of *loss* firms with other firms

Year	Intercept	LnMVE	MTB	ROA	Loss
2010	0.00006	0.00069	0.00039	-0.02281	-0.03852
2011	0.00129	0.00137	0.00054	0.04433	-0.06145
2012	0.00409	0.00154	-0.00038	0.05908	-0.04248
2013	0.00354	0.00079	0.00043	0.03469	-0.04376
2014	0.00385	0.00087	-0.00011	0.08217	-0.05791
2015	0.00045	0.00343	-0.00001	0.07302	-0.02487

$$AM_t = \beta_0 + \beta_1 \text{LnMVE}_{t-1} + \beta_2 \text{MTB}_{t-1} + \beta_3 \text{ROA}_t + \beta_4 \text{Suspect firm} - \text{years}_t + \text{Year Indicators} + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Loss
2010	0.00635	-0.00343	0.00122	-0.70172	-0.03381
2011	0.00230	-0.00010	-0.00026	-0.66187	-0.02187
2012	0.00155	-0.00667	-0.00118	-0.33035	-0.00342
2013	-0.00246	-0.00731	-0.00053	-0.33040	0.00714
2014	-0.00151	-0.01233	0.00035	-0.30530	0.01312
2015	0.00037	-0.01174	0.00074	-0.50602	-0.01314

$$\text{Abn_CFO}_t = \beta_0 + \beta_1 \text{LnMVE}_{t-1} + \beta_2 \text{MTB}_{t-1} + \beta_3 \text{ROA}_t + \beta_4 \text{Suspect firm} - \text{years}_t + \text{Year Indicators} + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Loss
2010	-0.00279	0.00250	0.00096	-0.05782	-0.06338
2011	-0.00300	-0.00551	-0.00190	-0.23861	-0.04189
2012	-0.00132	-0.00217	0.00048	-0.14684	-0.10514
2013	-0.00458	-0.00431	0.00105	-0.16121	-0.03520
2014	0.00047	-0.02575	0.00058	-0.13478	-0.02609
2015	-0.00307	-0.02690	-0.00028	0.13056	0.01008

$$\text{Abn_DISEXP}_t = \beta_0 + \beta_1 \text{LnMVE}_{t-1} + \beta_2 \text{MTB}_{t-1} + \beta_3 \text{ROA}_t + \beta_4 \text{Suspect firm} - \text{years}_t + \text{Year Indicators} + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Loss
2010	-0.00535	-0.00153	0.00159	-0.67157	0.05460
2011	0.00710	-0.00858	-0.00287	-0.85818	0.01570
2012	-0.01349	0.00477	-0.00313	-0.62247	0.08153
2013	-0.01023	-0.00929	0.00200	-0.40580	0.17708
2014	-0.00755	-0.02310	-0.00049	-0.49454	0.04712
2015	-0.00343	-0.02918	0.00307	-0.17952	0.06479

$$Abn_PROD_t = \beta_0 + \beta_1 LnMVE_{t-1} + \beta_2 MTB_{t-1} + \beta_3 ROA_t + \beta_4 Suspect\ firm - years_t + Year\ Indicators + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Loss
2010	0.00500	0.00409	0.00405	-1.37057	0.06840
2011	0.02406	-0.01541	-0.00558	-1.80782	-0.08167
2012	-0.00744	0.00112	-0.00587	-1.26629	-0.05412
2013	-0.01029	-0.02599	0.00531	-0.74895	0.23621
2014	-0.00667	-0.05635	-0.00078	-0.99032	0.03039
2015	-0.01058	-0.05868	0.00443	-0.41055	0.10312

$$RAM_t = \beta_0 + \beta_1 LnMVE_{t-1} + \beta_2 MTB_{t-1} + \beta_3 ROA_t + \beta_4 Suspect\ firm - years_t + Year\ Indicators + \varepsilon_t.$$

Year	Intercept	LnMVE	MTB	ROA	Loss
2010	0.00404	0.00552	0.00459	-1.32974	0.04081
2011	0.02435	-0.01278	-0.00502	-1.80341	-0.08674
2012	-0.00264	0.00243	-0.00567	-1.20811	-0.10398
2013	-0.00756	-0.02556	0.00577	-0.72166	0.18332
2014	-0.00512	-0.05507	-0.00107	-0.98724	-0.02346
2015	-0.01110	-0.05606	0.00444	-0.32270	0.06768

$$EM_t = \beta_0 + \beta_1 LnMVE_{t-1} + \beta_2 MTB_{t-1} + \beta_3 ROA_t + \beta_4 Suspect\ firm - years_t + Year\ Indicators + \varepsilon_t.$$

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