June 2008

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ISSN: 1835-9450
ISBN: 978-1-74067-479-9

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Abstract

This is a comprehensive large-sample study of Australian earnings management. Using a sample of 4,844 firm-year observations across nine Australia industries from 2000 to 2006, we find substantial corporate earnings management activity across several Australian industries. We document strong evidence of size and return on assets being primary determinants of earnings management in Australia. The effects of size and return on assets are also found to be dominant in both income-increasing and income-decreasing earnings manipulation. We also document that that periphery sector firms are more likely to involve larger magnitude of earnings management than firms in the core sector.

Keywords: Earnings management, discretionary accruals, income-increasing/decreasing manipulation, dual economy sector

JEL Classification: M40, M41, M49.

1. Introduction

In recent years, as accounting scandals such as Enron and WorldCom in US and HIH in Australia have been widely reported, the issue of earnings management has attracted attention of regulators and academics. Regulators are increasingly concerned about the extent to which disclosed financial information distorts the true information underlying the business economics of a firm. To date, most of the academic research provides evidence of earnings management when managerial incentives are expected to be strongly associated in earnings management behaviour. For example, structure of executive compensation and timings of equity offerings are known to be related to earnings management practices (Teoh et al., 1998a, 1998b; Erickson & Wang, 1999; Louis, 2004; Bergstresser & Philippon, 2006). However, there is little examination of the pervasiveness and frequency of earnings management in a broader context.

In this paper, we undertake a broad large-sample study of earnings management activities in Australia between 2000 and 2006. A primary reason for us to carry out this study is to shed light on whether earnings management practices are attributed to only a few occasions based on managerial incentive reasons or is it more widespread? Managers use flexibilities within the accounting standard to choose accounting methods, policies and estimates in the financial reporting process. A common assumption in incentive based studies of earnings management is that managers use this flexibility to distort financial information in order to maximize their own utility. However, it is also true that managers can use the same flexibility to adjust the reported earnings as a signal to reflect firms' future prospects (Holthausen, 1990; Healy & Palepu, 1993; and Guay *et al.*,1996). An examination of the level and degree of earnings management in a larger economy-wide context, therefore, can help regulators prescribe an optimal level of management judgement and discretion for

corporations. Evidence of widespread earnings management practice may prompt regulators to consider additional disclosure requirements. On the other hand, regulators may further promote discretion in financial reporting as a device to increase the value of financial reporting or as a mechanism to facilitate effective communication.

Gathering evidence regarding the scope and frequency of earnings management is also important because of its symptomatic relationship with earnings quality. Earnings are highly correlated with stock prices and some of the largest companies in the world have their stock performances consistently manipulated by earnings management techniques. The notion of earnings quality, therefore, is a major factor and concern in evaluating an entity's financial health and reliability of reported earnings (Beaver *et al*, 1968; Bernard, 1995; Ohlson, 1995; Feltham & Ohlson, 1995; Green & Segal, 1966). A further motivation for our study comes from recent concern of the Australian Securities and Investments Commission (ASIC) over perception of possible accounting abuses and earnings quality in Australia[1]. ASIC, in response to financial reporting scandals in the U.S., and to some extent in Australia, decided to increase its corporate surveillance activities in 2002[2]. We therefore argue that it is important to examine the level and degree of earnings management practice in the Australian context to gauge a broad sense of "earnings quality" in Australia.

Using 4,844 firm-year observations during the period of 2000 to 2006 in Australia, we first find that earnings management is prevalent across several industries. Firms in Energy, Metals & Mining, Industrials, and Information Technology are found to engage in income-decreasing earnings management while Health Care and Telecommunication & Utilities are associated with income-

[1] For a comprehensive account of accounting frauds in Australia and specifically at HIH see "The inside Story of Australian's Biggest Corporate Collapse" by Westfield and Wiley (2003).
[2] Concerned with the US corporate scandals, the chairman of ASIC David Knott instituted a new surveillance project 'directed at American-style accounting abuses' in Australia (Buffini, 2002).

increasing earnings manipulation. We also find that the aggregate magnitude of earnings management is greater for periphery sector firms than those in core sectors. The positive association between periphery sector and earnings management is significant even after controlling for firm-level characteristics. We also present evidence that a large degree of earnings management takes place in small size firms and firms with low profitability. Interestingly, however, the direction of earning manipulation by smaller firms appears to be bi-directional, as these firms seem to engage in both income-increasing and income-decreasing earnings management. There is also evidence, to suggest that the earnings manipulation activity is related with firms having higher levels of cash flows.

Our study makes several contributions in this area. First, despite substantial research on earnings management in the U.S., Australian research has been quite limited. These studies are mostly limited in scope and are small sample studies[3]. As such, our study investigates the overall breadth and scope of earnings management behavior in a broad context through a comprehensive analysis of reported earnings across Australian industry sectors and individual firm characteristics. Second, this study should be of interest to investors and regulators. The level of pervasiveness of earnings management practices in specific industries and the association of these practices with firm characteristics can help investors assess the overall quality of financial reporting. Third, the Australian capital market structure differs from that in

[3] Australian studies encompassing a broad scope of earnings management are non existent except Holland and Ramsay (2005) who use the distribution method approach to find if firms engage in earnings management to beat revenue benchmarks. Other studies which cover Australian firms are the following. Lim & Matolcsy (1999) investigate association between product price controls established by the Australian government in the early1970s and reported net income. Eddey & Taylor (1999) investigate whether acquiring firms overstate their earnings in the quarter preceding a stock swap announcement. Jones and Sharma (2001) document evidence on earnings management in Australian's 'old' and 'new' economy sectors. Wells (2002) and Godfrey *et al*. (2003) document a downward earnings manipulation in the years of CEO change. Monem (2003) finds income-decreasing earnings management in Australian gold-mining firms to reduce income tax after the introduction of 1991 Australian Gold Tax. Koh (2003) examines the non-linear association between institutional ownership and earnings management strategies.

the U.S. The capital market in Australia is relatively small and highly concentrated within resources and industrial stocks compared to the U.S market. Analysts following in Australia are fewer and the regulatory scrutiny level of Australian market is argued to be lower than that of U.S (Chan et al. 2002). Also, the accounting standards, institutional structure, and corporate governance are expected to be different from those in the U.S. For instance, the frequency of financial reporting is twice per year in Australia while in the U.S it is four times per year. Given all these differences, a comprehensive study in the Australian context is warranted.

The rest of the paper is organized as follows. Section 2 provides a background on important research issues of earnings management. Section 3 develops the research design and describes the data. Section 4 presents the empirical results. Section 5 reports results of supplementary analyses to test the robustness of our main results. Section 6 concludes the paper.

2. Earnings Management Background

The study of earnings management has now grown into a dynamic body of empirical literature and conceptual framework. Based on agency theory, the explicit and implicit contracts between the firm and stakeholders offer a range of incentives for managers to engage in earnings manipulations. A substantial body of research focus on capital market motives where managers manipulate earnings in an attempt to influence short-term stock performance. These studies are primarily focused on whether earnings management takes place in the presence of specific managerial incentives. One stream of research examines specific capital market events such as th initial public offerings (IPOs) and seasonal equity offerings (SEOs) where managers of firms with pending public issues may manage the earnings reported in their

prospectuses in the hope of receiving a higher price for their shares.[4] The other stream of research relies on the analysis of the discontinuity of earnings distribution. This stream suggests that earnings benchmarks provides a strong incentive for earnings manipulation since missing a benchmark will cause significant negative impact on stock valuation (Bartov *et al.*, 2000; Skinner & Sloan, 2002). Researchers are also motivated to measure the economic consequence of earnings management (Dechow et al., 1996; Xie 2001 and Core et al., 2007).

Arguments presented in above studies take the view of earnings management as an opportunistic behaviour by management which should have a negative impact on future firm performance. Researchers now acknowledge that earnings management per se is not negative in its implications for the earnings of a firm. Earnings management practice, if used as a signalling tool, may serve to signal future opportunities of firms and project the 'managerial style' of firms in managing the earnings of firms. Holthausen (1990), Healy & Palepu (1993) and Guay et al. (1996) document managers' use of discretionary accruals to better reflect the impacts of underlying economic events on firm performance. Subramanyam (1996), Hochberg et al. (2004) suggests that managers' use of discretion can provide useful information to both existing stakeholders and prospective investors and find that discretionary accruals are positively associated with future stock returns.

In our study, we do not necessarily seek to identify the reasons for earnings manipulation activities of Australian firms but offer comprehensive evidence of such on the basis of industry and individual firm characteristics. Industry classification has

[4] Teoh, Wong and Rao (1998) find that reported earnings of firms are unusually high at the time of both IPOs and SEOs and such unusual high earnings are attributed to discretionary accruals. Rangan (1998) and Teoh, Welch and Wong (1998a, 1998b) further document that IPO and SEO firms under-perform the market in the years following their offerings. Erickson & Wang (1999) find acquiring firms exhibit income-increasing accruals prior to stock-based acquisitions, as directors try to convince shareholders that the bid price is inadequate relative to earnings so that they can reject the bid. Louis (2004) not only confirms that acquiring firms overstate their earnings in the quarter preceding a stock swap announcement, but also find evidence of stock price reversals in the days leading to merger announcements.

proved to be of considerable significance in prior research in the area of earnings management. Previous research has identified industry variation in earnings managements practice. For example, McNichols and Wilson (1998) find income-decreasing manipulation in printing and publishing, nondurable wholesale goods, and business services industries. Teoh et al. (1998a) show over 30% firms who report higher net income before SEO are from electronic equipment and service industries. Beasley et al. (2000) document earnings management occurred in technology firms and financial-services firms. Nelson et al. (2002) report that significantly more earnings management attempts by firms in the electronics industry. The industry variation is not only present across individual industries but also through a dual economy perspective. The dual economy perspective of earnings management supposes that an economy can be classified as core and periphery sectors. In this dichotomous classification, periphery sector firms face higher degrees of environmental uncertainty and a restricted opportunity structure and therefore are more predisposed to manage earnings than core sector firms (Belkaoui and Picur, 1984; Albrecht and Richardson, 1990; Kinnunen et al. 1995)[5]. The only study of earnings management with the dual economy approach in Australia is by Jones and Sharma (2001) who report significantly lower frequency of earnings management in the "new economy' firms. In our study, we examine earnings management practice of firms by categorizing our sample into core and periphery sectors (see section 4 for details).

To examine the scope and frequency of earnings management, firm characteristics and their contribution to a higher or lower propensity for earnings

[5] This research of classifying dual industry classification system is based on Averitt (1968) who defines an economy as a composite of two business systems to be called the core and the periphery. Bluestone et al. (1973) describe that 'the core economy is by far the largest sector…with high productivity and profits, intensive utilization of capital, high incidence of monopoly power and a high degree of unionization…Unlike core sector industries, the periphery lacks almost all of the advantages normally found in core firms.'(pp.29-30)

management need to be considered. Previous research has shown that firms that adjust earnings are smaller, less profitable, higher levered, lower growth compared with their industry counterparts (Kinney and McDaniel, 1989; Defond and Jiambalvo, 1991; Callen et al., 2002; Beneish, 1999). We also examine earnings management behavior of Australian firms at the individual firm level through several characteristics known to be associated with earnings management. In the following, we outline these characteristics.

Watts and Zimmerman (1978) identify firm size as a factor for determination of accounting numbers. Otherwise known as the 'political cost hypothesis', they show that large size firms are politically more sensitive and are likely to attract higher political exposure. This political sensitivity suggests that managers of large firms are more likely to engage in income-decreasing earnings activities to reduce political exposure (also see Hagerman and Zmijewski, 1979; Bowen et al., 1981; Dhaliwal, 1988). Holland and Jackson (2004) however have contrary views. They argue that large firms have incentives to avoid earnings management as they are subject to more scrutiny from analysts, investors, and the regulators. Bathke et al. (1989) document a positive relationship between firm size and earnings stability with the underlying implication that there is less need for large size firms to manage earnings because large firms have sufficient resources to diversify risk and to stabilize growth leading to a more stable earnings stream.

A firm's growth opportunities can provide managers with incentive to smooth earnings as uncertain opportunities are likely to cause earnings volatility. Faced with the increased perceived firm risk and therefore higher cost of capital, managers may have incentive to manage earnings (Beaver et al., 1968). Collins and Kothari (1989) and Easton and Zmijewski (1989) find that earnings response coefficients are a function of growth and risk. Skinner and Sloan (2001) find that the market severely

penalizes growth firms for negative earnings surprise. Richardson et al. (2002) also find that restatement firms tend to be high growth firms which are under pressure to meet or beat analysts' forecasts. Pincus and Rajgopal (2002) and Young (1999) document a positive association between a firm's growth level and earnings management activity. Firth et al. (2007) point out that fast growing firms may find it easier to engage in earnings management than mature firms since it is difficult to observe the business activities of fast growing firms. Thus, managers of high growth firms are likely to have strong incentives to meet earnings benchmarks.

Profitability also affects the level of earnings management. Lower accounting profits provide motivation for firms to manipulate earnings because these firms are possibly facing financial constraints. White (1970) finds that firms with declining profitability tend to smooth earnings. Ashari et al. (1994) report that managers' incentive to smooth earnings will be stronger when the firm's profitability is poor and its fluctuations in income are severe. Wang (2004) argues that the firm's propensity for fraud is positively related to growth prospects and negatively related to the profitability of the firm's current assets. Related to the issue of profitability, rresearchers hypothesize that the degree of earnings management will also depend on the firm's operating performance. When operating performance is unusually high (or low), managers tend to decrease (or increase) reported earnings. However, if operating performance is extremely poor, some firms may severely decrease income which is known as the 'taking bath' strategy (Healey, 1985). The rationale is that when the lower boundary of the earnings cannot be reached efficiently, it is better to go as low as possible to make the future earnings targets easier to meet. McNichols and Wilson (1988) use operating cash flow as a measure of firm operating performance find systematic difference in accounting discretions. Young (1999) finds that extreme positive cash flows are associated with negative discretionary accruals.

Yoon and Miller (2002) document the association between the operating performance and the earnings management behavior of Korean firms.

Regardless of reasons to engage in earnings management, capital intensity of assets is a factor that indirectly affects the ability of managers to undertake earnings adjustment. Managers' ability to exercise discretion over reported earnings depend on the levels of current versus non-current components of assets and liabilities. Capital intensity measures the portion of a firm's non-current (fixed) assets to total assets base and thus is a measure of the lack of ability to manage earnings. Burgstahler and Dichev (1997) and Francis et al. (1999) find evidence that firms with large current assets and liabilities provide more maneuver room for the managers to exercise discretions through working capital accruals than otherwise. In a similar vein, Young (1999) reports a negative association between capital intensity and the level of discretionary accruals.

Finally, previous studies have shown that high leverage firms tend to engage in earnings management in order to prevent breaches of debt covenants. DeFond and Jiambalvo (1994) find evidence of income-increasing earnings management in the year prior to actual covenant violation as managers try to report high income in order to influence creditors. However, DeAngelo & Skinner (1994) argue that managers of financially troubled firms would highlight a firm's financial difficulties by reducing the reported earning so that they could obtain better terms in their contract renegotiations. Charitou et al. (2007) examine earnings management behaviour of 859 U.S. bankruptcy firms over the period 1986 to 2004 and suggest that managers of highly distressed firms shift earnings downwards prior to the bankruptcy filing as way to blame the 'old' management for the distressed condition. Despite the varied arguments of whether high leverage firms engage in income-increasing or income-

decreasing earnings management, it is apparent that a firm's leverage affects earnings management.

3. Research Design and Data Collection

3.1. Earnings Management Measures

Accounting earnings comprise a cash flow component and an accruals component. Accruals are accounting entries that adjust for deficiencies of cash accounting, involving managerial discretion. Although accruals can be observed, it is very difficult for researchers to separate them into their non-discretionary components and a discretionary component that has been manipulated. Non-discretionary accruals are necessary adjustments to the industry-related and firm-specific business conditions. For example, capital-intensive firms are expected to have high depreciation, while rapidly growing firms have, in general, more credit sales than cash sales. Discretionary accruals are viewed as a measure of earnings manipulation and are used as the proxy of earnings management. A widely used measure of earnings management through the discretionary accrual (DA) is the 'Jones model'. Jones (1991) proposes the total accrual as a function of changes in revenue and levels of property plant and equipment. Specifically, the Jones model in a regression equation form is:

$$TAC_{it} / TA_{it-1} = a_1(1/TA_{it-1}) + a_2(\Delta REV_{it} / TA_{it-1}) + a_3(PPE_{it} / TA_{it-1}) + \varepsilon_{it} \qquad (1)$$

where *i* and *t* are indices for firms and time periods. TAC_{it} is total accruals being the difference between net operating income and operating cash flows. ΔREV_{it} is the change in net sales from period *t-1* to *t*. PPE_{it} is net property, plant and equipment. Factors such as growth and inflations rate can cause the time series of economic variables to exhibit unequal variances over time. Therefore, all variables are scaled by lagged total assets, TA_{it-1} ,to reduce heteroscedasticity. Of interest in this Hones

model is the residual that is not dictated by firm conditions, and therefore, is the discretionary component.

Despite the popularity of Jones (1991) model, empirical studies have pointed out that this discretionary accrual estimation model suffer from correlated omitted variables, and therefore is potentially misspecified (Dechow et al.,1995; Subramanyam, 1996; Kasznik, 1999; Bartov et al., 2000; Klein, 2002; Kothari et al., 2005). In good years, managers may want to hide some income for a future rainy day, while in bad years they may take "big baths" to clear the sky for future periods. Consistent with this view, Dechow et al. (1995) find the measurement errors in estimation of discretionary accruals are correlated with firm earnings performance - firms with low (high) earnings tend to have negative (positive) discretionary accruals. McNichols and Wilson (1988) find discretionary accruals are negatively associated with operating cash flows. In this vein, researchers argue that tests related to earnings management which do no control for a firm's performance are misspecified. The inference is particularly biased involving firms experiencing extreme financial performance. In order to address these estimation issues, Rees et al. (1996) expanded the original Jones model by including cash flow from operations as an additional explanatory variable when estimating normal total accruals. Defond and Subramanyam (1998) control for cash flows; Teoh et al., (1998a) control net income; Kasznik (1999) uses the median performance of firms matched on return on assets; Kothari et al. (2005) use performance matching on return on assets and use a percentile grouping method to avoid the non-linear relationship between return on assets and accruals.

In this study, we attempt to mitigate above problems of model misspecification and potential correlation of discretionary accruals with performance by adjusting the Jones model in two ways. First, we estimate discretionary accruals by

using the following a variation of Jones model by including an additional variable, the change of operating cash flows, ΔCF_{it}, to control for effect of operating cash flows.

$$TAC_{it}/TA_{it-1} = a_1(1/TA_{it-1}) + a_2(\Delta REV_{it}/TA_{it-1}) + a_3(PPE_{it}/TA_{it-1}) + \alpha_4 \Delta CF_{it} + \varepsilon_{it} \quad (2)$$

We then estimate equation (2) cross-sectionally and calculate the residuals to obtain the unadjusted discretionary accruals (DA). Second, we employ the performance adjusted method similar to Kasznik (1999), to control for measurement errors in the discretionary accruals due to its correlation with earnings performance. We rank the DAs into percentile groups by their return on assets, defined as operating income deflated by lagged total assets (ROA_{it}/TA_{it-1}). We then compute the median of each percentile and subtract it from each observation's unadjusted discretionary accruals in that percentile. The rational for standardizing the residuals in this way is that that firms identified as having higher-than-median residuals are in fact managing earnings at a rate higher than the median *performance* firm. Spearman correlation coefficient between discretionary accruals and ROA before and after adjustment are 0.28980 (*p*-value<0.0001) and -0.01767 (*p*-value=0.2188), respectively which validates the adjustment procedure. For ease of exposition, the performance-adjusted discretionary accruals are referred to as discretionary accruals hereafter.

Large values of discretionary accruals are conventionally interpreted as evidence of earnings management. Under the null hypothesis that Australian firms do not engage in earnings management, the mean and median discretionary accruals are expected to be zero. In order to capture the dynamic nature of this discretionary accrual component of earnings, we also consider both the absolute and signed values. Absolute values are used to determine whether earnings management takes place at the aggregate level. The signs of discretionary accruals are expected to convey the

direction of earnings management. Positive (negative) discretionary accruals are indicators of income-increasing (income-decreasing) earnings manipulation activities.

3.2. Data Collection

The starting point for our sample is the population of all ASX listed firms in the DataStream database with annual accounting and market data from 2000 to 2006. In our sample we include the suspended and dead files to avoid potential survivorship bias. The initial sample includes 3,914 firms with 27,398 observations. We exclude all financial firms since their financial reporting requirements differ from those of industrial firms. These include 45 banks, 194 equity investment instruments, 228 general financial, 5 life insurance, 44 non-equity investment instruments, 19 nonlife insurance, 276 real estate, altogether 811 firms and 5,677 observations. We also exclude 1,603 firm-year observations whose industry codes are unclassified by DataStream. Further, 13,926 firm-year observations (about 50%) are discarded since we require non-missing values for all variables in modelling discretionary accruals. we also exclude 11 firm-year observations involving restructuring activities. In the analysis stage, to ensure our tests are not influenced by extreme outliers, we winsorize the top and the bottom 5 per cent observations by extreme values of discretionary accruals. These sampling criteria result in a final sample of 4,844 firm-year observations. Firm coverage varies from 119 firms in 2000 to 896 in 2006.

Since our estimation procedure requires enough data points for meaningful regression, we combine industry groups in a given sample year with close GICS codes into single industry groups. For example, telecommunication services (GICS 5010) and utilities (GICS 5510) are combined. As Australian markets are dominated by mining industries, we also isolate this sector to see whether there is any industry

cluster effect. GICS consists of ten sectors[6]. Our classification of nine industries is based on the GICS structure with the financial sector being excluded.

This procedure of ensuring consistency with GICS structure results in nine industry groups with about 60% of the sample appearing in Metals & Mining (29.42 per cent), Consumer Discretionary (17.09 per cent), and Information Technology (12.59 per cent) industry groups. Table 1 shows both industry-wise and year-wise distribution of the final sample. This reflects some evidence of industry clustering in our sample. Although industry clustering could be a problem if empirical results are driven by a particular industry, we do not disaggregate the industry classification any further. Australian economy is dominated primarily by resource and consumer service. Our industry classification essentially mirrors the nature of Australian economy and therefore can avoid self-selection bias. One of the objectives of this study is to investigate the scope of earnings management practice across different industry sectors. Our industry classification, based on a consistent GICS structure to properly identifiable industry sectors, therefore, is appropriate. The determined sample can thus truly reflect earnings management practices in Australia. To the extent we do not draw our inferences on the basis of small sample size in one particular industry, we do not regard industry clustering is a problem in our study.

In general, the incidences of available observations have steadily increased over the sample period. Higher frequencies of firm-year observations begin to appear after 2002 (9.74 percent in 2001, 6.60 percent in 2002), indicating higher levels of disclosures in financial reports as required by regulatory bodies.

[6] GICS (Global Industry Classification Standard) is a joint Standard and Poor's/Morgan Stanley Capital International classification system aimed at standardizing industry definitions.

4. Empirical Results

We estimate our Jones-based cash flow model (equation 2) cross-sectionally for each of the nine industry groups in each year from 2000 to 2006. The mean coefficient estimates of annual cross-sectional regressions for 63 industry-year pairs are presented in Appendix (Table A1). The coefficient estimates themselves are not of importance to draw inference about earnings management but hold some implications regarding the validity of our model. The mean coefficient estimate on change in revenue (ΔREV) usually is ambiguous because a given change in sales can cause either income-increasing accruals (e.g. account receivables) or income-decreasing accruals (e.g. account payables). We find that mean and median coefficient estimate on ΔREV (i.e. α_2) is positive and statistically significant from zero, with 68 per cent of the estimates being positive implying that the change in sales is associated with income-increasing accruals in our sample. The coefficient on PPE should be negative since the level of property, plant and equipment is linked to income-decreasing accruals such as depreciation, depletion and amortization. The mean coefficient of our regressions on PPE (α_3) is negatively significant at 1 per cent level and 73 per cent of the estimates are negative. As expected, the mean coefficient on operating cash flows (α_4) is negative and significant with only 17 per cent of the coefficient estimates being positive. Overall, with average R-square of 0.5305 and expected signs on the estimates, our modified Jones cash-flow model estimation procedure seem to capture the non-discretionary components of the accruals. We now turn our attention to specific analyses of the discretionary accruals.

4.1. Industry sectors

Under the null hypothesis that firms do not engage in earnings management, we should expect to see the discretionary component of accruals (DA) to be zero. We test this proposition by examining the mean, median and proportion of

positive/negative DAs in our sample. We employ the Student's-*t* test for mean, the Wilcoxon non-parametric signed rank test for median, and the binomial sign test for proportional differences and report the results in table 2.

Four industries (metals and mining, industrials, health care and telecom and utilities) have DAs significantly different from zero. For each of these four industries, the mean, median are statistically significant from zero under standard p values. This is confirmed with the binomial test for equal proportion of positive and negative values. For example, the mean and median DA are -0.0016, -0.0011, respectively for the Metals and Mining industry with 719 negative DAs. For this industry, the test statistics for mean, median and proportionality tests are significant with p values of 0.0517, 0.0128 and 0.0506, respectively. In addition to these four industries, when wilcoxon and binomial tests are considered, two additional industries (energy and information technology) exhibit DAs to be significantly different from zero. Taken together, there is evidence that earnings management is prevalent in six industries overall, with particularly strong evidence of earnings management in four of these six industries. It is worthwhile to note here that four of these industries (energy, metals and mining, industrials and information technology) have income-decreasing discretionary accruals while the other two are associated with income-increasing accruals (healthcare and Telecommunication & Utilities). This evidence suggests that, between 2000 and 2006, there is an industry wide variation in the practice of earnings management. The results in table 2 do not indicate earnings management practices among material, consumer discretionary, and consumer staples industries.

The dual economy approach about earnings management posits that periphery sector firms are exposed to higher degrees of business uncertainty and a more restricted opportunity structure and are more likely to be exhibit higher frequency of earnings management than the core sector (Belkaoui and Picur, 1984). In this study,

we classify the nine Australian industries into core and periphery sectors by broadly following the Beck, Horan and Tolbert's (1978) classification system as well as the most recent classification system used by the Australian Stock Exchange (ASX)[7]. According to the ASX, the Australian economy is dominated primarily by consumer service and in recent periods has experienced considerable growth in the so-called 'new economy', comprising firms in information technology, biotechnology and healthcare. Accordingly, we define the core sector comprising of Energy, Material, Metals & Mining, Industrials, Consumer Discretionary, Consumer Staples. Firms belonging to Information technology, Health Care and Telecommunication & Utilities are assigned to the periphery sector. This classification results in 3,623 of sample firm-year observations in the core sector (approximately 75 per cent) and 1,221 firm-year observations in the periphery sector (approximately 25 per cent).

We are not only interested in the difference between core and periphery sector in terms of overall earnings management over recent years, but we also want to know whether there is a difference in income-increasing or income-decreasing activity in these two sectors. We use absolute values of DAs to examine the magnitude and signed values for testing the directions of earnings manipulation. In conducting our tests, we categorise discretionary accruals into three initial cluster groups: (1) by values (with and without absolute values); (2) by extreme observations (high and low groups of absolute values); (3) by direction (positive and negative values), to examine the systematic differences between core and periphery sector firms. The results are presented in table 3.

[7] Under Beck, Horan and Tolbert (1978) classification, Mining, Construction, Durable/Nondurable Manufacturing, Transportation, Communications, Utilities and Sanitary Services, Wholesale Trade, Finance, Insurance, and Real Estate, Professional and Related Services, and Public Administration are classified as core sector. Agriculture, Forestry, and Fisheries, Miscellaneous Durable/Nondurable Manufacturing, Nondurable Manufacturing, Retail Trade, Business and Repair Services, Personal Services, Entertainment and Recreation Services are classified as periphery sector.

Table 3 reveals that, on average, greater accounting discretions occurred in the periphery sector than in the core sector. When the discretionary accruals are grouped according to their values (with and without absolute values), the mean and median DAs are lower for the core sector group. For example, the overall mean DA for the core group is -0.0013 and lower than the overall average DA of 0.0122 of the periphery group with the difference being significantly different from zero (p-value below 0.0001). When we consider the absolute value of the DAs to examine the aggregate levels, the same pattern holds with the core group DA (mean, median 0.0683 and 0.0557, respectively) significantly below that of the periphery group (mean, median 0.0746 and 0.0619, respectively).

In order to examine the difference between the two industry groups, we also stratify the firms according to their aggregate level of DAs. Firms are classified into quartiles according to their absolute discretionary accrual values with the uppermost quartile being 'high_DA' firms and the lowest quartile comprising of 'low_DA' firms. On average, firms in high_DA (low_DA) quartile are expected to be associated with higher (lower) levels of earnings manipulation. Table 3 shows that the mean and median DAs for the high_DA group firms in the periphery sector are 0.1483 and 0.1454, respectively, which are significantly greater than the mean (0.1445) and median (0.1401) of the high_DA group in the core sector. The differences in mean and medians are statistically significant with p-values of 0.0381 for difference in means and 0.0383 for difference in medians.

When the low_DA grouping is considered, the difference between core and periphery sectors is insignificant with *p*-value equal to 0.4801 and 0.4965 for differences of mean and median of DAs, respectively. This implies that periphery sectors firms exhibiting higher levels of DAs are quite likely driven by a group engaging in extreme earnings manipulation. This result is further bolstered by

considering the proportion of overall sample in each of the dual economy group for the extreme DA quartiles. The frequency of high_DA group is 28 per cent and higher for the periphery sector compared to 24 per cent for the core. The corresponding percentages for the low_DA groups are 22 per cent and lower for periphery firms while 26 per cent of these firms are in the core.

Next we examine the broad directions of earnings management activity in these two dual sectors. In table 3, we group discretionary accruals into positive discretionary accruals (+DA, income increasing) group and negative discretionary accruals (−DA, income decreasing) group for both core and periphery sectors. Difference in mean and medians suggest that periphery sector firms engage in more income-increasing earnings management than those in the core sector. Both the mean (0.0799 versus 0.0689) and median (0.0649 versus 0.0556) +DA for the periphery sector are greater than those of the core sector and the differences are statistically significant at less than 1 per cent. In terms of frequency, 54 per cent firms in periphery sector report positive discretionary accruals, which is more frequent than the core group at 48 per cent. However, if we examine the evidence regarding income decreasing activity (-DA) there is no evidence to suggest either core or the periphery group behave differently during our sample period.

Overall, it appears that the periphery sector firms are more likely to engage in earnings management than the periphery sector firms. Nonetheless, the core sector firms do exhibit earnings management in an income-decreasing fashion while the periphery sector firms are practicing in the traditional form of earnings management by income-increasing behavior. Although this is beyond the scope of the paper, one possible reason could be that given our sample period coincides with the recent boom in resource sector in Australia and predominance of resource based firms in our sample, the firms may be engaging in 'income smoothing'.

4.2. Association between earnings management and firm characteristics

Next we turn our attention to analysing the discretionary accruals and examine if the cross sectional relationship between the DAs and underlying firm-level characteristics.

4.2.1 Discretionary accruals portfolios

Following McNichols and Wilson (1988) and Kothari et al. (2005), we form portfolios of DAs to examine discretionary accruals. We construct ten portfolios according to the decile ranking of the absolute values of DA (abs_DA) to examine the magnitude of earnings management attributed to firm characteristics. In order to examine the direction of earning manipulation, we split the DAs into positive (+DA) and negative (-DA) accruals groups and construct similar decile portfolios within each group.

Table 4 presents the average size, growth opportunity, profitability, capital intensity, operating cash flows and leverage within each abs_DA portfolios. By construction, one can interpret firms in the extreme decile portfolios in our sample to possess the highest and lowest levels of aggregate earnings manipulation characteristics. Our lowest decile portfolio (portfolio-1) has a mean absolute DA of 0.0050 and the highest decile portfolio has mean DA of 0.1752[8]. We observe that as the absolute discretionary accruals increase, the firm size decreases. Portfolio-10 (High abs_DA) seems to be comprised of smallest firms with mean logarithm of total assets being 9.8603 while the portfolio-1 (Low abs_DA) has the largest firms with mean logarithm of total assets of 11.001. The relationship between size and abs_DA appear to be negatively monotonous by portfolios. The difference of firm sizes between two extreme portfolios is significant with *t*-statistics of 8.45 (p<0.0001).

[8] The mean DA of portfolio-1 is statistically close to zero under p-value of 5%. The mean DA of portfolio-10 is statistically different from zero. We do not report these statistics in our decile DA portfolio analyses.

When we consider growth opportunity (GROWTH), the relationship also appears to be related to high DAs with high growths tending to occur in portfolios 7, 8, 9 and 10. This indicates that firms with high abs_DA are likley to exhibit faster growth rate than lower abs_DA firms. However, the relationship between growth and abs_DA is likely to be non-linear since the difference between portfolio 1 and 10 is insignificant (p=0.1470). Profitability (*ROA*) and operating cash flows (*CF*) tend to become poorer when absolute discretionary accruals are of increasing nature. It is also interesting to note that both ROA and CF have negative means across all our portfolios, indicating a strong association of earnings management with less profitable and poor cash flow firms. In table 4, the High abs_DA portfolio has much lower profitability measure (−0.44) than the Low abs_DA portfolio (−0.028). This difference is significant at 5 percent. Correspondingly, cash flows for High abs_DA portfolio (−0.2743) are poorer than that of Low abs_DA portfolio (−0.0105) and the difference is significant at less than 1 per cent. Previous evidence suggest that firms engaged in earnings manipulation are likely to be firms with operating cash flow and profitability problems and the evidence presented in this table appears to support this notion for Australian firms during our sample period. According to the taking-a-bath hypothesis, when operating performance is poor, managers tend to increase earnings; however, if the operating performance is extremely poor, some firms may decrease income further. If managers attempt to take an opportunity of negative earnings in any particular period to depress earnings further then the negative earnings are likely to be clustered. We find some indirect evidence to support this conjecture in table 4 by noting that the highest abs_DA portfolio (portfolio-10) has not only a very high level of mean CF (-0.2743) but also this average is almost four times the CF mean of portfolio-9. As regards to the CIR characteristic, the measure for capital intensity, when we test the difference across the extreme portfolios, this factor is statistically

higher for the high abs_DA portfolio (p=0.0122). Although this evidence is contrary to the general intuition that firms with low CIR should have high DAs, the pattern is somewhat irregular across the portfolios. There is no specific association between the magnitude of earnings management and leverage. We do not observe any pattern for changes in LEVERAGE. This observation is confirmed with the t-test for the difference of leverage between High abs_DA and Low abs_DA showing no significant difference.

We also examine whether firm characteristics affect the direction of earnings management. Table 5 presents the mean of the same firm characteristics (size, growth opportunity, profitability, capital intensity, operating cash flows and leverage) of decile portfolios of two groups of positive and negative discretionary accruals. In panel A of table 5, when the income-increasing discretionary accruals are considered (+DA), we observe that small size, poor profit, and poor cash flows firms are more likely to involve in income-increasing earnings manipulation. The average size of the portfolio decrease as +DA increases with the smallest size being 9.5033 for the highest +DA portfolio (portfolio-10). Although patterns for profitability and cash flows are not as monotonous as firm size, we observe that the mean ROA and CF for high +DA firms are higher than those of the low +DA firms. Testing for the extreme deciles, we find that the differences are statistically significant (p values of 0.0494 and 0.0038 for ROA and CF, respectively).

Panel B in table 5 examines income-decreasing earnings accruals (−DA) and confirms the role of size and ROA in determining the directional effect of earnings manipulation Consistent with earlier evidence, smaller and lower ROA firms tend to be associated with income-decreasing earnings management. The evidence is particularly strong with the size factor, with the average size steadily decreasing as the –DAs become more negative. The average size in extreme deciles are significantly

different (p=0.0008). The evidence regarding ROA shows that, most high income-decreasing accruals are concentrated in firms with low ROA. In table 5, panel B, the mean ROA of portfolio-10, a decile portfolio of extreme –DAs, is -0.2072 and statistically different from that of the portfolio-1 (p=0.0026). Taken together, evidence presented in panel A and B shows that size and return on assets play large roles in determining the direction of earnings manipulation. Smaller size firms and firms with low return on assets firms are more likely to engage in earnings management and in both direction[9]. These results are further confirmed in our regression analysis later.

In addition to size and ROA, we find some weak evidence that high capital intensity firms tend to engage in more income-decreasing earnings management. Difference of CIR between highest negative DA firms (portfolio 10) and lowest negative DA firms (portfolio 1) is significant (*p*=0.0081). Although this difference is present between extreme portfolios, the pattern is much less clear across the decile portfolios.

Overall, on the basis of evidence presented in table 4 and 5, we suggest that size and profitability play significant roles in earnings management behaviour of Australian firms between 2000 and 2006. Moreover, smaller size and less profitable firms are associated with both income-increasing and decreasing earnings management activities. The results regarding size is quite strong and is consistent with evidence of U.S. firms by Sloan (1996). In terms of firm profitability and cash flows, our results are consistent with Kinney and McDaniel (1989) who find that firms who restate their earning figures are likely to be less profitable, and McNichols

[9] Interestingly, the average ROA for the portfolio of firms with extreme income-decreasing accruals is much lower than that of the extreme portfolio of income-increasing accruals (-0.6636 versus -0.2072).

and Wilson (1988) Dechow (1994) who find that firms with unusually poor operating cash flows tend to have higher accruals.

4.3.2 Logit regression analysis

We also use logit regressions to model earnings management behaviour. We use logit analysis to gauge the marginal impact of independent variables of firm characteristics and economic sectors on the choice variable of earnings manipulation. Moreover, the non-linear relationship between discretionary accruals and firm characteristics that we have observed in our portfolio analyses earlier is better modelled through binary dependent variable analysis. The model is represented as follows:

$$P_{(i)} = \frac{e^{\beta X_{(i)}}}{1 + e^{\beta X_{(i)}}} \qquad (3)$$

Where $P_{(i)}$ is the probability of earnings management by firm *i,* which is also the response variable. $X_{(i)}$ is a vector of independent firm characteristics for firm firm i in year t ($SIZE_{(it)}$, $GROWTH_{(it)}$, $ROA_{(it)}$, $CF_{(it)}$, $CIR_{(it)}$, $LEVERAGE_{(it)}$ and $SECTOR_{(it)}$); β is the regression coefficient vector. Independent variables are continuous except $SECTOR_{(it)}$ which is a binary variable if firm *i* is in periphery sector and 0 otherwise

In order to test the marginal effects on aggregate level of earnings management, we set the dependent indicator variable to be 1 if the observation is above the median value when ranked by absolute values of discretionary accruals and zero otherwise. The likelihood-ratio, Hosmer and Lemeshow goodness-of-fit test statistic and prediction accuracy are used to evaluate model fitting. The explanatory power of the model is determined by Max-rescaled R^2.

Table 6 presents the aggregate magnitude of earnings management in the presence of firm characteristics and economy sector classification. It shows that there is a high probability that if a firm is small (negative coefficient, p<0.0001), high

growth (positive coefficient, p=0.0525), less profitable (negative coefficient, p=0.0420), with poor cash flows (negative coefficient, p= 0.0190) and high capital intensity (positive coefficient, p<0.0001), it is more likely to engage in higher levels of earnings management. This result confirms the broad results regarding the aggregate levels of earnings manipulation contained in table 4. In table 6, although leverage has positive association with the magnitude of earnings management, Wald Chi-Sq for this coefficient is 1.2763 and insignificant (p=0.4877). The logistic regression also shows a significantly positive coefficient estimate for periphery sector (p=0.001). Controlling for the effects of underlying firm characteristics, the economy sector of a firm is still a determinant of the magnitude of earnings management. Consistent with earlier evidence regarding economic sectors, we find that periphery sector firms have larger magnitude of earnings management compared with core sector firms. The overall F-test (not reported) for the null hypothesis that all parameters of interest are jointly zero is rejected with chi-square value of 12.5021 (p-value=0.0004).

Next, we test the effect of firm characteristics and economy sectors on the direction of earnings management. To test this, we set the dependent indicator variable to be 1 if the firm is in the upper half of positive discretionary accruals group and zero otherwise. We repeat the regression procedure for the negative discretionary accruals by splitting the group above median with the independent variable being 1 for high negative DAs and 0 for the low negative DAs.

Table 7 (panel A) shows that firms with smaller size, (negative coefficient, p<0.0001) lower ROA, (negative coefficient, p<0.0001), low cash flow (negative coefficient, p<0.0001), and higher leverage (positive coefficient, p=0.0427) are likely to engage in income-increasing earnings management. The negative coefficient on SIZE confirms our earlier finding of overall negative relationship of size and earnings

management. The estimated signs on coefficients of ROA and CF are also consistent with earlier evidence (table 5) and with the general intuition is that managers try to boost reported earnings and profit when the true operating cash flows are poor (Fudenberg and Tirole, 1995; and McNichols and Wilson, 1988). The leverage factor is significantly and positively related to discretionary accruals. With regards to the economic sector, the logit analysis suggests that periphery sector firms display a higher degree of upwards earnings manipulation.

The results for the logit test of association between firm characteristics and negative discretionary accruals shows analogous pattern for size and profitability factors. Similar to estimates in panel A, SIZE and ROA coefficients are both significantly and negatively related to firms with high negative discretionary accruals. We are not sure of the role of size in artificial dampening of earnings for small firms. However, the negative relationship between low profitability and lowering of earnings could be an indirect evidence of taking-the-bath hypothesis. Given that lower profitable firms experience negative earnings in general, managers of these firms may have been reporting excessive negative earnings to set up positive earnings for future periods. The coefficient estimate for CF panel B of table 7 is significantly positive. This suggests that firms with high cash flows are likely to adjust their earnings downwards, a possible effect of income-smoothing. The significantly negative sign on LEVERAGE implies that firms with high leverage manage earnings downwards. It is interesting to note form the combined evidence from panel A and b that the effect of CF and LEVERAGE on the direction of earnings management is symmetric.

The CIR coefficient in panel B of table 7 is unexpectedly positive indicating that firms with high levels of fixed assets are able to manipulate earnings, although in a negative fashion. Unlike the evidence for firms exhibiting positive discretionary accruals (panel A), there does not seem to be any difference between firms belonging

to either core or periphery sector when negative discretionary accruals are considered. While interpreting these results one must take into consideration the nature and design of the logit regressions. Since the independent variable for a logit regression is dichotomized at the median, by construction, the logit test is of much broader nature as it has equal number of observations on each side of this binary classification. Therefore these results should be viewed in conjunction with results reported in tables 4 and 5 and interpreted accordingly.

The overall evidence, nonetheless, suggests that size and profitability are dominant features of firms engaging in earnings manipulation. Further, smaller size low profitable firms are active in both income-increasing and decreasing earnings management.

5. Supplementary Analysis

We perform a variety of additional tests to verify the validity of our findings. The following is brief motivation and summary results for these additional tests.

5.1. Alternative discretionary accrual measures

We use Jones-based cash flow model in estimating discretionary accruals. Given the reason that discretion is easier to be exercised through credit sales then cash sales, Dechow *et al*. (1995) assume that all changes in credit sales result from earnings management and thus adjust the original Jones model by removing credit sales from revenues. In the literature, their model is referred as Modified Jones model. In a similar spirit, we re-estimate discretionary accruals by including the change in accounts receivables (ΔREC_{it}) in our estimation of residuals (discretionary accruals) as follows

$$TAC_{it}/TA_{it-1} = a_1(1/TA_{it-1}) + a_2(\Delta REV_{it}/TA_{it-1} - \Delta REC_{it}/TA_{it-1}) + a_3(PPE_{it}/TA_{it-1}) + a_4\Delta CF_{it} \quad (4)$$

In Appendix, table A2, the results of this estimation is presented. We find that the predictive power of accrual model is not significantly increased with the mean adjusted R^2 is 0.5305 which is in fact slightly lower than that from our base model (0.5351). In general, the coefficients in Modified Jones cash flow model are statistically significant at different levels with consistent signs as our base model. The mean coefficient on change in sales adjusted by the change on account receivable (a_2) is positive, suggesting sales adjusted for account receivable is positively correlated with total accruals. We repeat all the earlier tests of earnings management using discretionary accruals estimated from this alternative model. In general, we obtain similar qualitative results.

5.2. Adjusting ROA versus including ROA as a regressor in accrual models

While we control for the effect of earnings performance on discretionary accruals using medians, an alternative is to model accruals as a direct function of earnings performance (see Fields et al., 2001). We can add a performance measure, ROA, as an additional regressor to the accrual regression models as follows and estimate the discretionary accruals from this model (not reported).

$$TAC_{it} / TA_{it-1} = \gamma_1(1/TA_{it-1}) + \gamma_2(\Delta REV_{it} / TA_{it-1}) + \gamma_3(PPE_{it} / TA_{it-1}) + \gamma_4 \Delta CF_{it} + \gamma_5 ROA_{it} + \varepsilon_{it} \quad (5)$$

However, we agree with Kothari et al (2005) that a linear regression approach to control for earnings performance is unlikely to perform as well as a performance-adjusted technique. They test both methods and show that performance matching performs typically better than adding ROA as an additional regressor. They further point out that regression-based method is disadvantaged in that it imposes a linear function on the relation between earnings performance and accruals. Butler *et al*. (2004) find that firms experiencing extremely poor performance engage in liquidity-related transactions and record asset impairment accruals and firms experiencing high

growth record large accruals. These accruals normally do not have a one-to-one income consequence. Therefore, we argue that our results from the performance-adjusted method are likely to perform better than a linear regression approach.

5.3. Fama and MacBeth (1973) method

Accrual models in this study are estimated by industry and then by year, resulting in 63 regressions of industry-year pairs. One limitation of this estimation is that the means of estimated coefficients and t-statistics computed over all of the regressions, the observations in small sample groups are given a heavier weight than observations in large groups. For example, observations in Telecommunication & Utilities (133 observations) may have as much as approximately ten times the weight of an observation in Metals & Mining (1425 observations). This skewed weighting may possibly bias our findings. To examine whether the disparity in industry group sizes biases our results, we estimate year-by-year cross-sectional regressions and then estimate mean coefficients and *t*-values based on Fama and MacBetch (1973) method. In each of year-by-year regression, we include indicator variables for the nine industry groups to control for industry effect. Regressions based on this procedure result in 7 regressions instead of 63. As such, the sample sizes are larger and the weights of the observations are evenly distributed. We then repeat all the tests and confirm that this alternative procedure do not alter the general inferences presented earlier.

5.4. Inclusion of a constant in the accrual models

Consistent with the original Jones model, our estimations of the parameters of the modified Jones cash flow accruals models do not include a constant term in regressions. However, recent studies argue for including a constant term in accrual models. Kothari et al. (2005) assert that constant term can control additional heteroscedasticity. We re-estimate our model with a constant included and estimate

the coefficients. Untabulated results indicate that the constant term is not significantly different from zero in most industry and years and thus we argue that the zero-constant assumption is satisfied. Therefore, out results, based on a variation of Jones model without the constant term, should be acceptable.

5.5. Earnings management evidence based on yearly horizons

This study detects earnings management practice on an aggregate basis across Australian industries from 2000 to 2006. Although, strictly speaking, this is a not criticism of our methodology but a time-series examination of our results, we aggregate our discretionary accruals for each year during the investigation period. Results show that, overall, earnings management practices are evident in 2000, 2003, 2005 and 2006. In particular, we find significant income-increasing earnings management occurred in the year of 2000, 2003 and 2006; while significant income-decreasing earnings management has occurred in year 2005. An interesting question is why earnings management is prevalent among these years. Possible reasons could be a change of regulation, a significant impact of new tax law, or capital market reasons. A further investigation is beyond this study's scope and we leave it to our future research.

6. Conclusion

We look for broad evidence of earnings management practice in Australia across nine GICS industrial groups during the period of 2000-2006. Results of this study indicate that some Australian firms engage in earnings management. Earnings management practice, in general, is prevalent in Energy, Metals & Mining, Industries, Health Care, Information Technology and Telecommunication & Utilities industries. When we classify the Australian economy into periphery and core sectors, the periphery sector firms exhibit a higher propensity for income-*increasing* earnings management behaviour than core sector firms.

We also investigate the characteristics of individual firms and their association to earnings management. We find strong evidence that firms which are small in size, and less profitable and more likely to engage in earnings management. There is some support, but not as strong, that high cash flow firms also tend to be associated with of earnings manipulation behaviour. In terms of direction of earnings management, we observe that smaller size and less profitable firms engage in both upward and downward earnings manipulation.

Our findings shed some light on earnings management in Australia. Regulators may consider additional disclosures requirements from firms. Firm characteristics such as size may help regulators to devise policies to ensure better financial disclosure.

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Table 1
Sample distribution by industry and year

Industry				Year		
GICS	Industry	Observations	%	Year	Observations	%
1010	Energy	324	6.69	2000	119	2.46
1510	Material	366	7.56	2001	472	9.74
1510	Metals & Mining	1425	29.42	2002	804	16.60
2010-2030	Industrials	272	5.62	2003	841	17.36
2510-2550	Consumer Discretionary	828	17.09	2004	819	16.91
3010-3030	Consumer Staples	408	8.42	2005	893	18.44
3510-3520	Health Care	478	9.87	2006	896	18.50
4510-4530	Information Technology	610	12.59			
5010-5510	Telecommunication & Utilities	133	2.75			
	Total	4844	100		4,844	100

Table 2
Univariate tests of discretionary accruals (DA)

Industry	Parametric t-test			Wilcoxon Signed Rank Test			Binomial Sign Test		
	Mean DA	*t*-stat.	*P*	Median DA	*z*-stat	*p*	+/–	*t*-stat	*p*
Energy	-0.0065	-1.2625	0.2077	-0.0138	-2846	0.0917	142/182	-20.0	0.0301
Material	0.0018	0.4558	0.6488	-0.0002	226	0.9111	182/184	-1.0	0.9583
Metals & Mining	-0.0016	-0.6476	0.0517	-0.0011	-10172	0.0128	706/719	-6.5	0.0506
Industrials	-0.0096	-2.2805	0.0234	-0.0195	-3691	0.0043	103/169	-33.0	<.0001
Consumer Discretionary	0.0018	0.6592	0.5100	0.0020	4010	0.5605	424/404	10.0	0.5091
Consumer Staples	0.0005	0.1334	0.8939	-0.0000	-83	0.9723	204/204	0	1.0000
Health Care	0.0253	6.6505	<.0001	0.0243	19757	<.0001	308/170	69.0	<.0001
Information Technology	-0.0046	-1.2174	0.2239	-0.0128	-7675	0.0779	267/343	-38.0	0.0024
Telecommunication & Utilities	0.0423	4.9744	<.0001	0.0495	2019	<.0001	88/45	21.5	<.0001

Discretionary accruals (DA) are obtained as the residual from Jones-based cash flow model (see Appendix A1) and adjusted by median earnings performance (Kasznik, 1999). The null hypotheses for t-test is that mean is zero, for the Wilcoxon signed rank test is that the median is zero and for the binomial sign test is that the proportion of positive and negative are equal. Reported p-values are from two-tailed tests.

Table 3
Discretionary accruals by economic sectors and groups

	Core Sector N=3623			Periphery Sector N=1221			t-test		Wilcoxon test	
Groupings	**Mean**	**Median**	**Freq.**	**Mean**	**Median**	**Freq.**	**t-stat.**	***p*-value**	**z-stat.**	***p*-value**
1.By values										
DA	**-0.0013**	**-0.0025**		**0.0122**	**0.0105**		**-4.53**	**<.0001**	**4.3144**	**<.0001**
|DA|	**0.0683**	**0.0557**		**0.0746**	**0.0619**		**-3.56**	**0.0004**	**3.3669**	**0.0008**
2. By extremes:										
High_DA	**0.1445**	**0.1401**	**24%**	**0.1483**	**0.1454**	**28%**	**-2.08**	**0.0381**	**2.0711**	**0.0383**
Low_DA	**0.0131**	**0.0128**	**26%**	**0.0128**	**0.0120**	**22%**	**0.71**	**0.4801**	**-0.6800**	**0.4965**
3. By direction:										
+ DA	**0.0689**	**0.0556**	**48%**	**0.0799**	**0.0649**	**54%**	**-4.29**	**<.0001**	**4.0640**	**<.0001**
− DA	**-0.0676**	**-0.0558**	**52%**	**-0.0682**	**-0.0596**	**46%**	**0.24**	**0.8135**	**-0.4160**	**0.6774**

Core sector consists of Energy, Material, Metals & Mining, Industrials, Consumer Discretionary, Consumer Staples. Periphery sector consists of Information technology, Health Care and Telecommunication & Utilities. Discretionary accruals (DA) are obtained as the residual from Jones-based cash flow model (see Appendix A1), and adjusted by median earnings performance (Kasznik, 1999). |DA| is absolute discretionary accruals. High_DA and Low_DA are top and bottom quartile groups when DAs are ranked by their absolute values. +DA and –DA comprises all observations with positive discretionary accrual sand negative discretionary accruals.

Table 4
Firm characteristics by magnitude of earnings management

Portfolio Ranking	N	Abs_DA	SIZE	GROWTH	ROA	CF	CIR	LEVERAG
1 (Low)	483	0.0050	11.0010	0.5939	-0.0280	-0.0105	0.3135	0.1790
2	483	0.0156	10.8462	0.5350	-0.0870	-0.0445	0.3307	0.1607
3	483	0.0272	10.7449	0.4604	-0.0790	-0.0424	0.3025	0.1786
4	484	0.0387	10.6980	0.8160	-0.0727	-0.0297	0.3313	0.1833
5	483	0.0506	10.5247	1.3367	-0.1184	-0.0538	0.3499	0.1706
6	483	0.0651	10.6953	0.6557	-0.0741	-0.0267	0.3686	0.1686
7	484	0.0827	10.3428	1.1027	-0.1535	-0.0642	0.3563	0.1719
8	483	0.1046	10.2200	3.3182	-0.0591	-0.0228	0.3837	0.1522
9	483	0.1335	10.1800	3.3926	-0.1332	-0.0660	0.3490	0.1753
10 (High)	483	0.1752	9.8603	2.2102	-0.4400	-0.2743	0.3597	0.1669
t- test of Low=High (p-value)			8.45 (<0.0001)	-1.45 (0.1470)	2.53 (0.0117)	2.90 (0.0039)	-2.51 (0.0122)	0.48 (0.6288)

'Abs_DA' is absolute values of discretionary accruals (DA) are obtained as the residual from Jones-based cash flow model (see Appendix A1), and adjusted by median earnings performance (Kasznik, 1999). Portfolio ranking is based on decile portfolios based on abs_DA. Means of each characteristic within each portfolio are reported. Size is the logarithm of the total assets at year end; *GROWTH* is the sales growth rate measured by the change of sales between from previous year; *ROA is* return on assets measured by net operating income divided by total assets; *CF* is the operating cash flows deflated by lagged total assets; *CIR (*capital intensity ratio) is the proportion of net property plant and equipment to total assets; *LEVERAGE* is total debt to total assets.

Table 5

Firm Characteristics and Direction of Earnings Management

Panel A (sorted by Positive DA)

Portfolio Ranking	N	+DA	SIZE	GROWTH	ROA	CF	CIR	LEVERAGE
1 (Low)	242	0.0052	11.0674	0.5381	-0.0307	-0.0062	0.3216	0.1941
2	242	0.0159	10.7197	0.2661	-0.1144	-0.0803	0.3424	0.1440
3	243	0.0276	10.7984	0.5417	-0.0715	-0.0498	0.3205	0.1667
4	242	0.0394	10.5196	1.0057	-0.0863	-0.0585	0.3405	0.1806
5	243	0.0514	10.2229	1.1596	-0.1493	-0.0992	0.3619	0.1639
6	242	0.0661	10.3723	0.6626	-0.0969	-0.0899	0.4098	0.1735
7	243	0.0847	10.1449	0.3689	-0.3182	-0.2809	0.4346	0.1819
8	242	0.1077	10.0800	0.9263	-0.0759	-0.1118	0.4011	0.1543
9	243	0.1380	9.8021	4.1802	-0.1207	-0.1340	0.3469	0.2085
10 (High)	242	0.1829	9.5033	3.9484	-0.6636	-0.5137	0.3622	0.1923
t- test of Low=High (p-value)			7.98 (<.0001)	-1.52 (0.1302)	1.97 (0.0494)	2.92 (0.0038)	-1.54 (0.1247)	0.04 (0.9676)

Panel B (sorted by Negative DA)

Portfolio Ranking	N	−DA	SIZE	GROWTH	ROA	CF	CIR	LEVERAGE
1 (Low)	243	-0.0047	10.9566	0.6289	-0.0282	-0.0196	0.2988	0.1674
2	241	-0.0153	10.9526	0.7781	-0.0462	0.0013	0.3280	0.1770
3	242	-0.0267	10.6817	0.4288	-0.0941	-0.0385	0.2830	0.1877
4	242	-0.0380	10.9140	0.5737	-0.0714	-0.0105	0.3225	0.1833
5	242	-0.0499	10.8124	1.5559	-0.0748	-0.0001	0.3447	0.1763
6	242	-0.0642	10.9584	0.7343	-0.0524	0.0328	0.3287	0.1655
7	242	-0.0810	10.5653	1.5855	0.0026	0.1308	0.2868	0.1530
8	242	-0.1017	10.4105	5.2099	-0.0336	0.0846	0.3739	0.1594
9	242	-0.1293	10.4236	2.9122	-0.1570	-0.0204	0.3160	0.1427
10 (High)	242	-0.1668	10.3254	0.6090	-0.2072	-0.0046	0.3663	0.1421
t- test of Low=High (p-value)			-3.38 (0.0008)	-0.07 (0.9431)	-3.04 (0.0026)	0.29 (0.7696)	2.66 (0.0081)	-1.00 (0.3159)

'+DA' and '–DA' are signed values of discretionary accruals (DA) obtained as the residual from Jones-based cash flow model (see Appendix A1) and adjusted by mean earnings performance (Kasznik, 1999). The total number of +DA and –DA in the above table are approximately equal because of this standardisation-by-mean DA procedure. Portfolio ranking is based on decile portfolios based on all observations within +DA (Panel A) or –DA (Panel B). Observations means of each characteristic within each portfolio are reported. Size is the logarithm of the total assets at year end; *GROWTH* is the sales growth rate measured by the change of sales between from previous year; *ROA is* return on assets measured by net operating income divided by total assets; *CF* is the operating cash flows deflated by lagged total assets; *CIR (*capital intensity ratio) is the proportion of net property plant and equipment to total assets; *LEVERAGE* is total debt to total assets.

Table 6
Logistic regression of firm characteristics on magnitude and directions of EM

	Model 1 (Magnitude) Dep. variable = 'Abs_DA'			
	Coefficient	**S.E.**	**Wald Chi-Sq**	**Pr>Chi-Sq**
Constant	**2.1245**	**0.2801**	**57.5135**	**<.0001**
SIZE	**-0.2250**	**0.0263**	**72.9526**	**<.0001**
GROWTH	**0.0217**	**0.0112**	**3.7601**	**0.0525**
ROA	**-0.5580**	**0.2744**	**4.1353**	**0.0420**
CF	**-0.7939**	**0.3384**	**5.5039**	**0.0190**
CIR	**0.8056**	**0.2051**	**15.4221**	**<.0001**
LEVERAGE	**0.1057**	**0.1523**	**0.4816**	**0.4877**
SECTOR	**0.1937**	**0.0589**	**10.8128**	**0.0010**
Max-rescaled R^2	**0.2910**			
Likelihood ratio	**130.2982**			
(p-value)	**(<.0001)**			
Goodness of fit	**13.4755**			
(p-value)	**(0.0965)**			
Prediction accuracy	**59%**			

Discretionary accruals (DA) are obtained as the residual from Jones-based cash flow model (see Appendix A1) and adjusted by median earnings performance (Kasznik, 1999). The dependent variable in this model is 'Abs_DA'=1 if firm observation is in top quartile of when sorted by absolute discretionary accruals and 0 otherwise. SIZE is the logarithm of the total assets at year end; *GROWTH* is the sales growth rate measured by the change of sales between from previous year; *ROA* is return on assets measured by net operating income divided by total assets; *CF* is the operating cash flows deflated by lagged total assets; *CIR (*capital intensity ratio) is the proportion of net property plant and equipment to total assets; *LEVERAGE* is total debt to total assets. *SECTOR* is a binary variable of 1 if a firm is in the periphery sector and 0 otherwise.

Table 7
Logistic regression of firm characteristics on directions of EM

Panel A: Positive Discretionary accruals

	Model 1: Dep. variable = '+DA'			
	Coefficient	Standard Error	Wald Chi-Sq	Pr>Chi-Sq
Constant	**1.1189**	**0.2893**	**14.9566**	**0.0001**
SIZE	**-0.1499**	**0.0273**	**30.1600**	**<.0001**
GROWTH	**0.0101**	**0.0075**	**1.8058**	**0.1790**
ROA	**-0.7386**	**0.1752**	**17.7721**	**<.0001**
CF	**-1.6677**	**0.3858**	**18.6867**	**<.0001**
CIR	**0.2382**	**0.2221**	**1.1496**	**0.2836**
LEVERAGE	**0.4328**	**0.2136**	**4.1071**	**0.0427**
SECTOR	**0.2056**	**0.0578**	**12.6793**	**0.0004**
Max-rescaled R^2	**0.2439**			
Likelihood ratio	**360.8048**			
(p-value)	**(<.0001)**			
Goodness of fit	**113.7409**			
(p-value)	**(<.0001)**			
Prediction accuracy	**77%**			

Panel B: Negative Discretionary accruals

	Model 2: Dep. variable = '-DA'			
	Coefficient	Standard Error	Wald Chi-Sq	Pr>Chi-Sq
Constant	**-0.3701**	**0.3027**	**1.4955**	**0.2214**
SIZE	**-0.0360**	**0.0266**	**3.1420**	**0.0763**
GROWTH	**0.0096**	**0.0054**	**1.8294**	**0.1762**
ROA	**-8.1411**	**0.6269**	**168.6597**	**<.0001**
CF	**9.9196**	**0.7593**	**170.6716**	**<.0001**
CIR	**1.0271**	**0.1996**	**26.4929**	**<.0001**
LEVERAGE	**-0.4351**	**0.2034**	**4.5746**	**0.0325**
SECTOR	**-0.0002**	**0.0646**	**0.0000**	**0.9975**
Max-rescaled R^2	**0.1747**			
Likelihood ratio	**268.0080**			
(p-value)	**(<.0001)**			
Goodness of fit	**93.9084**			
(p-value)	**(<.0001)**			
Prediction accuracy	**71%**			

Discretionary accruals (DA) are obtained as the residual from Jones-based cash flow model (see Appendix A1) and adjusted by median earnings performance (Kasznik, 1999). In Model 1 the dependent variable is 1 if firm observation is in upper half when sorted amongst positive discretionary accruals and 0 otherwise. In Model 2 the dependent variable is 1 if firm observation is from upper half when sorted amongst negative DAs and 0 otherwise. Size is the logarithm of the total assets at year end; *GROWTH* is the sales growth rate measured by the change of sales between from previous year; *ROA is* return on assets measured by net operating income divided by total assets; *CF* is the operating cash flows deflated by lagged total assets; *CIR (*capital intensity ratio) is the proportion of net property plant and equipment to total assets; *LEVERAGE* is total debt to total assets. *SECTOR* is a binary variable of 1 if a firm is in the periphery sector and 0 otherwise (we estimate periphery sector and use core sector as reference category).

Appendix

Table A1
Jones Cash Flow model for accrual estimation

$$TAC_{it} / TA_{it-1} = a_1(1/TA_{it-1}) + a_2(\Delta REV_{it} / TA_{it-1}) + a_3(PPE_{it} / TA_{it-1}) + a_4 \Delta CF_{it} + \varepsilon_{it}$$

The modified Jones cash flow model is estimated for each industry group in each year (N refers to 63 industry-year pairs regressions). TAC_{it} is total accruals being the difference between net operating income and operating cash flows form DataStream for firm i in year t. ΔREV is change in net sales, from year t-1 to t. PPE_{it} is gross property, plant and equipment (calculated as net property, plant and equipment plus depreciation and depletion). ΔCF_{it} is change in operating cash flows. TA_{it-1} is the total assets in year t-1. ***, **, and * indicate statistical significance at 1%, 5% and 10% respectively (two tail). The *t*-statistics is shown in parentheses.

Variables	N	Predicted Sign	Mean	Median	S.D.	Q1	Q3	% Positive
α_1 (t-statistic)	63	?	854.0458 (-3.0877)*	-183.6301 (-368)***	7847	-425.0943	-40.8189	21%
α_2 (t-statistic)	63	+/–	0.0487 (0.8803)***	0.0431 (112)***	0.1647	-0.0052	0.0973	71%
α_3 (t-statistic)	63	–	-0.1476 (-7.3535)***	-0.0666 (-688)***	0.4901	-0.1496	-0.0160	22%
α_4 (t-statistic)	63	–	-0.3681 (-6.74919)**	-0.1850 (-656)***	0.6681	-0.5010	-0.0256	17%
Adj- R^2	63		0.5351	0.4545	0.3359	0.2476	0.8936	

Table A2
Modified Jones Cash Flow model for accrual estimation

$$TAC_{it} / TA_{it-1} = a_1(1/TA_{it-1}) + a_2(\Delta REV_{it} / TA_{it-1} - \Delta REC_{it} / TA_{it-1}) + a_3(PPE_{it} / TA_{it-1}) + a_4 \Delta CF_{it} + \varepsilon_{it}$$

The modified Jones cash flow model is estimated for each industry group in each year (N refers to 63 industry-year pairs regressions). TAC_{it} is total accruals being the difference between net operating income and operating cash flows form DataStream for firm i in year t. ΔREV is change in net sales, from year t-1 to t. PPE_{it} is gross property, plant and equipment (calculated as net property, plant and equipment plus depreciation and depletion). ΔCF_{it} is change in operating cash flows. TA_{it-1} is the total assets in year t-1. ΔREC_{it-1} is the change in account receivable. ***, **, and * indicate statistical significance at 1%, 5% and 10% respectively (two tail). The *t*-statistics is shown in parentheses.

Variables	N	Predicted Sign	Mean	Median	S.D.	Q1	Q3	% Positive
α_1 (t-statistic)	63	?	753.5833 (0.7841)	-251.0373 (-619)***	7627	-464.8430	-67.9561	17%
α_2 (t-statistic)	63	+/–	0.0706 (2.4484)**	0.0331 (502)***	0.2290	-0.0144	0.1157	68%
α_3 (t-statistic)	63	–	-0.1634 (-1.9765)**	-0.0602 (-741)***	0.6560	-0.1525	0.0003	27%
α_4 (t-statistic)	63	–	-0.3854 (-4.5583)***	-0.2343 (-793)***	0.6710	-0.4747	-0.0568	17%
Adj- R^2	63		0.5305	0.4742	0.3289	0.2702	0.8881	