University of Sussex

Cash Flow Accounting and the Cost of Debt

Submitted by

Mahmoud Lari Dashtbayaz

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Declaration

I hereby declare that this thesis has not been and will not be, submitted in whole or in

part to another University for the award of any other degree.

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Mahmoud Lari Dashtbayaz

April 2011

UNIVERSITY OF SUSSEX

MAHMOUD LARI DASHTBAYAZ

DEGREE OF DOCTOR OF PHILOSOPHY

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SUMMARY

The aim of this study is to examine why firms may manipulate not just their earnings but also their cash flows, and to investigate the effects of this behaviour in debt markets with respect to the cost of debt. This research addresses current concerns about accounting rules (both GAAP and IFRS) which allow companies discretion in the presentation of their operating cash flow in financial statements. Using a sample of 8,684 UK and 23,935 USA firm-years from 1998 to 2010, the reported operating cash flow is decomposed into two components, unmanaged and managed, in order to examine the association between the estimated discretionary part of operating cash flow and the cost of debt. The results show that the cost of debt has a significantly positive association with the managed component of operating cash flows. By using path analysis, it is further shown that the effect of cash flow management in increasing the cost of debt is largely through its impact on accounting quality. Also it is found that the market positively prices abnormal operating cash flow information when firms experience financial problems, especially when companies are faced with low cash flows.

Key words: Cost of debt, Cash flow management, Abnormal operating cash flow, GAAP discretion

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Chapter 1

Introduction

1.1 Background and motivation

Although it is often assumed that cash flow is an objective accounting measure, or at least assumed to be more objective than accrual-based earnings, there is increasing evidence that reported cash flows themselves are not immune to manipulation (Kim et al, 2010; Lee, 2009; Zhang W., 2008; Zhang R., 2006; Roychowdhury, 2006; Frankel, 2005; Hardiman, 2005; Henry, 2004). This indicates in turn that there will be a demand for predictions of likely cash flow levels. Indeed, the finding of an increase in cash flow forecasting by analysts that is reported in Defond and Hung (2003) suggests that such information has already been gaining market attention, providing managers with incentives to meet or beat these cash flow targets.

There is already a considerable body of evidence that firms engaging in earnings management are rewarded for achieving earnings benchmarks such as avoiding losses, increasing profit levels and meeting the earnings per share benchmarks set by analysts in their forecasts (e.g. see the overview by Ronen and Yaari, 2007). In the same vein, with respect to cash flow, Zhang R. (2006) has provided evidence of firms engaging in operating cash flow manipulation to achieve targets such as reporting a positive figure for operating cash flow (*OCF*), meeting cash flow forecasts and cash-dividend targets, Frankel (2005) has pointed to working capital reductions that are designed to increase reported *OCF*, Hardiman (2005) has observed that some companies misclassify long-term customer receivables as investing cash flows again to increase reported *OCF*, and

Roychowdhury (2006) has demonstrated other means through which firms may manipulate their cash flow, particularly with respect to their operational activities.

Each of these studies, however, focuses on cash flow manipulation in the context of achieving earning targets. It is important to note, nevertheless, that cash flow management does not always have the same impact on earnings as it does on operating cash flow. Some activities increase earnings but decrease cash flow (e.g. sales discounts, overproduction), whilst others increase cash flow but have no impact on earnings (e.g. delayed vendor payments and quicker accounts receivable collection). Thus, it is possible that firms do not engage in cash flow management solely to increase earnings. For instance, it may also serve to influence the perceptions of lenders. If, say, cash flow management is informative about credit spreads, then these firms may exhibit a lower cost of debt. On the other hand if the management of the reported *OCF* is just the result of garbling, and credit analysts can recognize its overstatement as such, then these firms could exhibit a higher cost of debt as creditors punish managers for manipulating operating cash flow. If creditors scrutinising the *OCF* are less likely to be fooled by garbling than equity stakeholders, then examining the signalling versus garbling debate through the lens of credit markets may add to our understanding of why firms manipulate cash flow. By documenting the importance of cash flow information, more emphasis is placed by these recent research results on increased managerial incentives to meet or beat cash flow targets, and in turn on the likelihood that cash flows (and not just earnings) may be affected by deliberate manipulation in order influence capital markets.

At the same time, we now understand that a higher quality of public financial statement information (e.g. higher quality of reported accounting numbers, higher

quality of related disclosures) can be associated with both a lower cost of equity (e.g., Francis et al, 2004; Botosan, 1997; Frankel et al, 1995) and a lower cost of debt (e.g., Heflin et al, 2011; Francis et al, 2005; Yu, 2005; Moerman, 2005; Sengupta, 1998).

In this study, building on the above, it is predicted that managed *OCF* will be correctly priced 1) when it is easier to detect and 2) when bondholders are highly motivated to scrutinise the cash flow information. Specifically, easier detection of cash flow management by bondholders is predicted when the managed component of *OCF* is used to meet cash flow benchmarks. Also, it should be expected that bondholders will increasingly be motivated to scrutinise the components of *OCF* as firms approach financial problems. That is, knowledge of these disaggregated components may have a greater role in determining borrowing costs especially when the firm's financial condition is relatively weak.

The overall aim therefore is to examine transactions that impact on cash flows and the extent to which cash flow management is reflected in credit ratings and credit spreads. In this sense, the research study underlying this thesis will build on extant work that seeks to indentify the determinants of credit spreads, particularly Li and Richie (2009) who report that income smoothing appears to be a significant determinant of credit spreads and therefore of the cost of debt capital, and Provost et al (2008) who show that creditors who are able to see through managers' attempts to opportunistically influence earnings perceptions penalise such firms by demanding a higher cost of debt. The study will also take into account liquidity in debt markets, following Chen et al (2007) who report that bond liquidity is an important factor in explaining corporate yield spreads, and Tang and Yan (2007) who document liquidity effects with respect to credit default swap spreads.

In examining the question of whether cash flow management influences the cost of debt capital, two separate samples are examined in this study, each comprising of cash flow data reported between 1999 and 2010. These are: (i) a sample of 8,684 firm-year observations for UK firms and (ii) a sample of 23,935 firm-year observations for USA firms. It is found in both locations that, in general, the market appears to recognise cash flow management and that it is reflected in debt costs. In particular, a positive and significant association is found between the cost of debt and managed *OCF* when firms have losses, low cash flow and low earnings levels. This suggests that bondholders and creditors are more likely to detect and price the components of *OCF* when firms have a greater likelihood of experiencing financial problems.

It is also argued in the thesis that cash flow management not only increases the cost of debt directly, as mentioned above, but also indirectly by impacting on accounting quality which in turn may influence the cost of debt. That is, it is first documented how cash flow management can negatively affect accounting quality, and then shown how the documented reduction in accounting quality is associated with an increase in the cost of debt. The third main finding concerns the way in which the debt market prices abnormal *OCF*, especially when firms report lower earnings and lower cash flow at the same time.

Thus, whilst prior research often focuses on the impact of earnings manipulation, this thesis adds to the small body of literature on cash flow manipulation. As indicated already, the results provide evidence of managed operating cash flows and of their debt pricing implications. From a practical viewpoint, this study is equally relevant to interested parties such as creditors and policy makers, as well as academic researchers. First, with respect to credit market participants, the results suggest that

managed cash flow has different bond and debt pricing implications for different firms, and that, depending on the level of financial distress or default risk, creditors are likely to value cash flow management differently. Second, the study is informative for accounting regulators because the flexibility in current generally accepted accounting principles allows for the operating section of the Statement of Cash Flows to contain non-operating transactions that may mislead creditors regarding the operating cash flow performance. If transactions reported under the operating section of the Statement of Cash Flows do not result from operations, economic substance may be misrepresented A simple example is that, under IFRS, overdrafts can be offset against cash and cash equivalents, thus bypassing disclosure in the operating section of the Cash Flow Statement, although they are used to finance working capital. Poor quality cash flow information of this type may limit financial statement users' ability to evaluate a firm's performance, which is inconsistent with the Financial Accounting Standards Board's emphasis on more transparent financial statements. In a 2005 'Speech by SEC Staff', concerns were raised about the discretionary classification of finance subsidiary activities resulting in an artificial increase in operating cash flows, and ultimately the SEC ruled that this treatment was inappropriate (Hardiman 2005). Hence, from a policy perspective, this concern of the US security market regulator warrants further examination of the transparency of cash flow information, and this thesis provides some initial investigation in this respect.

1. 2 The intended contribution

This thesis aims to contribute to our understanding of earnings management and managers' opportunistic behaviour in financial reporting in a number of ways.

First, this study will rigorously examine the impact of the manipulation of Cash Flow Statements on the cost of debt. Previous studies have examined the effect of real earnings manipulation on cash flows (Burgstahler and Dichev, 1997; Roychowdhury 2006), but their main focus has always been on earnings management, i.e., income statement manipulation. Zhang W.(2008) and Lee (2009) are the first to focus on the management of Cash Flow Statements, examining real activities and reporting techniques used in cash flow manipulation, such as reporting short-term securities as trading securities instead of available-for-sale or held-to-maturity securities. However, their work does not investigate any externalities connected with such accounting behaviour. The research presented in this thesis builds on this prior understanding of cash flow accounting, and examines the relation between cash flow manipulation and the cost of debt. The results provide evidence that the credit markets are responsive to cash flow manipulation in that there is an observable effect on the cost of debt, which is analogous to the links drawn between earnings management and its price effect in the equity market. Figure 1.1 provides summary of relevant prior work, and illustrates the added contribution of the research reported in this thesis, which fills a gap by documenting the link between debt market pricing, the differential persistence of operating cash flow, and the accounting manipulation of reported cash flow.

Second, this study aims to contribute to the literature that investigates the valuation effects of information asymmetry and information risk on the cost of debt. In brief, whilst Biddle and Hilary (2006) show that higher quality accounting enhances investment efficiency by reducing information asymmetry between managers and outside suppliers of capital, Verdi (2005) finds that uncertainty has a significant positive relation with the cost of capital and that information asymmetry has a significant negative relation. Thus, this thesis is able to confirm these more general prior findings

with evidence of a significantly negative asymmetric 'cash flow manipulation' effect in debt markets.

Third, given that Zhang W. (2008) only considers the upward management of cash flows, and as it is also possible that managers in some years manage operating cash flows downwards (e.g. for benchmarking purposes, when firms achieve an *OCF* greater than forecast, they may have an incentive to save part of *OCF* for the future), we consider both upward and downward cash flow management in this study.

Finally, addressing a more general issue in financial accounting research, this thesis develops an approach to the validity of the accounting data sample that is employed in the analysis, with the suggestion that such procedures might be reported upon more fully in future accounting research. This is based on a joint working paper (Izadi et al, 2010), where all publications in three UK-based journals (Accounting and Business Research, Journal of Business Finance and Accounting and the British Accounting Review) were reviewed for the years 2005 to 2009, and the complete set of research studies was identified which drew on the Worldscope, Thomson Financial or Extel sources (35 papers in all). We found that the data collected by these authors was invariably trimmed in order to remove values in the extreme percentiles, but that there is little explanation of the treatment of any missing values, apparent zeros or blank cells, nor of any attempts to validate and reconstruct the accounting identities involved. This is not as surprising as it may seem, as all of these studies selected headline items as variables of interest, and did not explore therefore the articulation within financial statements. In this thesis, however, because the focus is on *OCF* (the reported Operating Cash Flow), a financial statement line item which is expected by the standard setters to reconcile with balance sheet changes, the research design places more emphasis on the

validity of the accounting numbers in commercial databases, the articulation of the financial statements from which the databases are constructed, and the nature of resulting values that are unrecorded, missing or zero. In some respects, therefore, the study reported in this thesis is amongst the first to address some of the limitations of accounting databases previously examined by Lara et al (2006) and Alves et al (2007), each of whom have mainly demonstrated that employing different databases can lead to different results for the same estimations. Here, the databases are combined in producing more comprehensive sets of information, and the financial statement articulations are validated, with a view to minimising the inclusion of so-called 'missing values' and also to correct for some database errors that have been discovered in the process.

1. 3 Structure of the thesis

The remaining seven chapters of this thesis are as arranged follows. The following three chapters (2, 3 and 4) review the theoretical background and the empirical evidence on capital structure and the cost of debt, on cash flow reporting and on cash flow manipulation. Chapter 5 describes the theoretical framework for the analysis and the development of the hypotheses that are then tested. Chapter 6 explains the sampling process and the research methods used in the analysis. Chapter 7 presents and discusses the empirical results, and Chapter 8 sets out the conclusions and the possible implications of the results of this study.

Figure 1.1: How prior research motivates this thesis
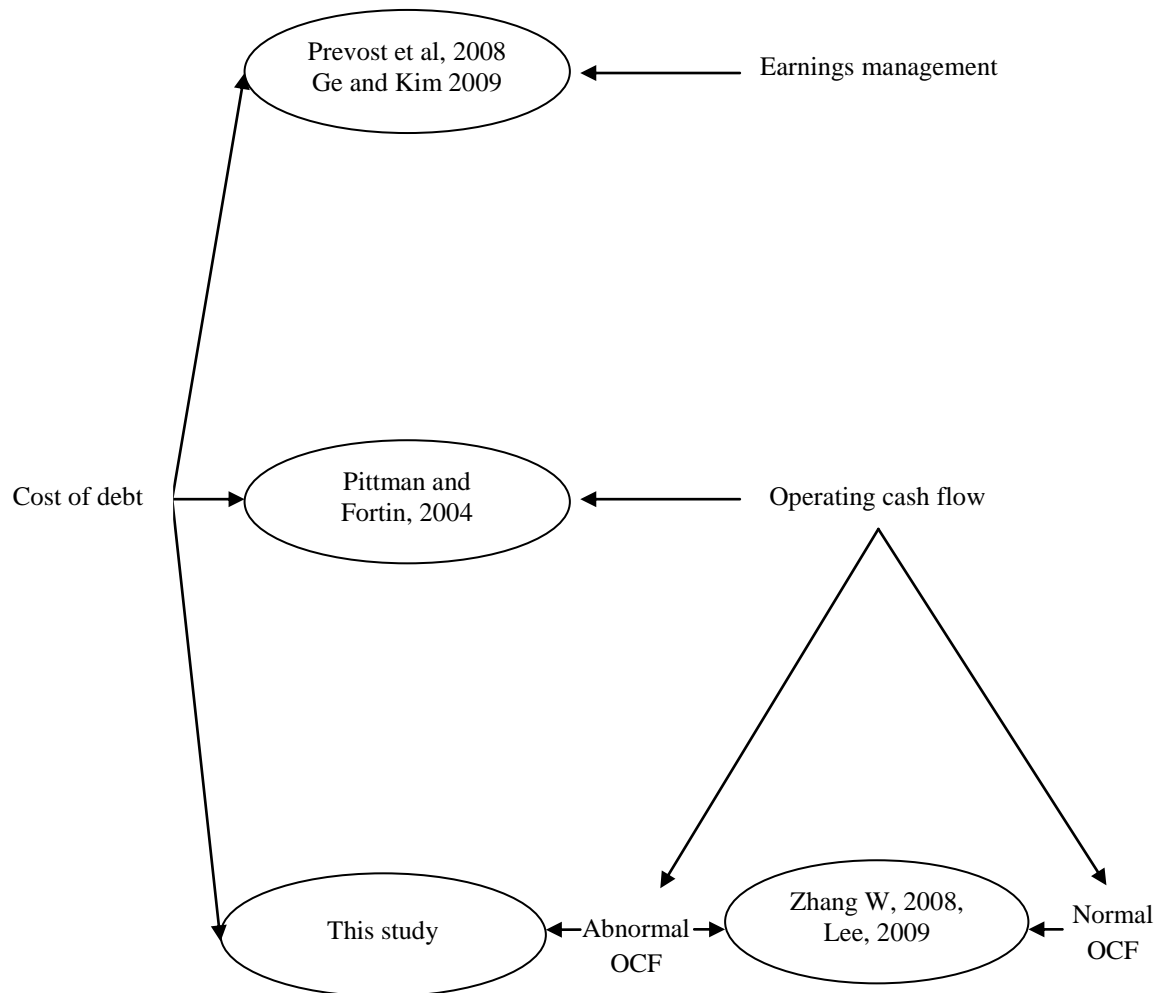
Chapter 2

Cash Flow Reporting and the Cost of Debt

2.1 Introduction

The previous chapter, Chapter 1, provided an overview of the thesis, explaining the objectives of the study and indicating its intended contribution. This chapter provides a review of the main research papers that have focused on the relation between cash flows and the cost of debt, since it was first discussed in Minton and Schrand (1999). The purpose of this chapter is to identify any limitations in the previous research, and to determine any outstanding research questions that need to be addressed.

2.2 Alternative perspectives on cash flow manipulation and the cost of debt

Amongst financial statement users, it seems to be accepted that the operating section of the Cash Flow Statement provides a key metric in assessing a firm's ability to generate cash from internal operations and remain viable (Luo, 2008). Indeed, this intended use is summarised by the international accounting regulator as follows:

> *A statement of cash flows, when used in conjunction with the rest of the financial statements, provides information that enables users to evaluate the changes in net assets of an entity, its financial structure (including its liquidity and solvency) and its ability to affect the amounts and timing of cash flows in order to adapt to changing circumstances and opportunities* (International Accounting Standard IAS7, Paragraph 5).

Lenders in particular have come to rely on the Statement of Cash Flows to evaluate whether existing or potential borrowers can repay a loan, using the information to determine how well a business is performing and, more importantly, how a company is generating and using its cash.[1] Although creditors may generally have viewed operating cash flow (*OCF*) as a more reliable metric than net income, successive financial reporting scandals seem to have caused many to question the age-old axiom that "cash is a fact and earnings an opinion."[2] Not only are analysts, lenders and regulators more closely scrutinising revenue recognition, expense accrual and related disclosures, at the same time it seems that corporate financial officers are now applying their earnings management skills to cash flows. *OCF* manipulation is not just found in major business frauds like Enron and WorldCom, but the press reports that it has manifested itself in such well-known corporate names as Boeing, Comcast, Ford, General Dynamics and Harley-Davidson (Barsky and Catanch, 2007).

For the US, the underlying problem is the flexibility of cash flow reporting permitted by FAS-95 (Statement of Financial Accounting Standards No. 95, *Statement of Cash Flows*). Although the calculation of the individual components presented in a Statement of Cash Flows is largely mechanical (a reconciliation of changes in a company's beginning and ending balance sheets), the classification of these individual components into operating, investing and financing activities is often highly judgment-based. Clearly, managers may have incentives to include other cash flows in *OCF* if

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[1] *See* Richard A. Turpin, E.L. Kittrell and John G. Fulmer Jr., *Insights from the Statement of Cash Flows,* COMMERCIAL LENDING REV., Jan.–Feb. 2005, 39–42.
[2] *See* David Henry, *Fuzzy Numbers,* BUSINESS WEEK, Oct. 4, 2004.

they believe that a higher *OCF* will improve their chances of, say, getting a loan, or that it will enhance their business opportunities in some other way.[3]

There are a variety of ways that managers can distort *OCF*, thereby negatively affecting the data used by lenders in evaluating credit quality (Barsky and Catanch, 2007). In addition, prior research suggests that firms may have incentives to manage reported *OCF*, even in the absence of an effect on bottom-line earnings. Several studies have documented that managers engage in activities to manage the presentation of items in financial statements even when there is no change in bottom-line earnings. Engel et al (1999) find that firms use the proceeds of trust-preferred stock issuances to retire debt in order to reclassify obligations out of the liability section of the balance sheet. Bowen et al (2002) provide evidence that Internet firms with greater individual investor interest and those that seek external financing adopt aggressive revenue-reporting practices that increase both revenues and expenses equally and thus do not affect bottom-line earnings. McVay (2006) finds that managers inflate core earnings by opportunistically shifting expenses from core expenses to special items, while Robinson (2007) finds that managers are willing to incur costs to shift an expense from a core expense to a tax expense. There is also evidence of capital market benefits associated with meeting or beating cash flow benchmarks, suggesting that firms may have incentives to manage reported *OCF*. Call (2007) finds that when setting stock prices, investors place more weight on *OCF* for firms with analyst cash flow forecasts, even after controlling for earnings. DeFond and Hung (2003) and Zhang W. (2007) document that the stock market reaction to cash flow surprise is positive, even after controlling for an earnings surprise. Cash flow information is useful to the credit market because, as mentioned above, creditors use financial statements to predict the amounts, timing and

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[3] *See* Debra C. Jeter, *Using the Statement of Cash Flows,* COMMERCIAL LENDING REV., July–Aug. 2005, at 3–8, 44.

uncertainties of future cash flows, so we may expect that the credit market also reacts to cash flow surprises.

A summary of the issues investigated to date in the context of the relationship between the market for debt and cash flow reporting is shown in Table 2.1. Below, the main themes that are considered in this stream of research are discussed in greater detail, focusing first on tests of the relationship between cash flow and debt financing, and, second, on the nature of reported cash flow, including measures of accounting quality.

2.3 Evidence of the relationship between cash flow and debt financing

The level of a firm's net cash flows appears to have a first-order effect on the costs of accessing external capital (Minton and Schrand, 1999). The results of Minton and Schrand's study indicate that low cash flow firms have worse S&P bond ratings, higher equity betas, and higher equity price risks than firms with median cash flows. High cash flow firms have better S&P bond ratings and lower dividend payout ratios. They emphasise that cash flow volatility not only increases the likelihood that a firm will need to access capital markets, but that it also increases the costs of doing so. Minton and Schrand's study is directly related to this thesis as it is assumed here that firms, in order to access the capital markets, especially the debt market, may have incentives to meet or beat cash flow targets, and that cash flows in turn may be affected by deliberate manipulation in order to influence the market for debt capital, not only with respect to bond ratings but also more generally with respect to bank lending.

For lending decisions, bank loan officers are presumed to use the financial information and reports published by potential borrowers, in particular cash flow information and, hence, the Statement of Cash Flow. In research by Kwok (2002), Where subjects were drawn from four groups of frequent users of financial reports (bank loan officers, auditors, financial analysts and accounting academics), each subject was presented with the annual reports of two loan applicant companies to make two independent lending decisions based on the information provided. The results show that cash flow was the second most used piece of financial information after earnings, but that the majority of the subjects obtained this information from other financial statements rather than directly from the Statement of Cash Flow, most notably from changes over the period in the balance sheet. Whilst the results suggest that loan officers do not use the cash flow information provided by the Statement of Cash Flow, but rely on the accounting information in the accrual-based financial statements, this viewpoint is not up to date, given the changes in accounting standards that have taken place. The evidence is that, when considering the broader context of the relationship between a metric such as *OCF* (operating cash flow) and debt financing, it is the Cash Flow Statement that is likely to be generally viewed by creditors as a more reliable source than other financial statements (Sharma and Iselin, 2003).

OCF has been predicted to have a negative association with the interest rate. Indeed, it is evident that firms that can generate more cash internally are in a better position to service their debts, as indicated by Pittman and Fortin (2004), whose results confirm that *OCF* is negatively and significantly correlated with the cost of debt (Panel A, Table 2.2).

We also know that more profitable firms enjoy greater stability of cash flow and therefore may achieve a lower cost of debt financing (Anderson et al, 2004). By measuring firm performance as a ratio of cash flows to total assets, these authors find firm performance to be negatively related to yield spread (Panel B, Table 2.2). They also use cash flow volatility as a proxy for default risk and suggest that the average impact of a change of one standard deviation in this variable is associated with about a 26 basis point change in the cost of debt. We may infer from this that the less profitable firms are likely to see substantially higher debt costs. Therefore, this thesis argues that firms with weak performance are more likely to try to manipulate financial statements, particularly the Cash Flow Statement, in order to limit the cost of debt.

To test the benefits associated with manipulating accounting benchmarks in the debt market, credit ratings and initial bond yield spreads have been used as proxies for a firm's cost of debt, and abnormal cash flow, abnormal accruals and the unexpected change in effective tax rates as alternative accounting manipulation proxies (Jinang, 2008). Although the focus is on earnings management and not on cash flow management, Jinang finds a significant negative correlation between *OCF* and credit ratings and initial bond yield spreads when *OCF* is used as a control variable in the earnings management models (Panel C, Table 2.2).

The six published research papers discussed above demonstrate the considerable agreement that exists concerning the importance of cash flow analysis in the debt market. On the one hand, there are tradeoffs between the costs and benefits of real cash flow management that would lead in equilibrium to an optimal cost of debt. On the other hand, there is clear evidence of cash flow *manipulation* in order to report to the market a positive figure for cash flow, especially *OCF*, which may lead to suboptimal

debt pricing if not transparent. Given that this is the case, and considering the incentives for managerial cash flow manipulation, this thesis extends this prior work by decomposing *OCF* into 'normal' and 'abnormal' components which are, respectively, estimates of the 'unmanaged' and 'managed' cash flows. Then, by analysing these two components of *OCF*, the thesis provides a better informed modelling of debt pricing.

2.4 The quality of reported cash flow and related accounting information

Cash flow is a measure of solvency and liquidity, and is well known as a traditional metric used in evaluating credit and bankruptcy risks (Beaver 1966; Ohlson 1980). There is also evidence of greater demand for high quality forecast cash flows for firms where accounting, operating and financing characteristics suggest that such additional cash flow information will be useful in interpreting earnings and assessing firm viability (Defond and Hung, 2003), findings which are consistent with financial analysts responding to market-based incentives to provide market participants with value-relevant information. More specifically, Defond and Hung find that analysts are more likely to make a forecast of cash flows for firms with (1) large accruals, (2) more heterogeneous accounting choices relative to their industry peers, (3) high earnings volatility, (4) high capital intensity, and (5) poor financial health. It follows that the management of cash flow can be a way to mask poor performance. Defond and Hung document that when earnings are affected by subjectivity, cash flows are useful in validating the information in earnings that contain large accruals. This finding is consistent with the findings of Penman (2010) and Wild et al (2001), who suggest that market participants will rely on higher quality in cash flow information in assessing whether earnings are likely to contain material misstatements.

Cash flow is also seen as the primary element that investors use to price and identify *accruals quality* as a measure of information risk associated with accounting earnings (Francis et al, 2005). That is, accruals quality tells investors about the mapping of accounting earnings into cash flows. Relatively poor accruals quality weakens this mapping and, therefore, increases information risk. Using a large sample of firms over the period 1970-2001, Francis et al examine the relationship between accruals quality and costs of both debt and equity, although focused mainly on the cost of equity. They define the realised cost of debt as the reported interest expense in a given year divided by the average of the interest-bearing debt for that year and the preceding year. Using this metric, Francis et al document a significant negative impact of accruals quality on the cost of debt. This result is consistent across several alternative specifications of the accounting quality metric. This thesis adds that cash flow quality, especially cash flow from operations, can also affect information quality. Poorer cash flow quality may increase information risk, resulting directly in an increase in the cost of debt.

One of the important issues that must also be addressed concerns the link between quality and volatility of cash flow. In principle, the effect of information quality on the assessed variance of a firm's cash flows is diversifiable, but the effect on the assessed covariance is not, which is precisely what the innovative work of Lambert et al (2007) deals with. Empirically, most studies find that information quality is indeed associated with the cost of capital. This suggests that either information risks are non-diversifiable, or that investors are under-diversified. That investors may be under-diversified is particularly a concern in the debt market, since this market is relatively illiquid with fewer trades by fewer investors compared to the equity market (Biais and Green, 2007).

Gu and Zhao (2006) also ask to what extent information quality affects the cost of debt, and to what extent private information affects the cost of debt differently from the cost of equity. They argue that, when bonds are rated, cash flow and accrual components of earnings take on different weights. They break down the commonly-used ROA ratio into two components: cash-based (*OCF* divided by average assets) and accrual-based (income before extraordinary item minus operating cash flows, divided by average assets). Building on other studies that have investigated the volatility of cash flows (Minton and Schrand, 1999) and the volatility of earnings (Ahmed et al, 2002), Gu and Zhao (2005) find that the *difference* between the two, a measure of income smoothing due to accruals, separately contributes to bond ratings, and the greater the income smoothing, the larger is the weight *OCF* then accruals in bond ratings.[4]

Prevost et al (2008) also ask about the extent information to which accounting quality affects the cost of debt. In fact, they examine the relation between earnings management and the marginal cost of debt to the firm, using a sample of traded corporate bonds for the period 1994-2005 whose marginal cost of debt is captured by market-determined yield spreads, while earnings management is proxied by three alternative estimates of abnormal discretionary accruals. They find that abnormal accruals have a negative price impact on all bonds in general. However, they also find that the effect is more severe for non-investment grade bonds. The study concludes that creditors are able to see through managers' attempts to opportunistically influence earnings perceptions by manipulating accruals, and penalise firms for doing so by demanding a higher rate of return.

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[4] Note also that Gu and Zhao (2006) examine two measures of the cost of debt: annual S&P senior bond ratings and yield spreads on new bond issuances. Bond ratings by S&P provide an assessment of a bond issuer's creditworthiness. In the bond rating sample, Gu and Zhao find a significant positive relationship between OCF and rating, and in the new issuance yield spread sample they find a significant negative relationship between OCF and the yield spread

Further evidence also shows that firms with higher income smoothing rankings exhibit lower costs of debt and higher credit ratings (Li and Richie, 2009). Multivariate analysis in this case reveals that higher financial leverage and lower credit ratings are associated with higher borrowing costs, but that such borrowing costs can be reduced by smoothing reported income. Furthermore, larger firms and firms with greater stock return volatility and who exhibit higher income smoothing rankings will experience relatively higher borrowing costs. These results also support the notion that, for smaller firms with lower stock return volatility, income smoothing represents information signalling rather than garbling. Li and Richie argue that to achieve income smoothing (especially over the long term), a manager may also need to manipulate *OCF*. Since creditors scrutinise *OCF*, if the management of *OCF* results in garbling, and credit analysts recognise this, then these firms could exhibit a higher cost of debt and a lower firm valuation as creditors punish managers for distorting *OCF*.

Cash flow quality is again a major concern when rating agencies assign credit ratings to firms (Standard and Poor's, 2008), and it has long been recognised that senior executives at the major bond rating agencies consider that the cash flow operation to long-term debt ratio is a key variable in their decision process (Backer and Gosman, 1980). In this respect, Beaver et al (2006) argue that the investment grade and non-investment grade boundary is a critical point in the distribution of such ratings. Certified credit ratings are used in several contractual settings, and a downgrade below investment grade has real economic consequences, such as the violation of debt covenants or the loss of investment from firms that can only hold investment grade bonds. Thus, firms have incentives to manage reported *OCF* to avoid downgrades, particularly at the investment and non-investment grade cut off.

Most recently, Kim et al (2010) have examined the relation between earnings management decisions and the slack in the firm's net worth debt covenant. Using private debt covenant data, they find that the overall level of earnings management is higher when the net worth covenant slack is tighter. Moreover, they find that this effect is more pronounced for loan-years with the tightest slack, which is a setting where the benefits of managing earnings are greater. Within the sub-sample of loan-years with the tightest slack, Kim et al find that earnings management is higher for borrowers that experienced increases in bankruptcy risks in the previous year.[5] These results suggest that: (1) firms use earnings management to avoid violations of debt covenants; and (2) firms are more likely to do so when their ability to renegotiate the technical covenant violations is restricted.

In this final section, the studies reviewed above have shown how the debt market may be sensitive to quality of accounting information, and more specifically the quality of cash flow. It follows that further examination of any measurable effect of cash flow manipulation on the cost of debt can help us to improve our understanding of these linkages between the quality of financial reports and the value placed on corporate debt by the market.

2.5 Summary

As explained above, previous research has widely documented a significant negative relationship between cash flows and various measures of the cost of debt (Minton and Schrand, 1999; Kwok, 2002; Pittman and Fortin, 2004; Anderson et al, 2004; Jinang, 2008). That is, lower cash flows are associated with a higher cost of debt, and this has

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5 Note that Kim et al's results are largely robust in controlling for endogeneity of the tightness of debt covenant slack, and they also find that the positive relation between the tightness of debt covenant slack and real earnings management exists both before and after the adoption of the Sarbanes-Oxley Act.

implications for the *quality* of reported cash flow information. Considering the incentives for cash flow management, this thesis builds on prior work by decomposing *OCF* into normal (or unmanaged) operating cash flows (*NOR_OCF*), and abnormal (or managed) operating cash flows (*ABN_OCF*). However, we need to consider in detail not only the cash flow metric but also the cost of debt itself. The purpose of the next chapter therefore is to review published research to date in relation to capital costs, capital structure and specifically the cost of debt.

Table 2.1
A chronological summary of prior studies on the relationships investigated between cost of debt and cash flow and liquidity.

Name	Year	Key finding
Minton and Schrand, JFE	1999	Low cash flow firms have worse S&P bond ratings than firms with high cash flows; cash flow volatility not only increases the likelihood that a firm will need to access capital markets, it also increases the costs
Kwok, IJA	2002	Bank loan officers' use of financial information and reports, in particular cash flow information and the Statement of Cash Flow, in making lending decisions
Defond & Hung, WP	2003	Analysts tend to forecast cash flows for firms where accounting, operating and financing characteristics suggest that cash flows are useful in interpreting earnings and assessing firm viability
Anderson, Mansi & Reeb, JAE	2004	Unlike Monks and Minnow (1995), find that firm performance (cash flow / total assets) is negatively related to yield spread
Pittman & Fortin, JAE	2004	Firms that can generate more cash internally are in a better position to service their debts; operating cash flow (OCF) is negatively and significantly correlated with the cost of debt
Francis, LaFond, Olsson & Schipper, JAE	2005	Measuring accruals quality (AQ) as the standard deviation of residuals from regressions relating current accruals to cash flows, they find that poorer AQ is associated with larger costs of debt and equity
Gu and Zhao, WP	2005	The stronger the income smoothing affects the larger weight on accruals in bond ratings
Lambert, Leuz and Verrecchia, JAR	2007	While the effect of information quality on the assessed variance of a firm's cash flows is diversifiable, the effect on the assessed covariance is not
Gu and Zhao, WP	2006	Although both cash flows and accruals are positively related to bond ratings, the weight on OCF is larger than on accruals, consistent with the lower predictive power of accruals for future cash flows. They also find a significant positive relationship between operating cash flows and rating, and in the new issuance yield spread sample they find a significant negative relationship between cash flows from operating and the yield spread
Jinang, AR	2008	Finds a significant negative relation between OCF and the cost of debt
Prevost Skousen and Rao, WP	2008	Abnormal accruals have a negative price impact on all bonds in general . Also, creditors are able to see through managers' attempts to opportunistically influence earnings perceptions and penalixe firms for doing so by demanding a higher rate of return
Li and Richie, WP	2009	Find firms with higher income smoothing rankings exhibit a lower cost of debt and higher credit ratings
Kim and Qi, AR	2010	Firms use real earnings management to avoid violations of debt covenants

AR: *The Accounting Review;* JAE: *Journal of Accounting and Economics;* JFE: *Journal of Financial Economics;* IJA: *The International Journal of Accounting;* JAR: *Journal of Accounting Research;* WP: *Working Paper*

Table 2.2
Prior research incorporating operating cash flow as a predictor variable in debt pricing models
Panel A: Pittman and Fortin (2004)

$$COD_{it} = \beta_0 + \beta_1\ OCF_{it} + \beta_2\ LEV_{it} + \beta_3\ SIZE_{it} + \beta_4\ Age_{it} + \beta5\ BigSix_{it} + \beta_6\ Age*BigSix_{it} + \beta_7\ Prime_{it} + B_8\ Default_{it} + \beta_9AssetStructure_{it} + \beta_{10}NegEquity_{it} + \gamma Industry_i + \delta Year_t + \varepsilon_{it}$$

Predictor Variables	Coefficient	
Intercept	0.0703	***
Operating Cash Flow (*OCF*)	-0.0069	**
Leverage (*LEV*)	0.0326	***
Firm size (*SIZE*)	0.0031	***
Age	-0.0031	***
Big Six auditor	-0.0143	***
Age *Big Six auditor	0.0019	***
Prime rate	0.3297	***
Default premium	0.174	
Asset structure	0.0038	***
Negative book equity	0.0102	***
Adjusted R^2	16%	
N	3,339	

COD, the dependent variable, is interest expense divided by the average of total short- and long-term debt during the year. *OCF* is operating cash flow scaled by total assets, *LEV* is the ratio of long-term debt to total assets, and *SIZE* is log total assets. Fixed effects are estimated for industry (γ) and year (δ). Significance at the 10% (*), 5% (**) and 1% (***) levels respectively.

Panel B: Anderson, Mansi and Reeb (2004)

$Spread_{it} = \beta_0 + \beta_1 OCF + \beta_2 SIZE + \beta_3 LEV + \beta_4 BoardInd_{it} + \beta_5 Big\ Boards_{it} + \beta_6 Small\ Boards_{it} + \beta_7 Duration_{it} + \beta_8 BondAge_{it} + \beta_9 Rating_{it} + \beta_{10} Block_{it} + \beta_{11} NLCredit_{it} + \beta_{12} Volatility_{it} + \gamma Year_{it} + \delta Industry_{it} + \varepsilon_{it}$

Predictor Variables	Coefficient	
Intercept	86.029	***
Operating Cash Flow (*OCF*)	-99.852	***
Firm size (*SIZE*)	-13.138	***
Leverage (*LEV*)	0.569	**
Board independence	-50.432	***
Big boards	-32.665	***
Small boards	23.123	**
Duration	4.301	***
Bond age	8.012	***
Rating	-5.095	***
NLCredit (Non investment grade debt)	136.643	***
Block (Number of outside blockholders)	3.081	
Volatility of Stock Return	238.361	***
Adjusted R^2	64%	
N	1,052	

Spread, the dependent variable, is the yield spread. *COD*, the dependent variable, is interest expense divided by the average of total short- and long-term debt during the year, *LEV* is the ratio of long-term debt to total assets, *OCF* is operating cash flow scaled by total assets, and *SIZE* is log total assets. Dummy variables are added for industry (γ) and year (δ). Significance at the 10% ($*$), 5% ($**$) and 1% ($***$) levels respectively.

Panel C: Jinang (2008)

$$Rating_{it+1} = \alpha_0 + \alpha_1 Benchmark_{it} + \alpha_2 EarningsControl_{it} + \alpha_3 Rating_{it} + \beta_1 OCF_{it} + \beta_2 Size_{it} + \beta_3 Lev_{it} + \beta_4 StdRoa_{it} + \beta_5 Times_{it} + \beta_6 RND_{it} + \beta_7 StdRet_{it} + \beta_8 BM + \sum_t \beta_t Year_{it} + \varepsilon_{it}$$

Predictor Variables	Coefficient with LagRating		Coefficient without LagRating	
Benchmark; *Profit*	-0.522	***	-0.587	***
Benchmark; *Incr*	-0.300	***	0.098	***
Benchmark; *Surp*	-0.063		-0.021	
EarningsControl; *EPS*	-0.57	**	-1.172	***
EarningsControl; *ΔEPS*	0.009		0.574	
EarningsControl; *UE_EPS*	-2.091	**	-2.757	***
Operating Cash Flow (*OCF*)	-0.552	**	-0.110	
Firm size (*SIZE*)	-0.222	***	-0.719	***
Leverage (*LEV*)	1.088	***	1.574	***
Rating	2.679	***	--	
StdRoa	-0.404		0.795	
Times	-0.242	***	-0.659	***
RND	2.278	***	5.323	***
StdRet	17.306	***	54.152	***
BM	0.475	***	0.318	***
Adjusted R^2	85%		48%	
N	2,484		2,484	

Rating, the dependent variable, is the firm's senior rating at *t*+1. *LEV* is the ratio of long-term debt to total assets, *OCF* is operating cash flow scaled by total assets, and *SIZE* is log total assets. Dummy variables are added for industry (γ) and year (δ). Significance at the 10% (*), 5% (**) and 1% (***) levels respectively

Chapter 3

Capital Structure and the Cost of Debt

3.1 Introduction

The previous chapter (Chapter 2) provided a theoretical perspective on cash flow management and the cost of debt, and described the relevant evidence that has been published to date. The purpose of this next chapter is to review prior studies that inform our understanding of debt pricing, starting with capital structure theory.

3. 2 Capital structure theory

Over the past four decades, one of the central areas of modern finance research has been on the factors that influence capital structure and the corporate financial decisions that are made in this respect. Much theoretical work characterises the choice between debt and equity in a trade-off context in which firms choose their optimal debt ratio by balancing the benefits and costs. Modigliani and Miller (1958) started the debate when they demonstrated that firm valuation and a firm's average cost of capital are independent of the financing choice under a set of perfect market assumptions. This suggested in turn that investment opportunities designed to increase firm value should be evaluated using a single discount, the weighted average cost of capital, i.e. the proportion of debt multiplied by the expected return on debt plus the proportion of equity multiplied by its expected return. As we know from the work of Brealeyet al (2008), a reduction in weighted average cost of capital would result in the acceptance of more investment opportunities and consequently lead to an increase in firm value.

Equity shareholders demand a higher rate of return than debtholders since debtholders enjoy a prior claim. Nevertheless, according to Modigliani and Miller (1958), the weighted average cost of capital cannot be reduced simply by borrowing more and increasing the proportion of debt, because extra borrowing leads shareholders to demand a higher expected rate of return. Consequently, the cost of equity capital increases by just enough to maintain the overall weighted average cost of capital (Brealeyet al, 2008).

Recent research on the net benefits to leverage is reported in Korteweg (2010). By generalising the Modigliani-Miller firm valuation formula, Korteweg estimates how the net benefits of debt vary with leverage and other covariates, explaining the observed variation in stock and bond betas and valuations. For identification he assumes within-industry homogeneity with respect to asset betas, but allows the net benefit function to vary with individual firm characteristics. Although this is a very different approach to the one used in the research reported in this thesis, it is important to note that Korteweg estimates median net benefits to leverage of about 4% relative to total firm value, which therefore places a significant discount on the cost of debt.

Other recent research relating to leverage and the cost of debt, by Binsbergen et al (2010) who estimate the marginal cost function for corporate debt, introduces an easy-to-use formula that allows for the implementation of firm-specific marginal cost functions, identifying an optimal debt policy against which firms' actual debt choices can be benchmarked. Binsbergen et al's estimates indicate that the optimal capitalised net benefits of debt are about 3.5% of asset value, with the cost of over-levering being greater than the cost of under levering, again implying a significant discount on the cost of debt.

The interest tax shield

In 1963, Modigliani and Miller modified their discussion of corporate debt to specifically recognize corporate taxes. Under the tax regulations at the time, interest payments made to bondholders would be deducted from corporate income before computation of taxes owed, and this is still mainly the case. MM conclude that, due to the fiscal deductibility of interest, the market value of an indebted company must be greater than that of the same company without debts. The weighted average cost of capital declines at first with an increase in debt, then rises, the minimum point being the point of optimal capital structure as shown in Brealey et al (2008). There are two reasons why moderate issues of debt may initially reduce the weighted average cost of capital. Firstly, shareholders don't notice or appreciate the financial risk created by moderate borrowing, and initially accept a rate of return lower than they should, then they eventually react when borrowings become excessive. Secondly, imperfections may simply allow firms to borrow at lower interest rates.

In practice, returns to debtholders, in the form of interest, are deducted from earnings before computing corporate tax liabilities, whilst returns to shareholders, in the form of dividends, are appropriated from earnings after corporate taxes have been paid. In this way, the interest tax shield provides debt finance with a comparative advantage, with a reduction in taxable income increasing the return on equity to shareholders. The interest tax shield reduces the cost of debt, so a greater return is available from the investments that debt is used to finance. Modigliani and Miller thus proposed that the value of a firm using debt finance is equivalent to the firm value if all equity was financed plus the present value of the interest tax shield (Brealeyet al, 2008).

At the extreme, Modigliani and Miller suggest a firm should be all debt financed to maximise the benefit derived from the interest tax shield. DeAngelo and Masulis (1980) argued that companies that enjoy non-debt tax shields have fewer incentives to become indebted. However, in the real world, the interest tax shield is only of benefit if a firm has income available to shield. As the magnitude of firms' taxable income varies, so does the benefit derived from the interest tax shield on debt. It follows that firms with large amounts of taxable income and thus high marginal tax rates might be expected to benefit to a greater extent from the interest tax shield than firms with little taxable income or low marginal tax rates arising from taxable losses or other non-debt tax shields (DeAngelo and Masulis, 1980). This points clearly to the relationships investigated later in this thesis in the context of accounting manipulation, where the sum of reported income plus accruals (including tax payables), i.e. cash flow, are related to the cost of debt.

Financial distress

The theory discussed so far has ignored the default potential of debt. Returns to debtholders (in the form of interest) are fixed payments made from income, whereas returns to shareholders are at management's discretion. If fixed interest payments are not made, debtholders might exercise their option to force liquidation and a firm could experience bankruptcy. In this event, a firm could be faced with the direct cost of legal and court fees and indirect costs reflecting the difficulty of managing firm reorganisation. Even if interest payments are met and liquidation not pursued, the increase in the likelihood of financial problems can be expected to incur costs. In the stakeholder theory of capital structure, Titman and Wessels (1988) suggest that the behaviour of various stakeholders is affected by financial problems, and it is worth

noting now the key firm-specific characteristics that may accentuate such financial problems, as follows:

- Less profitable firms are less likely to be able to meet interest payments when business fluctuates compared to firms with higher profitability.

- Firms with diverse business operations are more likely to withstand fluctuations in certain areas of business activity.

- Debt-holders are more likely to recover their investments in firms with standardised tangible assets that are easily liquidated.

- Firms providing quality products or products of a certain nature which require an element of after-sales service, are more likely to lose custom in the face of possible bankruptcy. If customers recognise that 'come-back' could be limited, they will be reluctant to pay high prices or even do business.

- Firms that are heavily reliant on specially trained and experienced employees are more likely to succumb to demands for higher wage claims as compensation for job insecurity in order to maintain their workforce.

- Firms which require inputs from specialised suppliers are more likely to succumb to increased input prices and decreased credit facilities.

Also, firms that are heavily reliant on debt provide less incentive for shareholders to contribute new capital as the shareholders would bear the cost of value-increasing projects while returns would be captured by debtholders (Myers, 1977). With such financial problems leading potentially to default, it is worth noting the recent work, by Almeida and Philippon (2007), Chen et al (2008) and Bhamra et al (2010) which

derives risk-neutral probabilities of default. Using such probabilities, Almeida and Philippon estimate that the expected cost of distress is approximately equal to the tax benefits of debt, suggesting that on average observed capital structure is consistent with optimal choices (see also Graham, 2000). More specifically, the authors provided a point estimate of the cost of default that is about 4% of firm value for investment grade firms and about 9% for speculative debt. Binsbergen et al (2010) estimate that the all-in cost of debt is about 6% of firm value for investment grade firms. These estimates are larger than Almeida and Philippon's, which is logical because their estimates reflect default costs while Binsbergen et al include default as well as other costs of debt (such as agency costs). Overall, the analysis by Binsbergen et al shows that default costs, as estimated by Almeida and Philippon, amount to approximately half of the total costs of debt, leaving about half of the costs to be explained by other factors and theories.

Later in this thesis, the potential arising from financial problems that was discussed by the above authors is reconsidered as a motivating factor for cash flow management, and related again to the cost of debt.

3.3 How firms determine their levels of debt and equity

According to capital structure theory, firms have what is often referred to as a target debt ratio, which is determined by various trade-offs between the costs and benefits of debt. A traditional view in corporate finance is that firms strive to maintain an optimal capital structure that balances the costs and benefits associated with varying degrees of financial leverage. When firms depart from this optimum, it is thought that they respond by rebalancing their leverage back to the optimal level (Leary and Roberts, 2005). Fama and French (2002) note that firms' debt ratios do adjust towards their targets in this way,

but that it appears to take a long time to return their leverage to its optimal level. Nevertheless, as Baker and Wurgler (2002) show, the difficulty of timing equity issuances with high market valuations will itself have an impact on corporate capital structures. This fact leads them to conclude that capital structures are the cumulative outcome of historical market timing efforts, rather than the result of a dynamic optimising strategy. Welch (2004) finds that equity price shocks have a long lasting effect on corporate capital structures as well. He concludes that stock returns are the primary determinant of capital structure changes and that corporate motives for net issuing activity remain uncertain.

These findings share the common theme that shocks to corporate capital structures have a persistent effect on leverage, which the last two studies interpret as evidence *against* firms rebalancing their capital structures towards an optimum. Most empirical tests, however, implicitly assume that this rebalancing is costless: in the absence of adjustment costs, firms can continuously rebalance their capital structures towards an optimal level of leverage, whereas, in the presence of such costs, it may be suboptimal to respond immediately to capital structure shocks (Leary and Roberts, 2005).

Given the above, researchers have attempted to model the process of how firms determine their levels of debt, and to date they have done so mainly in terms either static trade-off theory, or pecking order theory (e.g. Sunder and Myers, 1999; Fama and French, 2002; Frank and Goyal, 2003; Cotei and Farhat, 2009). The following provides an overview of these theories of capital structure, drawing general conclusions about the debt policies of firms.

The static trade-off theory of capital structure

In the traditional static trade-off theory of capital structure, each firm has an optimal debt ratio, at which the value of the interest tax shield from borrowing is balanced against the associated costs of bankruptcy or financial distress (Myers, 1984; Belkaoui, 1999).[6] The trade-off between the interest tax shield benefit and the costs of financial distress is illustrated in Figure 3.1. The straight line (AB) shows the value of a geared firm with increased levels of debt but without the increased costs of financial distress (i.e. firm value increases in line with debt as a result of the interest tax shield). The curved line (AC) shows the value of the firm when including the costs of financial distress. Up to the point X, financial distress is immaterial and firm value is increased with the use of debt by the interest tax shield. After X, the costs of financial distress arising from increased debt are larger than the increase in benefit from the interest tax shield. Firm value is thus maximised at X, the optimal debt ratio.

It follows that the curved line representing firm value with financial distress costs will vary according to individual financial distress potential. In firms with characteristics enhancing financial distress, X, the point of optimal capital structure would be lower. The opposite is true for firms with characteristics mitigating financial distress. The degree of benefit derived from interest tax shields could also alter the shape of the diagonal straight line in Figure 3.1; this explains why optimal debt ratios would deviate from firm to firm. Moreover, in individual firms the characteristics determining financial distress and the degree of benefit obtained from the interest tax shield are unlikely to remain static in a dynamic business environment, and therefore

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[6] Value of firm = Value of an all equity firm + PV of interest - PV of costs of Tax shield financial distress

individual optimal debt ratios could deviate over time. Although this provides one explanation as to why the actual debt ratios observed for a particular firm might deviate over time, actual deviations may also reflect deviations from optimal capital structure.

Under the static trade-off theory, a firm is supposed to substitute debt for equity, or equity for debt, until the value of the firm is maximised. According to Myers (1984), there must be costs and time lags involved in adjusting to the optimal capital structure when events cause a firm to deviate; in this case, actual deviations in debt ratios over time would reflect deviations from optimal capital structure. However, there does not appear to be any theoretical suggestion that adjustment costs are a major concern. Consequently, under the static trade-off theory, actual debt ratios are presumed to be optimal and therefore actual deviations over time correspond only to changes in optimal capital structure.

Pecking order theory

In the pecking order theory, firms do not have a target amount of debt in mind, but the amount of debt financing employed depends on the profitability of the firm. Firms follow a hierarchy or pecking order of financial sources. Firms prefer internal funds, and equity issues are avoided by issuing debt to meet external financing requirements for as long as possible (Donaldson, 1961).The pecking order theory (Myers and Majluf, 1984 and Myers, 1984) and its extensions (Lucas and McDonald, 1990) are based on the idea of asymmetric information between managers and investors. Managers know more about the true value of the firm and the firm's riskiness than less informed outside investors. To avoid the underinvestment problem, managers will seek to finance the new project using a security that is not undervalued by the market, such as internal funds or riskless debt. Therefore, this affects the choice between internal and external

financing. The pecking order theory is able to explain why firms tend to depend on internal sources of funds and prefer debt to equity if external financing is required. Thus, with this view, a firm's leverage is not driven by the trade-off theory, but it is simply the cumulative results of the firm's attempts to mitigate information asymmetry (Cotei and Farhat, 2009).

The previous study of evaluating the efficiency of the trade-off theory versus the pecking order theory has produced mixed evidence. Sunder and Myers (1999) test pecking order and static trade-off as contending theories of capital structure and find more supportive evidence for the pecking order theory versus the trade-off theory. Hovakimian et al (2001) examine the firms' debt-equity issuance (reduction) choice and find that deviation from the target leverage plays a more significant role in the repurchase decision than in the issuance decision of securities. Their results are consistent with the pecking order model in the short-run and reversion to the target leverage in the long-run, but there are many counter results. For instance, Fama and French (2002) find evidence both in favour and against each of the theories, Frank and Goyal (2003) inconsistent with the pecking order theory, especially for small firms, and Byoun and Rhim (2005) that both of the theories explain significant variations in the firms' total debt. Finally, in a more recent study, Cotei and Farhat (2009) find evidence that the trade-off theory factors play a significant role in determining the proportion of debt to be issued or repurchased under the pecking order assumptions, and that the pecking order factors are major determinants of the rate of adjustment under the trade-off theory assumptions. These empirical results imply that the pecking order theory and the trade-off theory are not mutually exclusive, and we shall need to consider further insights into the debt financing decision in order to understand leverage of debt on

equity, and the associated costs that will be investigated here in the context of cash flow manipulation.

3.4 The conflict between shareholders and managers

The theory discussed so far is based on the assumption of maximising firm value. However, the potential for conflict of interest arises when different parties with their own vested interests become involved in a firm. Two types of conflict between the providers of equity finance and managers, and between the providers of equity finance and those of debt finance have been identified by researchers.

The managers of a firm are in the best position to decide how resources should be allocated to maximise firm value. Nevertheless, if managers do not themselves contribute a significant amount of equity finance (i.e. they consider their personal share-holding to be immaterial) they may be less concerned with maximising shareholder wealth and more interested in appropriating resources for their personal benefit. Jensen and Meckling (1976) argue that the larger the fraction of equity held by managers, the more efficient with resources they become and the more they concentrate their energies on enhancing firm value. They also argue that the use of debt provides a vehicle for increasing managers' shareholdings. If the absolute investment by managers is held constant, an increase in the fraction of the firm financed by debt will increase the managers' share of equity and mitigate the loss from the conflicts of interest between managers and shareholders. Jensen (1986) further argues that managers will attempt to avoid shareholder control by using internal funds (for example free cash flow) to expand the firm size beyond the optimal size and to accept projects with a negative net present value (for example over investment).Shareholders can prevent management

from undertaking such action by reducing the free cash flow through increasing the firm's debt. The presence of debt causes the manager to pay out cash as interest and repayments. Moreover, debtholders will have the firm declared bankrupt if it cannot meet its obligations to them.

Similarly, Grossman and Hart (1982) indicate that, as well as causing managers to consume fewer perks, the use of debt creates an incentive for them to 'work harder and make better investment decisions'. The reason for this is to reduce the possibility of bankruptcy which could cost managers personally in terms of their loss of control and reputation. But the degree of agency benefit to be derived from issuing debt is far from certain. Debt is not the only vehicle for mitigating conflicts of interest between managers and shareholders. The personal stake or share-holding of managers in a firm can be enhanced through various compensation schemes tailored to maximise shareholder objectives. Also, proponents of this agency benefit of debt argument appear to suggest that debt is chosen with curtailing the allocation of resources to personal benefit specifically in mind. Yet, the levels of managers who are most likely to be in a position to seriously exploit resources are the same managers who take the decision to issue debt; it is unlikely that they would be issuing debt to control their own actions. Nevertheless, the arguments here invoke a strong expectation that managers may rationally engage in accounting manipulation exercises which influence debt policy, including the levels and the costs of debt.

Another form of conflict between managers and shareholders is that managers and shareholders may disagree over a firm's operating decisions. Harris and Raviv (1990) suggest that because of the managers' personal loss of control and reputation, they could be reluctant to cease operations when liquidation would be preferable to

shareholders. They propose that the use of debt gives debt providers the option to force liquidation in the event of default, which would also benefit shareholders if liquidation was the best strategy. Nevertheless, Harris and Raviv further note that forcing liquidation in itself incurs costs relating to the production of information necessary for decisions concerning future prospects. These additional costs would not be of benefit to shareholders. In this context, the use of debt appears to provide a benefit if liquidation is the best option and the costs of liquidation are less than the costs of continued operations. Furthermore, the use of debt and the commitment to fixed interest payments enhances the possibility of liquidation in the first instance. It seems highly unlikely that managers would view issuing debt as providing the benefit of instigating liquidation when they themselves would decline to do so. Stulz (1990) also suggests that conflict may arise when managers want to invest all available funds and are reluctant to payout cash to investors. The use of debt reduces free cash flow and prevents over-investment, another agency benefit of debt. However, it is important to note that debt payments may exhaust more than 'free cash', reducing funds available for profitable investments, implying a *cost* to using debt. Again, these arguments in finance theory suggest that managers may rationally engage in accounting manipulation exercises which influence the level and the cost of debt, as mentioned above.

3.5 The conflict between shareholders and debtholders

Recent research shows that, as deteriorating market liquidity pushes down bond prices, it amplifies the conflict of interest between the shareholders and debtholders because, to avoid bankruptcy, the equity holders have to absorb all of the short-fall from rolling over maturing bonds at the reduced market values. He and Xiong (2009) examine this

role of deteriorating market liquidity, revealing a trade-off between short-term debt's cheaper financing cost and higher future bankruptcy cost in determining firms' optimal debt maturity structure and liquidity management strategy. As a result, shareholders choose to default at a higher fundamental threshold even if there is no potential for firms to raise more equity, with a greater fraction of short-term debt then further exacerbating the situation by forcing the equity holders to realise the rollover loss at a higher frequency. This spiral creates the kind of debtholder-shareholder conflict that is posited here.

Such conflict between equity holders and debtholders has also been identified in the agency cost literature, and these too have implications for the hypotheses that will be developed in Chapter 5 of this thesis. Jensen and Meckling (1976) suggest that the use of debt finance provides managers acting on behalf of shareholders with an incentive to invest sub-optimally in very risky projects. If an investment yields large returns, shareholders capture the majority of the gain, as returns to debtholders are fixed. However, if the investment fails, debtholders bear the consequences, as a result of shareholders' limited liability. If debtholders anticipate this behaviour and incorporate restrictive covenants in debt contracts in order to prevent it, the return on investment financed by debt is decreased.

Smith and Warner (1979) suggest using restrictive covenants on debt such as including interest coverage requirements or prohibitions against investing in new unrelated lines of business. Restrictive covenants are irrelevant if managers are only interested in pursuing relatively safe projects out of adverse reputational considerations. Restrictive covenants reduce management flexibility by restricting the firm's investment and financing opportunities. Smith and Warner also suggested that secured debt may

provide the issuer with a means to mitigate agency costs of debt. Furthermore, the issue of convertible debt, where debtholders have the option to convert to shareholders, could be used to reduce the need for restrictive covenants. Firms may also use the convertibility option to mitigate the agency costs of debt. Jensen and Meckling (1976) argue that such conversion rights enable debtholders to recapture any positive wealth transfers to shareholders and to gain from any increase in risk.

Maturity of debt is another option that firms can use to mitigate agency costs. Myers (1977) observes that, if debt matures before growth options are exercised, the firm's incentive to deviate from a firm-value-maximizing exercise policy is eliminated. Billett et al (2007) argue further that short-term debt can mitigate both under- and over-investment incentives by making the debt less sensitive to changes in firm value and by allowing for more frequent re-pricing of debt.

According to Diamond (1989), managerial reputation also plays an important role in mitigating the conflicts between shareholder and debtholder. He suggests that the longer the period of non-default the better is a firm's reputation for safety and lower will be its borrowing costs; this suggests that older firms will choose safe projects to maintain reputation. Younger firms with a lesser reputation may choose risky projects with higher prospective returns, but, if they survive, they will eventually prefer safe projects.

Altogether, the above tells us that the terms of debt contracts, particularly covenants and maturity, are firmly linked to managerial behaviour by finance theorists, and we should expect these features of debt, and the debtholder-shareholder conflicts they entail, to be apparent as factors that motivate cash flow accounting choices when managers seek to influence market appraisals of debt costs. In an innovative accounting

study on this issue, Ahmed et al (2002) provide evidence suggesting that accounting does indeed help mitigate these debtholder-shareholder conflicts, specifically with regard to the influence of accounting conservatism over dividend policy and the reduction in debt costs. These authors use a market-based measure and an accrual-based measure of conservatism and find that both measures are significantly positively correlated with two of the three proxies for bondholder-shareholder conflicts over dividend policy (standard deviation of ROA and the dividend-to-asset ratio). They conclude that firms facing more severe bondholder-shareholder conflicts over dividend policy choose more conservative accounting.

In summary, whilst the benefits of issuing debt appear to arise mainly from conflicts of interest between shareholders and managers (even tthough issuing debt may incur costs when there is conflict over operating decisions), it is also the case that costs will arise when conflicts of interest between shareholders and debtholders cause debtholders to impose restrictions. This leads back to the Jensen and Meckling (1976) proposal that an optimal capital structure can be obtained by trading-off these agency costs and benefits to debt, and that this will maximise the value of the firm. For the purposes of this thesis, the debtholder-shareholder and debtholder-manager conflicts are seen as key motivating factors in the flows of accounting information between these parties.

3.6 Other empirical evidence regarding the cost of debt

Many studies have examined the relationship between cost of debt and firm characteristics. In order to provide a coherent review, an outline of previous researchers' intentions is provided on a study-by-study basis and findings are summarised according

to the relationships being tested and the proxies used. A tabulated summary of the hypothesised connections between debt costs and the characteristics of the firm is shown in Table 3.1.

A potential link between a firm's overall disclosure quality and its cost of debt financing was investigated by Sengupta (1998). Measuring the cost of debt as the yield on newly issued debt, thus capturing the marginal cost of debt to the firm, the paper provides evidence that those firms with high disclosure quality ratings from financial analysts enjoy a lower effective interest cost. Since debt financing is an important source of external financing for publicly traded firms, the results have important implications for understanding the motives and consequences of corporate disclosures.

Demirtas et al (2006) examine earnings management around the time of initial bond ratings. Using a sample of 1,257 industrial bonds with initial ratings from Moody's between 1980 and 2003, the authors document increasing (positive) current accruals in the years and quarters leading up to the initial rating followed by declining (negative) accruals. The results imply that firms opportunistically inflate earnings prior to issuing initial (rated) debt. In additional tests, Demirtas et al show that the inflated earnings were associated with higher ratings and, by implication, lower costs of debt. Their combined evidence suggests that rating agencies are fooled by managerial discretionary behaviour with regard to earnings management. The issue of whether firms manage earnings before issuing bonds to achieve a lower cost of borrowing was also studied by Liu et al (2010), who find significant income-increasing earnings management prior to bond offerings. They also find that firms that manage earnings upward issue debt at a lower cost. Their results are consistent with studies that report earnings management around equity issuance, and indicate that, like equity holders,

bondholders fail to see through the inflated earnings numbers in pricing new debt. Note however that Demirtas et al and Liu et al (unlike the current thesis) did not examine the direct impact of abnormal accruals on the market price of debt, nor the impact of cash flow management. It is conceivable that, even if ratings agencies are "fooled" by earnings management, bond buyers may be able nevertheless to see through the earnings management and price the debt appropriately.

Prior earning management research documents that firms attempt to beat three earnings benchmark (zero earnings, last year's earnings, and analyst's forecasted earnings) and that there are both equity market and compensation-related benefits associated with beating these benchmarks. Jiang (2008) investigated whether and under what conditions beating these three earnings benchmarks reduces a firm's cost of debt, using two proxies for a firm's cost of debt: credit ratings and initial bond yield spread. Jiang's results suggest that firms beating earnings benchmarks have a higher probability of rating upgrades and a smaller initial bond yield spread. Additional analyses indicate that (1) the benefits of beating earnings benchmarks are more pronounced for firms with high default risk; (2) beating the zero earnings benchmark generally provides the biggest reward in terms of a lower cost of debt; and (3) the reduction in the cost of debt is attenuated but does not disappear for firms beating benchmarks through earnings management. In summary, Jiang's results suggest that there are benefits associated with beating earnings benchmarks in the debt market. However, given that cash flow may be the more important metric for the debt market, we may ask whether the strong focus on earnings management focus is appropriate.

The role of accounting quality in improving bond liquidity and its implication on the cost of debt has been investigated by Subramanyam et al (2010). They argue that

high accounting quality not only reduces information asymmetry, but also decreases overall uncertainty in the market, in the way improving liquidity and reducing the cost of debt. Subramanyam et al find the accounting quality significantly reduce cost of debt (Table 3.1 panel D), they also show that the previously documented effect of accounting quality in reducing the cost of debt is largely through the improved liquidity. Considering these results from Subramanyam et al, this thesis goes on to argues how cash flow manipulation may affect accounting quality, thus increasing information asymmetry, and consequently influencing the cost of debt.

3. 7 Summary

This chapter has reviewed the prior studies in relation to capital structure and cost of debt. The chapter explained how firms determine their levels of debt and equity. Capital structure theory, interest tax shields and financial distress investigated. Moreover this chapter explained the trade-off theory and the conflict between shareholders, managers and debtholders. In addition the chapter documented evidence about the cost of debt and capital structure and relationships between the cost of debt and other firm characteristics in the previous studies. Nevertheless, we also need to know about structure of Cash Flow Statement and consider in detail how firm can manipulate *OCF*. The purpose of the next chapter is to review the studies in the area of the Cash Flow Statement and cash flow manipulation. The incentives for cash flow manipulation and different common methods for doing this are also discussed.

Table 3.1
Prior research of relationships between cost of debt proxies and other firm characteristics

Panel A: Partha Sengupta, (1998)

Definition	Sign	Sig/Insig
YIELD; Yield to maturity on first debt issued in year t + 1.		
DISC: Average of total FAF disclosure score over the years t, t-1 and t-2	NEG	SIG
DE: Total liabilities divided by market value of equity at the end of year t	POS	SIG
MARGIN: Income before extraordinary items of year t divided by net sales of year t		IN-SIG
TIMES: Income before extraordinary items plus interest expense, divided by interest expense		IN-SIG
LASSET: Log of the book value of total assets at the end of year t		IN-SIG
STDRETN: Standard deviation of daily stock returns over year t	POS	SIG
LSIZE: Log of the dollar amount of the debt issued		IN-SIG
LMATUR: Log of the number of years to maturity of the debt	POS	SIG
TBILL: Yield on equal maturity U.S. Treasury bonds	POS	SIG
BC: Average yield on AAA bonds minus the average yield on 30-year US Treasury bills	POS	SIG
CALL: Number of years to first call divided by the number of years to maturity		IN-SIG
CONVER:T 1, if the debt is convertible; 0 otherwise	NEG	SIG
SUBORD: 1, the debt is subordinated; 0 otherwise	POS	SIG
RATE: 1,2,...,6 for bonds rated Aaa, Aa, A, Baa, Ba and B, respectively		
Adjusted R^2		75%
N		114

Table 3.1
(Cont.)

Panel B: Anderson and Mansi, (2009)

Definition	Sign	Sig/Insig
YIELD SPREAD: Dependent variable		
ACSI: A measure of customer satisfaction	NEG	SIG
COD: Difference between the firm's' cost of debt less the cost of debt on a US Treasury security with similar effective maturity		
SIZE: Natural log of the firm's total assets	NEG	SIG
Profitability: Ratio of earnings before interest, taxes, depreciation and amortisation divided by total assets	NEG	SIG
LEV: Ratio of long-term debt to total assets	POS	SIG
Advertising: Ratio of advertising expenditures divided by sales	POS	SIG
Risk: Firm's standard deviation of the cash flow ratio for the past five years		IN-SIG
Rating: The portion of the rating (average of both Moody's and S&P) variable unexplained by ACSI	NEG	SIG
Duration: A linear combination of the weighted durations of each bond for each firm, where duration refers to Macaulay duration and represents a security's effective maturity	NEG	SIG
Age: Weighted average difference between the observation year date and the date of the original bond issue	POS	SIG
Adjusted R^2		65%
N		2,574

Table 3.1
(Cont.)

Panel C: Anderson and Mansi,(2009), Second Model

Definition	Sign	Sig/Insig
Credit Rating: Average of both Moody's and S&P bond ratings		
ACSI: A measure of customer satisfaction	POS	SIG
COD: Firm's cost of debt less yield on US Treasury bond with similar effective maturity		
SIZE: Natural log of the firm's total assets	POS	SIG
Profitability: Ratio of EBITDA to total assets	POS	SIG
LEV: Ratio of long-term debt to total assets	NEG	SIG
MTB: Book value of assets plus premium of market over book value of equity, divided by book value of assets	NEG	SIG
ADV: Ratio of advertising expenditures to sales	NEG	SIG
Risk: Standard deviation of the cash flow ratio for the past five years	NEG	SIG
Coverage: Linear combination of weighted durations of each bond for each firm	NEG	SIG
Adjusted R^2		69%
N		2,555

Table 3.1
(Cont.)

Panel D: Mansi S A, Maxwell W F and Wald J K, (2009)

Definition	Sign	Sig/Insig
Yield Spread: log(Yield Spread)		
SIZE: The log of total assets	NEG	SIG
LEV: The ratio of short- and long-term debt to total assets	POS	SIG
ROA: The ratio of earnings before interest and tax to total assets	NEG	SIG
Rating: Residual credit rating	NEG	SIG
HighYield: Dummy that takes on a value of one if the debt rating is noninvestment grade	POS	SIG
Duration: Debt duration	NEG	SIG
Age: The log of debt		IN-SIG
Call: Dummy that takes on a value of one if the bonds are callable	POS	SIG
FirmRisk: The standard deviation for cash flows for the previous five years		IN-SIG
Intangibles: Intangibles as a fraction of firm assets	NEG	SIG
Adjusted R^2		76%
N		8,345

Table 3.1
(Cont.)

Panel E: Pizzo, Moscariello, Skerratt and Gregoriou, (2009)

Definition	Sign	Sig/Insig
COD: Realised cost of debt		
LEV: Interest-bearing debt to total assets	NEG	SIG
SIZE: Log of firm j's total sales		IN-SIG
Tangibility: Percentile of PPE in company j's total assets	NEG	SIG
IntCov: Operating income to interest expense		IN-SIG
NIBE: Standard Deviation of firm j's net income before extraordinary items		IN-SIG
ROA: Return on assets		IN-SIG
Z_score		IN-SIG
Euribor: Yearly average six-months interbank interest rate	POS	SIG
Industry dummies		IN-SIG
IFRS: Dummy variable		IN-SIG
Adjusted R^2		25%
N		233

Table 3.1
(Cont.)

Panel F: Subramanyam K R, Qi and Zhang, (2010)

Definition	Sign	Sig/Insig
YIELD_SPREAD(Dependent)		
AQ: Accounting quality measure as developed in Dechow and Dichev (2002)	NEG	SIG
NEG_BIDASK: Firm liquidity measure 2, calculated as the (negative) average of bid-ask spreads across bonds issued by the firm, weighed by offering amount	NEG	SIG
AGE: Logarithm of AGE	POS	SIG
MATURITY: Logarithm of MATURITY	POS	SIG
OFFER: Logarithm of OFFER	NEG	SIG
BM: Book-to-market ratio	POS	SIG
CRATIO: Current ratio calculated as current assets divided by current liabilities	POS	SIG
LEV: Sum of current liabilities and long-term debt over total assets	POS	SIG
LOGNUMAN: Logarithm of one plus the number of analysts issuing an annual forecast for the firm in the fiscal year		IN-SIG
SIZE: Logarithm of Total assets	NEG	SIG
ROA: Return on assets calculated as operating income over average total assets	NEG	SIG
SDOCF: Rolling standard deviation of cash flows from operations over the past seven years	POS	SIG
TANGIBLE: Tangibility ratio calculated as net property, plant and equipment divided by total assets	POS	SIG
Adjusted R^2		80%
N		1,700

Table 3.1
 (Cont.)

Panel G: Shaw K W, (2011)

Definition	Sign	Sig/Insig
SPREAD: The bond yield to maturity minus the yield on a US Treasury bond of comparable maturity on the issuance date		
OPT: The number of shares related to CEO unexercised stock options, deflated by total common shares outstanding	POS	SIG
STK: The number of the firm's common shares held by the CEO, deflated by total common shares outstanding	POS	SIG
RES_RATING: The residual from a regression of RATING on CEO incentive variables	POS	SIG
RATING: The Standard and Poor's credit rating on the new issue		
DEBT: The ratio of total long-term debt to total assets	POS	SIG
EBITDA: Earnings before interest, taxes, depreciation and amortisation, scaled by total assets		IN-SIG
TIMES: Earnings plus interest expense, scaled by interest expense	POS	SIG
LASSET: The total book value of assets	NEG	SIG
LSIZE: The net proceeds ($millions) of the new debt issue	POS	SIG
LMATURITY: The number of years to maturity for the bond issue	POS	SIG
CALL: The ratio of the years to first call over the years to maturity		IN-SIG
INV_OPP: The factor score from a factor analysis employing research and development expenditures, the book to market ratio, and capital expenditure		IN-SIG
STDRET: The standard deviation of monthly stock returns	POS	SIG
MKT_RATE: The interest rate on a 10-year US Treasury bond, issued in the same month as firm i's debt in year t	NEG	SIG
INST: The percentage of outstanding shares held by institutional owners	NEG	SIG
TOP5: The percentage of outstanding shares held by the five largest institutional owners	POS	SIG
CEO: An indicator variable which equals 1 if the CEO is also the chairman of the firm's board of directors, and 0 otherwise	NEG	SIG
TRANSP: A measure of financial transparency based on returns-earnings regressions	NEG	SIG
AQ: Accruals quality, based on regressions of working capital accruals on lagged, current, and one-year ahead operating cash flows	NEG	SIG
RET: Annual stock return	NEG	SIG
Adjusted R^2		73%
N		598

Figure 3.1

Static trade-off theory of capital structure

Total value of firm

Value of geared firm with only
tax considerations

B

Costs of financial distress

Value of tax shield

Value with taxes and costs of financial distress

A

C

0

X

100%

Optimal level of gearing

Proportion of debt finance
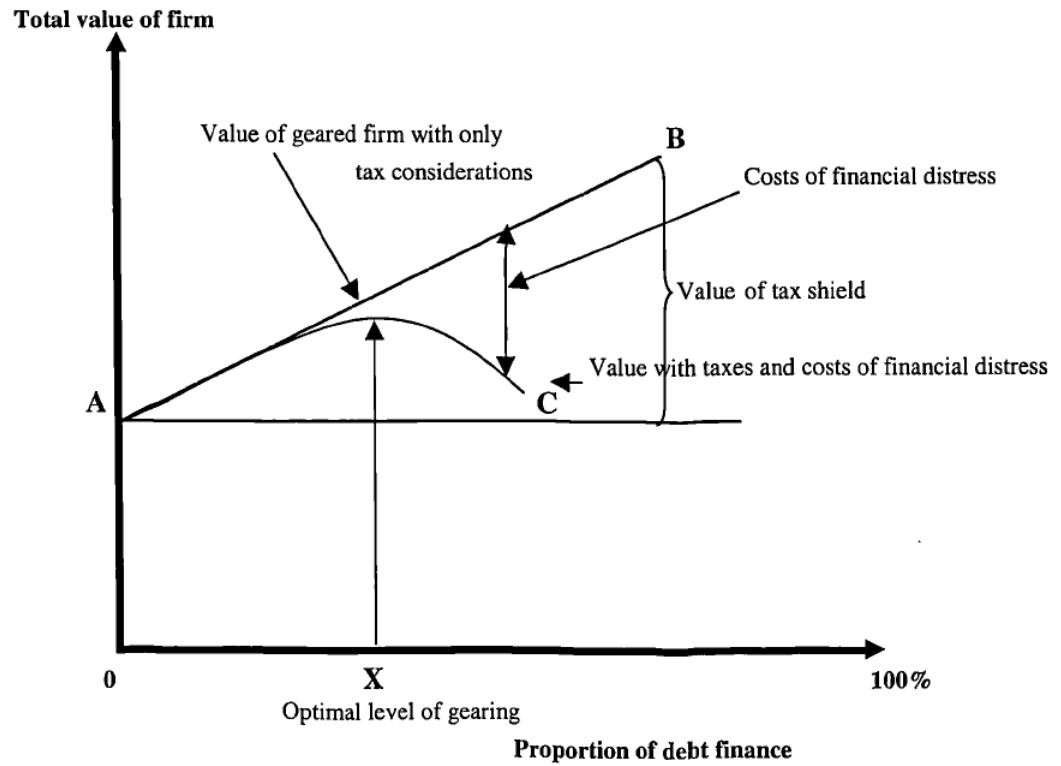
Source: Samuels, J.M., Wilkes, F.M., and Brayshaw, R.E., 'Management of Company Finance' sixth Edition, Chapman and Hall, 1995, p453

Figure 3.2: A Summary of capital structure theory
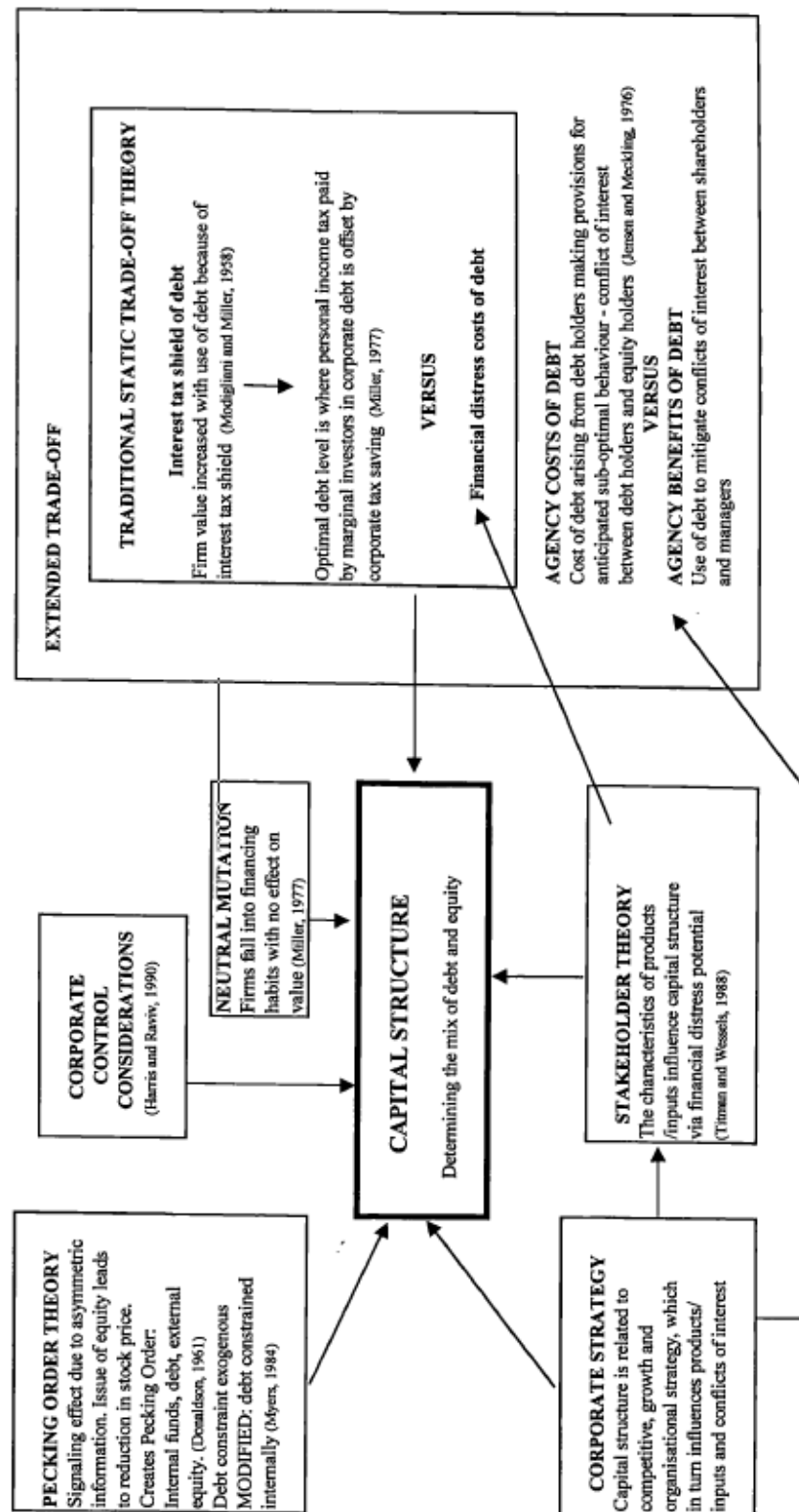
Source: Thomson S.J. (2003), 'The Role of Leasing in UK Corporate Financing Decisions, Accounting Treatment and Market Impact', PhD Thesis, University of Stirling P. 39

Chapter 4

Cash flow reporting and cash flow manipulation

4.1 Introduction

The previous chapter (Chapter 3) explained the theoretical perspectives on capital structure and the cost of debt in detail. The purpose of this chapter is not only overviews the Cash Flow Statement history but also reviews the cash flow manipulation studies. Moreover the incentives for cash flow manipulation and different ways for doing manipulation are also given.

4.2 Cash Flow Statements and the classifications of cash flows

The cash flow statement explains the change during the period in cash and cash equivalents, and classifies cash inflows and outflows as relating to operating, investing, or financing activities.

The Cash Flow Statement appears to have received little or no support from accountants until the early 1960s. At that time there was little concern over the use of 'cash flow' data in the financial analysis, cash flow being interpreted as profit plus depreciation (Winjum, 1972). In 1961 AICPA recognised the importance of funds statements by publishing an Accounting Research Study (ARS) No. 2: "Cash flow analysis and fund statements". Before that, accountants had prepared funds statements primarily as a management report. The Accounting Principles Board (APB) responded in October 1963 by issuing APB Opinion No. 3 (The Statements of Sources and

Application of Funds), which recommended fund statements on a supplementary basis. Because of the favourable response of the business community to this pronouncement, the APB issued Opinion No. 198, "Reporting Changing in Financial Position", in March 1971. This opinion required that a statement of changing financial position be presented as a basic financial statement and be covered by the auditor's report. In 1981 the Financial Accounting Standards Board (FASB) reconsidered funds flow issues as part of the conceptual framework project in 1976. At this time the FASB decided that cash flow reporting issues should be considered as a standard. As a result, in November 1987 the FASB released the statement of cash flows (SFAS No. 95). In 1991 the Accounting Standards Board (ASB) in UK issued cash flow statement (FRS No. 1), and in 1992, the International Accounting Standards Committee (IASC) issued cash flow statement (IAS7). The financial community adopted the concept of comprehensive cash flow reporting, particularly for evaluating the results of operations, because of the belief those traditional measures of income and working capital from operations are not a good surrogate for cash flow from operations (Mostafa, 2005).

In the United States, The FASB Statement No. 95, Statement of Cash Flows (SFAS-95, 1987) and Statement No. 117, Financial Statements of Not-for-Profit Organizations (SFAS 117, 1993) require most business and not-for-profit enterprises to provide a cash flow statement for each period for which results of operations are provided.

Classification of cash flows

Cash flows are to be classified according to operating, investing and financing activities. As we know from the work of Wallace et al 1997, the basis of such classification is derived from financial theory, which states that an enterprise derives the

cash used for investing activities and settlement of outstanding financial obligations in an accounting period from internal and external sources. Internal cash sources emanate from the net cash generated from current operations and perhaps from disinvesting and depletion of cash resources at start of the period. External cash sources come from financing activities such as borrowing, and receiving cash from the sale of equity shares to existing and new shareholders (Wallace et al 1997).

4.3 The objective and Scope of IAS 7

According to IAS 7, Information about the cash flows of an enterprise is useful in providing users of financial statements with a basis from which to assess the ability of the enterprise to generate cash and cash equivalents and the needs of the enterprise to utilise those cash flows. The economic decisions taken by users require an evaluation of the ability of an enterprise to generate cash and cash equivalents and of the timing and certainty of their generation. The objective of this statement (IAS 7) is to require the provision of information about the historical change in cash and cash equivalents of an enterprise by means of a Cash Flow Statement that classifies cash flows during a period from operating, investing and financing activities. An enterprise should prepare a Cash Flow Statement in accordance with the requirements of IAS 7 and should present it as an integral part of its financial statements for each period for which financial statements are prepared. Users of an enterprise's financial statements are interested in how the enterprise generates and uses cash and cash equivalents. This is the case regardless of the nature of the enterprise's activities, and irrespective of whether cash can be viewed as the product of the enterprise, as may be the case with a financial institution. Enterprises need cash for the same reasons, however different their principal revenue-

producing activities might be. They need cash to conduct their operations, to pay their obligations, and to provide returns to their investors. Accordingly, this standard requires all enterprises to present a Cash Flow Statement (IAS 7, Paragraph 1, 2 and 3).

Benefits of Cash Flow Information

Indicated in Lightstone (2011) academics have long advocated the importance and usefulness of the cash flow statement citing the studies of Gup and Dugan (1988); Hodgson and Stevenson-Clark (2000); Sharma and Iselin (2003); Purr (2004). As is summarised by IAS7, a cash flow statement, when used in conjunction with the other financial statements, provides information on liquidity, viability and adaptability that enables investors, creditors, and others to assess the changes in net assets of an enterprise, its financial structure and its ability to affect the amounts and timing of cash flows in order to adapt to changing circumstances and opportunities. Cash flow information is useful in assessing the ability of the enterprise to generate cash and cash equivalents and enables users to develop models to assess and compare the present value of the future cash flows of different enterprises. It also enhances the comparability of the reporting of operating performance by different enterprises because it eliminates the effects of using different accounting treatments for the same transactions and events. Analysts and other users of financial information often, formally or informally, develop models to assess and compare the present value of the future cash flow of entities. Historical cash flow information is often used as an indicator of the amount, timing and certainty of future cash flows. It is also useful in checking the accuracy of past assessments of future cash flows and in examining the relationship between profitability and net cash flow and the impact of changing prices.

4.4 The format of Cash Flow Statements under IAS 7

Cash and cash equivalents

The definitions of cash and cash equivalents are central to the preparation and interpretation of Cash Flow Statements. The international accounting regulator defines cash and cash equivalents as follows:

> *Cash comprises cash on hand and demand deposits and Cash equivalents are short-term, highly liquid investments that are readily convertible to known amounts of cash and which are subject to an insignificant risk of changes in value. (IAS7, Paragraph 6).*

According to the IAS 7 paragraph 7 cash equivalents are held for the purpose of meeting short-term cash commitments rather than for investment or other purposes. For an investment to qualify as a cash equivalent it must be readily convertible to a known amount of cash and be subject to an insignificant risk of changes in value. Therefore, an investment normally qualifies as a cash equivalent only when it has a short maturity of, say, three months or less from the date of acquisition. Equity investments are excluded from cash equivalents unless they are, in substance, cash equivalents, for example in the case of preferred shares acquired within a short period of their maturity and with a specified redemption date.

Preparation of Cash Flow Statements

IAS 7 requires cash flows to be classified into operating, investing and financing activities. Classification by activity provides information that allows users to assess the impact of those activities on the financial position of the entity and the amount of its

cash and cash equivalents. This information may also be used to evaluate the relationships among those activities (IAS7, Paragraph 11).

Cash flows from operating activities

Cash flows from operating activities are in general the cash effects of transactions and other events relating to operating or trading activities. Net cash flow from operating activities represents net increases or decreases in cash resulting from operations shown in the income statements in calculating profit from operations. According to the IAS 7 an entity shall report cash flows from operating activities using either:

> *The direct method, whereby major classes of gross cash receipts and gross cash payments are disclosed; or the indirect method, whereby profit or loss is adjusted for the effects of transactions of a non-cash nature, any deferrals or accruals of past or future operating cash receipts or payments, and items of income or expense associated with investing or financing cash flows (IAS7, Paragraph 18).*

IAS7 permits a choice between two possible methods for reporting net cash flow from operating activities. Nevertheless, entities are encouraged to report cash flows from operating activities using the direct method. The direct method provides information which may be useful in estimating future cash flows and which is not available under the indirect method[7] (IAS7, Paragraph 19).

Although the IAS7 prefers the direct method, the indirect method is widely used in practice (Barsky and Catanach, 2007). Accordingly CFA institute (2007) indicates;

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[7] According to Barsky and Catanach (2007) the use of the indirect method for preparing the cash flow statements presents several opportunities for misreporting the cash flow position.

The indirect method chosen by the vast majority of companies fails to provide adequate information for analysis. Instead of providing the essential information on cash inflows and outflows, the indirect method begins with net income and "patches" the income number, purging noncash elements and adjusting for changes in cash flows not reflected in current period income. Put simply, the only pure cash flow number in the operating cash flow section of an indirect method cash flow statement is the total, Cash Flows from Operations (CFA institute, Financial Reporting for Investors, 2007, p.13).

CFA Institute, reflecting on users' experience with cash flow statements prepared under current accounting standards, observed in 1993:

. . . Cash flow statements that have appeared in published financial reports have been much less useful in analysis than we might have expected. First, almost no public company presents its cash flows from operations using the direct format; virtually all use the indirect format. We have learned . . . that it is extremely difficult or impossible in most cases for financial statement users to calculate reasonable estimates of gross operating cash flows (direct method) using only the data provided in financial reports in the indirect format (Financial Reporting in the 1990s and Beyond, 1993, p. 65[8]).

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[8] Report titled *Financial Reporting in the 1990s and Beyond* was published in 1993, by the Financial Accounting Policy Committee of the Association for Investment Management and Research (AIMR).

CFA institute concludes if cash flow information is essential to investors, and the indirect method does not provide the needed information or enable investors to generate it from the data, then companies must be required to use the direct method[9].

Cash flows from investing activities

The separate disclosure of cash flows arising from investing activities is important because the cash flows represent the extent to which expenditures have been made for resources intended to generate future income and cash flows. Only expenditures that result in a recognised asset in the statement of financial position are eligible for classification as investing activities (IAS7, Paragraph 16).

Investing activities include (i) acquiring and disposing of plant assets, other productive assets and financial investments (except cash equivalents and trading securities); and (ii) making loans to and collecting loans from other entities. Investing outflows include payments to make or acquire loans, payments to acquire debt or equity securities of other entities, and payments to acquire plant assets and other productive assets. Investing inflows include receipts from collecting or disposing of loans, receipts from sales of debt or equity instruments of other entities, and receipts from sales of plant assets and other productive assets.

Cash flows from financing activities

The separate disclosure of cash flows arising from financing activities is important because it is useful in predicting claims on future cash flows by providers of capital to the entity (IAS7, Paragraph 17).

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[9] Contrariwise the UK ASB requires the indirect method as it does not believe that the benefits to the users of the direct method outweigh the costs of preparing it.

Financing activities include: (i) obtaining resources from owners and providing them with a return on, and a return of, their investment; (ii) receiving resources that are donor restricted for long-term purposes; (iii) borrowing money and repaying amounts borrowed, or otherwise settling the obligation; and (iv) obtaining and paying for other resources obtained from creditors on long-term credit. Financing inflows include proceeds from issuing debt or equity securities, proceeds from contributions and investment income that are donor restricted for long-term purposes, income tax benefits of windfall stock option deductions, receipts from certain derivative instruments with off-market terms and/or up-front payments at inception, and proceeds from other short- or long-term borrowing. Financing outflows include dividend payments, outlays to reacquire or retire equity securities, repayments of amounts borrowed, receipts from certain derivative instruments with off-market terms and/or up-front payments at inception, and payments of debt issuance costs.

The format and the classification of Cash Flow Statements in UK

Although there is general agreement between different accounting standard-setters across the world on the objectives of Cash Flow Statements, there are differences between them regarding the format and the classification of Cash Flow Statements. In this section the format of Cash Flow Statements in the UK will be reviewed in detail.

According to UK FRS1 (1991, revised in 1996) the Cash Flow Statement should contain the following headings:

1. Operating activities

2. Return on investments and servicing of finance

3. Taxation

4. Capital expenditure and financial investment

5. Acquisitions and disposals

6. Equity dividends paid

7. Management of liquid resources

8. Financing

The UK IAS 7 has indicated that the last two headings could be merged together under a single heading but a subheading should be given for each one. It also requires the first six headings be reported in the above sequence. Comparing the UK FRS1 (1991, revised in 1996) with those of other countries reveals many differences, the main differences being: (i) differences in defining cash; and (ii) differences in classification of some components of Cash Flow Statements. These differences might explain why the number of main headings in Cash Flow Statements varies between countries. For instance, in the US Cash Flow Statements contain three main headings: operating, investing and financing cash flows.

4.5 Cash flow manipulation – redefining net liquid assets

Only a handful of the thousands of public companies worldwide report *OCF* use the direct method (CFA institute, Financial Reporting for Investors, 2007) and majority of companies use the indirect method to report *OCF*.[10] This routine and mechanical technique reconciles accrual net income to *OCF*. The most common adjustments to net

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[10] *See* ACCOUNTING TRENDS & TECHNIQUES, 59th ed. (New York: American Institute of Certified Public Accountants, 2005).

income include those related to non-cash income and expense items, gains and losses reported for investing activities and changes in working capital components. However, the indirect method's apparent simplicity masks the multiple opportunities that it provides for misreporting *OCF*. Mulford and Comiskey (2005) identify a number of areas that illustrate the flexibility available in reporting *OCF* when this method is used. Four possible manipulation opportunities are as follows:

- Bank overdrafts**:** should bank overdrafts be reported as operating or financing activities?

- Investment securities**:** how are operating cash flows affected by the balance-sheet classification of investment securities?

- Notes receivable: does the nature of a particular receivable (that is, dealer versus customer) affect *OCF*?

    Receivable securitisations: are such activities operating or financing activities?

4. 5.1 Bank overdrafts

A bank overdraft arises when cheques written and presented for payment exceed an available bank balance, and a book overdraft is a negative cash balance recorded on a company's books. It is not an overdraft at the bank, but rather an excess of outstanding cheques on a company's books over its reported bank cash balance. A book overdraft becomes a bank overdraft when outstanding cheques are presented for payment (Mulford and Comiskey, 2005).While FAS No. 95, 'Statement of the cash flows', does not make specific reference to the cash flow classification of overdrafts, the Securities and Exchange Commission (SEC) indicates that "cash overdrafts should be reported as financing activities."[11] Unlike accounts payable, which are owed to vendors in the

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[11] *See* C. Davine, *Current SEC Developments* (speech at the American Institute of Certified Public Accountants 23rd Annual National Conference on Current SEC Developments, Washington, D.C., 1996).

normal course of operations, book overdrafts are substantively financing arrangements since monies are owed to a bank, not to vendors. FAS No. 95 clearly indicates that outside sources of cash should be reported as financing activities. Therefore, if a book overdraft is reported as a current liability together with accounts payable or accrued expenses, and subsequently included in calculating the change in current liabilities when the indirect method is applied, book overdrafts will appear to be a source of funds that increases operating cash flow (Mulford and Comiskey, 2005).

IAS 7 clarifies that bank overdrafts which are repayable on demand and which form an integral part of an entity's cash management are also included as a component of cash equivalents.

Most companies report changes in overdraft balances in financing cash flow. In research conducted by the Georgia Tech Financial Analysis lab, [12] 61 per cent of companies reporting overdrafts included changes in overdraft balances in financing cash flows, while 16 per cent reported changes in overdraft balances in operating cash flows. The remaining 23 per cent of firms reporting overdrafts did not provide sufficient information to determine whether overdrafts were reported in financing or operating cash flows.

4.5.2 Investment securities

FAS-115 (*Accounting for Certain Investments in Debt and Equity Securities*) requires that investments in debt and equity securities be classified in the balance sheet as either trading, available for sale (AFS) or hold to maturity (HTM), depending on management intent. Classifying cash flows for these securities is less clear. Generally, the acquisition and disposition of AFS and HTM securities are considered investing activities, while

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[12] Mulford and Maloney, Cash flow reporting in the presence of Overdrafts, p.7.

trading security cash flows are reported as operating activities. A potentially misleading disclosure problem arises when *non-financial companies* report trading securities as operating activities (which GAAP mandates), because these transactions are not likely to be recurring (Mulford and Comiskey, 2005). Moreover, Barsky and Catanach (2007) ask is it logical for a retailer to trade investment securities as part of its *normal*, recurring business operations? No: retailers' primary business purpose is to sell goods and services, not securities. Significant investment trading activities for a non-financial company are themselves a red flag that indicate weak cash flows related to core operations. From a disclosure perspective, misclassifying investment security cash flows as operating activities can greatly distort reported *OCF* (Barsky and Catanach, 2007). Nautica Enterprises' statement of cash flows from 2000 through 2002 illustrates just how *OCF* can be manipulated by misclassifying investment security cash flows (Table 4.1). During this period, Nautica was an independent retail apparel company, well-known for its sportswear, active wear, jeans and accessories. Its auditor was Grant Thornton. Between June 2001 and June 2003, the company's stock price declined by half, from $20 to $10 per share, before rising again to $14 just before Nautica's acquisition by VF Corporation in August 2003. The company's 2002 cash flow statement in Table 4.1, Panel A, also reveals significant operational pressures. First, the company experienced an impairment loss on long-lived assets. Next, operating cash inflows from short-term investments plummeted from those of prior years. Additionally, *OCF* increased dramatically through unusually large liquidations of accounts receivable and inventory. These cash inflows were then used to satisfy outstanding trade obligations. Collectively, these transactions suggest that Nautica was experiencing financial problems and, therefore, had an incentive to mislead the investing public.

As indicated previously, Nautica's investment activity should be considered quite unusual for a retail apparel company and, clearly, is not an operating activity. Panel A of Table 4.1 suggests that the company initiated significant security trading activity in 2000 and 2001 to compensate for its deteriorating retail clothing operations. This strategy appears to have bought Nautica some time before the equity markets declined in 2002.[13] In fact, because of asset liquidations and securities transactions, the company reported increasing *OCF* for the period 2000 through 2002, without a corresponding increase in net earnings. Confirmation of Nautica's intent to manipulate *OCF* can be found in Panel B of Table 4.1, which provides extracts from the company's 2000 cash flow statement. Before 2001, Nautica reported its investment security cash flows as investing activities, not as operating activities. Note that the $21,116,000 of cash inflows for short-term investments was reported in the 2000 Cash Flow Statement as investing activities (Panel B), while the very same cash flows were reported as operating activities in 2001 and 2002 (Panel A). According to the 2001 10-K accounting policy note, the company changed its classification of short-term investments from AFS to trading securities, apparently to present a more favourable picture of *OCF*.

Adjusting Nautica's *OCF* for security misclassifications and asset liquidations between 2000 and 2002 yields a very different picture. Had securities sales been reported in the investing activities section, rather than as operating activities (Panel A, Table 4.1), *OCF* would have approximated $62.6 million and $49.6 million in 2000 and 2001 respectively, a significant difference from the reported amounts of $83.9 million and $78.0 million respectively. This resulted in the overstatement of *OCF* by $28.4 million (57 per cent) in 2001 and $21.1 million (34 per cent) in 2000. To complete the

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[13] *See http://bigcharts.marketwatch.com/* for evidence of significant equity market price declines between 2000 and 2002.

story, 2002 *OCF* were adjusted for nonrecurring asset liquidations. The result is *OCF* of approximately $35 million, a reduction of almost 62 per cent from the $91.1 million reported previously (Panel A, Table 4.1). Nautica's manipulation of *OCF* illustrates just how critical it is that lenders carefully compare a company's current financial statements with those previously issued to identify inconsistencies in cash flow reporting.

4.5.3 Notes receivable

As is summarised by Barsky and Catanach (2007), manufacturing companies commonly have two types of financing receivable: one to finance sales to its own customers (dealer receivables), and another to finance sales to its dealers' customers (retail receivables). Dealer receivables are clearly part of *OCF* since they represent cash collections from the manufacturer's customers related to the sale of inventory. However, retail receivables are more appropriately classified as investing activities since they are created by the dealer, not by the manufacturer. Instead, the manufacturer is investing in receivables related to dealer sales. *OCF* misstatements are possible because manufacturing companies commonly report changes in *both* types of financing receivables solely as investing activities.[14] Therefore, *OCF* will be overstated when dealer receivables are reported as investing activities.

General Motors' (GM) 2003 statement of cash flows and related notes show how *OCF* can be distorted by misclassifying dealer receivables. Between March 2000 and December 2003, GM's stock price steadily declined from a high of about $90 per share to approximately $40 per share. Panel A of Table 4.2 also indicates that GM's *OCF* steadily declined during these same three years. Finally, Panel A also shows that

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[14] *See* Jonathan Weil, *Outside Audit: Cash Flow Doesn't Lie – Or Does It?* Wall St. J. (*online*), Apr. 16, 2004.

net cash outflows from financing receivables consistently increased from $11.6 billion ($107.6 billion less $96.0 billion) in 2001 to $41.9 billion ($149.4 billion less $107.5 billion) in 2003. This increase suggests that GM relied on product financing to effect product sales during this period. These three factors indicate that the company's management had incentives to misreport results of operations. GM's auditor during this period was Deloitte & Touche.

Panel B of Table 4.2 reveals that GM misclassified an increase of $4.1 billion ($25.5 billion less $21.4 billion) in dealer receivables as an investing cash flow, rather than as a cash flow from operations. This practice caused GM to overstate its *OCF* by 117 per cent in 2003. In 2004, the SEC forced GM, Ford and a dozen other companies to change their practices of reporting dealer receivables as investing activities in the statement of cash flows.[15] This example illustrates how important it is for lenders to know what reporting practices are peculiar to specific industries and to understand their potential effects on cash flow disclosures and intercompany comparisons.

4.5.4 Notes payable

Financing of operating costs with notes payable to suppliers (even notes that bear interest) is reported in the operating section of the Cash Flow Statement. Payments of the principal on those notes, as well interest on them, are also reported as operating uses of cash. Payments on notes payable to suppliers for purchases of operating-related items such as inventory are properly classified as operating cash flow. Cash flow classification, however, is less clear when those same notes are payable to lenders (Mulford and Comiskey, 2005).

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[15] *See* Diva Gullapalli, *Little Campus Lab Shakes Big Firms,* WALL ST. J., Mar. 1, 2005.

4.5.5 Receivable securitisations

As we understand from Mulford and Comiskey, (2005), in a securitisation, receivables are pooled and an undivided interest in the pool is sold, thus creating a security backed by receivables. As part of this process, a company (the sponsor) transfers receivables by 'sale' to a special-purpose entity (SPE), which is wholly owned by the sponsoring company. The SPE then borrows funds using the receivable assets as collateral and passes the loan proceeds back to the sponsor company, which continues to service the receivable. Securitisation is accounted for as a sale of receivables, so the proceeds received by the sponsor from the receivable transfer (sale) are reported as *OCF*. Two questions should concern lenders when evaluating *OCF* when asset securitisations are present: firstly, should securitisations really be considered financings rather than operating activities? And secondly, does this practice provide a temporary or permanent boost to *OCF*? Since securitisations qualify as sales for both accounting and legal purposes, it appears appropriate to classify them as operating activities. This treatment is consistent with that afforded to outright sales of receivables and factoring arrangements. However, reporting asset securitisations as *OCF* may be misleading if lenders perceive these cash inflows to be a permanent rather than a temporary cash flow. In reality, securitisation accelerates the collection of *OCF*-related receivables, and *OCF* are effectively being 'borrowed' from the future (Mulford and Comiskey, 2005).

4.6 Cash flow manipulation – other reporting issues

A variety of other reporting factors can also affect the operating cash flow number so critical to a lender's credit decision-making process. These are summarised in Table 4.3 and discussed below.

4.6.1 Capitalised operating costs

Whether a cost is capitalised or expensed can have a major impact on reported cash flows. Nevertheless, GAAP allows managers a great deal of flexibility in deciding whether operating costs are capitalised or expensed. Clearly, if incurred costs benefit future periods, they should be capitalised and the related cash outflows reported as investing cash outflows. However, as noted previously, when companies are experiencing financial difficulties, managers may choose to capitalise rather than expense certain costs in order to overstate OCF. Several common costs that lenders may wish to scrutinise include capitalised interest costs, software development costs, customer acquisition costs, film production costs and oil exploration costs. The decision facing loan officers is whether these cash outflows are more appropriately reported as investing cash outflows or operating cash outflows.

4.6.2 Insurance reimbursements

Proceeds received from insurance settlements should be reported in the statement of cash flows according to the activity or asset class to which they relate. For example, cash receipts from insurance settlements related to long-term asset investments such as buildings and plants (such as hazard reimbursements) should be reported as investing inflows, not OCF. However, many companies ignore the reason for the insurance reimbursement and report the cash inflow as an operating activity, thereby potentially overstating OCF. Again, credit analysts must decide whether these temporary cash inflows should be included in OCF for underwriting and loan review purposes.

4. 6.3 Business acquisitions

Increases in working capital (for example, accounts receivable and inventory) are reported as uses of cash when the indirect method is used to report *OCF*. Conversely, working capital declines represent sources of cash. However, GAAP requires that working capital increases resulting from a business acquisition be reported as an investing activity since these assets and liabilities were purchased, not created by a company's operations. This creates a potential cash flow reporting problem, since GAAP also requires that the subsequent liquidation of the acquired working capital accounts be reported as an operating activity. Consequently, a company can temporarily increase *OCF* through an acquisition. Clearly, lenders should be alert for potential cash flow classification problems associated with major business acquisitions made by their borrowers.

4. 6.4 Vendor-related payables

Loan officers should also determine if *OCF* are increasing because payments on vendor payables are slowing. If a company is experiencing cash flow difficulties, it may delay payment for as long as possible; thereby receiving what is essentially a free temporary loan. GAAP requires that increases in vendor payables be reported as operating sources of funds when the indirect method is used. Therefore, postponing payment of vendors may provide a temporary boost to *OCF*. The result is that an increase in *OCF* may not be positive.

4. 6.5 Customer-provided financing

When revenue is collected in advance of being earned, the proceeds received are reported as a liability, a form of customer-provided financing. That liability, typically

referred to as deferred revenue, reflects an obligation borne by the receiving company to provide goods or services to its customers. When those goods or services are provided, the underlying revenue is earned and is reported on the income statement. That recording of revenue is offset by a reduction in deferred revenue.

Deferred revenue is the result of customer-related collections. Accordingly, collections leading to increases in the deferred revenue liability are reported as operating and not as financing sources of cash. Later, when the underlying revenue is earned, increasing revenue and reducing deferred revenue, no operating cash flow is provided. As a result, reductions in deferred revenue are reported as subtractions from net income when computing operating cash flow (Mulford and Comiskey, 2005).

4.6.6 Income tax considerations

GAAP generally requires that cash receipts or disbursements related to all taxes be reported as *OCF*. While this practice is appropriate for taxes related to operating activities, it is not acceptable for taxes that are incurred due to investing or financing activities. Consequently, when faced with unusual and significant tax cash inflows or outflows that are reported as operating activities, lenders should determine if they really relate to operating activities. If not, these tax cash flows should be reclassified to the investing or financing sections of the statement of cash flows. For example, tax payments related to gains on the sale of a business or buildings are better classified as investing activities.

4. 6.7 Nonrecurring operating transactions

OCF can also be affected by nonrecurring cash flow items. These are cash transactions that do not appear with any regularity, or that are very irregular in amount, and that are

not derived from the core operating activities of a company.[16] Examples include restructuring cost payments, litigation settlements, merger-related charges, income tax refunds and contract termination fees. Such items should be removed from reported *OCF* to obtain a more sustainable measure of *OCF*.

4.7 Basic approaches to the identification of cash flow manipulation

Barsky and Catanach (2007) mentioned predicting expected *OCF* is often considered the Holy Grail for those involved in the credit analysis process, since cash flow is so critical to answering questions about borrower performance and potential debt service. However, managers have at their disposal a variety of cash flow manipulation techniques that even the major independent auditing firms appear powerless, unwilling or unable to combat. The following checklist has prepared by Barsky and Catanach can help guide lenders in their search for sustainable *OCF*.

Compare net income and operating cash flow

The indirect method format of the operating activity section of the statement of cash flows facilitates such a comparison. In addition to providing insight into the quality of earnings, comparing net income and *OCF* focuses attention on the composition of *OCF* and their permanence. Are reported *OCF* reasonable given a company's stated strategy and historical operations? Do the changes in working capital accounts make sense for the company? For example, consider the disparity between the two metrics reported by Nautica in Panel A of Table 4.1 for 2002. The $73.9 million difference ($91.1 million less $17.2 million) would lead one to conclude that Nautica was pursuing an asset

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[16] *See* Charles W. Mulford and Eugene E. Comiskey, CREATIVE CASH FLOW REPORTING (Hoboken, NJ: John Wiley & Sons, Inc., 2005).

liquidation strategy and that *OCF* were generally temporary in nature (Barsky and Catanach, 2007).

Reconciling balance sheet changes with note disclosures

This step tells lenders if they can rely on the reported cash flow numbers. The indirect method of the operating activities section of the statement of cash flows is largely a product of a company's balance sheet. Consequently, changes in working capital amounts and other reported items should be traceable to the balance sheet and related note disclosures. If reported indirect method reconciling items cannot be easily verified using simple addition and subtraction, then the operating activities section of the statement of cash flows has been poorly prepared and its contribution to cash flow analysis should be considered suspect. For example, a number of OCA's working capital changes (Panel B, Table 4.1) could not be verified from the company's balance sheet, raising questions about the quality of reported cash flow disclosures.

Investigating large and unusual reconciling items

As noted above, nonrecurring cash flow items can distort *OCF* and lead to flawed credit analysis. Therefore, bankers should verify that *OCF* only include cash flows related to a company's core operations. Nautica's significant cash inflows from short-term investments in 2000 and 2001, together with its 2002 asset impairment loss, fall into this category (see Panel A, Table 4.1). Once identified, the banker should adjust reported *OCF* to arrive at a more sustainable measure of cash flow.

4. 8 Advanced modelling of cash flow expectations

OCF and earnings are complementary measures of firm performance. Investors advocate the use of *OCF* to gauge the credibility of earnings on the basis that *OCF* is more real than earnings.[17] However, cases of cash flow misreporting have raised concerns that managers exercise discretion in financial reporting and in the timing of transactions to alter reported *OCF*. Despite the concerns about misreporting of *OCF*, there is limited research about when, why and how firms manage reported *OCF* (Lee, 2009).

Several pieces of literature on manipulation of numbers reported in financial statements have focused on manipulation of income. These results provide an important counter to the notion that reported earnings can be managed, but cash flows cannot. In contrast, a few studies suggest that cash flows are not immune to manipulation (see for example Burgstahler and Dichev, 1997; Frankel, 2005; Roychowdhury, 2006; Zhang W., 2008 and Lee, 2009).

Firms reporting small positive annual profits engage in real activities to avoid negative earnings (Roychowdhury, 2006). Some of these activities, such as reducing discretionary expenses, may also be examples of myopic behaviour to manage cash flows to meet certain benchmarks. Zhang R. (2006) finds indications that managers take actions to report positive *OCF*, to avoid missing analyst cash flow forecasts, and to meet cash-dividend targets. Zhang W. (2008) finds that firms that just meet cash flow forecasts engage in higher rates of manipulation of real activities to increase cash flows. Lee (2009) finds that *OCF* is managed by shifting items between the Cash Flow Statement categories and by timing certain transactions.

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[17] See *The Wall Street Journal* article "Cash Flow Reigns Once Again" by Lauricella (2008) and others such as Fink (2000), Glassman (2002), Henry (2004) and Robinson (2006) and Lee (2009).

In order to provide a logical review, an outline of previous researchers' intentions is provided on a study-by-study basis. A summary of the research that has investigated cash flow manipulation is shown in Table 4.4.

Cash flow from operations and changes in working capital have been manipulated to increase earnings (Burgstahler and Dichev, 1997). Burgstahler and Dichev find evidence consistent with the manipulation of cash flow from operations to effectively move observations from small losses to small positive earnings. They plot the 25th, 50th and 75th percentiles of unscaled cash flows for each earnings interval and find that the distribution of cash flows shifts upwards in the first interval to the right of zero, and interpret this as suggesting the existence of cash flow manipulation. However, the focus of their paper is on earnings rather than on cash flow management.

Frankel (2005) finds a significant fourth quarter reduction in working capital and that managers attempt to exceed *OCF* benchmarks. This decrease is subsequently reversed in the first quarter of the next fiscal year. This temporary decrease in fourth quarter non-cash working capital remains significant after controlling for seasonal variation in the firm's activity level as proxies by quarterly contemporaneous/lead/lag sales and net income. Consistent with capital market incentives to manage reported cash flows, Frankel finds firms attempt to beat benchmarks based on operating cash flow levels, changes and forecast errors. Examining contracting incentives, he finds that firms mentioning working-capital-related compensation targets have larger fourth quarter working capital declines, but these declines are not more likely to reverse. Frankel suggests the discontinuity in the *OCF* level distribution is most pronounced for firms near bankruptcy. Nevertheless Frankel consider capital market incentives for cash flow management, his main focus is on working capital manipulation for benchmark

purposes. For the purposes of this thesis not only change in working capital but also others technique in operating cash flow manipulation and effects on debt market are considered.

While much of the prior research on earning management focuses on detecting abnormal accruals, Rochowdhury (2006) investigates evidence that firms engage in earnings management not only by manipulation of accruals with no direct cash flow consequences, but also that they have incentives to manipulate real activities during the year. He finds evidence consistent with managers manipulating real activities to avoid reporting annual losses: sales manipulation, decreasing discretionary expenses and reporting lower costs of goods sold by overproduction, to improve reported margins among firms reporting small positive annual profits. Roychowdhury focuses on cash flow manipulation to achieve earnings targets, so it is argued here that operating cash flow management doesn't always result in a one-direction impact on earnings. For example, Roychowdhury examines activities to increase earnings including discounts on sales, overproduction and reduced discretionary expenses. However, these activities do not result in a consistent directional movement of *OCF* and earnings. All three are likely to increase earnings but sales discounts and overproduction lead to lower *OCF*, while reduction of discretionary expenses increases operating cash flow.

Given the extensive evidence on the existence of real earnings management, Gunny (2007) examines the extent to which real earnings management affects subsequent operating performance. The study focuses on the four types of real earnings management activities: (1) myopically investing in R&D to increase income; (2) myopically investing in SG&A to increase income; (3) timing income recognition from the disposal of long-lived assets and investments; and (4) cutting prices to boost sales in

the current period and/or overproducing to decrease COGS expenses. The study finds that analysts recognise the future earnings implications of all four types of real earnings management. This empirical study likewise priors focus on cash flow manipulation for achieving earnings targets.

Zhang R. (2006) examines management of cash flow operations, its causes and the market's reaction to cash flow management. He uses a sample for the 19 years from 1987 to 2005, and for detecting discontinuities in cash flow distributions he uses the methods of Burgstahler and Dichev (1997) and DeGeorge et al (1999). This study has several findings. For instance, Zhang R. finds unusually high frequencies of small positive cash flows, small positive cash flow surprises, and small cash-flow/cash-dividend differences. He emphasises that these findings indicate that managers take actions to report positive cash flows and positive cash flow surprises, and to reach cash-dividend targets. By using goodness-of-fit and best-fitted-distribution tests the study suggests that this is a fairly widespread phenomenon: 5.52 per cent of firms with small positive cash flows manage cash flows to achieve positive cash flows, 14.95 per cent of firms with small positive cash flow surprises manage cash flows to reach the analyst forecasts threshold, and 7.05 per cent of firms that just reach cash-dividend targets manage cash flows to reach them. Zhang R. also compares the prevalence of cash flow management to that of earnings management, as well as the association between several cross-sectional firm characteristics and abnormal cash flows for investigating managers' incentives to manipulate cash flows. To calculate normal cash flows, Zhang R. adopts a model suggested by Dechow et al (1998), using the firm-year's sales and the estimated relation between cash flows and sales for the corresponding industry-year. The study predicts that those firms' cash flow management will increase with the importance of cash flow information. It also explores the relation between cash flow management and

accrual management. The results suggest that firms with low accrual management, a large magnitude of total accruals, high capital intensity and low probability of financial distress tend to manage cash flows. Zhang R. also investigates the persistence of abnormal and normal cash flows and whether the market misprices abnormal cash flows. In accord with intuition, the results suggest that abnormal cash flows are less persistent than normal cash flows. The Mishkin (1983) test has been used to examine whether the market rationally prices abnormal cash flows with respect to their one-year-ahead earnings implications. The results show that the market rationally anticipates the lower persistence of abnormal cash flows compared to normal cash flows, but it still underprices both components of cash flows. However empirical results in this study confirm the result of prior studies about cash flow manipulation with more detail.

Firms' incentives to opportunistically manipulate real activities to meet analysts' cash flow forecasts and the economic consequences of such manipulation have been investigated by Zhang W. (2008). She estimates manipulation of real activities and tests whether suspect firms engage in more manipulation of real activities with the approaches suggested by Roychowdhury (2006). The study uses earnings growth as a proxy for operating performance and runs a regression similar to that of Lev and Nissim (2004), when testing whether current manipulation of real activities impairs a firm's operating performance in future years. Using a sample from 1993 to 2005, Zhang has made several findings. First, the suspect firms engage in more manipulation of real activities, particularly under-production, to inflate cash flow. Second, current manipulation of real activities among suspect firms impairs the firms' future operating performance. Third, an additional analysis found that firms with analyst cash flow forecasts coverage have higher abnormal cash flow and lower abnormal discretionary expenditure than other firms. The study primarily examined whether firms manipulate

real activities to meet analyst cash flow forecasts, and how the manipulation of real activities influences a firm's performance in future years. A further analysis investigated whether cash flow forecasts' coverage motivates managers to manipulate cash flow with the purpose of increasing cash flow. Zhang provides evidence that firms just meeting cash flow forecasts manipulate cash flow upwards, at least through production reduction. These results are consistent with the notion that in order to be rewarded by market return, managers opportunistically manipulate real activity to meet cash flow forecasts. Furthermore, Zhang shows that manipulation of real activities among suspect firms impairs these firms' operating performance in the subsequent year. These findings support the arguments in earlier literature that manipulation of real activities may have significantly negative economic consequences. Finally, Zhang finds that firms followed by cash flow forecasts tend to have a higher abnormal cash flow, primarily through the reduction of discretionary expenditures. These results are consistent with the notion that firms with cash flow forecasts conduct more manipulation of real activities, because they have a higher risk of being detected for accrual manipulations and experience greater pressure to meet cash flow forecasts. These results implying the cash flow are not immune from manipulation.

Firms manage reported *OCF* in response to incentives (Lee, 2009). Lee distances cash flow operating management from earnings management and examines two questions: (1) what are the incentives to manage reported *OCF*? And (2) what are the mechanisms through which *OCF* is managed? He identifies five firm characteristics that are associated with stronger incentives to manage reported *OCF*: (i) financial distress; (ii) a long-term credit rating near the investment/non-investment grade cut-off; (iii) less persistent earnings; (iv) a trend of diverging earnings and *OCF*; and (v) the existence of analyst cash flow forecasts. Lee documents how firms manage operating

cash flows by shifting items between the statements of cash flows categories (classification) and timing when they have high incentives. For testing the hypothesis that firms manage reported *OCF* at times when the incentives to do so are high, Lee divides *OCF* into expected and unexpected components by modelling expected *OCF* based on Dechow et al (1998). The results show that unexpected *OCF* increases incentives to manage reported *OCF*. In terms of magnitude, he finds that a standard deviation change of one in one of the firm characteristics listed above increases unexpected *OCF* by an amount that is between 1 per cent and 10 per cent of total *OCF*, depending on the firm characteristic. To understand how *OCF* can be managed, Lee conducted an array of tests based on the familiar equation: earnings = cash flows + accruals. Each component in the equation consists of items in the operating and non-operating (financing and investing) categories. To document classification, Lee used a sample of firms that restated *OCF* due to classification errors and firms that reported tax benefits from the exercise of stock options as a separate line item in the Cash Flow Statement (tax benefit sample) for the years 1994 to 2000. For the restatement sample, there is evidence that firms are more likely to restate *OCF* when managerial incentives to manage *OCF* are stronger. The coefficients suggest that depending on the firm characteristic, on average, a one standard deviation or one unit increase in the firm characteristic changes the odds of having a cash flow restatement by at least 15 per cent.

For the tax benefit sample, Lee investigates whether the decision to classify the cash inflow from the tax benefit of stock options exercised in the operating section versus the financing section is associated with incentives to manage reported *OCF*. He finds some evidence that firms are more likely to classify the tax benefit in the operating section of the Cash Flow Statement at times when incentives to manage *OCF* are stronger. Depending on the firm characteristic, a one standard deviation or one unit

increase in the firm characteristic changes the odds of classifying the tax benefit in the operating section of the Cash Flow Statement by 3 per cent to 22 per cent. Taken together, the results suggest that firms use classification to manage reported *OCF*. Next, Lee investigates whether firms manage reported *OCF* by carefully timing certain transactions, such as delaying payments to suppliers or accelerating collections from customers. The results show that incentives to manage *OCF* are positively associated with a shorter cycle in the fourth quarter of the year that reverses in the next quarter. Further analysis on timing reveals that the association is stronger for non-December year-end firms. For these firms, it is likely that the fiscal year-end of their customers or suppliers does not match their own year-end, making them more amenable to timing the transaction in a favourable way for the firm.

Last, Lee's main findings on classification are weaker when the firm has analyst cash flow forecasts. Lee tests the conjecture that timing is a more effective tool than classification if firms are motivated to meet or beat analyst cash flow forecasts. Using a sample of firms that have analyst earnings forecasts and cash flow forecasts, the study documents a prominent upward shift from the left of zero to the right of zero in a distribution of cash flow forecast errors. The discontinuity suggests that firms manage *OCF* to meet or beat analyst cash flow forecasts. Again these results also implying the cash flow are not immune from manipulation. The thesis will use the result of this study and other cash flow manipulation study widely.

In addition to accrual manipulation, however, firms can manage earnings by altering real activities (see for example Gunny, 2005; Roychowdhury, 2006; Zhang R., 2006). The distinction is important, because while accrual-based earnings management activities have no direct cash flow consequences, manipulations of real activities affect

cash flows. Cohen and Zarowin (2010) examine both real and accrual-based earnings management activities around SEOs (seasoned equity offerings). They refer to real activities manipulation as actions managers take that deviate from normal business practices. They contribute to the literature by showing that SEO firms engage in real activities manipulation in the year of the SEO, and the decline in post-SEO performance due to the real activities management is more severe than that due to accrual. Manipulation of real activities affects cash flows while accrual-based earnings management activities have no direct cash flow consequences. Cohen and Zarowin examine both real and accrual-based earnings management activities around seasoned equity offerings. They find that real earnings management is more likely than discretionary accruals to be associated with earnings declines. The evidence shows that the effects of real earnings management activities on subsequent operating performance are likely to be greater than the effects of accrual earnings management. Combined with the empirical evidence documented in Roychowdhury (2006) and Zhang R. (2006), Cohen and Zarowin (2010) suggest that future research on earnings management should focus on real activities manipulation as well as accrual-based manipulation.

The above research papers demonstrate reported cash flows are not immune to manipulation. However these studies mainly focus on cash flow manipulation in the context of achieving earning targets. The thesis argues it is also possible that firms do not engage in cash flow manipulation just for earnings targets.

4. 9 Summary

This chapter has demonstrated the history of Cash Flow Statements, classification rules under Statement No. 95 and the benefits of cash flow information. It has also

discussed the incentives for cash flow manipulation in more detail. Moreover the chapter explained the common methods of cash flow manipulation and the basic approaches to identification of cash flow manipulation. The final section of this chapter provided a coherent review of previous studies investigating cash flow manipulation. The following chapter (Chapter 5) investigates the hypotheses of this study. These include cash flow management, cash flow management and the cost of debt, and incentives for cash flow management. Furthermore, the chapter gives a hypothesis development for the direct and indirect effects of cash flow manipulation on the cost of debt capital.

Table 4.1
 Nautica Enterprises, Inc. Reported Operating Cash Flows (2000 and 2002 10-Ks)

Panel A: Cash flows from operating activities

	Year ended		
	March 2/2002	March 3/2001	March 4/2000
Net earnings	$17,259	$46,103	$46,163
Adjustments to reconcile net earnings to net cash provided by operating activities			
Deferred income taxes	-6,921	-2,478	-1,035
Depreciation and amortisation	29,045	22,968	17,072
Provision for bad debts	5,161	1,451	1,424
Loss on impairment to long-lived assets	7,870	—	—
Changes in operating assets and liabilities, net of assets and liabilities acquired:			
Short term investments	-804	28,445	21,116
Accounts receivable	14,342	-17,935	-768
Inventories	41,766	-24,142	-3,667
Prepaid expenses and other current assets	1,902	-2,024	-20
Other assets	-1,824	-36	-2,686
Accounts payable trade	-15,394	14,833	-548
Accrued expenses and other current liabilities	109	7,054	3,292
Income taxes payable	-1,363	3,779	3,458
Net cash provided by operating activities	91,148	78,018	83,801

Table 4.1
(Cont.)

Panel B: Cash flows Cash flows from operating and investing activities

	Year ended		
	March 4, 2000	February 27,1999	February 28,1998
Net earnings	$46,163	$58,708	$56,418
Adjustments to reconcile net earnings to net cash provided by operating activities, net of assets and liabilities acquired:			
Minority interest in net loss of consolidated subsidiary	—	-405	-785
Deferred income taxes	-1,035	-1,119	-453
Depreciation and amortisation	17,072	12,552	8,979
Provision for bad debts	1,424	531	748
Changes in operating assets and liabilities:			
Accounts receivable	-6,562	-21,867	-20,600
Inventories	-3,667	-3,486	-4,224
Prepaid expenses and other current assets	-20	-552	-575
Other assets	-2,686	-2,491	-1,120
Accounts payable—trade	-548	10,854	-3,054
Accrued expenses and other current liabilities	9,086	6,140	8,780
Income taxes payable	3,458	1,771	9,960
Net cash provided by operating activities	62,685	60,636	54,074
Cash flows from investing activities:			
Purchase of property, plant and equipment	-33,289	-20,224	-21,370
Acquisitions, net of cash acquired	—	-1,650	-2,837
Sale (purchase) of short-term investments	21,116	-2,764	-52,343
Payments to register trademark	-277	-169	-304
Net cash used in investing activities	-12,450	-24,807	-76,854

Table 4.2
General Motors Reported Operating Cash Flows and Financing Receivables (2003, 10-K)

Panel A: Reported Operating Cash Flows

	December 31,		
(dollars in millions)	2003	2002	2001
Net cash provided by operating activities	$7,600	$15,482	$12,180
Cash flows from investing activities:			
Expenditures for property	-7,330	-6,871	-7,832
Investments in marketable securities—acquisitions	-28,660	-39,386	-38,248
Investments in marketable securities—liquidations	24,253	35,688	37,560
Net change in mortgage servicing rights	-2,557	-1,711	-2,075
Increase in finance receivables	-149,419	-143,024	-107,566
Proceeds from sale of finance receivables	107,505	117,276	95,949
Proceeds from sale of business units	4,148	—	—
Operating leases—acquisitions	-11,761	-16,624	-12,938
Operating leases—liquidations	9,952	13,994	11,892
Investments in companies, net of cash acquired (Note 1)	-201	-870	-1,283
Other	-1,422	1,004	126
Net cash used in investing activities	-55,492	-40,524	-24,415

Table 4.2
(Cont.)

Panel B: NOTE 8. Finance Receivables and Securitisations Finance Receivables—Net
Finance receivables—net included the following:

(dollars in millions)	December 31	
Consumer:	2003	2002
Retail automotive	87,163	78,857
Residential mortgages	46,307	15,238
Total consumer	133,470	94,095
Commercial automotive:		
Wholesale	25,517	21,459
Leasing and lease financing	1,465	5,910
Term loans to dealers and others	3,912	4,190
Commercial and industrial	9,783	9,464
Commercial real estate:		
Commercial mortgage	180	621
Construction	2,053	1,963
Total commercial	42,910	43,607
Total finance receivables and loans	176,380	137,702
Allowance for financing losses	-3,243	-3,059
Total consolidated finance receivables— net	173,137	134,643

Table 4.3
Other Common cash flow reporting issues

Capitalised operating costs	Capitalisation choices can potentially overstate operating cash flows since capitalised costs are usually reported as investing cash outflows.
Insurance reimbursements	If insurance proceeds relate to a long-lived asset, they should be reported as investing cash inflows rather than as operating cash flows.
Business acquisitions	Acquisitions can temporarily boost operating cash flows, since acquired working capital is initially classified as an investing activity, while subsequent liquidations are reported as operating activities.
Vendor-related payables	Postponing vendor payments temporarily increases *OCF,* since increases in accounts payable appear to be sources of operating funds when the indirect method is used.
Income tax considerations	Operating cash flows may be misstated because GAAP requires that all tax cash receipts and disbursements be reported as operating activities, thus ignoring the nature of the transaction originating the cash flow.
Nonrecurring operating transactions	Unusual or irregular cash flow amounts not related to the core activities of a company should be deducted when computing operating cash flows.

Sourse: Barsky and Catanach, (2007), page 10

Table 4.4

A chronological summary of prior studies on the relationships affecting cash flow manipulation

Name	Year	key finding
Burgstahler and Dichev, JAE	1997	Cash flow from operations and changes in working capital have been manipulated to increase earnings
Graham, Harvey and Rajgopal, JAE	2005	Executives consider cash flow measures to be more important to external constituents than earnings when the firm is in financial distress
Frankel, WP	2005	Significant fourth quarter reduction in working capital; managers attempt to exceed *OCF* benchmarks
Melendrez, Schwartz and Trombley, WP	2005	Only firms that beat both earnings expectations and cash flow expectations are rewarded with higher returns
Gunny, WP	2005	Four types of real earnings management are associated with significantly lower future earnings and cash flows after controlling for size, performance, level of accruals and industry
Roychowdhury , JAE	2006	Firms reporting small positive annual profits engage in real activities to avoid negative earnings
Zhang R., WP	2006	Managers take action to report positive *OCF*, to avoid missing analyst cash flow forecasts and to meet the cash-dividend target
Zhang W., WP	2008	Firms which just meet cash flow forecasts engage in higher real activities manipulation to increase cash flows
Lee , WP	2009	*OCF* is managed by shifting items between the categories of Cash Flow Statements and by timing certain transactions
Cohen and Zarowin, JAE	2010	Real earnings management is more likely than discretionary accruals to be associated with earnings declines

JAE: *Journal of Accounting and Economics;* WP*: Working Paper*

Chapter 5

Hypotheses Development

5.1 Introduction

The previous section has reviewed the prior research related to this study. It comprised three parts: the first part reviewed the cost of debt and the cash flow management literature; the second part explained the capital structure theories and the cost of debt literature; and the third part explained the effect of cash flow management on the cost of debt. This chapter explains the hypotheses of this study. These include cash flow management, cash flow management and the cost of debt, and incentives for cash flow management. In addition, the chapter gives a hypothesis development for the impact of cash flow accounting directly and indirectly on the cost of debt capital.

5.2 The cost of debt and cash flow management

5.2.1 Cash flow management

Although Generally Accepted Accounting Principles (GAAP) may be clear in their definition of *OCF*, there is considerable flexibility permitted in its calculation: an examination of the Statements on GAAP as well as the research literature on the Cash Flow Statement clearly indicates that there are grey areas in cash flow reporting that are open to various interpretations (see for example Everingham and Watson, 2002). Although cash flow information is based on the actual receipt and payment of cash, and is sometimes naively thought not to be open to manipulation, we know that managers

may manipulate *OCF* in at least two possible ways: (i) by undertaking activities before the end of the financial year to influence the reported change in working capital (e.g. selling off inventory, reducing the collection period on accounts receivable, delaying payments to suppliers or changing credit terms, and selling accounts receivable when they need cash sooner than the collection period allows); and (ii) by reclassifying financial statement line items (e.g. reporting changes in trading investment securities under the operating section of the statement of cash flows, offsetting overdrafts or reclassifying them from financing to operating activities, and so on).[18] All of these manipulations may impact on cash flow, but the former may or may not change earnings, while the latter will have no impact on earnings.

As mentioned above, managers have numerous opportunities to engage in *OCF* management in order to manipulate the stated cash available from the normal recurring operating activities of a business. For example, for the operating section of the Cash Flow Statement, which provides an assessment of a firm's ability to generate cash from internal operations and still remain viable, most firms adopt indirect methods of adjusting earnings by accruals to present the cash flow from operations (Luo, 2008). Under the indirect method of presentation of cash flow from operations, net income is reconciled by accruals to derive *OCF*, yet net income could contain many nonrecurring items, the associated cash positions of which are included in total *OCF*. Companies can classify income items to be nonrecurring based on their functional properties, such as income generated from discontinued operations. Companies also can opportunistically classify certain negative or positive items as nonrecurring to influence investor perception of the firm's performance. In this respect, it is worth noting that this is not

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[18] For example, in accordance with GAAP, a book overdraft should be reclassified as accounts payable, since a company owes money to a bank, not to vendors. Overdrafts are a financing agreement and if the indirect method is used increases in accounts payable can directly boost OCF.

merely a preoccupation by researchers – several global firms have been accused of overstating *OCF*, and in various ways.[19]

Managers realise that analysts are scrutinising *OCF* with regard to recent rule changes on revenue recognition and restatement. Analysts need sustainable *OCF* numbers for forecasting, yet under existing accounting rules (both GAAP and IFRS) firms may include several transactions in the operating section of the statement of cash flows that do not result from normal operations.[20] These transactions include: working capital changes, factoring accounts receivable, purchases and sales of securities classified as trading, and establishing and using finance subsidiaries. Under GAAP, all four of these transactions may be reported in the operating section of the statement of cash flows. Managers may engage in any of these activities and/or deliberately time such transactions to manage *OCF*, leading to abnormal or unsustainable *OCF*. More pointedly, the evidence of Roychowdhury (2006) suggests that firms do indeed manipulate *OCF* through operational activities such as price discounts, sales increases and overproduction to lower the cost of goods sold, mainly where the end result is to report small profits rather than breaking even or a loss, and positive earnings changes rather than no growth.

Also mentioned in Chapter 1 is the possibility that cash flow management may be intended to achieve two separate goals. First, firms may manipulate *OCF* in order to achieve earnings targets, and second, they may be seeking to achieve cash flow targets. Nevertheless, regardless of the reason, the manipulation of *OCF* impacts on the quality

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[19] For example: General Motors and Ford (misclassification of loans); Rite Aid and Halliburton (securitisation transactions); and General Mills and Universal Security (investment returns): see www.glgroup.com/Council-Events.

[20] *Business Week* outlines four examples of specific transactions related to financing and investing decisions but reported under OCFs (Henry, 2004).

of reported financial information. The first of these findings is consistent with firms engaging in cash flow manipulation in order to avoid losses and report positive earnings. Burgstahler and Dichev (1997) divide earnings into cash flow from operations, changes in working capital and other accruals, and find that firms are manipulating cash flows from operations to transform small losses into small positive earnings. Again, this is consistent with firms manipulating *OCF* to achieve earnings targets.

Providing evidence that firms try to meet cash flow targets, Frankel (2005) examines working capital reductions that increase *OCF*. Specifically, decreases in current assets and increases in current liabilities result in an increase of *OCF*. He finds a significant fourth quarter reduction in working capital and that managers attempt to exceed *OCF* benchmarks. That is, managers are orchestrating decreases in working capital to achieve cash flow targets. Further, he demonstrates a contracting incentive to engage in manipulation by showing that cash flow management is more prevalent in firms where 'working capital' wording is found in executive compensation contracts. This provides specific evidence that managers are rewarded for meeting working capital or *OCF* targets. This thesis contributes to the evidence of managers' incentives to manipulate *OCF* for credit market rewards. Zhang R. (2006) also provides evidence of firms engaging in *OCF* management to achieve targets such as positive *OCF*, meeting forecasts and cash-dividend targets. Consistent with earlier literature on *OCF*, Zhang finds the abnormal cash flow component has lower persistence. This is consistent with *OCF* management producing unsustainable lower-quality financial information.

As discussed, prior research often focuses on cash flow manipulation to achieve earnings targets, and it is argued here therefore that *OCF* management doesn't always

result in a one direction impact on earnings. For example, Roychowdury examines activities to increase earnings including discounts on sales, overproduction and reduced discretionary expenses. However these activities do not result in consistent directional movement of *OCF* and earnings. All three are likely to increase earnings, but sales discounts and overproduction lead to lower *OCF*, while reduction of discretionary expenses increases *OCF*.

Lee (2009) shows (see Figure 5.2) how reported *OCF* can be managed with no change in earnings. He begins with this equation: earnings = cash flows + accruals. Each component in the equation consists of items in the operating and non-operating (financing and investing) categories. With this simple framework Lee illustrates how firms can manage reported *OCF* using classification and timing.

OCF in firms can be manipulated in two ways. First, the manager achieving this aim will have done some of the manipulating activity during the fiscal year, before the end of the financial year. Activities affecting changes in working capital may include selling off inventory, reducing the collection period on accounts receivable, and delaying payments to suppliers, selling accounts receivable when cash is needed, sooner than the collection period allows. Second, managers can play games with the classification of some items by shifting them between the statement of cash flow categories, namely operating, financing and investing, for example by reporting trading investment securities under the operating section of the statement of cash flows, or through overdrafts classification. Some of activities in the first group (manipulating activity during the fiscal year) may or may not change earnings. For example, decreases in working capital, delayed vendor payments and quicker accounts receivable collection have no impact on earnings, as the payable or receivable is previously recorded with the

purchase or sale. When a firm factors accounts receivable, the sale is recorded and only the cash inflow, the lowering of accounts receivable, and possibly a loss on the sale is recorded. Only the loss may reduce earnings. When trading securities are sold, only the unadjusted gain or loss impacts earnings, as the unrealised gains and losses are continuously recorded in earnings. Finally, finance subsidiaries may increase sales and thus earnings via ease of financing to customers. All of the activities related to massaging the presentation of cash flow in the financial statement have no impact on earnings, so overall, it can be said that there is no direct relationship showing all the discussed transactions that may increase *OCF* or directly increase earnings. Therefore, it is argued here that firms do not use *OCF* management solely to increase earnings.

5.2.2 Cash flow and cost of debt

Cash flow information is useful to the bond market because creditors use financial statements to predict the amounts, timing and uncertainties of future cash flows (Statement of Financial Accounting Concept No.1). Cash flow adequacy is a major concern when rating agencies assign credit ratings to firms (Standard and Poor's 2008). Backer and Gosman (1980) find that senior executives at the major bond rating agencies consider the *OCF* to long-term debt ratio to be a key variable in their decision-making process. Minton and Schrand (1999) document that cash flow volatility is associated with worse S&P ratings and higher costs of accessing external capital. Bhojraj and Sengupta (2003) find that bonds of firms with high levels of accruals underperform bonds of firms with lower accruals. By assuming that high levels of accruals are accompanied by low levels of cash flows, this suggests that firms with higher cash flows relative to accruals are required to pay lower costs of debt. Prior literature has documented a significant negative relationship between cash flows and various

measures of the cost of debt (see for example Pittman and Fortin, 2004; Minton and Schrand, 1999; Anderson, 2004). That is, higher cash flows are associated with lower costs of debt.

Beaver et al (2006) argue that the investment grade and non-investment grade boundary is a critical point in the distribution of ratings. Certified credit ratings are used in several contractual settings, and a downgrade below investment grade has real economic consequences, such as violation of debt covenants or the loss of investment from firms that can only hold investment grade bonds. Thus, firms have incentives to manage reported *OCF* to avoid downgrades, particularly at the investment and non-investment grade cut-off (Lee, 2009). Lee finds that firms with a long-term credit rating near the investment grade cut off and firms with less persistent earnings have higher unexpected *OCF*.

To analyse the relation between *OCF* and the cost of debt, *OCF* is divided into 'normal' and 'abnormal' components. By subdividing *OCF* in this way, this permits the examination of how the credit market prices unmanaged *OCF* associated with actual operations and managed *OCF* that is likely due to strategic choices by firm management. Similar to Geile (2007), who applies Healy and Wahlen's (1999) definition of earnings management, we define cash flow management as managers' judgment and choice of transactions to alter financial reporting, either to mislead external users or to produce positive outcomes in response to compensation contracts.

5.2.3 Normal and abnormal operating cash flow

There are several possible explanations for the association between normal and abnormal *OCF* and cost of debt. First, if there is a negative association of similar magnitude for both the unmanaged (normal) and managed (abnormal) components of

OCF and the cost of debt, this suggests that the market is not efficient and does not distinguish between the managed and unmanaged components of *OCF*. However, I know the market may identify the managed component of *OCF* but choose not to price the information differently from the unmanaged component, and therefore I do not consider this probability in the hypothesis.

Second, if both components of *OCF* are negatively associated with the cost of debt, but the managed component has a stronger negative association than the unmanaged component, the debt market interprets this as a positive signal. For example, if a manager has knowledge that future cash flows are likely to increase, the manager's decisions currently depend on this knowledge. The market may infer this knowledge from the observed decision. Managers are likely to be rewarded for reducing information asymmetry and uncertainty, thus incurring a lower cost of debt.

Third, if the managed component of *OCF* is either less negatively associated with cost of debt than the unmanaged component or not associated with cost of debt at all, the credit market places less or no weight on the managed cash flow information. Such pricing implies that the market is relatively efficient in processing cash flow information by lowering the weight of or discarding the information regarding the managed component, and thus relying largely on unmanaged *OCF*.

Lastly, if the managed component of *OCF* has a positive association with the cost of debt, the market is relatively efficient and assesses a penalty for managing *OCF*. The managed component of *OCF* may be interpreted as a signal regarding the quality of all cash flow information, or even a signal regarding total firm information risk and uncertainty. The market may penalise the firm with an increase in the cost of debt via a positive association with the managed component of cash flows and/or a less negative

association between the unmanaged component and the cost of debt. Given the increase in the cost of debt associated with either the managed or unmanaged components of *OCF*, the firm would have been better off without engaging in cash flow management.

The above alternatives imply either a positive, negative or zero association between the cost of debt and managed *OCF*. Accordingly, H1 can be stated in null form as follows:

H1 (null). Managed *OCF* has no association with the cost of debt.

5.2.4 Incentives to manage operating cash flows

Typically regulators and financial statement users are more concerned with misleading or aggressive applications of GAAP than conservative applications. Specifically, they are concerned about firms overstating performance. Therefore, the following discussion focuses on one circumstance when firms have incentives to manage *OCF* and where an efficient market is likely to detect and assess a penalty for the behavior.

When firms are in financial problems, cash flow information may become more important because the firm is closer to default. Scrutiny is likely to increase as risk increases. That is, the credit market has greater incentives to correctly detect and price financial information when a firm is at greater risk of default. Cash flow manipulation reflects managers' choices that may result in unsustainable *OCF* and which may mislead investors. This is consistent with Zhang's (2006) finding that the abnormal component of *OCF* has less persistence. In this situation the users are highly motivated to identify *OCF* management. A manager's attempt to mislead investors should be viewed as a negative signal regarding the firm. As a result, the credit market can assess

a penalty in the form of a higher cost of debt. In summary, when firms opportunistically meet *OCF* benchmarks or have financial problems, the credit market is more likely to detect the quality of the components of *OCF* and correctly price the information.

Prior studies suggest that firms in financial problems situation are closer to default and thus incur higher costs of debt. Financial problems can be indicated by losses, low levels of cash flows or low levels of earnings. Alternative measures of financial problems include the Altman Z-score and a firm's credit rating. Hayn (1995) suggests that loss firms are valued differently and have a lower earnings return relation, concluding that losses provide less information than profits about a firm's future. Both the poor performance and increased uncertainty embedded in losses suggest loss firms have a higher default risk.

Casey and Bartzcak (1985) find that cash flows do not provide incremental information in distinguishing between bankrupt and non-bankrupt firms, but Sharma (2001) finds that they do. Furthermore, while Gombola et al (1987) and Gentry et al (1985) find that cash flows are not significant in predicting firm failure, Pervits et al (1994) find that cash flows appear to be more important to analysts in evaluating companies that are highly leveraged, and Graham et al (2005) document that executives consider cash flow measures to be more important to external constituents than earnings when the firm is in financial distress. Zang (2005) asserts that for a financially distressed firm, the marginal cost of deviating from optimal business decision-making is likely to be high. Finally, Zhang W. (2008) finds that a firm with a low probability of financial distress is more likely to manipulate cash flows.

Minton and Schrand (1999) find a positive association between quarterly *OCF* volatility and various proxies for external financing costs, including the cost of debt.

This suggests that firms with more volatile cash flows incur a higher cost of debt. They show that firms with low levels of *OCF* have high cash flow variability.[21] This suggests that both the volatility of the cash flows and the interaction between cash flow levels and cash flow volatility may be important to investors. The importance of cash flow levels is also shown in Ali (1994), where small cash flow changes appear to contain incremental information regarding earnings; however, this effect does not hold in firms with large cash flow changes. These results indicate that investors place differential importance on cash flows depending on the level or change in cash flow values. Similarly, creditors are concerned with a firm's proximity to default and the ability of the firm to pay interest payments. If *OCF* levels are low, creditors become increasingly concerned about a firm's ability to maintain a payment schedule. However, extremely high levels of *OCF* do not generally impact bondholders positively because they are not compensated above a contracted amount. Prior literature identifies whether a loss is transitory or persistent by the combined information in cash flow and earnings values. For example, Joos and Plesko (2005) conclude transitory losses are made up of positive cash flows and negative accruals, while persistent losses include large negative cash flows and negative accruals. If the combined information from cash flows and earnings implies different future scenarios, then the interaction of managed cash flows and earnings levels is also likely to impact creditors' predictions of future performance. Melendrez et al (2005) also support the use of combined information from cash flows and earnings by showing that the market prices cash flow surprises differently depending on earnings performance.

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[21] Minton and Schrand (1999): "For firms that have cash flows that are in the lowest three deciles when compared to firms in their respectively two digit SIC code (LO), the average cash flow variation is 6.574, compared to cash flow variation of .368 for firms in the highest three deciles (HI)."

Again, this implies investors consider the interaction of cash flow and earnings information. Documenting that earnings are priced in the cost of debt, Jiang (2008) shows reporting profits have the largest effect on cost of debt for high default risk firms.[22] The samples is partitioned into low and high groups using credit ratings and Z scores and predict that the low groups represent firms with relatively more distress and therefore higher default risks. Creditors are interested in a firm's ability to pay the interest and principal from current *OCF*. Therefore, a stronger association is predicted here between managed *OCF* and the cost of debt the closer a firm is to default.

When firms are underperforming, financial statement users may rely on multiple indicators of financial strength, thus drawing more attention to *OCF* quality. The majority of previous studies supporting the importance of cash flow information for distressed firms are consistent with cash flows being a traditional measure in evaluating credit and bankruptcy risks (Beaver, 1966; Ohlson, 1980; DeFond and Hung, 2003). Creditors have incentives to accurately assess the future implications reflected in current financial information. For example, if managers use cash flow management to improve reporting results, the underlying cash flow information is likely to be of lower quality. Since distressed firms are already close to default, bondholders cannot afford to let cash flow management go undetected. Therefore, creditors have greater incentives to detect and correctly price cash flow management for firms in financial problems.

H2. Managed *OCF* has an incremental positive association with the cost of debt when firms (a) report losses, (b) have low levels of cash flow, or (c) have low levels of cash flow and earnings in the same time.

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[22] Jiang classifies firms with a rating of BBB or less as having a high default risk.

5.2.5 Cash flow management, accounting quality and the cost of debt

Earlier studies show that information quality affects the estimation risk of firms (Barry and Brown, 1984, 1985; Coles and Loewenstein, 1988; Coles et al, 1995). The quality of accounting information impacts lenders' estimates of future cash flows from which the debt repayments will be serviced (Bharath et al, 2008); in addition, large abnormal operating accruals indicate unexpected deviations between earnings and *OCF* that make it harder for the lenders to reliably estimate future *OCF*. Accounting quality also affects debt contract design in systematically different ways depending on the lender's ability to process information and renegotiate the contract ex post. In the case of private debt, Bharath and Shumway (2008) find that there is substantial variation in all contract terms based on variation in borrower accounting quality, while for public debt, they find that the higher risk from poorer accounting quality is entirely reflected in the interest spread, and that firms with poorer accounting quality face significantly higher interest costs.

Easley and O'Hara (2004) and Leuz and Verrecchia (2004) predict that firms with more information risks will have higher costs of capital. In both models, information risk concerns the uncertainty or imprecision of information used or desired by investors to price securities. Francis et al (2004), assuming that investors value securities based on their assessments of future cash flows, seek a measure that captures information uncertainty in cash flows. They believe the information about cash flows is supplied by earnings (i.e. cash flow equals earnings less accruals), and accruals quality is a more primitive construct for information risk concerning cash flows than are other earnings attributes. Therefore, Francis et al use accruals quality as the proxy for information risks. Nevertheless, there is no direct relationship that shows all the transactions that may affect cash flow directly supply by earning. Therefore, it is argued

here that cash flow is not always supplied just by earnings and cash flow management (quality of cash flow) may also affect information risk. Using accounting quality as the proxy for information risk, this formalizes the prediction that accounting quality is decreasing in cash flow management; stated in null form, the hypothesis is:

H3 (null). Managed *OCF* has no association with accounting quality.

Although classic asset pricing models assume that information issues are irrelevant because they can be diversified away (Subramanyam et al, 2010), this assumption has been questioned by a growing literature on information risk that provides theoretical and empirical support for the idea that the quality of information is priced into a firm's cost of capital (see for example Easley and O'Hara, 2004); Francis et al, 2005). Theoretically, this literature suggests two different paths by which information quality is priced in a firm's cost of capital. The first path is information asymmetry. Easley and O'Hara propose a model wherein information asymmetry arising from poor information quality is a non-diversifiable risk that is directly reflected in the firm's expected return. Some earlier papers such as Diamond and Verrecchia (1991) and Kim and Verrecchia (1994) theorise an indirect link between information asymmetry (arising from public information quality) and the cost of capital through the information asymmetry component of the firm's bid-ask spreads. In contrast, a second path is the direct effect of earning quality on the cost of debt; Lambert et al (2007) make the suggestion that earnings quality can directly affect the cost of equity capital because earnings quality reduces the firm's non-diversifiable covariance with other firms' cash flows. Empirically, Francis et al (2005) find that poorer accounting quality is associated with higher implied cost of equity. Easley et al (2002) find that PIN (a proxy for

information asymmetry) is associated with realised returns, and Bhattacharya et al (2009) find that the association between accounting quality and the implied cost of equity arises through both a direct path from earnings quality to the cost of equity and an indirect path through information asymmetry.[23]

However, the link between information quality and the cost of capital has been disputed on both theoretical and empirical grounds. Theoretically, the non-diversifiability of information risk has been questioned. For example, Hughes et al (2007) conclude that information risk is either diversifiable or subsumed by existing risk factors. Also, Lambert et al (2007) find that when the number of traders becomes sufficiently large, information risk is fully diversifiable.

Empirically, Core et al (2008) dispute the findings of Francis et al (2005) by showing that that accounting quality is not a priced risk factor; that is, it has no association with future returns. In addition, Mohanram and Rajgopal (2009) cast doubts on whether the information asymmetry (proxied by PIN) reflects information risk that is systematically priced by investors. Finally, Duarte and Young (2008) show that the information asymmetry component of PIN is not priced by the market, but the illiquidity component is priced.

At the same time, we can see that cash flow management can demolish cash flow quality and may affect accounting quality through its effect on information quality. In this respect, the thesis explores which cash flow qualities can affect accounting quality, and accounting quality's effect on the cost of debt (Francis et al, 2005). It is hypothesised that cash flow management affects the cost of debt both directly and

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[23] Proxied by the adverse selection component of bid-ask spreads and PIN

indirectly through destroyed accounting quality (Figure 5.3). Accordingly as a null hypothesis, H4 would be stated as follows:

H4. Managed *OCF* is associated with the cost of debt both (a) directly, and (b) indirectly through decreased accounting quality.

5.3 Summary

This chapter has explained the development of hypotheses in this study. Base on the rational relation between the cost of debt and cash flow manipulation the first hypothesise which is; managed *OCF* has no association with the cost of debt has been stated in null form. Furthermore the effect of manipulation of *OCF* on the cost of debt when firms have incentive discussed. In addition the chapter gives details of the effect of cash flow management in the cost of debt through the impact on accounting quality. The next chapter, Chapter 6, investigates the research data collection of this study to select the sample. The chapter also discusses the criteria to select the sample, and the final sample of the study. Furthermore, the chapter will explain the commercial data sets problems, including Thomson One Banker, and specifically the Worldscope, Thomson and Extel data platforms. Finally the chapter will report some descriptive statistics about the firms included in the study.

Figure 5.2
How reported *OCF* can be managed
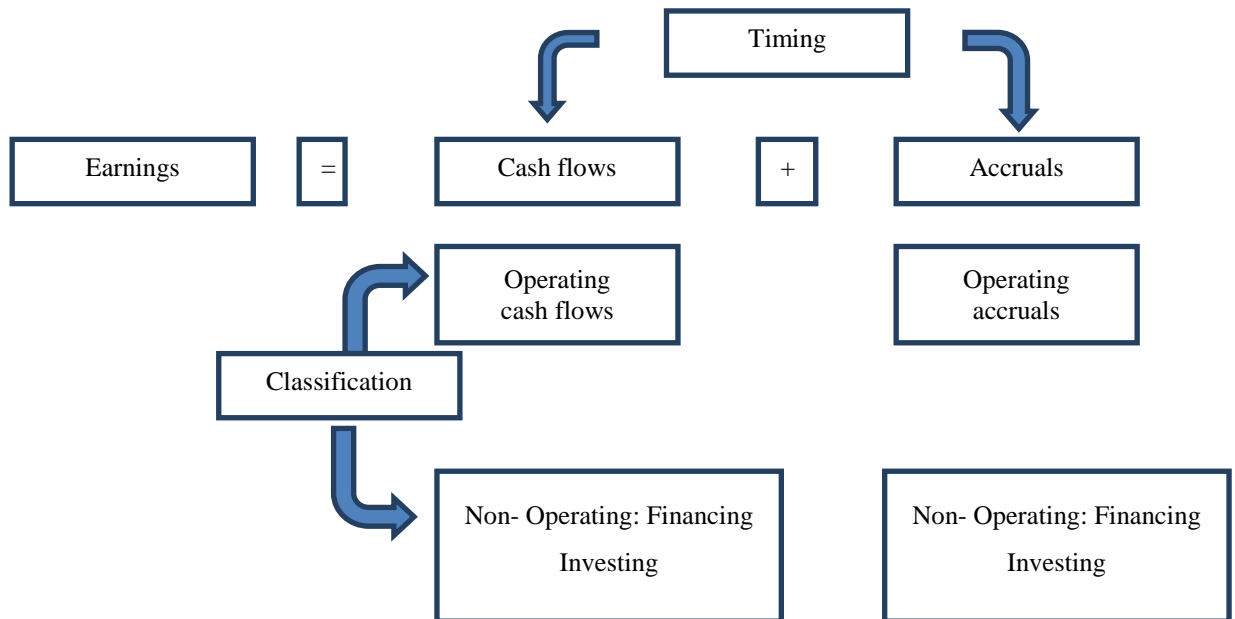
The chart above illustrates how reported operating cash flows can be managed with no change in earnings:

i. Classification refers to the shifting of items between the statement of cash flow categories, namely operating, investing and financing, holding earnings and aggregate cash flows as constant. To increase reported operating cash flows, firms can classify cash inflows (outflows) from the non-operating (operating) section to the operating (non-operating) section of the Cash Flow Statement.

ii. Timing refers to the adjustment of working capital to alter reported *OCF*, holding earning constant. To increase reported operating cash flows using timing, firms can delay payments to suppliers and hasten collections from customers.

Source: Lee (2009), p 37

Figure 5.3
 Path diagram of the relationship between cash flow manipulation, accounting quality
and the cost of debt
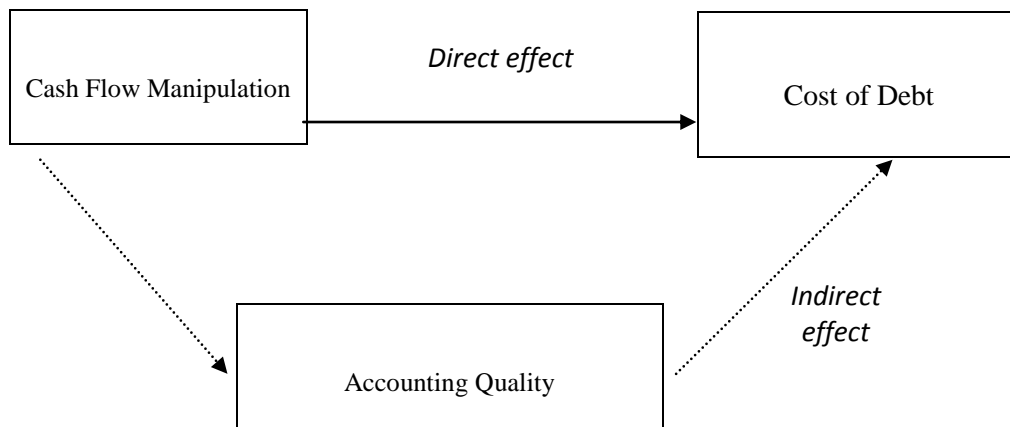
Chapter 6

Data, sampling and research methods

6.1 Introduction

The previous chapter explained the hypotheses of the study. The first part reviewed the relation between the cash flow management and the second part explained the relationship between the cost of debt and cash flow manipulation when firms have incentives for cash flow manipulation. In addition, the chapter gave a hypothesis development for the impact of cash flow manipulation directly and indirectly on the cost of debt capital. This chapter investigates the research data collection and explains the research methodology of this study. This includes illustrating the sample of the study and discussing the criteria for selecting the sample, and the final sample of the study. Furthermore, the chapter explains the commercial data sets problems, including Thomson One Banker, and specifically the Worldscope, Thomson and Extel data platforms. The econometric approaches employed in the study are discussed in Section 6.5. Finally, Section 6.6 gives an explanation of the models that are estimated in the empirical evidence section.

6.2 Data validity, the implications of using commercial sources, and sample structures

According to the Encyclopaedia of Computer Science and Technology, 'rough data sets' are defined as those which include uncertain or inaccurate information (Düntsch and Gediga, 2000). It may seem odd at first to allude to corporate accounting data that is available commercially in this way, especially given the audited nature of the published

financial statements which are the primary source. Furthermore, we could expect that the market demand for online information would impose a market discipline that encourages high levels of completeness and accuracy. Nevertheless, the paper of Izadi et al,(2010)[24] presented at the 46th annual British Accounting Association Conference demonstrates that there can be considerable uncertainty surrounding those data points which are left blank or recorded as not applicable in portfolio download. In fact, in some cases, the underlying information appears to be available, and can be retrieved using alternative methods of interrogating the data services, e.g. by examining the financial statement summaries for each individual firm rather than by downloading items for portfolios of companies. This paper also notes that there are cases where missing information is not in the database but nevertheless can be retrieved by referring to the primary source, e.g. the accounts published by the company involved.

Furthermore, the aforementioned paper demonstrates how some missing values may be deduced directly from the data that are available, by backfilling via the appropriate accounting identity. Finally, it shows that a few basic errors do creep into these data sets, in spite of the evident internal checks.

This thesis considers the data structure of the most common UK provider, Thomson One Banker, and specifically the Worldscope, Thomson and Extel data platforms. We are already aware from prior research that such financial data banks are not perfect substitutes, not only as the coverage of firms and accounting items varies across the databases, but also because there are differences in the way each database defines and constructs key variables (Alves et al, 2007).

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[24] Using Rough Data Sets in Accounting Research: An Evaluation of the Integrity of UK Company Data in Commercial Databases (2010)

However, the main aim of this kind of work is not to compare these data structures and values per se, but rather to consider the potential for uncovering 'hidden values' amongst items that are reported in downloads as 'not applicable', or that are recorded ambiguously in the form of a dash, or simply left blank.

With reference to a recent paper on earnings management (Botsari and Meeks, 2008), the JBFA discussant makes the suggestion that the results reported in the paper may be influenced by the use of Worldscope data for the empirical analysis. The Worldscope financial statement data items are said to have been adjusted by Thomson analysts in order to reverse differences in local accounting practices, with the aim of enhancing their international comparability (Young, 2008). The use of standardised information in the database rather than as-reported numbers is potentially problematic because the comparability adjustments made by Worldscope may be conflated with the discretion exercised by company management in computing earnings, a problem which is exacerbated in the research design when such adjustments vary across the items that comprise estimated accruals. The evidence to support these claims is set out clearly in another paper (Alves et al, 2007), where the properties of items from the Worldscope income statement, cash flow statement and balance sheet are compared with those of corresponding items from Extel Financial and the Datastream Company Accounts Archive (both of which are said to contain as-reported data). The results are based on a single sample of UK firm-years that is common to all three databases, and they reveal some dramatic disparities. For instance, the mean and median Worldscope values for operating cash flow are 25 per cent lower than the Extel equivalents, and the results reported by Tesco PLC illustrate this difference between operating cash flow computed according to UK GAAP and Worldscope's adjusted operating cash flow figure – Tesco's reported operating cash flows are £1,321 million for the financial year ending in

February 1999, whilst Worldscope gives a figure of £955 million. Yet, at the same time, the operating profit is identical on the two delivery platforms.

The effects of database choice on accounting research have also been examined recently by Lara et al (2006). They regress the book value of shareholders' equity and earnings on the market value of the company, using EU data from seven sources for the period 1990–99. They conclude that much of the variation is attributable to differences in firm coverage across databases. In the US and Canada, Ulbricht and Weiner (2005) compare Worldscope and Compustat over the period from 1985 to 2003.

Full UK listed company data sets were formed in Worldscope and Thomson Financial in order to download accounting data, and then banking firms and other financial institutions were excluded (GeneralIndustryClassification 4 and 5), as the corporate accounting identities used in the study apply only to industrial groupings 1-3 and 6. The data was downloaded for ten years, from 1999 to 2008, for all income statement and balance sheet items, including all subtotals. For now, this work has not been extended to the completion of firm series that are interrupted by balance sheet date changes where two fiscal periods end in the same calendar year, and it is to be noted that this represents an additional source of 'hidden values' across the entire 'missing' financial statement set, which can generally be recovered directly from the database in question. The accounting identities that underlie the following line items were then evaluated:

CashAndSTInvestments

TotalInventories

TotalCurrentAssets

Total Investments

TotalPropPlantEquipGross

AccumulatedDepreciation

TotalPropPlantEquipNet

TotalOtherAssets

TotalAssets

TotalCurrentLiabilities

LTDebtExclCapitalizedLeases

TotalLTDebt

DeferredTaxesBalSht

TotalLiabilities

TotalCommonEquity

TotalLiabAndShareholdersEquity

GrossIncome

TotalOperatingExpenses

OperatingIncomeAfterDepr

EarningsBeforeInterestAndTaxes

IncomeBefIncomeTaxes

IncomeBefExtraItemsAndPfdDiv

IncomeBefPreferredDividends

NetIncome

Table 6.1 provides an indication of the initial results for a subset of the key aggregates in the above listing. Two line items, Current Assets and Current Liabilities, which are often used in accounting research, are characterised by incomplete data that can be obtained by backfilling the missing value, by summing components and/or by logical deduction, e.g. from balance sheet net totals of other aggregates. It was found that the highest recovery was with Worldscope's Current Assets: 3900 backfilled firm-years.

In certain cases, the failed accounting identity could not be backfilled from other line items, as these were not all present. In such cases, the firm's financial statements were referred to systematically on the system, and then to any available copy of the relevant annual report. The highest recovery rate was for Thomson's Total Receivables: 70 firm-years.

Finally, a number of instances where there was an error were also noted, which could be verified not only because the financial statement clearing identity failed, but also because recourse to the original annual accounts proved this to be the case. The greatest number of corrections was with respect to Thomson's Sales: 23 firm-years.

Lastly, this provides initial evidence that seems to point to a potential drawback in accounting research that is based on commercial data sets. Evidence of missing values has been provided that can be readily reconstructed from accounting identities, of other missing values that are retrievable either from the underlying database or from the

source accounts, and finally of incorrect summations of accounting identities that lead to the discovery of data errors.

6.3 The identification of extreme values in accounting research

The nature of accounting data plays a vital role in empirical accounting studies. The identification of influential observations, which can have a marked impact on modelling, enhances the generalisation of the estimations (Mottaghi, 2010).

As mentioned earlier (Section 6.2), financial database information sometimes presents difficulties in articulating the financial statements that are covered (see Izadi et al 2010), Before we use this financial data, we consider data cells that are left blank and also others that are recorded as 'not applicable', or thatcontain numbers that prove to be incorrect, which can be corrected using alternative methods of validating the accounting numbers.

As it is normal to expect that extreme values in the data will influence this empirical study, as is generally the case in accounting research, we may consider following many other studies which have simply used winsorising to resolve the problem, by replacing the upper and lower extremes of the empirical distribution (say 1 per cent at either end, i.e. the 1st and 99th percentiles) with the values of the 2nd and 98th percentiles respectively (see for example Liu and Thomas, 2000 and Jones et al, 2008). An alternative is truncation, which involves discarding the upper and lower extreme values, for instance at the 1 per cent extremes of each tail (see for example Kothari and Zimmerman, 1994; Fama and French, 1998). A combination of the two methods can also be applied (see for example Hogan and Wilkins, 2008). Christodoulou

and Bradbury (2009) indicate that winsorising is not suitable for economic ratio variables, and also demonstrate that these are not robust against 'masking' and 'swamping' problems: that is, when one extreme value may mask the appearance of another, or a small cluster of outliers may swamp the mean and inflate the variance in such a manner that another observation will appear as an outlier when in fact it is not.

More importantly, trimming and winsorising are univariate approaches that fail to address the problem of multivariate robustness that is of main concern to regression analysis (Christodoulou et al, 2010). Hadi and Simonoff argue that the filter developed by Hadi (1992) is specifically designed for multivariate analysis (Hadi and Simonoff, 1993; Hadi, 2006). Hadi's filter is applied by jurisdiction to the multivariate relationship prior to estimation on the level of firm-means, and outliers are detected at the 5 per cent level of statistical significance (Christodoulou, et al, 2010). This study uses truncation for solving the extreame value problems and also includes Hadi's filter in order to control the results.

6.4 Sample selection

This thesis uses two different observations as an overall measure of the cost of debt: backward-looking market and forward-looking accounting proxy. For the backward-looking market the study includes two different samples: the UK and the USA. However, for the forward-looking approach the study uses UK data.

As outlined in Table 6.2, the sample comprises 8,684 (23,935) firm-year observations from 1998 to 2010 for 1,699 (3,363) non-financial UK (USA) companies on the 2011 Worldscope database. Prior studies also exclude financial firms from the

sample because financial firms' leverage is highly affected by explicit (or implicit) investor insurance schemes such as deposit insurance. Moreover, financial firms' debt-like liabilities are not strictly comparable to the debt issued by non-financial firms. Following the previous studies related to the cost of debt, in order to obtain a sample of firms with a calculated cost of debt, this requires the exclusion of 3,181 (6,889) firm years with interest equal to zero and 1,590 (2,790) with total debt equal to zero or not available on the database, where accounting numbers could not be substituted using alternative methods.

Outliers were controlled for by following the procedures in Barth et al (2001) and Lev et al (2009). Thus, after truncating the top and bottom one percentile of observations for the variables included (cost of debt, *OCF* and INTSAL), 613 (1,527) firm-year observations were excluded. In addition, in order to calculate the one-year lag, the first year for which the effect of cash flow quality on debt was examined is 2000, thus a further 346 (254) firms were excluded with 2,411 (4,415) firm-year observations. Studentised residuals greater than 2 or less than -2 were treated as influential outliers and removed, leaving a final sample comprising 8,684 (23,935) firm-year observations from 1,699 (3,363) firms.

Table 6.2, Panel A illustrates the effect of each of the sample filters and breaks down the sample by year and by industry. The study uses the ICB (Industry Classification Benchmark) for the firms' industry classification. Ten sectors are represented in the samples. Panel B includes the number of firm-year observations of the final sample by industry. The 'others' in the last column of Panel B report all firms with missing ICB. Panel B shows that in both samples the 'industries' sector has the highest number of observations, while the 'telecommunications' sector has the lowest.

There is not much difference between distributions of the number of companies per year.

The sample selection process for the bond market is summarised in Table 6.3. Data on the total sample of UK companies were obtained from 1998-2009. Only 378 issuers including 821 firm-years identify as public companies. Financial firms were also eliminated as their financing decisions are affected by somewhat different factors than those of industrial firms. Finally, after excluding issues without a fixed coupon rate, the final sample comprises 194 observations from 82 issuers. The relatively small sample size is mostly due to the fact that there are fewer firms with publicly traded bonds. It is also consistent with the literature analysing corporate bonds. For example, Qi et al (2010) analyse a sample of Eurobond issues from 1980-2006 that contains only 180 issues from the UK, and Kabir et al (2010) over 2003-2006 analysed a sample of 150 firm-year observations from the UK.

Stata 11 software was used for analysing the models and regression results. This is due to the fact that Stata 11 is a complete statistical software package for managing, graphing and analysing data, and also Stata 11 enables the estimation of all econometric techniques that are used in the study (e.g. the pooled sample analysis, the panel data analysis etc.). Furthermore, Stata 11 can deal with samples with missing observations.

6.5 Econometric techniques

In order to achieve the aims of the study, several econometric techniques have been employed. In this section a brief explanation of each econometric technique is offered.

6.5.1 Ordinary Least Squares regression and Panel Data analysis

The method of Ordinary Least Square (OLS) is used to estimate most of the models that are employed in the study. OLS has very attractive statistical properties that have made it one of the most powerful and popular methods of regression analysis.

The following model and assumptions underlie the method of Ordinary Least Square.

$$Y_t = ß_0 + ß_I X_{1i} + ß_2 X_{2i} + e_i$$

where:

$ß_0$: is the intercept.

Y_t: is the dependent variable.

X_i: is the independent variable (s).

e_i: is the error term (the disturbance).

The assumptions underlying the OLS method are:

1. The mean or expected value of the random disturbance term e_i is zero.

11. Given the value of X, the variance of the error term e_i is the same for all observations (the disturbances are homoscedastic)(no heteroskedasticity)

III. Given any two X values, X_i and X_j $(i \neq j)$, the correlation between any two e_i and e_j $(i \neq j)$ is zero (there is no autocorrelation between the disturbances)

IV. There is no correlation between the disturbances and any independent variable (zero covariance between e_i and X_j).

V. The regression model is correctly specified (there is no specification bias or error in the model used in the empirical analysis).

VI. There is no perfect multicollinearity. That is, there are no perfect linear relationships among the explanatory variables (Gujarati, 2003).

Panel Data Analysis

It is well known that OLS standard errors are unbiased when the residuals are independent and identically distributed (Peterson, 2009). In order to overcome the problems of using pooled sample analysis, and due to the advantages of using panel analysis, the models that are employed in the study are estimated using panel data analysis. Murray (2006) argues that we call data that contain a time series of cross sections a panel data.

The Advantages of Panel Data Analysis

Murray (2006) argues that panel data offer three main advantages over studying a single cross section or time series:

1. The panel data analysis increases the sample size.

II. The additional observations of a panel may bring additional variation in the explanatory variables.

III. Panel data can overcome some omitted variable biases that might plague a single cross section.

Gujarati (2003) points out that Baltagi (1995) mentioned the following advantages of panel data analysis:

I. The technique of panel data estimation can take the firm's heterogeneity explicitly into account by allowing for individual-specific variables.

II. By combining a time series of cross-section observations, panel data give "more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency".

Ill. By studying the repeated cross section of observations, panel data are better suited to studying the dynamics of change.

IV. Panel data can better detect and measure effects that simply cannot be observed in pure cross-section or pure time series data.

V. Panel data allows for studying more complicated behavioural models. Greene (2003) contends that the fundamental advantage of a panel data set over a cross-section is that it will allow the researcher great flexibility in modelling differences in behaviour across individuals.

Murray (2006) points out that panel data with unobserved heterogeneity come in two varieties. The unobserved heterogeneity may be the same from one sample to the next or it may vary randomly from one sample to the next. Fixed effect models are suitable when the unobserved differences among groups are the same from one sample to the next. Error component models (random error models) are those in which the unobserved differences among groups vary randomly from one sample to the next. In the following two sub-sections a brief explanation of both kinds of panel data analysis is offered.

6.5.2 The fixed effects model for panel data

Gujarati (2003) contends that the fixed effect model (FEM) takes into account the specific effect of each firm's 'individuality'. This can be achieved by letting the intercept vary for each firm, but still assumes that the slope coefficients are constant across firms. The following model explains the fixed effect model:

$$Y_{it} = \beta_{01} + \beta_I X_{1it} + \beta_2 X_{2it} + e_{it}$$

where:

β_{01}: is the intercept.

Y_{it}: is the dependent variable.

X_{it}: is the independent variable.

e_{it}: is the error term.

The subscript i on the intercept term is to suggest that the intercepts of the firms included in the sample may be different. This difference is due to special characteristics of firms. It is worth mentioning that the FEM assumes that the slope coefficients of the regressors do not vary across individuals or over time. Ordinary Least Square analysis is used in estimating the FEM.

The FEM is based on the assumption that the error term follows the classical assumptions, namely, $e_{it} \sim (0, \sigma^2)$. In the fixed effect, e_{it} is uncorrelated with the explanatory variables, so OLS is consistent if the explanatory variables are not asymptotically perfectly collinear (Murray, 2006). The term "fixed effects" is attributed to the idea that although the intercept may differ across individuals (firms), each

individual's intercept does not vary over time; that is, it is time invariant. This model is usually referred to as the Least Squares Dummy Variable (LSDV) model. Gujarati (2003) argues that although the Fixed Effect Model is easy to use, it has problems that need to be kept in mind, such as:

I. If you introduce too many dummy variables, you will run up against the degree of freedom problem.

II. With so many variables in the model, there is always the possibility of multicollinearity.

III. A fixed effect approach may not be able to identify the impact of time invariant variables (sex, colour, and ethnicity).

6.5.3 The random effects (error correction) model

It has been argued that instead of capturing the individual specific effects by different intercepts for each firm (the Fixed Effect Model). The effect in the Random Effect Model appears in the error component as a random disturbance that is the same for every observation for a given sample, but that is random across samples. The individual specific disturbance is one component of the total disturbance term (Murray, 2006).

The following model explains the Random Effect Model:

$$Y_{it} = \beta_0 + \beta_I X_{1it} + \beta_2 X_{2it} + w_{it}$$

where:

β_0: is the intercept.

Y_{it}: is the dependent variable.

X_{it}: is the independent variable.

w_{it}: is the composite error term.

$w_{it} = e_{it} + u_{it}$.

e_{it} is the random error term.

u_{it} is the combined time series and cross-section error.

In the Random Effect Model, instead of treating β_0 as fixed, we assume that it is a random variable with a mean value of β_0 for all the individuals (firms) (no subscript i here). The intercept value for an individual firm can be expressed as:

$\beta_{Ii} = \beta_{I} + e_i$ i=1,2,......,N where e_i is a random error term with a mean value of zero and variance σ^2. The idea here is that the firms in the sample are drawing from a much larger universe of such firms and that they have a common mean value for the intercept (=β_I), and the individual differences in the intercept values of each firm are reflected in the error term e_i (Gujarati, 2003).

The underlying assumptions of the Random Effects Model are:

I. $E(w_{it}) = 0$.

11. The two sorts of disturbances, the u_{it} and e_i, have means of zero and are homoscedastic.

Ill. The u_{it} are uncorrelated over time and across individuals.

IV. The e_i, are uncorrelated across individuals.

V. The u_{it} and e_i are uncorrelated.

VI. Var $(w_{it}) = \sigma^2_\varepsilon + \sigma^2_u$ (homoscedastic).

It is worth noting that in estimating the Random Effects Model, the Generalised Least Square (GLS) is used. This is because the GLS technique takes into account the different correlation structure of the error term in the REM (Gujarati, 2003). Gujarati argues that if we do not take this correlation structure into account, and we estimate by Ordinary Least Square (OLS), the result estimators will be inefficient.

Fixed Effects Model versus Random Effects Model

The difference between fixed and error components is that in the fixed effect each cross-sectional unit has its own (fixed) intercept value, while in the error correction model, the intercept $ß_0$ represents the mean value of all the (cross-sectional) intercepts and the error component e_i represents the (random) deviation of individual intercepts from this mean value. The error term e_i is not directly observable; it is an unobservable or latent variable (Gujarati, 2003).

It has been argued that the answer to whether to use fixed effects or random effects depends on the assumption that we make about the likely correlation between the individual, or cross-section specific, error component ei and the X regressors. If it is assumed that ei and the X's are uncorrelated, the ECM may be appropriate, whereas if ei and the X's are correlated, the FEM may be appropriate (Gujarati, 2003).

Greene (2003) argues that the crucial distinction between the FEM and the REM is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not. What makes a fixed effect appropriate for one and an error component appropriate for the other is the persistence or variability of the individual specific effect across samples (Murray,

2006). In order to select between the Fixed Effect and Error Correction Models, the Hausman test is employed. The null hypothesis is that the FEM and ECM estimators do not differ substantially. The test has asymptotic X2 distribution. If the null is rejected, the conclusion is that the ECM is not appropriate and we may be better off using FEM, in which case statistical inferences will be conditional on the e_i in the sample.

All the models that are employed in the study are estimated using OLS regression and then are re-estimated with pooled sample analysis. The pooled analysis uses the full data set with cross-sectional observations in each period in the series (basic details are available in Gujarati, 2003). Fixed and random effects estimators have also used for re-estimating the models, allowing for the firm panel structure and it can be noted here that the Hausman's test reported later in this thesis show conclusively that fixed effects are sufficient and that a random effects model is not appropriate. Therefore, generalised least squares is not been applied in this thesis given that the variances of the observations are generally not shown to be heteroscedastic, suggesting that ordinary least squares is statistically efficient and will not give misleading inferences.

The study employs pooled sample analysis because of the advantages of pooling the sample. It has been argued that pooled samples have many advantages. Pooling data generates more informative data, more variability, less collinearity among variables, more degrees of freedom and more efficiency. Furthermore, aggregating data of many observations minimizes the bias that might result if we aggregate individuals or firms into broad aggregates (Gujarati, 2003).

6.6 Research designs

In general, this study employs three models in order to achieve its objectives. This section gives a brief explanation of the models that will be used in the chapter. A detailed explanation and the justification of each variable, and the hypotheses that are tested, are given in the following chapter.

6.6.1 The determinants of abnormal cash flow

Abnormal operating cash flow is estimated from the components of operating cash flow in a manner similar to Roychowdhury (2006), Zhang R (2006) and Cohen and Zarowin (2010), who apply the Dechow et al (1998) abnormal accruals model in two stages. This thesis estimates normal *OCF*, as driven by the level of revenues and change in revenues in the current period. Zhang L. (2006) and Lee (2009) include a constant in the normal cash flow estimation model and get similar results from a cash flow estimation model without a constant. To estimate the model the following regression for each industry-year group (see Appendix A) has been run:

$$OCF_t/TA_t = \beta_0 + \beta_1(1/ TA_t) + \beta_2(REV_t/TA_t) + \beta_3(\Delta REV_t/TA_t) + \varepsilon_t \quad (1)$$

where TA_t is the total assets at the end of period t, REV_t the sales during period t and $\Delta REV_t = REV_t - REV_{t-1}$

It is a general convention in the literature to include a scaled intercept, β_1 ($1/TA_t$), when estimating nondiscretionary accruals. This avoids a spurious correlation between scaled operating cash flows and scaled due to variations in the scaling variable or total assets (Roychowdhury, 2006). To ensure that the mean abnormal operating cash flows for every industry-year are zero, Roychowdhury also includes an unscaled intercept. He adds that including the intercepts allows the average OCF_t/TA_t for a

particular industry year to be non-zero even when the primary explanatory variables in the model, revenues and change in revenues, are zero. Eliminating the unscaled intercept does not materially affect the results, nor does retaining the unscaled intercept, but eliminating the scaled intercept $1/TA_t$.

After estimates of β_1, β_2, and β_3 are obtained from the regressions for the pooled data, abnormal cash flow from operations is computed as the actual OCF minus the 'normal' level of OCF as follows:

$$ABN\_OCF_t /TA_t = OCF_t /TA_t - [\beta_1(1/TA_t) + \beta_2(REV_t/TA_t) + \beta_3(\Delta REV_t/TA_t)]$$

(2)

Panel A of Table 6.4 provides descriptive statistics for coefficient estimates in Equation (2) for samples, in the regression used to estimate abnormal cash flows. The coefficient on $\Delta REV_t/TA_t$ for the UK firms is significantly positive (0.007) and the coefficient on REV_t/TA_t is also significantly positive (0.057), which is higher than the mean adjusted R-Squared of 45 per cent reported by Roychowdhury (2006), who estimated the regression at the industry level every year, and the 38 per cent reported by Lee (2009). Table 6.4 also reports descriptive statistics for coefficient estimates in Equation (2) for the USA sample, where the regression is used to estimate abnormal cash flows. The coefficients are as predicted by Dechow et al (1998), Roychowdhury (2006), Zhang W. (2008) and Lee (2009). The coefficient on $\Delta REV_t/TA_t$ is significantly negative (-0.014) and the coefficient on REV_t/TA_t is significantly positive (0.043). The average R-Squared is 27 per cent.

6.6.2 The determinants of cost of debt

Prior studies have typically used two different observations as an overall measure of the cost of debt: forward-looking market proxy for the cost of debt and backward-looking accounting proxy for the cost of debt.

Certain prior research studies have used the credit rating spread or initial bond yield spread as a proxy for the cost of debt (see for example Sengupta, 1998; Minton and Schrand ,1999; Ahmed et al, 2002; Shi 2003; Anderson et al, 2004; Yu, 2005; Jiang, 2008; Mansi et al, 2009; Qi et al, 2010).

Sengupta (1998) uses two proxies to measure cost of debt: yield and interest cost. He defines yield as yield to maturity on the first debt issue of year $t + 1$. This represents the effective rate of interest that equates to the present value of the principal and interest payments with the amount paid by the lender. Interest rate is defined as the total interest cost to the firm on its first debt issue of year $t + 1$. This also represents the effective rate of interest at which the present value of the principal and interest payment is equal to the amount received by the firm, net of underwriter discounts. Minton and Schrand (1999) also use two proxies for the cost of debt: S&P bond rating (the average S&P rating) and yield-to-maturity (weighted-average yield-to-maturity on long-term debt calculated using data from S&P Bond Guides). However, convertible debt has been excluded. Ahmed et al (2002) use senior debt rating assigned by Standard and Poor's (S&P) as a proxy to measure firms' cost of debt. Shi (2003) uses average yield on Moody's Aaa bonds for the month of issue less average yield on 30-year US Treasury bonds for the month of issue. This variable is intended to control for the time series variation of risk premiums over the economic cycle.

Anderson et al (2004) use yield spread (spread), which is measured as the difference between the weighted-average yield to maturity on the firm's outstanding (non-provisional) publicly traded debt, and the yield to maturity on a Treasury security with a corresponding duration, where the weight of each debt issue is the fraction of the amount outstanding for that issue divided by the total market value of all outstanding traded debt for the firm. Jiang (2008) measures a firm's cost of debt using firm credit ratings and initial bond yield spread. Mansi et al (2009) use yield spread.

In the backward-looking accounting approach, several researchers have used accounting data to calculate the cost of debt. For instance Pittman and Fortin (2004) use interest as a proxy for the cost of debt. They use accounting data for calculating the cost of debt and define it as interest expense for the year divided by the average of total short- and long-term debt during the year. Francis et al (2005) calculate cost of debt as the ratio of firm j's interest expense in year $t + 1$ to average interest-bearing debt outstanding during year's t and $t + 1$. In Pizzo et al (2009) the dependent variable cost of debt is represented by the realised cost of debt, given by firm j's interest expense in year t to average interest-bearing debt outstanding during years t and $t - 1$.

Following Pittman and Fortin (2004), Francis et al (2005), Pizzo et al (2009), and Ghosh and Moon (2010), the dependent variable (cost of debt) is given by the firm's reported Interest Expense On Debt (Field No 03054 in Worldscope), divided by the average over the year of the sum of Long-Term Debt (Field No 03251), plus Short-Term Debt and Current Portion of Long-Term Debt (Field No 03051), plus Debt Capitalised Lease Obligations (Field No 03249)[25].

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[25] Note that other researchers describe their methods in various ways. For example, Francis *et al.* (2005) calculate cost of debt as the ratio of firm j's interest expense in year t+1 to average interest-bearing debt outstanding at the end of years t and t+1. Similarly, Pittman and Fortin (2004) calculate the interest rate as

The following model of a firm's cost of debt has been used in this study;

Cost of Debt

$$= \beta_0 + \beta_1 SIZE + \beta_2 LEV + \beta_3 INTSAL + \beta_4 LOSS + \beta_5 \Delta EARN\_POS + \beta_6 LIBOR + \beta_7 OCF + \varepsilon \tag{3}$$

We include a number of well-established variables in the model, following a considerable number of recent related studies, for example Sengupta (1998), Shi (2003), Anderson et al (2004), Pittman and Fortin (2004), Mansi et al (2004), Nikolaev and Vanlent (2005), Francis et al (2005), Jiang (2008), Mansi et al (2009) and Ghosh and Moon (2010).

Among the predictor variables which have been found by a large number of studies to influence a firm's cost of debt include firm size (*SIZE*), leverage (*LEV*), interest coverage (*INTCOV*), the level of the operating cash flow (*OCF*), and dummies for the sign of negative earnings (*LOSS*) and the change in earnings *(ΔEARN_POS)*. Definitions of test variables and expected signs of regression coefficients are shown in Table 6.5.

It seems that there is an agreement between theories about the positive effect of *SIZE* on a firm's capital structure, though their explanation differs. From the point of view of the trade-off theory, firms trade-off between the benefits of *LEV*, such as tax savings or mitigation of agency problems, against the costs of leverage, such as the costs of bankruptcy. Rajan and Zingales (1995), however, argue that large firms tend to be more diversified and so suffer bankruptcy less often. Accordingly, an observed

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interest expense for the year divided by average short- and long-term debt during the year. More recently Rendeiro (2011) also calculates cost of debt as interest expense divided by average interest bearing debt.

positive dependence is expected between *LEV* and firm *SIZE*. Alternatively, because of information asymmetries, smaller firms are likely to face higher costs for obtaining external funds. Moreover, Bevan and Danbolt (2002) argue that due to credit ratings, large companies are more likely to have access to non-bank debt financing. In turn, this too would suggest a positive relationship between size and debt. Hence, an inverse relation is predicted between interest rates and firm *SIZE* (measured as the natural logarithm of one plus total assets). Larger firms are perceived to have lower default risk and therefore are expected to incur lower costs of debt. (Carey et al, 1993), so *SIZE* should be negatively related to cost of debt. The logarithmic specification that provides for the expected decreasing marginal impact of size follows extant research, e.g. Kennedy (1998).

LEV proxies for default risk. A higher debt ratio indicates a greater risk of default, so firms with more debt are likely to have a higher cost of debt, resulting in a positive coefficient.

The *INTSAL* interest cover ratio is frequently used to measure a firm's ability to pay its interest obligations. Although interest coverage is often defined as operating income before taxes to interest expenses, that definition is avoided here because the ratio is difficult to interpret for firms with losses. One potential solution is to delete firm-year observations with negative interest coverage ratios but that might result in firms that are central to the hypothesis being discarded. Instead, the variable used is interest expense deflated by revenues (interest expense) as a proxy for debt financing (Ghosh and Moon, 2010). This measure avoids problems associated with loss firms and can be interpreted in the same way as debt, with the prediction that higher *INTSAL* ratios are associated with a higher cost of debt.

OCF measures a firm's ability to generate cash in order to meet interest payments, and consistent with prior research studies (Minton and Schrand, 1999; Pittman and Fortin, 2004; Anderson, 2004), it is predicted therefore that *OCF* should have a negative association with the cost of debt.

Two earnings benchmarks are also included to control for achieving earnings targets, in order to isolate the association of operating cash flow information and the cost of debt. By controlling for the earnings targets, it is hoped that this will control for operating cash flow management that is designed to achieve earnings targets, thus capturing manipulation to achieve cash flow targets. *LOSS* is an indicator variable equal to 1 if the firm's earnings are negative and zero otherwise, and Δ*EARN_POS* is a second indicator variable equal to 1 if the firm records a positive increase in earnings and zero otherwise. *LOSS* also acts as a control for an increased likelihood of bankruptcy, where a company with negative earnings is expected to incur a higher cost of debt to reflect the added failure risk (Amir et al, 2009).

To examine H1, that managed operating cash flows have no association with the cost of debt, first the study runs the following regression without a control variable:

$$Cost\ of\ Debt = \beta_0 + \boldsymbol{\beta_1 ABN\_OCF} + \varepsilon \tag{4}$$

As explained above, OCF is subdivided into abnormal and normal components; therefore the study ran the following regression and added the normal component of OCF to the model:

$$Cost\ of\ Debt = \beta_0 + \boldsymbol{\beta_1 ABN\_OCF} + \boldsymbol{\beta_8 NOR\_OCF} + \varepsilon \tag{5}$$

The results from the reduced model excluding control variables might be overstated because they do not account for the other factors that explain the variation in earnings

quality. Therefore, a number of other factors are included that are expected to be associated with the cost of debt, and the cost of debt model is modified as follows:

Cost of Debt

$$=\beta_0 + \beta_1 SIZE + \beta_2 LEV + \beta_3 INTSAL + \beta_4 LOSS + \beta_5 \Delta EARN\_POS + B_6$$

$$LIBOR + \boldsymbol{\beta_7 ABN\_OCF} + \boldsymbol{\beta_8 NOR\_OCF} + \varepsilon. \tag{6}$$

where the total reported operating cash flow is now divided into the estimated abnormal operating cash flow *ABN_OCF* and the residual normal operating cash flow *NOR_OCF*, each of which is scaled by total assets in year t.

If omitted variables are a source of endogeneity bias in Equation (6) then including the variables described above will reduce the amount of bias, and OLS estimation of the augmented Equation should be consistent (in the absence of firm heterogeneity effects). Therefore, changes in the coefficient estimate on disclosure in Equation (6) will be documented in order to evaluate the extent of the endogeneity bias caused by omitted variables.

Finally, both sources of endogeneity bias are investigated simultaneously, using panel (fixed effects and random effects)[26] to estimate the following Equation:

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[26] In principle, Equation (7) could be estimated using fixed and random effects respectively. The appropriateness of each estimator depends on assumptions about the correlation between a_i and the included independent variables. If the firm-specific characteristics captured in a_i are independent of the regressors, random effects estimation is consistent and efficient. However, if the firm-specific characteristics are correlated with any of the regressors this estimation procedure is inconsistent and fixed effects are preferred. Since we have strong theoretical reasons to believe that firm-specific characteristics are correlated with the disclosure variable, our priors are that fixed effects estimation is the most appropriate when estimating Equation (7). In fact, unreported results of a Hausman test of the consistency of random and fixed effects estimation support the choice of random effects. This is further evidence that firm heterogeneity is important in the current setting and should be taken into account (using fixed effects) when estimating the relation between disclosure and cost-of-debt capital.

Cost of Debt

$$=\beta_0 + \beta_1 SIZE + \beta_2 LEV + \beta_3 INTSAL + \beta_4 LOSS + \beta_5 \Delta EARN\_POS + B_6$$

$$LIBOR + \boldsymbol{\beta_7 ABN\_OCF} + \boldsymbol{\beta_8 NOR\_OCF} + \alpha + \varepsilon \qquad (7)$$

where:

α = any unobservable firm-specific variable that remains fixed over time, and all other variables are as defined above.

H2 predicts that creditors are motivated to detect and price the managed component of operating cash flows when firms experiencing financial problems. Financial problems are measured using the following indicators: 1) losses; 2) low cash flow levels; and 3) low earnings levels. Following Minton and Schrand (1999), the operating cash flows and earnings are ranked into deciles where the low (LOW) group is deciles 1 through 3 and the high (HI) group is deciles 7 through 10. The following models are used:

Cost of Debt

$$=\beta_0 + \beta_1 SIZE + \beta_2 LEV + \beta_3 INTSAL + \beta_4 LOSS + \beta_5 \Delta EARN\_POS + B_6$$

$$LIBOR + \beta_7 ABN\_OCF + \beta_8 NOR\_OCF + \boldsymbol{\beta_9 LOSS*ABN\_OCF} + \varepsilon \qquad (8)$$

Cost of Debt

$$=\beta_0 + \beta_1 SIZE + \beta_2 LEV + \beta_3 INTSAL + \beta_4 LOSS + \beta_5 \Delta EARN\_POS + B_6 LIBOR$$

$$+ \beta_7 ABN\_OCF + \beta_8 NOR\_OCF + \boldsymbol{\beta_9 \ OCFLOW} + \boldsymbol{\beta_{10} \ OCFHI} +$$

$$\boldsymbol{\beta_{11} OCFLOW*ABNOCF} + \boldsymbol{\beta_{12} OCFHI*ABNOCF} + \varepsilon \qquad (9)$$

Cost of Debt

$$= \beta_0 + \beta_1 SIZE + \beta_2 LEV + \beta_3 INTSAL + \beta_4 LOSS + \beta_5 \Delta EARN\_POS + B_6$$

$$LIBOR + \beta_7 ABN\_OCF + \beta_8 NOR\_OCF + \beta_9 OCFLOW + \beta_{10} \ OCFHI +$$

$$\beta_{11} OCFLOW*ABNOCF + \beta_{12} \ OCFHI*ABNOCF + \boldsymbol{\beta_{13} EARNLOW} +$$

$$\boldsymbol{\beta_{14} EARNHI} + \boldsymbol{\beta_{15} ABNOCF*EARNLOW} + \boldsymbol{\beta_{16} ABNOCF*EARNHI} +$$

$$\boldsymbol{\beta_{17} ABNOCF*OCFLOW*EARNLOW} + \varepsilon \qquad (10)$$

where:

OCF_LOW = bottom three deciles of reported operating cash flow

OCF_HI = top three deciles of reported operating cash flow

EARN_LOW = bottom three deciles of earnings before interest and tax

EARN_HI = top three deciles of earnings before interest and tax

For regressions (8), (9), and (10), we predict a positive association between managed cash flows and cost of debt when conditioned on losses or low cash flow and earnings levels.Significant coefficients on β_9, β_{11} and β_{17} for regressions (8), (9) and (10) respectively may suggest when firms are in a loss position or have low levels of cash flow or earnings; cash flow information comes under stronger scrutiny by the market. As a result, the market will penalise the firm for managed operating cash flows through an increase in the cost of debt.

6.6.3 The effects of cash flow management on the cost of debt

H3 predicts the impact of cash flow management on the accounting quality. Based on Dechow and Dichev (2002) and Francis et al (2005), the following regression for each

industry-year group has been estimated. The accounting quality measure in year t is the standard deviation from the regression. For ease of interpretation, the measure is multiplied by -1 so that higher values of accounting quality measures represent better accounting quality.

$$TCA_t \ /TA_t = \beta_0 + \beta_1(OCF_{t-1}/ \ TA_t) + \beta_2(OCF_t/TA_t) + \beta_3(OCF_{t+1}/ \ TA_t) +$$

$$\beta_4(\Delta REV_t/TA_t) + \beta_5(PPE_t/TA_t) + \varepsilon_t \hspace{4cm} (11)$$

where $TCAt$ is firm j's total current accrual and PPE_t is firm j's gross value of property, plant and equipment (all other valuables follow the definitions in previous paragraphs). ABN_OCF is also used to measure cash flow management. Again for ease of interpretation, ABN_OCF has been multiplied by -1 and called operating cash flow quality ($OCFQ$) so that higher values of cash flow quality represent better cash flow quality. For the estimation of the relation between cash flow quality ($OCFQ$) and accounting quality (AQ) I run the following regression:

$$AQ_t = \beta_0 + \beta_1(OCFQ_t) + \varepsilon_t \hspace{4cm} (12)$$

For testing the relation between accounting quality and the cost of debt, the following regression is employed:

Cost of Debt

$$= \beta_0 + \beta_1 SIZE + \beta_2 LEV + \beta_3 INTSAL + \beta_4 LOSS + \beta_5 \Delta EARN\_POS + B_6$$

$$LIBOR + \beta_7 AQ + \varepsilon \hspace{4cm} (13)$$

It is hypothesised that Operating Cash Flow Quality affects the cost of debt both directly and indirectly through accounting quality. To formally test this hypothesis, path analysis is required, involving decomposition of the incremental explanatory power.

Path analysis allows us to compare the magnitude of the direct effect of cash flow quality on the cost of debt and the indirect effect through accounting quality.

6.7 Summary

This chapter has explained the research data collection and investigated the research methodology of this study. The chapter has also discussed the criteria used to select the sample, and the final sample of the study. Furthermore, the chapter has explained the commercial data sets problems, including Thomson One Banker, and specifically the Worldscope, Thomson and Extel data platforms. The chapter has also discussed the econometric techniques that are employed in the empirical results section. These include Ordinary Least Square, pooled sample analysis, panel data analysis (the Fixed Effect Model and the Random Effect Model) and path analysis. In addition, the chapter has given a brief explanation of the models and the variables that are employed in the study. The next chapter, Chapter 7, investigates the empirical evidence of the determinants of cash flow management and the cost of debt in the UK and USA markets during the period 2000-2010.

Table 6.1 Enhancing downloaded data using backfilled accounting identities and other procedures

	Downloaded data		Backfilled by deduction	Obtained from source documents	Corrections	Enhanced data	
	Downloaded as values	Downloaded as 'N/A'				Useable values	Missing values
Thomson Financial							
TF.CashAndSTInvestments	15,070	5,670	0	69	14	15,139	5,601
TF.TotalReceivables	14,856	5,884	0	74	20	14,930	5,810
TF.TotalInventories	14,835	5,905	0	40	7	14,875	5,865
TF.TotalCurrentAssets	11,184	9,556	3,896	46	18	15,126	5,614
TF.TotalPropPlantEquipNet	12,953	7,787	0	48	16	13,001	7,739
TF.TotalAssets	15,084	5,656	2	46	15	15,132	5,608
TF.AccountsPayable	10,720	10,020	0	52	0	10,772	9,968
TF.TotalCurrentLiabilities	11,186	9,554	1,779	42	13	13,007	7,733
TF.TotalLiabilities	15,082	5,658	11	38	17	15,131	5,609
TF.TotalCommonEquity	15,084	5,656	0	49	19	15,133	5,607
TF.Sales	15,073	5,667	0	31	23	15,104	5,636
TF.NetIncome	15,076	5,664	52	5	20	15,133	5,607
Worldscope							
WS.CashAndSTInvestments	15,164	5,576	4	2	1	15,170	5,570
WS.TotalReceivables	15,012	5,728	0	3	0	15,015	5,725
WS.TotalInventories	14,981	5,759	2	1	1	14,984	5,756
WS.TotalCurrentAssets	11,265	9,475	3,900	2	0	15,167	5,573
WS.TotalPropPlantEquipGross	11,722	9,018	40	1	1	11,763	8,977
WS.TotalAssets	15,177	5,563	0	0	0	15,177	5,563
WS.AccountsPayable	10,846	9,894	0	3	4	10,849	9,891
WS.TotalCurrentLiabilities	11,267	9,473	1,736	1	0	13,004	7,736
WS.TotalLiabilities	15,175	5,565	2	1	0	15,178	5,562
WS.TotalCommonEquity	15,177	5,563	0	0	3	15,177	5,563
WS.Sales	15,167	5,573	0	1	0	15,168	5,572
WS.NetIncome	15,172	5,568	4	1	4	15,177	5,563

Table 6.2
Sample construction: accounting-based cost of debt

Panel A: Sample selection

	UK		USA	
	Number of firms	Number of observations	Number of firms	Number of observations
Companies with reported financial statements (1998-2010)	2,968	19,603	4,103	44,517
Less:				
Firm-years with missing Interest Cost data, or Interest Cost equal to 0	-294	-3,181	-174	-6,889
Firm-years with missing Total Debt data	-150	-1,590	-84	-2,790
Studentised residuals greater than 2	-391	-3,124	-140	-4,961
Outlier truncation (±1%)	-88	-613	-88	-1,527
Lag operation	-346	-2,411	-254	-4,415
Final sample	1,699	8,684	3,363	23,935

Panel B: The number of firm-year observations by industry and year

	Oil and Gas	Basic Materials	Industrial	Consumer Goods	Consumer Services	Telecoms	Utilities	Technology	Others
				by Industry: UK Sample					
2000	16	30	219	78	135	7	13	53	243
2001	15	28	230	78	147	8	12	64	204
2002	14	28	242	80	166	11	12	72	165
2003	17	31	261	80	196	13	12	76	120
2004	21	35	276	88	199	13	13	75	61
2005	21	37	281	85	198	14	13	73	47
2006	21	36	269	88	197	14	14	70	64
2007	24	38	270	84	179	13	13	72	73
2008	28	42	258	80	169	15	15	73	89
2009	33	44	258	73	153	13	16	73	90
2010	10	24	145	48	108	10	12	44	59
Total	220	373	2,709	862	1,847	131	145	745	1,215

Others' in the last column report all firms with missing ICB

Panel C: The number of firm-year observations by industry and year (continued)

					by Industry: USA Sample					
Year	Oil and Gas	Basic Materials	Industrial	Consumer Goods	Health Care	Consumer Services	Telecoms	Utilities	Technology	Others
2000	107	100	435	233	224	274	29	90	213	139
2001	111	104	455	246	233	292	30	94	236	152
2002	119	110	465	254	246	310	32	95	262	164
2003	133	120	471	259	269	333	34	99	263	171
2004	135	124	477	256	276	331	35	100	254	187
2005	143	124	484	258	275	344	35	100	243	223
2006	148	125	496	260	276	347	34	101	252	257
2007	158	137	523	271	286	342	34	103	265	296
2008	165	138	534	279	304	363	38	103	291	336
2009	167	141	561	281	314	380	40	104	296	363
2010	110	101	362	192	181	220	20	81	190	159
Total	1,496	1,324	5,263	2,789	2,884	3,536	361	1,070	2,765	2,447

Others' in the last column report all firms with missing ICB

Table 6.3
 Sample construction: market-based cost of debt

	Number of issuers	Number of firm-years
Full sample	2,089	3,055
Identifiable public companies	378	821
After excluding financial companies	166	428
Matched with company financial statement data	143	335
After excluding issues without fixed coupon rates	82	194

The sample comprises 194 firm-year observations from 1998 to 2009: data from bond issues file

Table 6.4

Estimation of abnormal operating cash flow

	UK		USA	
	Mean	Median	Mean	Median
Intercept	0.029	0.051	0.010	0.022
1/*TA*	-724,108	-67,2811	-288,785	-212,532
REV/TA	0.057	0.049	0.043	0.033
Δ*REV/TA*	0.007	0.051	-0.014	-0.015
Adj R-Squared	0.462	0.415	0.269	0.263

The table reports the mean and median parameter estimates and adjusted R-squared across industries, based on the original samples of 7,548 UK and 21,119 USA firm-year observations during 1998-2009. The estimates presented are for the regression Equation: $OCF_t/TA_t = \beta_1(1/TA_t) + \beta_2(REV_t/TA_t) + \beta_3(\Delta REV_t/TA_t) + \varepsilon_t$, where: TA_t is the Total Assets at the end of period t, REV_t the Sales Revenues during period t and $\Delta REV_t = REV_t - REV_{t-1}$

Table 6.5
Definitions of test variables and expected signs of regression coefficients

Variable	Expected Sign	Definition	Similarly defined in prior research
Cost of Debt (*COD*)		Firm j's interest cost at t ÷ Average short- and long-term debt plus capitalised lease obligations (i.e. average of opening and closing balance sheet amounts)	Francis et al (2005: 307) Nikolaev & Van Lent (2005:695) Mansi et al (2009 :707)
Natural logarithm of Total Assets (*SIZE*)	-	Natural logarithm of Total Assets for firm j at t-1	Nikolaev & Van Lent (2005: 695) Jiang (2008: 384) Mansi et al (2009: 707)
Leverage (*LEV*)	+	Long-term debt at t-1 ÷ Total Assets at t-1	Nikolaev & Van Lent (2005: 695) Francis et al (2005: 307) Jiang (2008: 384) Mansi et al (2009: 707)
Interest to Sales (*INTSAL*)	+	Interest cost ÷ Sales Revenues	Nikolaev & Van Lent (2005: 695),
Negative earnings (*LOSS*)	+	Indicator variable equal to 1 if the firm has negative earnings before interest and tax, and 0 otherwise	Nikolaev & Van lent (2005: 715)
Increase in earnings (Δ*EARN_POS*)	-	Indicator variable equal to 1 if the firm increased earnings before interest and tax from the prior year, and 0 otherwise	
EARN_LOW	+	Deciles 1-3 of earnings before interest and tax	
EARN_HI	-	Deciles 7-10 of earnings before interest and tax	
Operating Cash Flow (*OCF*)	-	Total reported operating cash flow at year t deflated by total assets at year t-1	Francis et al (2005:302) Jiang (2008:384)
OCF_LOW	+	Deciles 1-3 of deflated operating cash flow	
OCF_HI	-	Deciles 7-10 of deflated operating cash flow	
Monthly money market reference rate (*LIBOR*)	+	London Inter Bank Offered Rates at year t-1	Valta (2010:13)

Appendix A: Roychowdhury's synthesis of models of accruals and cash flows

Dechow et al (1998) present a model that relates the earnings of a company to its cash flows and accruals. They make some simplifying assumptions: absent manipulation, sales follow a random walk, accounts receivables at the end of the year are a constant fraction of the current year's sales, target inventories at the end of the year are a constant fraction of next period forecasted cost of sales, accounts payable are a constant percentage of the firm's purchases during the year and there are no fixed costs. Note that these are the same assumptions underlying the Jones (1991) model of non-discretionary accruals. Earnings can be represented as

$$E_t = \pi\, S_t, \tag{A.1}$$

where π is the profit margin, E_t is earnings for period t and S_t is sales for period t.

Dechow et al (1998) presume the following about current asset items.

Accounts receivables, AR_t, are given by a constant fraction α of sales in period t.

$$AR_t = \alpha\, S_t.$$

Target inventory is a constant fraction, γ_1, of the next period's forecasted cost of sales. Under the assumptions that sales follow a random walk, target inventory at end of period t is $\gamma_1(1-\pi)S_t$, $\gamma_1>0$. Actual inventory deviates from target inventory because of sales realisations in period t different from what was expected for period t, and it can be shown that the deviation is given by $\gamma_2\,\gamma_1\,(1-\pi)(S_t - S_{t-1})$, where γ_2 is a constant that captures the speed with which a firm adjusts its inventory to its target level. So, actual inventory at the end of period t is given by

$$INV_t = \gamma_1\,(1-\pi)\,S_t - \gamma_2\,\gamma_1\,(1-\pi)\,(S_t - S_{t-1}).$$

Purchases are calculated as (cost of goods sold + closing inventory - opening inventory). Accounts payable at the end of period t are a constant fraction b of that

amount. Working capital is defined as (accounts receivable + inventory - accounts payable). The change in working capital in period t gives the accruals for period t, A_t.

$$A_t = [\alpha + (1 - \pi)\gamma_1 - (1 - \pi)\beta]\varepsilon_t - (1 - \pi)\gamma_1[\beta + \gamma_2(1 - \beta)]\Delta\varepsilon_t + (1 - \pi)\gamma_1\gamma_2\beta\Delta\varepsilon_{t-1}$$

(A.2)

where a is the constant percentage of accounts receivables to sales, b the constant percentage of accounts payable to purchases, γ_1 the constant percentage of target inventory to expected cost of sales next period, γ_2 a constant that represents the speed at which the firm adjusts inventory, $\varepsilon_t = S_t - S_{t-1}$, Δ is the first difference operator.

Dechow et al (1998) further simplify this expression by noting that the second and the third terms are likely to be negligible in practice and denoting $[\alpha + (1- \pi) \gamma_{1} - (1- \pi)\beta]$ by Δ. Essentially, Δ is a measure of the operating cash cycle and accruals in this model would be the operating cash cycle times the change in sales, or the sales shock, given last period's expectation.

After this simplification, accruals are given by

$At = \Delta\varepsilon_t$

This is the basic underlying equation for the Jones (1991) model for determining normal working capital accruals. To estimate normal depreciation accruals, Jones (1991) also includes property, plant and equipment as an explanatory variable.

Cash flows from operations, CFO_t, is then given by

$$CFO_t = E_t - A_t = \pi S_t - \delta\varepsilon_t = \pi S_t - \delta (S_t - S_{t-1}). \tag{A.3}$$

The above Equation expresses cash flows as a function of current-period sales and last period sales. This is the Equation used in the subsequent regressions. The estimation Equation does not change much in the presence of fixed costs. Equation (3) is augmented by another term, the change in outflow on fixed costs, assuming that fixed expenses are paid in cash. Incorporating this into the equation would make the model

for normal cash flows more powerful, but this term is omitted for the sake of simplicity. Besides, in the estimation of abnormal cash flow from operations, other variables included are industry membership, size and the market-to-book ratio. To the extent that operating leverage is likely to be correlated with these variables, a control is added for the effect of fixed costs.

Chapter 7

Analysis and Results

7.1 Introduction

The previous chapter explained the research methodology of this study and also discussed the analysis of the results. Furthermore, the chapter discussed the econometric techniques that were employed in the empirical results section. These include the Ordinary Least Squares, pooled sample analysis, panel data analysis (the Fixed Effect Model and the Random Effect Model) and path analysis. Finally, the chapter gave a brief explanation of the models and the variables that are employed in the study.

The aim of this chapter is to investigate the effects of cash flow management on the cost of debt. The chapter is organised as follows: Section 7.2 explains the descriptive statistics; Section 7.3 discusses the results of testing obtained from estimating the models; Section 7.4 Model extensions and Section 7.5 include Sensitivity analysis.

7.2 Descriptive statistics

UK sample

Table 7.1 Panel A presents the descriptive statistics for the variables used in the models for the UK. The average (median) value of our cost-of-debt capital for the UK sample is 8.20 (7.04) with a standard deviation of 4.75, which is similar to the findings in Sengupta (1998) and Nikolaev and Van Lent (2005). Inter quartiles for cost of debt is changed from 5.53 to 9.23. The average (median) for *OCF* (deflated by total assets) is

0.040 (0.070). With 0.17 standard deviation, the inter quartile changes from 0.01 to 0.12. For a normal component of *OCF* the average is 0.050 (SD 0.13; IQR 0.03: 0.90). The average of abnormal *OCF* (deflated by total assets) is -0.10 (SD 0.15; IQR -0.05 : 0.06)[27], and for abnormal *OCF* (absolute deflated by total assets) the mean is also 0.09 (SD 0.12; IQR 0.02 : 0.12), with the spread suggesting that our sample firms exhibit considerably varying degrees of operating cash flow manipulation.

As can be seen in Table 7.1, *SIZE* with an average of 18.43 and 2.29 standard deviations changes from 16.95 across the inter quintile.

The average for *LEV* is 0.24 (SD 0.18; IQR 0.1: 0.34), which suggests that the UK companies are more equity based. For *INTSAL* (interest to sales), instead of using operating income before taxes to interest expenses, interest expense deflated by revenues is used as a proxy for debt financing. This measure avoids problems associated with loss firms, which is expressed here as the reciprocal of interest cover (interest expense divided by operating income). The average for *INTSAL* is 0.04 and the IQR is 0.010: 0.032. Table 7.1 also reports that the numbers are highly skewed and peaked. It should be noted however that such skewness and kurtosis is attributable to the nature of accounting data.

USA sample

As can be seen in Table 7.1 Panel B, the summary statistics for US companies have been presented. Mean, standard deviation, 25th percentile, median, 75th percentile and skewness, kurtosis are the detectors used in the presented table. The average (median) value of our dependent variable of cost-of-debt capital is 8.14 (6.96) with a standard

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[27] The average of abnormal operating cash flow (deflated by total assets) is -0.01 (SD 0.17; IQR -0.05 : 0.06).

deviation of 4.83 (IQR 5.41: 9.12), which is also similar to the findings in Sengupta (1998) and Nikolaev and Van Lent (2005). Pittman and Fortin (2004) report 0.093 (N=3,339) average for interest rate and Francis et al (2005), with a sample of 91,280 firm-year observations over 1970-2001, report cost of debt with a mean (median) of 9.9% (9.2%), with 80% of the sample having a cost of debt between 5.9% and 14.4%. With a standard deviation of 0.23, the average for scaled *OCF* is 0.04, and it changes from 0.02 to 0.13 between the first and third inter quartiles. Panel B shows the normal component of *OCF* as 0.03 for average and 0.18 for standard deviation and inter quartile from 0.01 to 0.08. For the abnormal component of *OCF* the mean is 0.01 (SD 0.24; IQR -0.04: 0.09), with the spread suggesting that our sample firms exhibit considerably varying degrees of *OCF* manipulation. The average of abnormal *OCF* (absolute deflated by total assets) is 0.12 with 0.20 standard deviation and changes in first and third inters quartile from 0.03 to 0.13.

The average (median) for *SIZE* is 19.44 (19.69) (SD 0.71; IQR 0.14: 0.044). The average for *LEV* is 0.33, (SD 0.28; IQR 0.14: 0.43) and for *INTSAL* (interest to sales) the average (median) is 0.070 (0.02). Panel B also reports the skewness and kurtosis of variables. Again, these levels of high skewness and kurtosis in the above characteristics are due to the fact of nature of accounting data.

UK vs US

Table 7.2 reports the comparison firm characteristics between the UK and the USA. With respect to the first item, which is cost of debt, the mean for the US companies is almost the same as for the UK companies, which are 8.140 and 8.200 respectively. In addition to the mean statistic, another factor, median, also performs almost the same, as it is marginally lower for the US companies in comparison to the UK ones, which are

6.96 and 7.04 respectively. Drawing a comparison between the standard deviation of the two groups of companies, this implies a slightly more volatile situation for the US companies in comparison to the UK companies. The values for standard deviations are 4.83 and 4.75 respectively. The average for the second item, *OCF*, for both samples is the same (0.04), while the median for the US is more than for the UK (0.08 and 0.07 respectively), which also shows *OCF* for the US companies is more volatile than for the UK (SD 0.23 vs. 0.17). Drawing a comparison between the normal and abnormal *OCF* of these two groups of companies implies more degrees of *OCF* manipulation for the US companies in comparison to the UK companies (0.03, 0.05 average of *NOR_OCF* and 0.12, 0.09 average of *|ABN_OCF|* , for the US and the UK respectively).

The comparison between the natural logarithm of total assets for UK and US firms shows that US firms are comparatively larger then UK firms (19.44, 18.43 average of *SIZE* for the US and the UK respectively). The mean *LEV* of US firms is 0.33 and 0.24 for UK firms, which suggests that the US companies used debt more than the UK ones.[28] The mean of *INTSAL* for the UK firms (0.04) is significantly lower than the mean for US firms (0.07). Means for the dummy variables, negative earnings and changes in earnings are almost identical for US and UK firms and are not significantly different.

Pearson correlations; UK sample

Table 7.3 reports the Pearson correlations and their significance levels (in italics) between the selected variables for the UK (below diagonal) and for the US (above diagonal).

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[28] Francis *et al* (2005) report leverage with a mean of 0.276.

A preliminary indication of the association between *ABN_OCF* and the cost of debt measures for UK firms can be obtained by looking at the simple (Pearson) correlations between variables presented in the below diagonal in Table 7.3 The table reveals that the cost of debt is positively and significantly associated with *ABN_OCF* (the proxy for the managed component) at the 0.01 level, which means that the market punishes companies with higher cash flow management by greater cost of debt. Panel A Figure 7.1 plots the mean and the median values of cost of debt by the *ABN_OCF* deciles. There is a strong monotonic increasing pattern for the cost of debt across the deciles of the *ABN_OCF*. To provide evidence of the trend and variability in the cost of debt across the *ABN_OCF* deciles, the study also plots the mean in Panel B of Figure 7.1, plus or minus one standard deviation. Interestingly, the variance of each cost of debt increases with the magnitude of the *ABN_OCF*. This pattern is consistent with increased costs of debt for companies with more managed operating cash flows.

Table 7.3 (below diagonal) also reports that the cost of debt is negatively and significantly associated with *NOR-OCF* (the proxy for the unmanaged component). As expected, the cost of debt is negatively and significantly associated with *SIZE*, which is a similar to finding to that reported in prior studies (e.g. Pitman and Fortin, 2004; Anderson et al, 2004; Anderson and Mansi, 2009; Subramanyam et al, 2010 and Shaw, 2011) and positively correlated with *LOSS* and *LIBOR*. However, for the correlation between cost of debt with *INTSAL* and *LEV*, the signs are surprisingly negative when in effect we would expect it to be positive. In fact, there is already contradictory evidence in this respect. Whilst most prior research (e.g. Sengupta 1998; Ahmed et al. 2002; Anderson et al. 2004; Jiang, 2008; Anderson and Mansi, 2009) find a positive relation between *LEV* and *COD*, the work of Pittman and Fortin (2004), Francis et al. (2005) and Pizzo et al. (2009) has also found, as here, that *LEV* may be negatively related to

COD. Analysing the correlations among the operating cash flow component proxies reveals that the correlation coefficient between *ABN_OCF* and *NOR-OCF* is negative and significant. The other variables with the highest negative correlation with *ABN_OCF* are *SIZE* (-0.391, p-value <0.001) and *LOSS* (0.193, p-value <0.001).

SIZE has a positive correlation with *NOR_OCF* (0.495, p-value <0.001) while it has a negative correlation with *ABN_OCF* (-0.346 p-value <0.000). Correlations between *SIZE* and *LOSS* are also relatively high (-0.309, p-value <0.001). This high correlation between accounting-based control variables is consistent with prior studies on the cost of debt (Sengupta, 1998; Pittman and Fortin, 2004; Dhaliwal et al, 2004; Jiang, 2008). Nevertheless, whilst the correlation between *LEV* and *INTSAL* is also relatively high at 0.382, it may be noted that *LEV* shows low association with other variables.

Pearson correlations; USA sample

Table 7.3 (above diagonal) reports Pearson correlations between the selected variables and their p-values for US companies. Here the cost of debt is significantly associated with all control variables and has the same sign as predicted. As predicted, the cost of debt is positively and significantly associated with *ABN_OCF* (the proxy for the managed component), which implies that the market punishes companies with higher cash flow management by higher cost of debt. Panel C Figure 7.1 plots the mean and the median values of cost of debt by the *ABN_OCF* deciles. There is a strong monotonic increasing pattern for the cost of debt across the deciles of the *ABN_OCF*. To provide evidence on the shape of the distribution of each cost of debt across the *ABN_OCF* deciles, we also plot the mean plus or minus one standard deviation in Panel D of Figure 7.1 Interestingly again the variance of each cost of debt increases with the magnitude of

the *ABN_OCF*. This pattern is consistent with increased costs of debt for companies with more managed *OCF*.

Table 7.3 (above diagonal) also reports that the cost of debt is negatively and significantly associated with *NOR-OCF* (the proxy for the unmanaged component). The other control variables are significant and have the same sign as the predicted correlation with the cost of debt.

ABN_OCF is negatively associated with *NOR-OCF*. The variable with highest correlation with *SIZE* is *LOSS* (-0.362, p-value <0.001). Correlations across most other variables are relatively low. Again, the high correlation among control variables is consistent with prior studies on the cost of debt (Sengupta, 1998; Pittman and Fortin, 2004; Dhaliwal et al, 2004; Jiang, 2008).

Moreover, firm characteristics are examined here across the deciles of abnormal cash flows, with the expectation of finding systematic difference in firm characteristics across the deciles. A two-sample t-test is also performed with respect to the null hypothesis that the difference in firm characteristics between deciles one and ten is zero, against the alternate hypothesis that the difference is not equal to zero. The results are reported in Table 7.4.

It is found that the cost of debt significantly increases as the abnormal *OCF* increases for both UK (2.58 increase) and USA (5.59 increase) samples. Size monotonically decreases as the abnormal *OCF* increases for both UK (-3.02) and USA (-3.91) firms. This suggests the cash flows are managed in small companies more than in larger companies. The rate of interest to sales decreases as the abnormal *OCF* increases; however the differences are only marginally significant in both samples. *LEV* between deciles of abnormal *OCF* for the UK companies does not seem to be

economically different, but for the USA firms, changes in *LEV* across the deciles of abnormal cash flows significantly increases as the abnormal operating cash flows increase.

7.3 Model Estimation

Results of the regression models

The study starts with the estimation of Equations 3 - 6 by pooling the sample for the period 2000-2010 (pooling time-series and cross-sectional data). In the case of pooling the sample, we assume that intercept and slope coefficients are constant across time and firms, and the error term captures differences over time and firms (Gujarati, 2003). Gujarati argues that the assumptions of the pooled sample that the intercept and the slope coefficients are constant across time and firms and that the error term captures differences over time are highly restrictive. Therefore, despite its simplicity, the pooled regression model may distort the true picture of the relationship between the dependent and independent variables. In this section we also investigate whether using panel data analysis is better than pooling the data. Furthermore, the study aims to investigate whether the Fixed Effects Model or the Random Effects Model is more suitable.

Table 7.5 reports the main regression results (OLS) and contains the findings for the fixed effects estimation of the model[29] developed on 7,548 and 21,119 observations for the UK and USA firms respectively on both the baseline model, including total operating cash flows and *OCF*, and on the components of *OCF* shown in Equations (3), (4), (5) and (6).

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[29] The Fixed Effects and Random Effects Models also produce unbiased standard errors, but only when the firm effect is permanent.

Results of the regression models – UK sample

Table 7.5 shows (Equation 3) for UK firms, *OCF* is negative and significant (coeff. = -1.433, t-stat. = -4.23, p-value <0.001). The next column (Equation 4) has only included *ABN_OCF* (absolute) for testing the relation between cost of debt and cash flow quality; as is expected, the coefficient on *ABN_OCF* (absolute) is positive (5.474, t-statistic = 12.80, p-value <0.001) but with a very low adjusted R-Squared (1.84%). A positive relationship is consistent with the view that cost of debt increases with cash flow manipulation. More formally, the null hypothesis (H1) that managed *OCF* has no association with the cost of debt is rejected for the UK sample. Because *OCF* has been divided into managed and unmanaged, the next column includes *ABN_OCF* and *NOR_OCF*. Compared with Equation (4), the magnitude of the coefficients for *ABN_OCF* in Equation (5) remains the same (5.507, t-statistic = 11.85, p-value <0.001), but the coefficient on *NOR_OCF* is not significant. Further, adjusted R-Squared in the regression model which includes one more variable does not marginally change.

As mentioned above, results from the reduced model excluding control variables might be overstated because they do not account for the other factors that explain the variation in earnings quality. Therefore, a number of other factors associated with the cost of debt are included, as in Sengupta (1998), Shi (2003), Anderson et al (2004), Pittman and Fortin (2004), Mansi et al (2004), Nikolaev and Van Lent (2005), Francis et al (2005), Jiang (2008), Mansi et al (2009) and Ghosh and Moon (2010). These include: *SIZE*, since previous studies find a significant association between the *COD* and the *SIZE* of the firm, with larger firms being perceived to have lower default risks and therefore expected to incur lower *COD* (Carey et al, 1993); *LEV* controls for default risk, a higher debt ratio indicating a greater risk of default; and *INTSAL*, the

interest cover ratio that is frequently used to measure a firm's ability to pay its interest obligations. For macroeconomic control, the study also uses *LIBOR* as a control variable. Finally, two earnings benchmarks are included to control for achieving earnings targets in order to isolate the association of operating cash flow information and the cost of debt (*LOSS* is an indicator variable equal to 1 if the firm's earnings are negative and zero otherwise, and Δ*EARN_POS* is a second indicator variable equal to 1 if the firm records a positive increase in earnings and zero otherwise). For Equation (6), including all control variable for UK firms, the two components of *OCF* are positive and significant (3.683, t-statistic = 8.08, p-value <0.001 and 2.857, t-statistic = 4.89, p-value <0.001 for *ABN_OCF* and *NOR_OCF* respectively). Although the coefficients are similar, the unmanaged component of *OCF* does have a lower positive coefficient. This is consistent with the debt market relatively discounting the cash flow information in the managed component.

Results for the control variables are consistent with findings in earlier studies and with our expectations, except for Δ*EARN_POS* the sign is surprisingly positive although predicted to be negative and LEV: surprisingly again the sign is negative when in effect it is expected to be positive. Prior research using either the credit rating spread or initial bond yield spread to proxy for cost of debt (e.g. Sengupta, 1998; Ahmed et al, 2002; Anderson et al, 2004: Jiang, 2008) generally finds a positive relation between *LEV* and *COD*. However research on the relation between the realised *COD* and *LEV* includes Pittman and Fortin (2004), who argue that realised debt cost is a noisy proxy for the underlying construct. Francis et al (2005) and Pizzo et al (2009) find *COD* negatively related to *LEV*. The negative coefficient on *LEV* suggests the possibility that firms with little debt in their capital structures are minimally levered because they face a high cost of debt. Francise et al (2005) for solving this problems excludes firms with

debt less than 20% of assets, however the thesis re-estimates the model after excluding firms with low debt (firms with *LEV* less than 25%) financing. Nevertheless the research sample reduces from 8,684 to 3,674, Apendex B shows the coefficient on *LEV* becomes significantly positive, and does not affect inferences about other variables except Δ*EARN_POS* that becomes insignificant.

Further, by including control variables, the explanatory power jumps substantially; an adjusted R-Squared increases to 10.45 per cent for Equation (6) from 1.84 per cent in Equations (4) and (5).

The study also estimates models used in Equation (6), but this time using panel data analyses rather than the pooled sample. Table 7.5 (fixed effects column) contains the findings for the fixed effects estimation of the model[30] for UK firms. These regressions attempt to simultaneously control for firm-specific heterogeneity bias and for endogeneity caused by omitted variables. The findings are consistent throughout the table. Cost of debt is positively and significantly associated with *ABN_OCF* (coeff. 1.008, t-stat. 2.01, p-value 0.04). *NOR_OCF* is also positive and significant. These results support the finding with the OLS regression results in Equation (6). The random effects estimator is another econometric method for panel data. This method assumes that the individual level effects and not correlated with the independent variables. When the random effects assumption is satisfied, the random effects model is more efficient than the fixed effects model and should be used. Housman's test is used to evaluate whether a fixed effects or random effects model is appropriate. When the test is reflected, the random effects model is biased and the correct estimation model is the fixed effects model. The result of Housman test shows the fixed effects is suitable.

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[30] The Fixed Effects and Random Effects Models also produce unbiased standard errors, but only when the firm effect is permanent.

Results of the regression models – USA sample

Table 7.5, also represents the empirical results of the regression analysis base on Equations (3) to (6) for the USA companies (21,119 observations).Here also for Equation (3), *OCF* has negative and significant (coeff.= -2.846, t-stat.= -19.09, p-value <0.001) correlation with the cost of debt. First in next column (Equation 4) we only include *ABN_OCF* (absolute) for testing the relation between cost of debt and cash flow quality; as predicted, the coefficient on *ABN_OCF*(absolute) is positive (5.337, t-statistic = 35.93, p-value <0.001) with 5.11 per cent adjusted R-squared. This finding of a positive relationship between managed *OCF* and *COD* indicates that the cost of debt increases with cash flow manipulation. That is, the null hypothesis (H1) that managed *OCF* has no association with the cost of debt is rejected for the USA sample, as also found above for the UK sample. In the next column (Eq.5) we include *ABN_OCF* and *NOR_OCF*. Compared with the result of Equations (4), with almost the same magnitude of the coefficients, *ABN_OCF* is positive and significant (5.588, t-statistic = 30.31, p-value <0.001), although the coefficient on *NOR_OCF* is positive but does have a very low t-test and magnitude coefficient (0.474, t-statistic = 2.30, p-value 0.022). This is also consistent with the debt market comparatively discounting the cash flow information in the managed component.

As mentioned above (Results of the regression models – UK sample) we include a number of other factors associated with the cost of debt. For Equation (6), including all control variables for US firms, the two components of *OCF* are positive and significant (2.959, t-statistic = 16.86, p-value <0.001 and 1.561, t-statistic = 8.11, p-value <0.001 for *ABN_OCF* and *NOR_OCF* respectively). Again, although the coefficients are similar, the unmanaged component of *OCF* does have a lower positive coefficient. This is consistent with the US debt market also relatively discounting the

cash flow information in the managed component. The control variables are generally significant and have the same sign as predicted, but in the predicted direction for *LEV*, the sign is surprisingly negative when in effect should be positive , and the sign for Δ*EARN_POS* is also positive when it should be negative. Again the negative coefficient on *LEV* suggests the possibility that firms with little debt in their capital structures are minimally levered because they face a high cost of debt. To explore this possibility, the thesis re-estimates the model after excluding firms with low debt (firms with *LEV* less than 10%) financing. Despite the research sample reduces from 23,935 to 19,653, Apendex B shows with 25% adjusted R-Squared the coefficient on *LEV* becomes significantly positive, and does not affect inferences about other variables. Together the independent variables have a good explanatory power; the adjusted R-squared is about 17.46 per cent.

In the last column, for the USA sample fixed effects (the result of Housman test shows the fixed effects is suitable)[31] regression also shows that the cost of debt is positively associated with both *ABN_OCF* and *NOR_OCF*.

7.4 Model extended

In order to control the effect of macroeconomic factors on the cost of debt, in addition the study uses adjusted dependent variables instead of the cost of debt. *LIBOR* has been deducted from *COD* and the new dependent variable denoted as *COD_LIB*. Table 7.6 shows the regression results for the Equations 3 to 6 using *COD_LIB* as a dependent variable. Overall the results are the same as those of our main findings in the previous section.

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[31] Random effects estimate results are available from the authors upon request.

7.5 Sensitivity analysis

Alternative Research Design

In order to examine whether the market distinguishes between overstating and understating *OCF*, the full samples have been partitioned based on positive and negative abnormal *OCF*. Table 7.7 represents the results for disaggregating abnormal *OCF* to positive (overstating) and negative (understating) for UK and USA companies. For the UK Column 1 reports the regression results for 4,506 overstated operating cash flows' firms' year observations. The *ABN_OCF* is positive and significant (2.433, t-statistic = 4.07, p-value 0.001), while *NOR_OCF* is insignificant. For the USA Column 2 gives the regression results for 14,849 US overstated *ABN_OCF* companies (over 60%). The result shows that with almost 14.5 per cent R-squared, *ABN_OCF* and *NOR_OCF* are positive and significant (1.575, t-statistic = 5.12, p-value <0.001 and (0.939, t-statistic = 3.36, p-value <0.001 respectively). This is consistent with the findings in the main regression models, and implies the debt market (both UK and US) can identify the managed component of *OCF* and price the information differently from the unmanaged component.

Table 7.7 also presents the results of underestimating *OCF* for both samples (4,506 and 9,086 firm years for the UK and the USA respectively). *ABN_OCF* for both samples is positive and significant (3.793, t-statistic = 5.12, p-value <0.001 and 3.323, t-statistic = 13.40, p-value <0.001 respectively). The control variables are generally significant and have the same sign as predicted, but in the predicted direction for *LEV* and Δ*EARN [±]* the signs are surprisingly negative when in effect should be positive.

Table 7.8 presents regression results for the UK and US samples for H2, assessing whether firms with financial problems are likely to exhibit more pronounced associations between managed *OCF* and *COD*, testing more precisely whether managed operating cash flows are conditioned on losses, low cash flows and low earnings levels.

Table 7.8 shows for the UK sample, *ABN_OCF* and *NOR_OCF* are positive and significant (coeff.2.993, T-test=4.15, p-value <0.001, coeff.2.131, T-test=14.66, p-value <0.001). *LOSS*, a dummy variable for companies with negative earnings (a proxy for financial distressed firms), is positive and significant, but *ABN_OCF *LOSS* is not economically significant. Consequently the first part of the second hypothesis (H2) – that managed *OCF* has an incremental positive association with the cost of debt when firms report losses – is rejected for the UK sample. Equation 9 (UK sample) examines managed operating cash flows, conditioned on low cash flow levels. The results show that *ABN_OCF*OCFLOW* (interaction variable) has a more positive magnitude of the coefficients than *ABN_OCF* (coeff. 3.871, 2.683 respectively). Given it is significantly associated with the cost of debt, means the financial problems firms (low cash flow levels) face more cost of debt with overstating operating cash flows, when conditioned on measures of financial problems. Therefore the second part of the hypothesis (H2) – that managed *OCF* has an incremental positive association with the cost of debt when firms have low levels of cash flow – is accepted for the UK sample.

Equation 3 (UK firms) shows the result of examining managed *OCF* conditioned for firms that face low and high cash flow and earnings levels at the same time. The results show that firms with low cash flow levels face greater costs of debt when overstating operating cash flows than firms with high cash flow levels. However, earnings levels and also interaction variables are not significant. As a result, the third

part of the hypothesis (H2) – that managed OCF has an incremental positive association with the cost of debt when firms have low levels of both cash flow and earnings at the same time – is rejected for the UK sample. Table 7.8 also reports the regression results for Equations 8, 9 and 10 for the USA companies. *ABN_OCF* and *NOR_OCF* in Equation 8 are positive and significant (coeff. 2.663, T-test=14.66, p-value <0.001 and coeff. 1.725, T-test=8.89, p-value <0.001), which is the same as the results for the UK companies. *LOSS* is positively and significantly associated with the cost of debt. The coefficient for *ABN_OCF *LOSS* is positive and significant, but the coefficient is less than coefficient of *ABN_OCF*. Consequently, for the USA sample as well, this finding does not support the first part of the proposed hypothesis that managed *OCF* has an incremental positive association with the cost of debt when firms report losses. Consistent with Minton and Schrand (1999), *OCF_LOW* (low cash flow levels) is positive and significant indicating that when cash flow levels are low, firms incur higher costs of debt (coeff. 0.270, T-test=3.41, p-value 0.001). The coefficient for *ABN_OCF*OCFLOW* interaction variables in Equation 9 is less than *ABN_OCF*, but has significance associated with the cost of debt, so it can be stated that the second part of the hypothesis 2 – that managed *OCF* has an incremental positive association with the cost of debt when firms have low levels of cash flow – is rejected for the USA sample, consistent with the results obtained with the UK sample. The last column (Equation 10) shows the results for combined cash flow and earnings levels. *ABN_OCF*OCFLOW*, with almost twice the magnitude of the coefficients then *ABN_OCF* is positive and significant (coeff. 3.700, T-test=5.99, p-value <0.001). However, *ABNOR*EARNLOW* and *ABNOR*OCFLOW*EARNLOW* are surprisingly negative and significant. Hence the third part of the hypothesis (H2) – that managed *OCF* has an incremental positive association with the cost of debt when firms have low

levels of both cash flow and earnings at the same time – is also rejected for the USA sample.

Further Analysis

In this section the study examines whether accounting quality differs with managed *OCF*. No tabulated results show that better *OCF* quality (less managed) for both samples (UK and USA) associated with higher accounting quality. Based on the findings, it can be concluded that null hypothesis (H3) – that managed *OCF* has no association with accounting quality – is rejected. Following prior research, the relation is examined between accounting quality and the cost of debt. The results (untabulated) are consistent for both samples (UK and USA), with prior studies indicating that better accounting quality is associated with a lower cost of debt (see for example Francis et al, 2005 ; Subramanyam et al, 2010).

According to the regression results in the two prior paragraphs, the study hypothesise that cash flow management (hereafter cash flow quality) affects the cost of debt both directly and indirectly. For testing this hypothesis, path analysis has been used. As mentioned before (Chapter 6 Section 6.6.3), path analysis allows us to compare the magnitude of the direct effect of cash flow quality on the cost of debt, and the indirect effect through accounting quality effects. Path analysis is used to obtain the total effect of cash flow quality on the cost of debt. The total effect informs us how much the cost of debt changes as a result of changes in cash flow quality. Table 7.9 reports that the direct coefficient of *OCF* quality on the cast of debt for UK firms is -0.155, and with accounting quality it is 0.193. The direct coefficient of accounting quality and cost of debt is -0.105 and the indirect effect of *OCF* quality, and the cost of debt, is -0.03 (0.193 * -0.155). The significant total effect (indirect and indirect) of *OCF*

quality on the cost of debt is -0.135(-0.030+ (-0.105)). Table 7.9 also reports that the direct coefficient of operating cash flow quality on the cost of debt for the USA sample is -0.014, and with accounting quality it is 0.194; the direct coefficient of accounting quality and the cost of debt is -0.158; so the indirect effect of operating cash flow quality and the cost of debt is very low: -0.003(0.194* -0.014). The significant total effect (indirect and indirect) of operating cash flow quality on the cost of debt is -0.161 (-0.003+ (-0.158)). Based on above findings the fourth hypothesis which is managed *OCF* is associated with the cost of debt both (a) directly, and (b) indirectly through decreased accounting quality is accepted.

The study also did some more robustness tests. First, in order to measure the effect of industry classification, the regression is run for each industry group; the result did not provide any additional insights into the pricing of managed operating cash flows.

Second, the study examines the association between managed operating cash flows and ex ante costs of debt, using yield as a dependent variable for the UK sample.[32] The sample size for these tests is small (including 194 firm-year observations from 1998 to 2009: data from bond issues files). As mentioned in Chapter 6, the relatively small sample size is mostly due to the fact that there are fewer firms with publicly traded bonds and is consistent with the literature analysing corporate bonds. Consistent with the results for the realised cost of debt, the regression results (Table 7.10) are not statistically significant.

Third, for controlling the mergers and acquisitions effects on the results, the study using the same sampling process, observations with 50% or more increase or 33%

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[32] We have some limitations in accessing bond data bases, so I have been not able to carry out checks with USA bond market data.

or more decrease in total assets (Finger, 1994) have been dropped. Despite the research samples reduces from 8,684 to 7,703 for the UK and from 23,935 to 21,610 for the USA the results consistent of the regression estimations for both sample (Table 7.11).

Forth, according to differents method for outlier test, mentionented in Section 6.3 in Chapter 6, the study includes the Hadi multivariate outlier test. The recalculated sample selection and regretion results based on Hadi's filter are shown in Table 7.12. Althouth the research samples are redused but, the regression results confirm the main result are given by truncation method.

Finally, the thesis has examined whether inactive firms are likely to exhibit pronounced associations between managed operating cash flows and the cost of debt. Partitioning the full sample between active and inactive firms, a stronger association between the components of operating cash flows and the cost of debt is predicted for the now inactive companies, because they might have needed to manipulate operating cash flow to achieve cash flow targets for financing under conditions of distress. However, the result does not provide any additional insights into the pricing of managed *OCF*.

7.6 Summary

This chapter has investigated the empirical evidence of the relation between cash flow manipulation and the cost of debt. Two separate samples are examined in this study: 8,684 firm-year observations for UK firms and 23,935 firm-year observations for USA firms, each comprising cash flow data reported between 1998 and 2010. The chapter has explained descriptive statistics for variables used in the models for both samples. The Pearson correlations for both samples have also been given. The study uses two

econometric techniques to estimate the model, namely Ordinary Least Square and Panel Data analysis. In particular, a positive and significant association is found between the cost of debt and managed *OCF*. The relation between the cost of debt and managed *OCF* has also been examined for the case when firms have losses, low cash flow and low earnings levels. Furthermore, the chapter has investigated alternative research design and further analysis, include: using *COD_LIB* as a dependent variable and research models using Yield as a proxy for cost of debt and re exam the models and also path analysis.

The next chapter (Chapter 8) includes the summary conclusions of the study. In addition, the chapter discusses a comparison with other prior study finding. Furthermore the limitations, implications and the potential further research of the thesis have been given.

Figure 7.1
Cost of debt by decile of abnormal operating cash flow (*ABN_OCF*)

Panel A; Cost of debt by decile *ABN_OCF* for UK Sample

	1	2	3	4	5	6	7	8	9	10
Mean(COD)	7.61	7.54	7.73	7.7	8.13	8.08	8.49	8.67	8.72	10.19
Medn(COD)	6.72	6.78	6.88	6.75	7.16	6.94	7.31	7.42	7.56	8.54
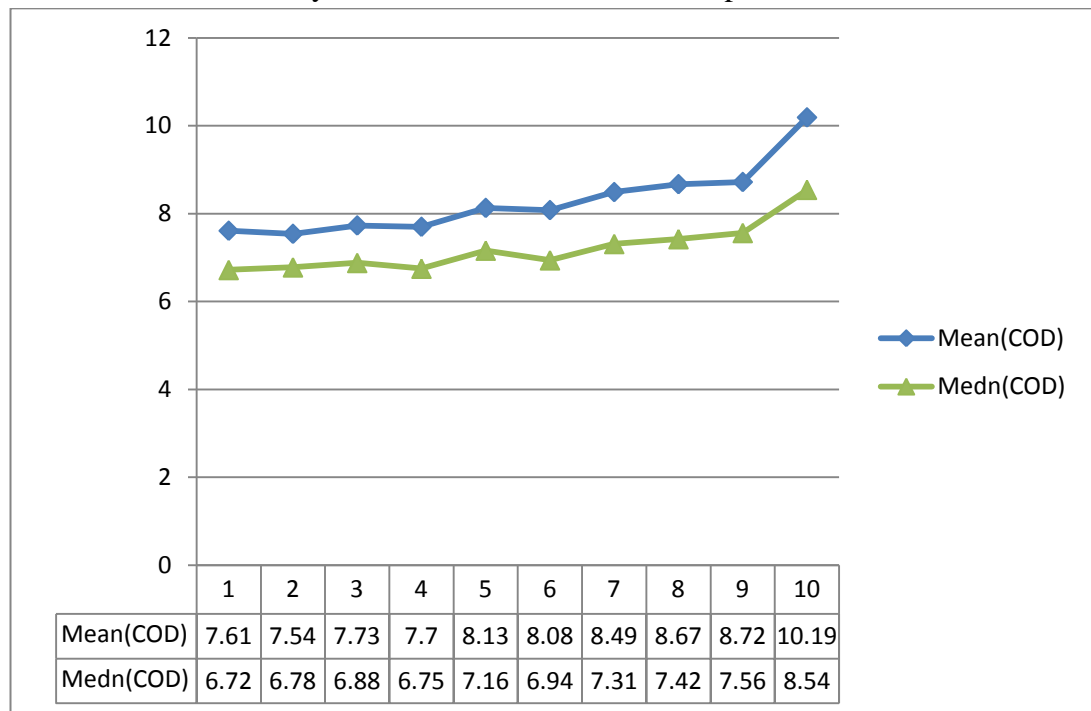
Panel B: Variability in cost of debt estimates (mean±σ) by decile of abnormal operating cash flows (UK sample)

	1	2	3	4	5	6	7	8	9	10
Mean	7.61	7.54	7.73	7.7	8.13	8.08	8.49	8.67	8.72	10.19
Mean +1sd	11.71	11.52	12.06	11.94	12.61	12.87	13.43	13.74	13.81	16.58
Mean -1sd	3.51	3.56	3.4	3.46	3.65	3.29	3.55	3.6	3.63	3.8
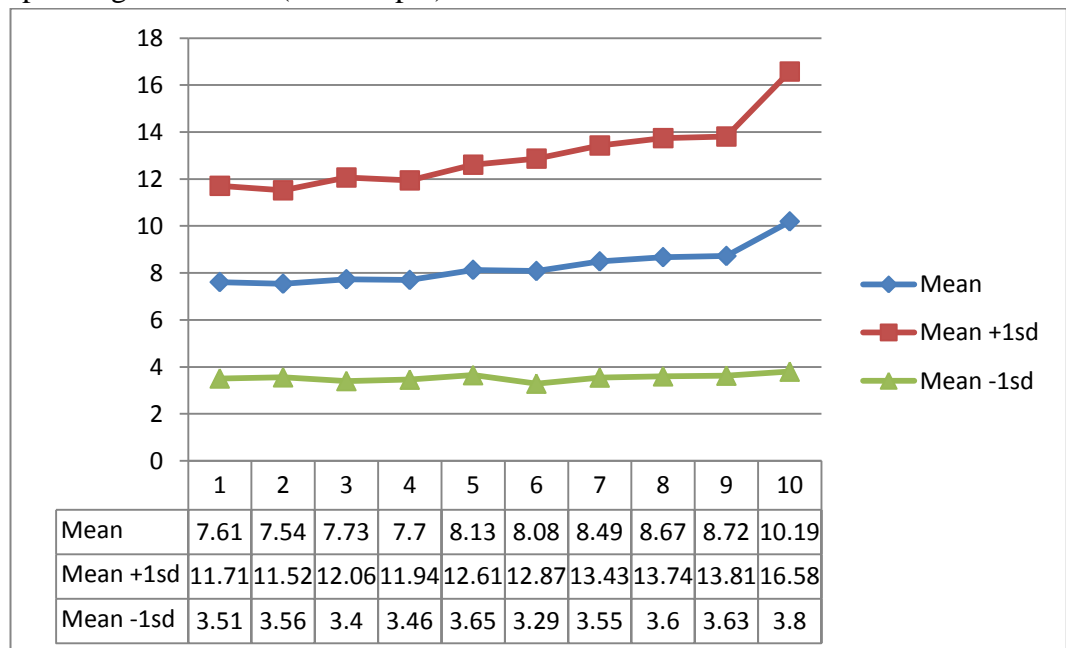
Panel C: Cost of debt by deciles of *ABN_OCF* for the USA sample**.**

	1	2	3	4	5	6	7	8	9	10
Mean	7.15	7.57	7.44	7.58	7.66	7.87	8.22	8.23	9.10	12.5
Mdn	6.48	6.85	6.70	6.80	6.86	6.93	7.19	7.00	7.34	10.0
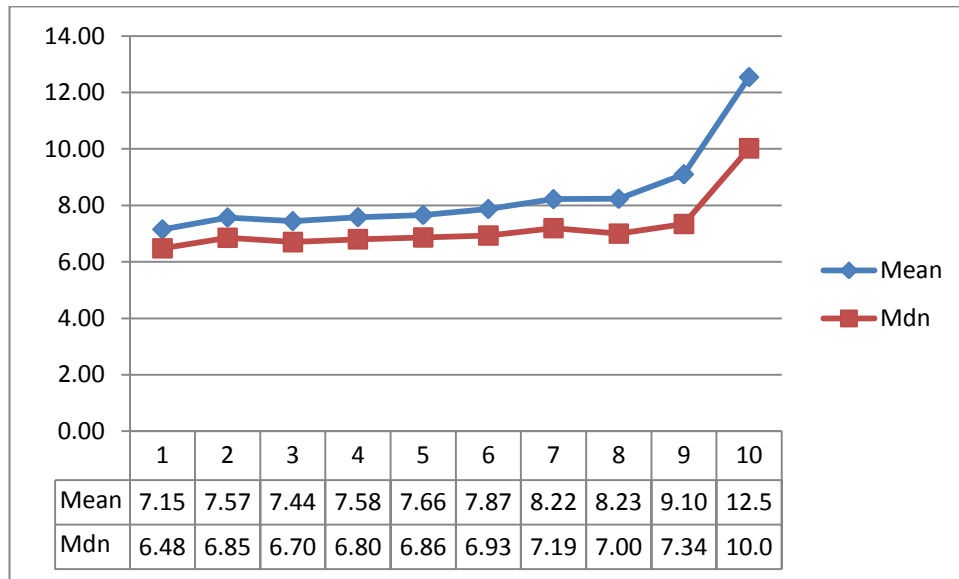
Panel D: Variability in cost of debt estimates (mean±σ) by decile of abnormal operating cash flows (USA sample)

	1	2	3	4	5	6	7	8	9	10
Mean	7.15	7.57	7.44	7.58	7.66	7.87	8.22	8.23	9.10	12.5
Mean +1sd	10.9	11.3	11.2	11.5	11.7	12.2	13	13.3	15.2	20
Mean -1sd	3.43	3.84	3.69	3.65	3.66	3.53	3.41	3.12	3.01	5.07
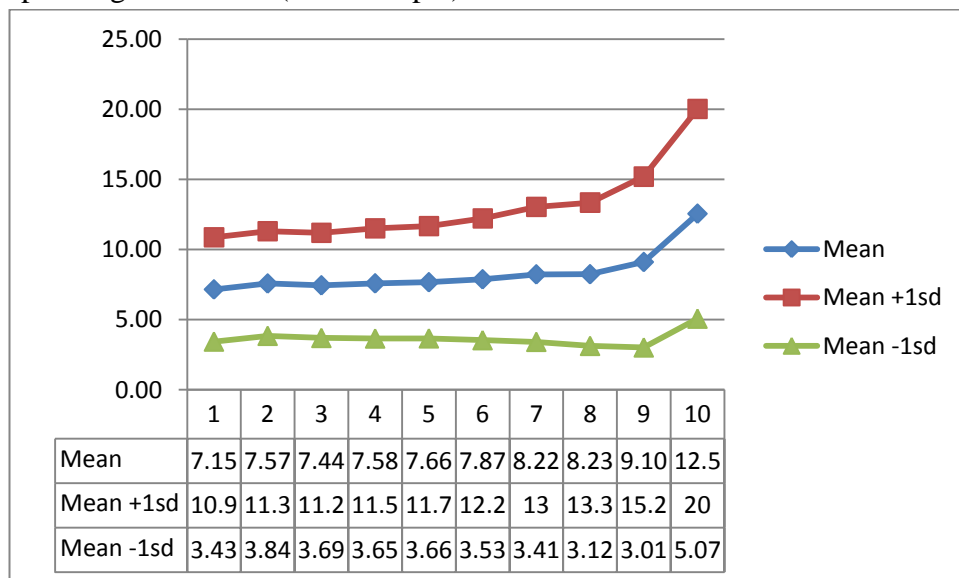
Table 7.1
Descriptive statistics
Panel A: UK

	Mean	Standard deviation	25th percentile	Median	75th percentile	Skewness	Kurtosis
Cost of debt (*COD*)	8.200	4.750	5.530	7.040	9.230	1.874	6.928
Operating cash flow (*OCF*)	0.040	0.170	0.010	0.070	0.120	-2.434	13.666
Normal operating cash flow (*NOR_OCF*)	0.050	0.100	0.030	0.070	0.090	-4.421	40.768
Abnormal operating cash flow (*ABN_OCF*)	-0.010	0.150	-0.050	0.010	0.060	-1.051	13.393
Abnormal operating cash flow – absolute (|*ABN_OCF*|)	0.090	0.120	0.020	0.060	0.120	3.429	20.837
Natural logarithm of total assets (*SIZE*)	18.430	2.290	16.750	18.230	19.950	0.349	2.878
Leverage (*LEV*)	0.240	0.180	0.100	0.210	0.340	1.181	4.947
Interest /Sales (*INTSAL*)	0.040	0.080	0.010	0.012	0.032	4.357	25.233
Negative Earnings (*LOSS*)	0.310	0.460	0.000	1.000	1.000	0.835	1.697
Change in Earnings: positive = 1, negative = 0 (Δ*EARN_POS*)	0.460	0.500	0.000	0.000	1.000	0145	0157
Monthly money market reference rate (*LIBOR*)	3.830	1.740	2. 190	3.740	5.350	1.021	1.774

Table 7.1

(Con.)

Panel B: USA

	Mean	Standard deviation	25th percentile	Median	75th percentile	Skewness	Kurtosis
Cost of debt (*COD*)	8.140	4.830	5.410	6.960	9.120	1.975	7.212
Operating cash flow (*OCF*)	0.040	0.230	0.020	0.080	0.130	-4.253	30.551
Normal operating cash flow (*NOR_OCF*)	0.030	0.180	0.010	0.050	0.080	-20.440	56.854
Abnormal operating cash flow (*ABN_OCF*)	0.010	0.240	-0.040	0.020	0.090	4.069	78.954
Abnormal operating cash flow – absolute (|*ABN_OCF*|)	0.120	0.200	0.030	0.070	0.130	11.069	87.955
Natural logarithm of total assets (*SIZE*)	19.440	2. 400	17.860	19.690	21.100	-0.328	2.966
Leverage (*LEV*)	0.330	0.280	0.140	0.280	0.430	2.626	15.696
Interest /Sales (*INTSAL*)	0.070	0.160	0.010	0.020	0.060	7.843	87.896
Negative Earnings (*LOSS*)	0.320	0.470	0.001	1.000	1.000	0.783	1.613
Change in Earnings: positive = 1, negative = 0 ($\Delta EARN\_POS$)	0.480	0.500	0.000	0.000	1.000	0.0698	1.004
Monthly money market reference rate (*LIBOR*)	3.770	1.710	2.190	3.740	5.350	0.180	1.816

The table provides summary statistics for all variables used in cost of debt predictions. The samples include 7,548 firm-year observations in the UK and 21,119 in the USA, from 1,019 and 3,483 companies respectively, for the period 1998-2009.

Table 7.2

Firm characteristics UK vs USA

Variable	UK		USA		t-test	P- Value
	Mean	Std. Dev.	Mean	Std. Dev.		
COD	8.201	4.750	8.140	4.825	-1.07	0.288
OCF	0.044	0.166	0.040	0.225	-1.41	0.158
NOR_OCF	0.046	0.102	0.034	0.182	-7.31	<0.001
ABN_ OCF	-0.002	0.151	0.006	0.235	3. 84	0.001
(*|ABN_OCF|*)	0.094	0.118	0.117	0.204	12.62	<0.001
SIZE	18.401	2.287	19.443	2.403	35.85	<0.001
LEV	0.242	0.184	0.328	0.281	31.88	<0.001
INTSAL	0.037	0.075	0.066	0.164	21.62	<0.001
LOSS	0.307	0.461	0.317	0.465	1.77	0.076
Δ*EARN_POS*	0.463	0.498	0.482	0.499	3.03	0.002

Table 7.3
Pearson correlations and their significance levels (in italics)
US above diagonal, and UK below diagonal

	COD	ABN_OCF	NOR_OCF	SIZE	LEV	INTSAL	LOSS	ΔEARN_POS	LIBOR
COD		0.226	-0.122	-0.363	0.032	0.145	0.288	-0.075	0.012
		<0.001	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
ABN_ OCF	0.136		-0.592	-0.335	0.119	0.167	0.202	-0.033	0.0195
	<0.001		*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*0.002*
NOR_ OCF	-0.052	-0.391		0.265	-0.155	-0.157	-0.183	0.039	0.012
	<0.001	*<0.001*		*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*0.066*
SIZE	-0.152	-0.346	0.495		-0.082	-0.096	-0.362	0.081	-0.023
	<0.001	*<0.001*	*<0.001*		*<0.001*	*<0.001*	*<0.001*	*<0.001*	*0.004*
LEV	-0.247	-0.062	0.004	0.145		0.367	0.182	-0.022	-0.008
	<0.001	*<0.001*	*0.690*	*<0.001*		*<0.001*	*<0.001*	*<0.001*	*0.176*
INTSAL	-0.078	-0.055	-0.143	0.098	0.382		0.196	-0.056	0.015
	<0.001	*<0.001*	*<0.001*	*<0.001*	*<0.001*		*<0.001*	*<0.001*	*0.019*
LOSS	0.119	0.193	-0.300	-0.309	0.058	0.073		-0.278	-0.049
	<0.001	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*		*<0.001*	*<0.001*
ΔEARN_POS	-0.003	-0.035	0.087	0.091	-0.042	-0.074	-0.286		-0.081
	0.776	*0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*		*<0.001*
LIBOR	0.107	0.034	0.035	-0.001	-0.051	0.008	-0.090	-0.076	
	<0.001	*0.002*	*0.001*	*0.949*	*<0.001*	*0.420*	*<0.001*	*<0.001*	

Pearson correlation and their significance levels are reported above the diagonal for the USA firm-year sample and below the diagonal for the UK. The samples consist of 7,548 firm-year observations for the UK and of 21,119 for the USA. See Table 3 for variable definitions.

Table 7.4

Firm Characteristics by deciles of abnormal operating cash flows

Panel A: UK sample

Variable	Low 1	2	3	4	5	6	7	8	9	High 10	Dif.	t-test
Cost of debt	7.61	7.54	7.73	7.70	8.13	8.08	8.49	8.67	8.72	10.19	2.58	-8.78
Size	19.29	19.25	19.10	18.96	18.68	18.45	18.20	18.01	17.47	16.27	-3.02	28.63
INTCOV	0.06	0.12	0.05	0.04	0.04	0.03	0.04	0.05	0.03	0.05	-0.01	1.21
LEV	0.26	0.27	0.18	0.26	0.24	0.23	0.34	0.21	0.24	0.23	-0.03	2.36

Panel B: USA sample

Variable	Low 1	2	3	4	5	6	7	8	9	High 10	dif	t-test
Cost of debt	7.15	7.57	7.44	7.58	7.66	7.87	8.22	8.23	9.10	12.74	5.59	--25.92
Size	20.09	20.17	20.08	20.03	19.83	19.66	19.38	19.27	18.72	16.18	-3.91	46.38
INTCOV	0.11	0.07	0.07	0.06	0.06	0.06	0.05	0.16	0.10	0.04	-0.07	-1.67
LEV	0.32	0.33	0.34	0.33	0.33	0.32	0.30	0.30	0.39	0.62	0.30	-68.13

Table 7.5

Regression of the Cost of Debt (*COD*) on Abnormal Operating Cash Flow (*ABN_OCF*)

		UK (*N*=8,684)					USA (*N*=23,935)				
	Predicted Sign	(Eq.3)	(Eq.4)	(Eq.5)	(Eq.6)	Fixed effects	(Eq.3)	(Eq.4)	(Eq.5)	(Eq.6)	Fixed effects
Intercept	+	10.788	7.685	7.678	10.681	26.629	16.742	7.511	7.465	16.441	24.156
		<0.001	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
OCF_TA	-	-1.433					-2.846				
		<0.001					*<0.001*				
ABN_ OCF	+*		5.474	5.507	3.683	1.008		5.337	5.588	2.959	0.148
			<0.001	*<0.001*	*<0.001*	*0.045*		*<0.001*	*<0.001*	*<0.001*	*0.023*
NOR_ OCF	-*			0.097	2.857	1.949			0.474	1.561	0.614
				0.856	*<0.001*	*0.030*			*0.022*	*<0.001*	*0.007*
SIZE	-	-0.146			-0.172	-1.046	-0.515			-0.534	-0.874
		<0.001			*<0.001*	*<0.001*	*<0.001*			*<0.001*	*<0.001*
LEV	+	-6.163			-6.227	-5.859	-1.111			-1.051	-1.449
		<0.001			*<0.001*	*<0.001*	*<0.001*			*<0.001*	*<0.001*
INTSAL	+	0.494			1.830	8.736	2.096			2.771	1.860
		0.484			*0.010*	*0.003*	*<0.001*			*<0.001*	*<0.001*
LOSS	+	1.128			1.306	0.404	1.513			1.852	0.592
		<0.001			*<0.001*	*0.001*	*<0.001*			*<0.001*	*<0.001*
ΔEARN_POS	-	0.385			0.365	0.388	0.151			0.107	-0.071
		<0.001			*<0.001*	*<0.001*	*0.010*			*0.067*	*0.128*
LIBOR	+	0.293			0.281	0.228	0.317			0.321	0.301
		<0.001			*<0.001*	*<0.001*	*<0.001*			*<0.001*	*<0.001*
Adj R-squared		9.89%	1.84%	1.83%	10.45%	5.80%	19.59%	5.11%	5.13%	19.32%	16.26%
Within						6.41%					5.37%
Between						7.52%					26.75%
Chi2*						152.22					268.20
Prob>chi2*						*<0.001*					*<0.001*

Table 7.5 provides estimators for Equations 3-7. *OCF_TA* is computed as a real *OCF* deflated by total assets, *ABN_ OCF* is abnormal OCF deflated by total assets and *NOR_OCF* is computed as real *OCF* minus abnormal *OCF* deflated by total assets. Size is computed as the natural logarithm of Total Assets. *LEV* is Leverage and computed as long–term (interest-bearing debt) debt divided by total assets. *INTSAL* is Interest expenses divided by sales, *LOSS* is an earnings dummy and Δ*EARN_POS* is a change in earnings dummy, and *LIBOR* is London Inter Bank Offered Rates at year t-1. *Hausman test; H0: difference in coefficients not systematic.

Table 7.6
Regression of the Cost of Debt minus *LIBOR* (*COD_LIB*) on Abnormal Operating Cash Flow (*ABN_OCF*)

	Predicted Sign	UK (N=8,684)					USA (N=23,935)				
		(Eq.3b)	(Eq.4b)	(Eq.5b)	(Eq.6b)	Fixed effects	(Eq.3b)	(Eq.4b)	(Eq.5b)	(Eq.6b)	Fixed effects
Intercept	+	7.247	4.312	4.333	7.090	11.002	13.313	4.194	4.158	12.882	6.986
		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
OCF_TA	-	-1.408					-2.579				
		<0.001					<0.001				
ABN_OCF	+*		5.153	5.062	3.518	1.341		5.333	5.531	3.061	0.373
			<0.001	<0.001	<0.001	0.008		<0.001	<0.001	<0.001	0.049
NOR_OCF	-*			-0.265	2.687	2.590			0.372	1.581	0.808
				0.630	<0.001	0.004			0.079	<0.001	<0.001
SIZE	-	-0.097			-0.121	-1.065	-0.467			-0.478	-0.938
		<0.001			<0.001	<0.001	<0.001			<0.001	<0.001
LEV	+	-6.131			-6.187	-6.113	-1.033			-0.980	-1.484
		<0.001			<0.001	<0.001	<0.001			<0.001	<0.001
INTSAL	+	0.824			2.093	9.756	2.115			2.692	2.024
		0.259			0.005	<0.001	<0.001			<0.001	<0.001
LOSS	+	1.582			1.761	0.221	2.008			2.306	0.4.4
		<0.001			<0.001	0.0731	<0.001			<0.001	<0.001
ΔEARN_POS	-	0.807			0.791	0.306	0.531			0.448	-0.188
		<0.001			<0.001	<0.001	<0.001			<0.001	<0.001
Adj R-squared		8.84%	1.54%	1.53%	9.31%	7.11%	17.44%	4.84%	4.85%	17.46%	14.99%
Within						3.66%					2.83%
Between						9.75%					26.22%
Chi2*						56.65					341.18
Prob>chi2*						<0.001					<0.001

Note: Table 7.6 provides estimators for Equations 3-7, but using *COD – LIBOR* as a dependent variable. *OCF_TA* is computed as a real *OCF* deflated by total assets, *ABN_ OCF* is abnormal *OCF* deflated by total assets and *NOR_OCF* is computed as real OCF minus abnormal *OCF* deflated by total assets. Size is computed as the natural logarithm of Total Assets. *LEV* is Leverage and computed as long-term (interest-bearing debt) debt divided by total assets, *INTSAL* is Interest expense divided by sales, *LOSS* is an earnings dummy and Δ*EARN_POS* is a change in earnings dummy, and *LIBOR* is London Inter Bank Offered Rates at year t-1.
*Hausman test; H0: difference in coefficients not systematic.

Table 7.7

Regression of the Cost of Debt (*COD*) on positive and negative Abnormal Operating Cash Flow (*ABN_OCF*)

| | Positive 'Managed' OCF | | Negative 'Managed' OCF | |
| | ABN_ OCF >0 | | ABN_ OCF <0 | |
	UK	USA	UK	USA
Intercept	9.476	15.641	12.733	17.114
	<0.001	*<0.001*	*<0.001*	*<0.001*
ABN_ OCF	2.433	1.575	3.793	3.323
	0.001	*<0.001*	*<0.001*	*<0.001*
NOR_ OCF	0.702	0.939	3.940	-0.401
	0.371	*<0.001*	*<0.001*	*0.289*
SIZE	-0.113	-0.491	-0.261	-0.547
	<0.001	*<0.001*	*<0.001*	*<0.001*
LEV	-5.713	-1.000	-6.581	-0.962
	<0.001	*<0.001*	*<0.001*	*<0.001*
INTSEL	-0.073	1.700	2.710	2.765
	0.952	*<0.001*	*0.003*	*<0.001*
LOSS	1.131	1.681	1.131	1.627
	<0.001	*<0.001*	*<0.001*	*<0.001*
ΔEARN_POS	0.314	0.074	0.393	0.216
	0.018	*0.829*	*0.012*	*0.051*
LIBOR	0.307	0.328	0.246	0.305
	<0.001	*<0.001*	*<0.001*	*<0.001*
Adj R-squared	9.06%	14.46%	11.04%	20.51%
N	4,506	14,849	4,178	9,086

Table 7.8

Low and high values of the cash flow and earnings variables

	UK(N=8,684)			USA(N=23,935)		
	(Eq. 8)	(Eq. 9)	(Eq.10)	(Eq. 8)	(Eq. 9)	(Eq.10)
Intercept	11.966	10.631	12.163	16.324	16.024	17.332
	<0.001	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
ABN_ OCF	2.993	2.683	2.651	2.663	2.562	2.317
	<0.001	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
NOR_ OCF	2.952	3.423	3.817	1.725	1.731	1.719
	<0.001	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
SIZE	-0.174	-0.165	-0.260	-0.528	-0.5150	-0.599
	<0.001	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
LEV	-6.201	-6.304	-6.347	-1.065	-1.028	-1.050
	<0.001	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
INTSEL	1.768	2.122	2.242	2.736	2.650	2.672
	0.013	*0.003*	*0.002*	*<0.001*	*<0.001*	*<0.001*
LOSS	1.198	1.253	1.276	1.829	1.768	1.640
	<0.001	*<0.001*	*<0.001*	*<0.001*	*<0.001*	*<0.001*
ΔEARN_POS	0.367	0.373	0.352	0.108	0.112	0.090
	<0.001	*<0.001*	*0.001*	*0.064*	*<0.001*	*0.123*
LIBOR	0.281	0.277	0.276	0.321	0.319	0.313
	<0.001	*<0.001*	*<0.001*	*<0.001*	*0.056*	*<0.001*
ABN_OCF * LOSS	1.255			0.612		
	0.112			*<0.001*		
OCF_LOW		-0.502	-0.557		0.270	-0.082
		0.001	*0.002*		*<0.001*	*0.358*
OCF_HI		-0.293	-0.363		0.026	0.029
		0.043	*0.013*		*0.704*	*0.682*
EARN_LOW			0.219			0.894
			0.209			*<0.001*
EARN_HI			0.704			0.953
			<0.001			*<0.001*
ABN_OCF*OCFLOW		3.871	4.229		0.684	3.700
		<0.001	*0.001*		*<0.001*	*<0.001*
ABN_OCF*OCFHI		1.984	2.281		0.017	0.047
		0.009	*0.005*		*0.787*	*0.445*
ABN_OCF*EARNLOW			-1.379			-1.067
			0.397			*0.003*
ABN_OCF*EARNHI			-1.083			-1.145
			0.442			*0.053*
ABN_OCF*OCFLOW*EARNLOW			0.757			-2.066
			0.665			*0.002*
Adj R-squared	10.46%	10.98%	11.09%	19.45%	19.54%	20.13%

The regression results are for Equations 8, 9 and 10, when managed operating cash flows are conditioned on losses, cash flow and earnings levels.

Table 7.9

Direct and indirect effects of cash flow quality on the cost of debt

	UK			USA		
	AQ	*Cod*	Total	*AQ*	*Cod*	Total
OCFQ Indirect Through *AQ*	0.193	-0.155	-0.030	0.194	-0.014	-0.003
Direct *OCFQ*		-0.105	-0.105		-0.158	-0.158
Total Effect			-0.135			-0.161

Table 7.9 describes the direct and indirect effects of cash flow quality on the cost of debt for the UK and the USA. The table reports the results of SEM (path analysis) that analyse the relations between cash flow quality, accounting quality and the cost of debt depicted in Figure1. *OCFQ* is abnormal operating cash flow multiplied by -1.

Table 7.10

Regression of the Cost of Debt (*COD*) on Abnormal Operating Cash Flow (*ABN_OCF*) using yield as the proxy for COD

Dependent Variable: YIELD	(Eq.3)	(Eq.6)
Intercept	19.481	18.833
	<0.001	*<0.001*
OCF_TA	-0.844	
	0.660	
ABN_ OCF		-0.998
		0.562
NOR_ OCF		2.659
		0.400
SIZE	-0.597	-0.574
	<0.001	*<0.001*
Bond maturity	-0.842	0.732
	0.343	*0.416*
LEV	-6.301	-5.118
	0.147	*0.258*
INTSEL	-0.978	-0.928
	0.002	*0.003*
LOSS	0.146	0.145
	0.498	*0.500*
ΔEARN_POS	-0.368	-0.405
	<0.001	*<0.001*
Adj R-squared	49.30%	49.34%
N	194	194

The regression results are for Equations 3 and 6, using the coupon rate as the proxy for COD. Bondmaturity is log of number of years until maturity.

Table 7.11

Regression of the Cost of Debt (*COD*) on Abnormal Operating Cash Flow (*ABN_OCF*) with consider the effects of mergers and acquisitions

	UK	USA
Intercept	10.449	15.417
	<0.001	*<0.001*
ABN_ OCF	3.245	3.275
	<0.001	*<0.001*
NOR_ OCF	2.432	1.609
	<0.001	*0.289*
SIZE	-0.159	-0.484
	<0.001	*<0.001*
LEV	-6.489	-1.214
	<0.001	*<0.001*
INTSEL	2.008	3.311
	0.008	*<0.001*
LOSS	1.384	1.746
	<0.001	*<0.001*
$\Delta EARN\_POS$	0.406	0.125
	<0.001	*0.051*
LIBOR	0.298	0.319
	<0.001	*<0.001*
Adj R-squared	10.78%	17.28%
N	7,703	21,610

Table 7.12

Hadi multivariate outlier test

Panel A: Sample selection, using Hadi multivariate outlier test

	UK	USA
	Number of observations	Number of observations
Companies with reported financial statements (1998-2010)	19,603	44,517
Less:		
Firm-years with missing Interest Cost data, or Interest Cost equal to 0	-3,181	-6,889
Firm-years with missing Total Debt data	-1,590	-2,790
Studentised residuals greater than 2	-3,124	-4,961
Outliers remaining; Hadi test	-877	-1,527
Lag operation	-2,411	-4,415
Final sample	8,420	23,935

Panel B: Regression of the Cost of Debt (*COD*) on Abnormal Operating Cash Flow (*ABN_OCF*), using Hadi multivariate outlier test

	UK	USA
Intercept	12.823	16.259
	<0.001	*<0.001*
ABN_ OCF	2.995	3.802
	<0.001	*<0.001*
NOR_ OCF	7.721	3.698
	<0.001	*<0.001*
SIZE	-0.273	-0.512
	<0.001	*<0.001*
LEV	-9.534	--3.200
	<0.001	*<0.001*
INTSEL	24.101	8.934
	<0.001	*<0.001*
LOSS	1.278	1.871
	<0.001	*<0.001*
Δ*EARN_POS*	0.336	0.129
	<0.001	*0.032*
LIBOR	0.261	0.305
	<0.001	*<0.001*
Adj R-squared	12.04%	15.18%
N	8,420	23,557

Panel B, Table 7.5 provides estimators for Equations 6 using Hadi multivariate outlier. *ABN_ OCF* is abnormal OCF deflated by total assets and *NOR_OCF* is computed as real *OCF* minus abnormal *OCF* deflated by total assets. Size is computed as the natural logarithm of Total Assets. *LEV* is Leverage and computed as long–term (interest-bearing debt) debt divided by total assets. *INTSAL* is Interest expenses divided by sales, *LOSS* is an earnings dummy and Δ*EARN_POS* is a change in earnings dummy, and *LIBOR* is London Inter Bank Offered Rates at year t-1.

Apendex B

Regression of the Cost of Debt (*COD*) on Abnormal Operating Cash Flow (*ABN_OCF*), after excluding firms with low *LEV*

	UK	USA
Intercept	6.533	15.279
	<0.001	*<0.001*
ABN_ OCF	2.842	2.532
	<0.001	*<0.001*
NOR_ OCF	1.612	1.427
	0.009	*0.289*
SIZE	-0.101	-0.510
	<0.001	*<0.001*
LEV	0.778	0.302
	0.016	*0.004*
INTSEL	-0.018	2.777
	0.970	*<0.001*
LOSS	1.238	1.759
	<0.001	*<0.001*
ΔEARN_POS	0.339	0.031
	0.001	*0.565*
LIBOR	0.303	0.329
	<0.001	*<0.001*
Adj R-squared	9.11%	24.83%
N	3,674	19,643

Re-estimates the model after excluding firms with low debt (firms with *LEV* less than 25% and 10% for UK and USA recpectivly excluded) firms with *LEV* less than 10%

Chapter 8

Summary and Conclusions

The main focus of previous work on cash flow manipulation has been on earnings management, and although there is evidence that operating cash flow management techniques may impact on earnings performance, it is not clear that this is a direct and on-way effect. We know also from prior research that the stronger a firm's profitability, the lower is likely to be the cost of debt (e.g., Subramanyam et al, 2010; Mansi et al. 2009; Jinang, 2008; Anderson et al, 2004; Mansi et al, 2004; Pittman and Fortan, 2004; Shi, 2003). This thesis considers the linkage between these two previous findings, and assesses whether an increase in the information risk associated with managed operating cash flows is reflected in the cost of debt.

Two large samples are examined in this respect: 8,684 UK firm-years and 23,935 USA firm-years, between 1998 and 2010. The results show that, for both samples, abnormal operating cash flow has a positive and significant relationship with the cost of debt. More specifically, while operating cash flow is often thought of as a value not manipulated, this thesis demonstrates that such manipulation is likely, that the market appears to recognise the cash flow management involved, and that this is reflected in debt costs. In particular, a positive and significant association is found between the cost of debt and managed *OCF* when firms have losses, low cash flow and low earnings levels. This suggests that bondholders and creditors are more likely to detect and price the components of *OCF* when firms have a greater likelihood of experiencing financial problems.

It is also argued here that high cash flow management not only increases the cost of debt directly but also increases it indirectly, thereby impacting on accounting quality. The thesis first documents that cash flow management negatively affects accounting quality, then demonstrates the effect of accounting quality on decreasing the cost of debt, concluding that the effect of cash flow management in increasing the cost of debt is largely through its impact on accounting quality. It can be said, therefore, that given the evidence provided by this study that an increase in the cost of debt associated with managed components of operating cash flows, firms would be better off without engaging in cash flow management.

These findings should be of interest to policy makers and company creditors, as well as academic researchers. Three aspects in particular would benefit from further research. First, although a smaller sized bond sample is also employed, the explanatory power of the regression models is limited, and it is the two far larger samples based on accounting data that provide the significant and robust results. It should be acknowledged that using accounting data for calculating the cost of debt is likely to be subject to measurement error, and therefore future research should attempt to extend the study reported here in order to provide greater reconciliation between market debt pricing and the accounting-based cost of debt. The results obtained with UK market data in this study are not statistically significant and it has not been possible to carry out checks with USA bond market data. Therefore, further analysis would be useful using USA market data in order to compare the results with those obtained with accounting data, which may provide more detail about the effect of cash flow manipulation on the cost of debt. In addition, given that the overall cost of capital includes the cost of debt and the cost of equity, and this thesis considers only the effect of cash flow manipulation on the cost of debt, further work should attempt to integrate these two

separate strands of research by considering interactions between earnings management and cash flow management and their joint effects on the costs of equity and debt. A third point concerns the fact that abnormal *OCF* has been evaluated for this study using Dechow's original 1998 procedure, taking account of Roychowdhury's 2006 improvements. Other approaches to cash flow manipulation might be developed in future in order to obtain more detailed estimates relating to the timing and classification of cash flow components.

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