The Practice and Implications for Performance Measurement and Equity Valuation of Dirty Surplus Accounting Flows: International Evidence

Thesis submitted to Lancaster University in fulfilment of the requirements of the degree of Doctor of Philosophy in Accounting and Finance

by

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THE PRACTICE AND IMPLICATIONS FOR PERFORMANCE MEASUREMENT AND EQUITY VALUATION OF DIRTY SURPLUS ACCOUNTING FLOWS: INTERNATIONAL EVIDENCE

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ABSTRACT

This thesis investigates dirty surplus accounting practice in different countries and its implications for performance measurement and equity valuation. First, I examine the characteristics of dirty surplus accounting permitted by accounting regulation and reported by companies in four countries: France, Germany, the U.K and the U.S during the period 1993 to 2001. I find that dirty surplus flows are negative on average. I also find substantial cross-country variation in dirty surplus accounting both in accounting rules and in companies' reporting practice. Dirty surplus accounting seems more severe in France and Germany than in the U.K and the U.S.

Second, I analyse the implications of dirty surplus accounting and cross-country variation therein for accounting-based measures of abnormal performance. I find that the omission of dirty surplus flows creates inaccuracy in abnormal performance measurement for all classes of dirty surplus flows and across the four accounting regimes studied. Bias in abnormal performance measurement is largely caused by goodwill-related flows.

Third, I explore the valuation implications of dirty surplus accounting. I demonstrate that the residual income valuation model (RIVM) and the abnormal earnings growth model (AEGM) should yield identical intrinsic value estimates provided there is consistency in projections of accounting numbers. Accordingly, omission of dirty surplus flows from these projections results in identical valuation error in both models. I then perform empirical tests of the relationship between valuation errors and dirty surplus flows, both in terms of bias and inaccuracy. Only in the case of the U.S. do I find some evidence of such relationship. For this country, I also find evidence of industry differences in the relationship between financial and non-financial companies. Finally, results suggest cross-country differences in the relationship between the U.S. and the other three countries, particularly in terms of inaccuracy.

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DECLARATION

I hereby declare that this thesis is my own work, and has not been submitted in substantially the same form for the award of a higher degree elsewhere.

I declare that part of the work presented in the third and fourth chapters of the thesis has been used, in a substantially different format, in a published article co-authored with my supervisors, Prof. John O'Hanlon and Dr. Steven Young. The article titled "Dirty surplus accounting flows: international evidence" was published in *Accounting and Business Research* (2004), volume 34, number 4, pages 383 – 411.

Helena de Oliveira Isidro

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Chapter 1

Introduction

1.1 Introduction

This thesis investigates the practice of dirty surplus accounting in different countries and its implications for measurement of business value and performance.

The concept of earnings and how to report it has long been a source of debate among accounting prepares and users. Because earnings is viewed as a summary indicator of company financial performance and value-creation, the decision about which items to include in earnings and how to disclose earnings information is of major importance to investors, managers, creditors and regulators. Historically, two extreme definitions of earnings have been advocated by academics and regulators: One view considers only the recurring operations of the company and hence regards earnings as a measure of current operating performance; The other view assumes an all-inclusive concept where all changes in equity during the period, except transactions with owners, are included in the earnings figure. This second approach is often referred to as clean surplus earnings or comprehensive income. Under the clean surplus earnings concept, there exists complete articulation between the balance sheet and the income statement (known as the clean surplus relationship or CSR). By contrast, dirty surplus earnings exclude certain transactions, (so-called dirty surplus flows) which represent violations of the CSR. Transactions that give rise to dirty surplus flows, such as asset revaluations, currency translation differences, goodwill write-offs on business acquisitions and disposals, are reported directly as movements in shareholders' funds, bypassing the income statement. Such an accounting procedure might have implications for measures of company value and performance based on earnings, as certain gains and losses are excluded from the earnings figure. Moreover, implications might vary across accounting regimes as accounting standards across the world vary with respect to the degree of dirty surplus accounting that is allowed. For example, Frankel and Lee (1999) state that in Anglo-Saxon countries, especially the U.S., accounting is closer to clean surplus than in Continental-European countries such as France and Germany and this might cause problems when accounting-based measures of value are used for international comparisons. Although the academic literature and standard-setting entities have long acknowledged these problems (e.g. Black, 1993; Frankel and Lee, 1999; Francis, Olsson and Oswald, 2000; Chen, Jorgensen and Yoo, 2004; International Accounting Standards Board, 2005 – *Financial Performance Reporting Project*), no conclusive evidence currently exists concerning either the magnitude and nature of dirty surplus accounting in different countries, or the potential impact on valuation and performance measures that rely on accounting numbers. This research seeks to address these questions.

Previous studies, such as Dhaliwal, Subramanyam and Trevezant (1999) and Wang (2003), have addressed the question of the magnitude of dirty surplus flows by applying algorithms to machine-readable data from commercial databases. However, after comparing the measures of dirty surplus flows based on these algorithms with the dirty surplus flows reported in the companies' financial statements, I conclude that algorithm-based measures do not accurately capture the amount and nature of dirty surplus flows. This failure is often a consequence of imprecise financial reporting from the companies' side, which sometimes reflects the lack of clear accounting standards on how to treat and disclose such flows. I seek to overcome this problem and obtain an accurate measure of the magnitude and nature of dirty surplus by collecting information directly from published financial reports. This is a complex and labour-intensive assignment given the opacity of certain financial reports and the fact that non-U.K. companies often report in their native language. For that reason, I restricted certain parts of my analysis to a sub-sample of companies from four countries (France, Germany, the U.K. and the U.S.). I ensure that the sample represents different industries and size groups, as well as capturing substantial variation in the range of permitted dirty surplus accounting practices. I complement this data with algorithm-based measures of dirty surplus flows from large datasets obtained from commonly used commercial databases.

Based on data gathered from companies' financial reports during the period 1993 to 2001, I present evidence that dirty surplus flows are negative on average, and that there exists significant cross-country variation in such flows. French and German companies report larger dirty surplus transactions while such practices are less common among U.K. and U.S. companies. However, if goodwill write-offs resulting from merger accounting (pooling-of-interests) are included as a dirty surplus category, U.S. companies become responsible for most of the dirty surplus accounting flows. This is mainly attributed to companies from the financial sector where merger accounting has been frequently applied in the U.S. Overall, the most important category of flows in the sample are goodwill-related items, which regulators are now eliminating. For example, the pooling-of-interests method is not permitted in the U.S. after June 2001. Other relevant dirty surplus practices used by the companies in the sample include asset revaluations in France and in the U.K., adjustments due to currency translation and consolidation in Germany, and currency translation differences and adjustments for marketable securities in the U.S.

Based in these findings, I investigate the impact of dirty surplus accounting on accounting-based measures of performance. Specifically, I assess the effect of disregarding dirty surplus flows on a measure of abnormal performance denoted Excess Value Added (EVC). EVC corresponds to the terminal value of the realised clean surplus residual income cumulated over a multi-period interval, adjusted by beginning- and end-of-interval differences between economic value and accounting book value (O'Hanlon and Peasnell, 2002). Comparing clean surplus EVC with dirty surplus EVC enables me to examine the effect of disregarding dirty surplus flows when using accounting earnings to measure abnormal economic performance. Empirical results indicate that disregarding dirty surplus flows from earnings results in bias (signed measurement error) in the EVC measure of abnormal performance and that the effect varies across the four countries. However, bias in EVC is largely driven by goodwill-related flows that, as mentioned above, are being eliminated in some jurisdictions. Omission of dirty surplus flows also creates significant inaccuracy (absolute measurement error) in abnormal performance measurement for all classes of dirty surplus flows and in all accounting regimes studied.

I continue my analysis of the implications of omitting dirty surplus flows by exploring the effects of such omissions on equity valuation. Equity value is typically defined as the present value of expected future dividends (PVED). PVED can be expressed as the residual income valuation model (RIVM), provided that the CSR holds for projected accounting numbers, and projected closing and opening book values of equity are consistent across accounting periods. PVED can also be expressed as the abnormal earnings growth model (AEGM), provided that there is consistency in projected earnings, earnings changes and retained earnings across periods. It has been argued in previous studies that intrinsic value estimates from the RIVM might be distorted if projections of accounting earnings used to implement the model violate the CSR (Francis, *et al.*, 2000). Further, it has been acknowledged that implementations of the models using analysts' forecasts of earnings as proxy for projections of future flows might result in valuation errors because analysts' forecasts usually do not include dirty surplus flows (Cheng, 2005). Furthermore, the problem becomes more acute when using accounting-based value estimates in international comparisons since the magnitude and nature of dirty surplus accounting practices vary across countries (Isidro, O'Hanlon and Young, 2004). As a response, recent studies have proposed the use of the AEGM, which does not rely on the CSR (Ohlson and Juettner-Nauroth, 2000; Ohlson, 2003; Gode and Mohanram, 2003; Chen, *et al.*, 2004; Daske, 2005). The importance of dirty surplus flows in equity valuation depends on whether market participants believe that such flows are associated with expected future dividends. If this is the case, then omission of expected dirty surplus flows in standard applications of the accounting-based models might result in important valuation errors. I investigate this issue by exploring the relationship between valuation errors in the RIVM and AEGM and expected future dirty surplus flows. I demonstrate analytically that both models yield identical intrinsic value estimates and identical valuation errors from omission of dirty surplus flows, as long as there is consistency in projections of accounting numbers. I then investigate empirically the relationship between valuation errors (difference between intrinsic value estimates and the observed price, scaled by price) and total dirty surplus flows, both in terms of bias (signed valuation errors) and inaccuracy (absolute valuation errors), in four countries: France, Germany, the U.K. and the U.S. Overall, empirical results provide limited evidence of a significant relationship. Only in the case of the U.S. do I find some supporting evidence of a negative (positive) relationship in terms of bias (inaccuracy). For this country, I also find evidence of differences in the relationship relative to that observed in the other three countries, as well as cross-industry differences with respect to companies in the financial sector.

1.2 Structure of the thesis

This thesis is organised in six chapters. The next chapter reviews the debate and research findings relating to income measurement and disclosure. I start by presenting the arguments in favour and against the two extreme definitions of income: current operating performance and comprehensive income. I review the historical debate among academics and the position adopted by regulators in the recent decades in four accounting regimes: France, Germany, the U.K. and the U.S. Given the increasing importance of international accounting standards, I also include the IASB position on the issue of income reporting.[1] In this context, I present the CSR and show the type of CSR violations found in the accounting rules and in practice within the four countries during the period 1993 to 2001. I also review the main empirical findings on the usefulness of net income versus comprehensive income, and on the value relevance of CSR violations.

Chapter 3 provides evidence on the magnitude and nature of dirty surplus accounting flows in France, Germany, the U.K. and the U.S. during the period 1993 to 2001. I show the level and characteristics of dirty surplus accounting reported by a sample of companies from each of the four countries. The chapter also provides evidence on the accuracy of different data sources and methods of measuring dirty surplus flows. I explore the reliability of the algorithm-based methods used in previous studies to determine dirty surplus flows by comparing the dirty surplus flows reported in the companies′ financial statements with those computed using algorithms.

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[1] The International Accounting Standards Board (IASB) was established as the standard-setting body of the International Accounting Standards Committee (IASC) Foundation as from 1 April 2001. The IASB issues International Financial Accounting Standards (IFRS) but also endorses the previous standards, the International Accounting Standards (IAS), issued by the International Accounting Standards Committee (IASC). Throughout this thesis, I refer to international accounting standards as to the complete set of IAS and IFRS.

Chapter 4 reports findings on the implications and cross-country variation therein, of dirty surplus accounting practices on accounting-based measures of performance. Using the sample and data from chapter 3, I analyse the bias and inaccuracy created in a measure of abnormal performance (EVC) by omitting dirty surplus flows from clean surplus earnings. I investigate different classes of dirty surplus flows responsible for bias and inaccuracy in EVC and I test for differences across the four countries considered (France, Germany, the U.K. and the U.S.). I then explain the link between the EVC measure of abnormal performance and the RIVM, through the CSR.

Chapter 5 studies the implications of omitting dirty surplus flows in intrinsic value estimates obtained from the RIVM and AEGM. I explore the link between the PVED and the accounting-based valuation models and develop an analytical expression of the valuation error caused by omitting dirty surplus flows from projected accounting numbers. I then perform a series of empirical tests that explore the relationship between valuation errors and expected future dirty surplus flows.

Finally, chapter 6 presents the main conclusions of this thesis.

Chapter 2

Reporting Income and the Clean Surplus Relationship

2.1 Introduction

In this chapter I present the concepts of clean surplus income and dirty surplus income. I also review the historical and on-going debates concerning these concepts within the context of reporting income. The debate on the definition and disclosure of income was particularly lively in the U.S. during the 1930s. Since then, the discussion spilled over to other jurisdictions and involved several financial statement user groups. Because the income figure is of particular importance in the measurement of business value and performance, academics, regulators, investors and other users of financial information have been particularly active in this debate. I review that debate and show how regulators in different accounting regimes have dealt with the topic of reporting income. I also review the main findings of empirical studies on the usefulness of comprehensive income and net income.

The chapter is organised as follows. The next section introduces the concept of income. Section three presents the clean surplus relationship and illustrates violations of that relationship. Section four presents the debate surrounding the all-inclusive and operating income concepts. An historical overview of the regulators position in different accounting regimes is presented in section five. Section six reviews the main findings of the empirical literature on the usefulness of net income and comprehensive income. Section seven concludes.

2.2 The concept of income

The objective of accounting numbers is to provide information about the financial position and performance of an enterprise that is useful for economic decision-making (*International Accounting Standards Board (IASB)* framework, point 12). During the

1930s, particularly in the U.S., the emphasis of financial reporting moved from providing financial information for managers and creditors to providing information for shareholders. The market crash of 1929 and the economic depression that followed generated widespread concern about financial disclosure, and market participants questioned whether certain accounting practices led to poor investment decisions (Wolk, Tearney and Dodd, 2001). As a result, the professional accountants' association (the American Institute of Accountants - AIA, the predecessor of the American Institute of Certified Public Accountants - AICPA) and the stock market authority (the New York Stock Exchange - NYSE) began joint work to develop a set of accounting principles and rules, including ones on income reporting, designated to protect investors' interests.[2]

Income plays a central role in evaluating companies' financial performance and value-creation. As a summary measure, it condenses information that is disclosed separately, thus requiring less time and knowledge to analyse (Black, 1993). As a financial indicator, income is often the core figure in business decisions such as executive compensation, debt covenants and IPO' valuations (Dechow, 1994). Often considered the most important figure in the financial statements (Arthur Anderson & Co.,1962; Kiger and Williams, 1977), the concept of income has attracted a lot of discussion among users, researchers and regulators.

Two extreme positions can be identified regarding the definition of income: a focus on 'current operating performance' and a focus on 'all-inclusive income'. The current operating performance concept focuses on the ordinary and recurring operations of the company. Any extraordinary and non-recurring items are excluded from net income. In contrast, the all-inclusive concept requires net income to include

[2] In 1930, the AIA started collaborate work with the NYSE, which led to the first document dealing with 'generally accepted accounting principles'.

all items affecting the net change in equity of the company during the period, with the exception of transactions with owners. The all-inclusive income concept is sometimes referred to as clean surplus or comprehensive income. According to the Financial Accounting Standards Board (FASB), *Statement of Financial Accounting Concepts (SFAC) 3: Elements of Financial Statements of Business Enterprises*) and *SFAC 6: Elements of Financial Statements*, comprehensive income is defined as:

> ".... the change in equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources. It includes all changes in equity during a period except those resulting from investments by owners and distributions to owners."

The FASB distinguishes earnings from comprehensive income in *SFAC 5: Recognition and Measurement in Financial Statements of Business Enterprise*, issued in 1984. Both earnings and comprehensive income have the same broad components – revenues, expenses, gains and losses. However, earnings is a narrower concept than comprehensive income.

2.3 The clean surplus relationship and violations

2.3.1 The clean surplus relationship

If the all-inclusive concept is adopted, all revenues, expenses and other gains and losses are included in income. As a result, there is a complete articulation between the balance sheet and the income statement, and the lifetime net income of the business equals the aggregate net distributions to shareholders over the company's life, independent of accounting policy choices. This articulation is referred to as the 'clean surplus relationship' (CSR). In equation form the book value of shareholders' funds at time t is:

$$B_t = B_{t-1} + X_t - D_t, \qquad \text{(CSR)}$$

where:

B = Book value of the shareholders' funds;

X = Net income defined as comprehensive income or clean surplus earnings;

D = Dividends net of equity issues.

2.3.2 Dirty surplus accounting

Regulators have often defended the concept of clean surplus income but in practice they have allowed certain transactions to be reported directly in equity, thereby bypassing the income statement. That practice is known as 'dirty surplus accounting' and the transactions responsible for the CSR violations are referred to as 'dirty surplus flows'. Examples of dirty surplus accounting include revaluations of assets, unrealised gains and losses from marketable securities, differences from currency translation, consolidation adjustments, and prior-year adjustments.

Accounting standards across the world allow for violations of the CSR, but the degree to which the relationship is violated varies from country to country. It is believed that in Anglo-Saxon accounting regimes, especially in the US, accounting is closer to clean surplus than in Continental-European countries such as France and Germany (Frankel and Lee, 1999, p.2).

Table 2.1 documents the dirty surplus accounting practices allowed in different GAAP regimes. Table 2.1 also documents international differences in dirty surplus accounting practices found by directly observing the financial reports of eighty companies from France, Germany, the U.K. and the U.S. during the period 1993 to 2001. I refer to these countries because they are usually identified in the international accounting literature as representatives of different accounting systems (Nobes and

Parker, 2002). These countries are also economically significant and characterised by substantial cross-country variation in the amount of dirty surplus accounting practices permissible under domestic GAAP. I also report sources of dirty surplus accounting under the IASB international accounting standards, given the increasing importance of these standards. For example, in France and Germany, legislation introduced in 1998, allows companies to switch to international accounting standards or U.S. GAAP and I found that some companies actually choose to do so.[3] In addition, it is also expected that more European companies will adopt international standards since the European Union requires listed companies to apply international accounting standards in the consolidated accounts from 2005 onwards.[4]

Under French GAAP during the period 1993 to 2001, the most common dirty surplus accounting practices are goodwill write-offs, asset revaluations, foreign currency translation differences, and other dirty surplus flows such as certain investment subsidies, special provisions required by legislation, consolidation adjustments due to variations in the scope of consolidation and adjustments resulting from changes in accounting methods. This last type of adjustment is economically significant for some companies, especially post-1999, as a consequence of changes in the accounting rules regarding consolidation introduced by *Comité de Réglementation Comptable (CRC) 99-02* effective after January 1999. For example, the French company *BNP Paribas* reports adjustments to reserves due to changes in accounting methods of –19% of net income for the fiscal year 1999. French GAAP also allows for other dirty surplus flows, namely prior-year adjustments and provisions for

[3] Of a total of eighty companies in each country, I found that fourteen French companies and sixteen German companies adopted international accounting standards or U.S. GAAP in 2001.
[4] Regulation (EC) 1606/2002 of the European Parliament and the European Council requires listed companies to apply international accounting standards in the consolidated accounts by 2005. In the following cases the implementation can be delayed until 2007: (1) companies that have issued debt, but not equity securities, on a regulated market of a member state; and (2) companies that already use other international standards for the purpose of a listing outside a regulated market of a member state.

pensions when constituted for the first time. However, direct charging of these flows to equity is only allowed in exceptional situations and is rarely found in practice.

Under German GAAP during the period 1993 to 2001, dirty surplus accounting can arise from goodwill write-offs, foreign currency translation differences, restatements of previous years' figures and consolidation adjustments. Contrary to the situation in France and in the U.K., asset revaluations are not permitted. In practice, the most commonly found sources of dirty surplus accounting are goodwill write-offs, foreign currency translation differences, and consolidation adjustments resulting from changes in the scope of consolidation and in the consolidation method. For example, the company *Wella AG* reported dirty surplus flows (mostly resulting from foreign currency translation differences) corresponding to 64% of net income and 5% of shareholders' funds in 1997. Another potentially important category of dirty surplus flows in Germany concerns the so-called *Sonderposten mit Rucklageanteil* (special items with an equity portion).[5] These special items usually result from differences between tax accounting and financial accounting. For example, the depreciation expense allowed by tax rules may be higher than the economic depreciation. In order to be tax deductible, the tax depreciation should be charged to the income statement, the economic depreciation should be deducted from the asset value and the excess should be disclosed in the liabilities side of the balance sheet, as 'special item with an equity portion.[6] However, the special item is usually reported as a single total, without distinguishing between the tax effect (liability) and the equity effect. Another common transaction that gives rise to a special item in the balance sheet is the gain resulting from the disposal of assets. This gain is tax deductible if reinvestment is undertaken and a special item is reported. The special

[5] Also referred as 'special item with a reserve component' (TRANSACC, 2001, p.1287).

[6] This is required both by the German Commercial Code, where German accounting regulation is codified (*Handelsgesetzbuch* – HGB), and the Income Tax Act (*Einkommensteuergesetz* – EstG).

item may also include investment grants and tax benefits from promoting regional economy. The case of the German company *Creaton AG* illustrates how important the special items might be. In 2001, the company reported special items, representing more than 50% of shareholders' equity before special items (see appendix 2.1). There is no consensus on how to classify these special items: as equity item, as liability item, or partly equity and partly liability. The decision where to draw the line separating equity from liabilities is left to the user of the financial reports, as the reports often do not contain detailed information about the transactions underlying the special items.

In the U.K. during the period 1993 to 2001, the most important types of dirty surplus flows are asset revaluations, currency translation differences, and prior-year adjustments resulting from changes in accounting policies and fundamental errors. Until 1998, goodwill write-offs were the most important dirty surplus practice but the introduction of *Financial Reporting Standard (FRS) 10*: *Goodwill and Intangible Assets* eliminated this practice. The remaining dirty surplus items can still be large in magnitude. For example, for the fiscal year 2000, the U.K. company *Hammerson Plc* reported asset revaluations and prior-year adjustments corresponding to 250% and 40% of net income, respectively.

In the U.S., *SFAS 130*: *Reporting Comprehensive Income*, issued in 1997, recognises three dirty surplus items: unrealised gains and losses in marketable securities, currency translation differences, and adjustments related to additional minimum pension liabilities. But U.S. GAAP permits other dirty surplus accounting practices. Penman (2001) identified the following dirty surplus flows in addition to the ones in *SFAS 130*: certain adjustments resulting from changes in accounting policies, changes in accounting for contingencies, certain tax benefits, and deferred compensation related to employee stock options and stock. Nevertheless, from analysis of a small sample of U.S. financial reports during the period 1993 to 2001, I concluded that these other types of dirty surplus flows occur only rarely. Another source of dirty surplus accounting frequently found in the U.S. relates to the pooling-of-interests method used in accounting for business combinations. Under this method, goodwill, which represents the difference between the market value and the fair value of the net assets acquired, is not recognised and amortised as it is under the purchase method. Instead, the pooling-of-interests method effectively treats any goodwill as an immediate write-off against reserves, thereby creating a dirty surplus item. This category of goodwill is usually not referred to in the dirty surplus accounting literature but it gives the same result as writing-off goodwill to reserves (Penman, 2004). The pooling-of-interests method may have an important impact on earnings and could interfere with measures of performance or measures of value that rely on clean surplus earnings (Ohlson, 2000). The pooling-of-interests method of accounting has been allowed by the accounting standards in the four countries and by the IASB. However, contrary to the European countries where the pooling-of-interests method is rarely used in practice, it has been widely used in the U.S., particularly in the financial sector (Moehrle and Reynolds-Moehrle, 2001).[7] For example, the U.S. company *Union Platers Corporation* reported several mergers between 1993 and 1998 accounted for using the pooling-of-interests method. The aggregate amount of unrecognised goodwill in that period represents approximately three times the aggregate amount of net income over the same period. It is important to note that after June 2001, the pooling-of-interests method was eliminated as a method of accounting for business combinations in the U.S. (*SFAS 141: Accounting for Business Combinations*).

[7] Some reasons pointed out to justify the low frequency of pooling-of-interests mergers in Europe are: (1) restricted conditions to apply the method, (2) the low frequency of acquisitions by exchange of shares and (3) the relatively low benefits of using pooling compared to the purchase method since goodwill can be written-off against reserves and so bypassing the profit and loss account (TRANSACC, 2001).

Finally, the IASB international accounting standards during the period 1993 to 2001, allow for the following items to bypass the income statement: asset revaluations, foreign currency translation differences, gains and losses on available for sale financial assets, and prior-year adjustments.

2.4 The debate on clean surplus versus dirty surplus accounting

For more than sixty years, regulators and academics have been debating the issue of clean surplus accounting. The debate has been particularly active in the U.S. and usually relates to two aspects of financial reporting: (1) definition and measurement of income and (2) reporting of income.

According to Brief and Peasnell (1996), the first discussion about clean surplus accounting started in the beginning of the 20th century with the increasing interest in the role of the income statement. The discussion became more active during the 1930s with the increasing interest on the information provided by the income statement. In the 1980s and 1990s, some analytical research explored the relationship between residual income and the properties of accounting numbers for valuation using a clean surplus framework (Ohlson, 1989; Peasnell, 1982; Ohlson, 1995; Feltham and Ohlson, 1995). This work linked the discussion of the clean surplus relationship to the usefulness of accounting numbers for equity valuation. However, the debate on clean surplus earnings versus dirty surplus earnings is not only relevant to equity valuation. Accounting information, in particular the income number, has other roles in addition to valuation. The choice of net income or comprehensive income is also likely to have implications for performance measurement and reward systems (Biddle and Choi, 2002; Holthausen and Watts, 2001). Debate over whether the assessment of the company's past and future performance can be best achieved by current operating net income or comprehensive income is ongoing. In the next sections I review the arguments for and against the current operating and all-inclusive definitions of income.

2.4.1 The current operating performance concept

Some authors propose that non-recurring items should be removed from income and that the income statement should report only recurring operations (Dickinson, 1908; Paton and Stevenson, 1916 and 1976; Paton, 1922; May, 1937). Often, the argument presented to support this position is based on the usefulness of earnings for equity valuation. In particular, stripping non-recurring, abnormal items from earnings makes it a measure of permanent earnings, which is a better predictor of future permanent cash flows. For example, Black (1993) states that non-recurring items such as dirty surplus flows impair the ability of income to predict future cash flows and consequently earnings figures become less useful for valuation. Therefore, we should choose accounting rules that minimise variation in earnings to maximise the association between earnings and value. A similar statement is made by Arthur Anderson & Co. (1962). The former auditing company argued that the statement of income is more useful if net income represents only current operating performance. The argument is that users are better served by a figure of income that represents net results of operations because the inclusion of non-recurring items could impair the usefulness of income and give misleading inferences.

Another argument in favour of the current operating performance is that some users might not be capable of analysing the income statement and identifying extraordinary items and prior-year adjustments. Instead, managers are in a better position to eliminate the effect of these items from earnings because they possess superior information about the business. Opponents of this idea advise that smoothing earnings to have a permanent earnings figure might result in manipulations of earnings by managers (Hepworth, 1953). Black's (1993) answer to that argument is that a set of frequently revised accounting rules on how to construct earnings would reduce the scope for managers' manipulations. In Black's view, the right amount of smoothing makes earnings figure more objective and more informative. Another idea in favour of the current operating performance concept considers inter-period and inter-company comparability. It is argued that reporting non-recurring transactions directly in equity makes the earnings figure more meaningful for comparisons because it removes any distortion in earnings caused by abnormal events (Littleton, 1940; Davies, Paterson and Wilson, 1999).

Finally, some authors advocate the current operating performance approach because comprehensive income creates the possibility for double counting (Johnson and Reither, 1996). That possibility arises because certain unrealised gains and losses would be recognised in comprehensive income in one period and in income in a subsequent period when they are realised, which can mislead users of financial statements.

2.4.2 The all-inclusive (comprehensive income) concept

Supporters of comprehensive income claim that earnings should include all transactions that affect the net change in equity. One of the first authors who supported this concept was Littleton (1940). He advocated the presentation of all items of income, expense, and profits and losses in a single income statement because 'only in this way does the income statement fulfil its role of conveying information to absentee interests on the business'. More recently, Robinson (1991) added that financial statements should provide information about all facts, and managers should not be given discretion to decide what to include in net income. This way shareholders and users of the financial statements would be given all the information to make their own judgments.

It has also been argued that non-recurring items are more likely to be considered and understood by users if included in current income figures. The argument is presented in Johnson, Reither and Swieringa (1995) in their discussion of the FASB project on comprehensive income. The authors point out that adoption of the all-inclusive definition of income would make items that are usually not presented in the income statement more transparent and that this would facilitate understanding. This approach would bring to the income statement items that are often reported directly in equity such as unrealised gains and losses.

Some supporters of the comprehensive income concept emphasise the articulation between inter-period income figures. Littleton (1940) states that aggregated income reported each period should equal the total income over the life of the company because the company operates in a continuum with regular and irregular transactions throughout its life. Linsmeier, *et al.* (1997) also stress the importance of a clean articulation between the financial statements and hence the need for comprehensive income. With comprehensive income, the balance sheet will articulate with the income statement and that will articulate with the cash flow statement: cash items can be calculated by identifying the corresponding income statement item and the related changes in the balance sheet. The argument that comprehensive income impairs inter-period and inter-company comparability is contested by Littleton (1940). He counters this argument stating that properly organised statements will still allow comparability between income statement components. A similar point is made in

Linsmeier, *et al.* (1997). They argue that reporting comprehensive income in a single statement of income complemented with a proper component classification facilitates the reconciliation of accounts across jurisdictions. Linsmeier, *et al.* (1997) also defend the role of comprehensive income in equity valuation and performance measurement. They argue that both equity valuation and performance evaluation can only be complete if based on a measure that shows all sources of wealth creation. In order to enhance the usefulness of comprehensive income, Linsmeier, *et al.* (1997) defend the desegregation of comprehensive income into separate components.

Another argument introduced in Linsmeier, *et al.* (1997) is that comprehensive income disciplines users and preparers of financial statements. First, evaluating and rewarding managers based on comprehensive income would force them to focus on all sources of wealth creation. Secondly, targeting a comprehensive income number would force analysts to consider all sources of profitability when constructing forecasts. Finally, a comprehensive income approach would help standard setters in solving some recognition issues.

2.5 The position of the accounting regulators

The concept and presentation of income has been a major concern of regulators. They usually try to answer three general questions: (1) what should be included in net income? (2) should a measure of comprehensive income be reported? (3) where should it be reported? Regulators' answers have sometimes favoured the all-inclusive approach and other times have favoured the current operating performance approach. Currently a hybrid solution is adopted in most jurisdictions. In this section, I analyse the position of regulators in four accounting regimes: France, Germany, the U.K. and the U.S. For completeness, I also present the position adopted by the IASB.

2.5.1 The U.S.

The controversy regarding the definition and reporting of income has a long history in the U.S. accounting standard-setting process. According to Kiger and Williams (1977), during the period between 1940 and 1975 U.S. accounting standards moved from an all-inclusive approach to an extreme position of current operating performance, to end in a moderate concept closer to the all-inclusive. The *Accounting Research Bulletin (ARB) 8*: *Combined Statement of Income and Earned Surplus*, issued in 1941 by the Committee on Accounting Procedures of the AIA (currently the AICPA), showed a clear preference for a comprehensive income:

> '...Over the years it is plainly desirable that all costs, expenses, and losses of a business, other than those arising directly from its capital stock transactions, be charged against income'.

The *ARB 32*, issued in 1947, defended a similar position but determined that material items not identifiable with typical business operations were to be excluded from net income. Special items should either be presented in the income statement following the amount labelled as net income or in the statement of retained earnings. This mixed position reveals an intention to include all items in income but to have at the same time an operating measure of income. The *ARB 35* (1948) and *ARB 41* (1951), further revealed a preference for an operating performance concept, where it was argued that net income should not include items such as extraordinary items and contingency reserves and the most prominent figure in the income statement should reflect operating performance. *ARB 43: Restatement and Revision of Accounting Research Bulletins Nos. 1 – 42* (1953) followed the position expressed in *ARB 35* and *ARB 41*. Although accepting the inclusion of special items in the income statement, the

Committee indicated a preference for their presentation in the statement of retained earnings.

The next standard issued on this topic was *Accounting Principles Board Opinion (APB) 9: Reporting the Results of Operations*, issued in 1966. This pronouncement defined two levels of income: ‘income before extraordinary items’ and ‘net income’ to be placed at the bottom of the income statement with extraordinary items between them. This way, net income moves closer to the all-inclusive concept (prior-year adjustments are excluded from income) while users can still obtain a figure of income on the basis of operating activities. But in practice companies reported extraordinary items and other special items in a variety of ways leading to considerable public discontent. Kiger and Williams (1977) analyse companies’ reporting practices regarding special items during the period 1953 to 1966 and find that presentation of special items varied considerably. At the end of the period, 70% of companies reported the special items in the income statement while the remainder reported in the retained earnings statement. The companies that chose the income statement disclosed special items in various ways: (1) among other income items but disclosed separately, (2) aggregated with other income items but reported in notes and descriptive sections of the financial reports, (3) in a separate section in the income statement before net income, and (4) in a separate section in the income statement but after net income. In order to improve the concept of income, the APB issued opinions *APB 20: Accounting Changes* (1971) and *APB 30: Reporting the Results of Operations. Reporting the Effects of Disposal of a Segment of a Business and Extraordinary, Unsual and Infrequently Occuring Events and Transactions* (1973). These standards introduced the following changes: corrections of errors in previous financial statements constituted a prior period adjustment; a new figure of 'net income from continuing operations' was created; extraordinary items were defined in a more specific way; and discontinuing operations were to be included in net income before extraordinary items.

The FASB, the successor of the APB, made another step towards comprehensive income with *SFAS 8: Accounting for the Translation of Foreign Currency Financial Statements* (1975) and *SFAS 16: Prior Period Adjustments* (1977). With these two statements, the regulator changed the definition of prior-year adjustments as defined in *APB 9* and established that all items recognised during the period (with some exceptions) should be presented as part of net income.[8] At the same time, the concept of comprehensive income was formally introduced in accounting standards in a way consistent with the all-inclusive philosophy via *SFAC 3: Elements of Financial Statements of Business Enterprises* (1980). This statement was later replaced by *SFAC 6: Elements of Financial Statements* (1985).

The concept of income introduced in the statements discussed above gave rise to some debate regarding the components of net income, namely gains and losses resulting from currency translation, accused of introducing volatility in reported earnings. The FASB response appeared in 1981 with *SFAS 52: Foreign Currency Translation*, which allowed gains and losses resulting from currency translation to be taken to shareholders' funds rather than being included in net income. According to Walsh (1995), this turnaround of the all-inclusive concept of income expressed in *SFAS 8* had important implications. First, it linked the debate with the concepts of income measurement and capital maintenance defined in *SFAC 3*. Second, it created a precedent for direct entries to owners' equity. In fact, *SFAS 87: Employers'*

[8] The only gains and losses included directly in shareholders' funds were: (1) holding gains and losses recognised as part of quasi-reorganisation; (2) corrections of errors in the financial statements of a prior period; (3) adjustments arising from the realisation of tax benefits of pre-acquisition operating loss carry forwards of purchased subsidiaries; (4) items associated with certain industry specific accounting practices; and (5) adjustments arising from certain changes in accounting method (Walsh, 1995).

Accounting for Pensions (1985) and *SFAS 115*: *Accounting for Certain Investments in Debt and Equity Securities* (1993)[9], permitted certain pension adjustments and gains and losses on marketable securities to be written off to shareholders' funds. Furthermore, in the framework of the time, the FASB project on financial instruments, which resulted in *SFAS 133*: *Accounting for Derivative Instruments and Hedging Activities* (1998), would introduce new dirty surplus flows. About the same time, users of financial statements revealed some discontent about the amount of transactions bypassing the income statement. In 1993, the Association for Investment Management and Research (AIMR), one of the most influential user groups of financial statements according to Johnson, *et al.* (1995), issued a report expressing concerns about the increasing number of transactions bypassing the income statement. They proposed the introduction of comprehensive income and the disclosure of the components of comprehensive income. This position coincided with concerns expressed in the accounting research literature about the value-relevance of reported income and the possibility that the components of income have different predictive ability about future payoffs (Johnson, *et al.*, 1995). Internally, the FASB was also suffering pressures stemming from the project on financial instruments. Some members were concerned with the amount of transactions on financial instruments reported 'off-balance sheet' and intended to bring them into the financial statements. However, because these transactions were to be recognised at fair value, the impact in the financial statements could be dramatic. In response to these claims and considerations, in 1995 the FASB introduced in its agenda a project on reporting comprehensive income that later gave rise to *SFAS 130: Reporting Comprehensive Income*, applicable for fiscal year-ends beginning after 15 December 1997. The project assumes the

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[9] Following the previous *SFAS 12: Accounting for Certain Marketable Securities*, issued in 1975.

existing definition and measurement of comprehensive income and focuses on the question of presentation of comprehensive income (Johnson, *et al.*, 1995). A similar approach had been used earlier in the U.K. with the introduction of the Statement of Total Recognised Gains and Losses. *SFAS 130* requires that comprehensive income and its components should be reported in a financial statement that is displayed with the same prominence as other financial statements that are part of a full set of financial statements. Preference was given to the display in the income statement below net income or in a separate statement of comprehensive income, which begins with net income. Alternatively, the changes in components of comprehensive income can be presented in the statement of shareholders' equity. Under *SFAS 130*, the components of comprehensive income are: (1) unrealised gains and losses related to marketable securities, (2) foreign currency translation differences and (3) changes in additional minimum pension liability in excess of unrecognised prior service costs.

2.5.2 The U.K.

Compared to the U.S., a much wider use of dirty surplus accounting practices has been traditionally allowed in the U.K., including goodwill write-offs and asset revaluations.

The Accounting Standards Committee (ASC), the predecessor of the Accounting Standards Board (ASB), first dealt with the topic of reporting income in 1974 through the issue of *Statement of Standard Accounting Practice (SSAP) 6: Extraordinary Items and Prior Adjustments*. Confronted with a variety of practices regarding non-recurring items, the Committee adopted an all-inclusive position. The view of the ASC was that all expenses and revenues should be reported in the income statement because: (1) inclusion of all items in the profit and loss account gives a better view of the companies' profitability; (2) exclusion of non-recurring items requires the use of subjective judgements that can impair comparability across companies; and (3) systematic exclusion of non-recurring items may result in a distorted view of the company's profitability in the long run. Although in favour of the all-inclusive concept, the statement did not reject dirty surplus accounting when it is useful for users. The statement accepted that prior-year adjustments and items that either by law or as a result of accounting standards were specifically permitted or required to be taken directly to shareholders' funds could be treated in this way. It also advocated the separation between operating activities and non-recurring activities (extraordinary and exceptional items) within the income statement.

SSAP 6 was revised in 1986 and later superseded by *Financial Reporting Standard (FRS) 3: Reporting Financial Performance* (1992). Like *SFAS 130* in the U.S., *FRS 3* focuses on disclosure issues. It requires the disclosure of dirty surplus flows in a more transparent way. A Statement of Total Recognised Gains and Losses must be presented as a primary financial statement, including profit and loss for the period and all other movements in reserves reflecting gains and losses attributable to shareholders. A reconciliation of movements in shareholders' funds is also required combining the performance of the period as shown in the statement of total recognised gains and losses with all changes in shareholders' funds in the period, including capital transactions with owners. *FRS 3* is currently under revision in a joint project with the IASB in the area of reporting financial performance (IASB, 2005 – *Financial Reporting Project*). The main aim of the project is to develop a single statement of performance combining the current profit and loss account and statement of total recognised gains and losses and showing all gains and losses recognised during the period. According to *Financial Reporting Exposure Draft (FRED) 22*, issued in

December 2000, the revision of *FRS 3* follows the international move towards reporting comprehensive income.

In addition to *FRS 3*, the ASB issued other statements regarding specific dirty surplus items such as goodwill, asset revaluations and foreign currency translation. In the case of goodwill, *SSAP 22*: *Accounting for Goodwill* (1984) provided managers with a choice of how to account for purchased goodwill: direct write-off to shareholders' funds or a capitalisation approach without depreciation. In 1991, the ASB issued *Urgent Issues Task Force (UITF) 3*: *Treatment of Goodwill on Disposal of a Business* which required that previously written-off goodwill should be accounted for when reporting the gain or loss on the sale of a business. This eliminated one particularly important abuse whereby an acquirer could buy and sell a subsidiary for the same price, debit the acquired goodwill to reserves and book the same amount as 'profit on disposal'. Finally, in 1997, *FRS 10: Goodwill and Intangible Assets* eliminated the dirty surplus treatment of purchased goodwill in favour of the capitalisation option.

As with goodwill, the ASB attempted to eliminate discretionary practices regarding revaluation of assets and foreign currency translation. *FRS 15: Tangible Fixed Assets* (1999) requires that once companies choose to follow a policy regarding asset revaluation they must keep the assets valued up to date and they must revalue a whole class of assets and not 'cherry-pick' certain assets. Similarly, *SSAP 20*: *Foreign Currency Translation* (1980) restricts the translation of foreign currency to the closing rate/net investment method for most situations.

2.5.3 France and Germany

Discussion about the concept and reporting of income has been less prominent in France and Germany than in the U.S. and the U.K. Debate in the accounting literature on this topic is relatively scarce and regulators have not dedicated a specific accounting standard to the issue of reporting income. The absence of debate might be a result of the internationalisation of accounting standards, namely the adoption of international accounting standards and U.S. standards.[10] That is, as national accounting regulation adheres more to international regulation and more companies choose to follow international standards, the debate on accounting issues is transferred to the international institutions. In fact, in a sample of eighty companies from France and Germany I found fourteen French companies and sixteen German companies using either international accounting standards or U.S. GAAP in the period from 1993 to 2001 (especially in the later years).

Traditionally, French and German regulators have permitted a wider use of dirty surplus accounting practices than their U.S. and U.K. counterparts. In France, most of these movements are related to goodwill adjustments, currency translation differences, and other gains and losses such as consolidation adjustments and provisions required by law. In Germany, dirty surplus practices arise mainly from goodwill write-offs, foreign currency translation differences and other adjustments to reserves such as consolidation adjustments.

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[10] In France, Law No. 98-261 of 6 April 1998 allowed listed companies to use international accounting standards instead of national standards under certain conditions. Until 31 December 2002 and in the absence of international accounting standards, the companies may use internationally recognised standards (U.S. GAAP). In Germany, after a legislation reform in 1998, listed companies have the choice to prepare their group accounts in accordance to the German Commercial Code or to international accounting standards or U.S. GAAP. Additionally, the companies listed in the New Market (Neue Markt), launched in March 1997, were required to present financial statements in accordance with international accounting standards or U.S. GAAP.

More recently, French and German regulators seem to be joining the international tendency to improve the disclosure of financial performance. In France, the *Comité de Réglementation Comptable* (CRC), the French Accounting Regulation Committee, issued a standard revising the consolidation methodology adopted in 1986. The new standard, *CRC 99-02* in effect after 1 January 2000, introduced a new methodology (denominated Second Methodology), which now requires a statement of changes in shareholder's equity for consolidated accounts. Similar to the international standards the new standard allows some flexibility regarding the positions of the statement of changes in shareholder's equity: either as part of the main statements or as part of the notes, although preference is given to the last option. In Germany, the recently created *Deutscher Standardisierungsrat*, the German Accounting Standards Committee, issued *German Accounting Standard (GAS) 7: Group Equity and Total Recognised Results* requiring that, for periods commencing after 30 June 2001, consolidated accounts include a statement of changes in shareholders' funds. The statement should be reconciled with the earnings figure reported in the income statement.

2.5.4 The IASB

The IASB definition of income reflects a preference for the all-inclusive measure. The IASB conceptual framework refers to income as including all revenues and gains that may, or may not, arise in the course of the ordinary activities, together with any unrealised gains (IASB framework, points 74 to 77). The same view is expressed in *IAS 8: Net Profit for the Period, Fundamental Errors and Changes in Accounting Policies* (1999) which requires that all items of income and expense should be included in net income for the period unless an International Accounting Standard requires or permits otherwise.[11]

Nevertheless, the IASB allows certain items to be accounted for directly in shareholders' funds. The main examples include corrections to fundamental errors related to prior periods and effects of changes of accounting policies (*IAS 8*), revaluation of assets (*IAS 16: Property, Plant and Equipment*, issued in 1999, and *IAS 38: Intangible Assets*, issued in 1999), and certain exchange differences (*IAS 21*: *The Effects of Changes in Foreign Exchange Rates*, issued in 1995). Goodwill is required to be capitalised and amortised according to *IAS 22*: *Business Combinations* (1999) in line with *FRS 10* in the U.K.

Similar to U.S. GAAP and U.K. GAAP, international accounting standards require a separate statement of changes in equity showing the net profit or loss for the period, items recognised directly in shareholders' funds and the cumulative effects of changes in accounting policy and corrections of fundamental errors (*IAS 1*, point 86).

The IASB is currently discussing the issue under the Financial Reporting Project. The project, which started as a partnership-project with the U.K. regulators and other domestic standard setters, is as from 2004 a joint project with the FASB, designated the Joint International Group on Performance Reporting. The project concerns the presentation of financial performance and echoes a preference for comprehensive income. In motivating the project, the Board states that:

> "There is no strong conceptual motivation for having some income and expenses reported in an income statement while others are taken directly to equity."

The main focus of the project is:

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[11] *IAS 8*, point 7.

"...the development of a single statement of comprehensive income – i.e. a statement that reports all recognised income and expenses."

A statement of comprehensive income will be required and consequently the statement of changes in equity and the cash flow statement will undergo some changes. It is also an objective of the project to undertake the categorisation and display of components of reported performance in order to have consistency of presentation among reporting entities. The proposed statement of comprehensive income will contain four main categories of items: business, financing, tax and discontinued operations, with the bottom line figure being comprehensive income. The statement will be presented in a matrix or columnar format, with a column for income and expenses from re-measurements and a column for other income and expenses. The re-measurements column will include items such as asset revaluations, fair value adjustments, etc.

2.6 Evidence on the usefulness of net income and comprehensive income

Empirical research has attempted to contribute to the debate on clean surplus versus dirty surplus income by analysing the implications of different definitions of income for users of accounting information: investors, managers, financial analysts, etc.

Dhaliwal, *et al.* (1999) investigate whether comprehensive income or net income is a better measure of company performance. They test the association between net income and comprehensive income with the companies' market returns and future cash flows. The results indicate that net income is more strongly associated with market returns and is a better predictor of future operating cash flow and future income. Dhaliwal, *et al.* (1999) also test the association between each individual component of comprehensive income, as defined in *SFAS 130*, and stock returns and find that only marketable securities adjustments improves the association between returns and income. Not surprisingly, financial companies that usually have large amounts of financial assets are responsible for this result. Contrary to Dhaliwal, *et al.* (1999), Hand and Landsman (1998) find evidence that aggregated dirty surplus flows are value-relevant although transitory. In a study that implements the residual income valuation model, they find that dirty surplus items are significantly associated with market value but have a lower coefficient that earnings.

O'Hanlon and Pope (1999) conduct similar tests using a U.K. sample and both short-interval and long-interval tests. Their argument for using use long-term intervals up to 20 years is that the low association between short-interval returns and short-interval accounting variables found in studies like Dhaliwal, *et al.* (1999) may be influenced by the time differences in the recognition of events by the market and the financial reporting system. As the interval of analysis increases the effect of time differences diminishes and association between returns and income measures might became higher. Furthermore, the impact of some dirty surplus flows is likely to be spread over long periods and short-term analysis would miss part of the effect. For example, goodwill can have an economic life of 20 years. O'Hanlon and Pope (1999) find a strong association between ordinary profit and stock returns over short and long-intervals. Similar to the results of Dhaliwal, *et al.* (1999) for a U.S. sample, they find little evidence that U.K. dirty surplus flows are value-relevant even in long-intervals.

Cahan, Courtenay, Gronewoller and Upton (2000) also test the value-relevance of other comprehensive income items (asset revaluations and foreign currency translation reserves) for New Zealand companies. In contrast to Dhaliwal, *et al.* (1999) and O'Hanlon and Pope (1999), they show that comprehensive income is more value relevant than net income, which is mainly attributable to asset revaluations. They also find that the desegregation of comprehensive income into components is not incrementally value relevant beyond the aggregate comprehensive income figure. However, as pointed out by the authors, the results are difficult to generalise given the potential influence of outliers in their sample. The New Zealand capital market is small and influenced by a few larger companies.

More recently, Wang (2003) investigates the association of dirty surplus flows and stock returns in the EU countries. The study tests the value-relevance of reported net income and comprehensive income (measured by the author) and the incremental-value-relevance of comprehensive income in the presence of net income. Like Dhaliwal, *et al.* (1999) and O'Hanlon and Pope (1999), Wang (2003) reports that net income better explains stock returns than clean surplus earnings in Belgium, Germany, Denmark, France, The Netherlands and Portugal. The author attributes this result to the more permanent nature of net income. However, dirty surplus flows appear to have incremental explanatory power over net income for some countries (Germany, Spain, Finland, the U.K. and Sweden) but the study does not provide information on the type of flows or on the companies' characteristics responsible for that effect.

Although informative about the association between income measures, dirty surplus items and company value, these studies do not provide a basis for deciding whether these items should be disclosed and where they should be disclosed. To address this issue, Cahan, *et al.* (2000) analyse whether the disclosure of the components of comprehensive income in a separate statement of changes in equity affects the value-relevance of these items in relation to disclosure in the income statement. They analyse the incremental value-relevance relative to both comprehensive income and net income. The results indicate that the incremental value-relevance of the items does not change when they are disclosed in a separate statement, suggesting that the statement of changes in equity provides additional information to investors.

Hirst and Hopkins (1998) also investigate the disclosure implications of comprehensive income. They conduct an experiment with buy-side financial analysts to test whether the explicit disclosure of comprehensive income and its components as required by *SFAS 130* helps analysts detect earnings management through available-for-sale marketable securities. First, they find that analysts better identify comprehensive income when reported in the income statement. Second, they find that the difference in the analysts' stock price judgments between companies that manage available-for-sale marketable securities and companies that do not is mitigated when comprehensive income is displayed in a prominent way, particularly in the income statement. These results indicate that clear comprehensive income reporting helps analysts assess the quality of earnings and adjust their valuation judgment.

Maines and McDaniel (2000) complement the previous study by analysing the impact of different format presentations of comprehensive income on non-professional investors' judgments. Using a similar experimental framework as Hirst and Hopkins (1998), they test how MBA students' assessment of company performance varies with different formats of comprehensive income disclosure, especially with respect to unrealised gains in available-for-sale marketable securities. In line with Hirst and Hopkins (1998), the study provides evidence that non-professional investors' judgments about company and managerial performance is affected only when comprehensive income and its components are presented in a separate statement of comprehensive income. Both Hirst and Hopkins (1998) and

Maines and McDaniel (2000) studies seem to indicate that disclosure of comprehensive income in a prominent statement improves the users' perceptions.

Biddle and Choi (2002) also contribute to the debate on clean surplus and dirty surplus earnings by showing that different measures of income better serve different users and interests. They compare the usefulness of sixteen measures of income (including net income, comprehensive income and combinations of *SFAS 130* components in between) for three applications: information content, executive compensation, and prediction. Their results are as follows: (1) for information content purposes, measured in terms of equity returns, comprehensive income, as defined in *SFAS 130*, dominates other income measures, (2) executive compensation is more highly associated with net income, and (3) no income definition is superior in explaining future net income, future operating income and future cash flows. These results indicate that comprehensive income is more useful for explaining stock returns but net income is a better measure for evaluating managerial performance and explaining executive compensation. Biddle and Choi (2002) also concluded that in general, usefulness in the three applications increases with the introduction of more comprehensive income components.

Taken together, the results of the empirical studies seem to provide evidence on the decision usefulness of comprehensive income and support the disclosure of comprehensive income and its components in a prominent financial statement. This lends support to the IASB position on requiring a single statement of financial performance combining net income and comprehensive income.

2.7 Summary

For many decades academics and regulators have been trying to resolve the issue of how to measure and report financial performance. Usually two extreme positions are defended: reporting only current operating transactions (dirty surplus earnings) and reporting all the transactions (clean surplus earnings). The choice between net income and comprehensive income is an important choice because it is likely to have implications in equity valuation and performance measurement. Accounting research has provided evidence on these issues. For example, there is some evidence that the disclosure of comprehensive income in a prominent statement improves users' perceptions of company's performance. There is also evidence that net income may be more useful for evaluating managerial performance while comprehensive income may be better at explaining stock returns.

Until now, regulators across the world have adopted a hybrid measure of income that is based on an all-inclusive concept of income but that allows a certain level of dirty surplus accounting. However, the current position seems to favour the all-inclusive concept of income. In the U.S., *SFAS 130* requires the presentation of comprehensive income and its components in a prominent financial statement. The IASB are also developing a joint project with the FASB on reporting a single statement of income including both net income and comprehensive income.

The intense debate on the issue of reporting financial performance gives rise to the question of whether the existence of dirty surplus flows actually matters in practical contexts. In this thesis, I provide some evidence relevant to this question.

Table 2.1 - Reporting of Comprehensive Income and Dirty Surplus Accounnting

	France	*Germany*	*U.K.*
Panel A: Reporting of comprehensive income and/or movements in shareholders' funds			
Form of disclosure	Statement of Changes in Shareholder's Equity	Statement of Changes in Shareholder's Equity	Statement of Total Recognised Gains and Losses (STRGL)
Requirements	Required for consolidated accounts after 1 January 2000 (*CRC 99-02*)	Required for consolidated accounts after 30 June 2001 (*GAS 7*)	Reconciliation of movements in shareholders' funds Required after 22 June 1993 (*FRS 3*) Under revision (*FRED 22*)
Panel B: Regulation on dirty surplus accounting and companies' practice			
Goodwill write-off	Write-off against equity allowed in certain circumstances *CRC 99-02* (January 2000) restricts this practice to: 'only if it improves the true and fair view'	Write-off against equity allowed in certain circumstances	Write-off against equity allowed before FRS10 Goodwill is capitalised and amortised (*FRS 10* effective from 23 December 1998)
	Common practice	Common practice	Common practice before *FRS 10*
Revaluation of assets	Write-off to revaluation reserves	Not allowed	Write-off to revaluation reserve Reported in the STRGL (*FRS 15* effective after 23 March 2001)
	Common practice		Common practice
Foreign currency translation differences	Differences arising in the closing rate method are registered in equity (*ecarts de conversion*)	Differences arising in the closing rate method are registered in equity	Differences arising in the closing rate method are registered in equity Reported in the STRGL
	Common practice	Common practice	Common practice
Prior year adjustments and restatements	In exceptional cases can be written-off to equity	Restaments resulting from changes in accounting policies can be written-off to equity	Restaments resulting from changes in accounting policies or correction of fundamental errors are adjusted in the opening balance of reserves (*FRS 3* effective from 22 June 1993)
	Not frequent practice	Not frequent practice	Common practice

Table 2.1 (continued) - Reporting of Comprehensive Income and Dirty Surplus Accounting

	France	*Germany*	*U.K.*
Panel B: Sources of dirty surplus accounting and practice			
Unrealised gains and losses in financial instruments	In the income statement if recognised	Market-to-market not used	Gains and losses due to changes in value of long-term fixed rate debt and non-equity shares and due to early redemption of the above debt are registered in equity Reported in the STRGL (*FRS 13* effective from 23 March 1999)
			Rare practice
Pension adjustments	Pension provisions can be written-off to reserves when constitued for the first time and when correcting previous years		Actuarial gains and losses related to retirement benefits can be registered in equity Reported in the STRGL (*FRS 17* effective after 22 June 2001)
	Rare practice		Rare practice
Merger (pooling-of-interests)	Allowed in certain conditions	Allowed in certain conditions	Allowed in certain conditions
	Rare practice	Rare practice	Rare practice
Other dirty surplus flows	Investment subsidies Certain changes in accounting methods Special provisions imposed by legislation (c) Consolidation adjustments due to variations in the consolidation scope can be registered in equity	Consolidation adjustments due to variations in the consolidation scope Special items with an equity portion (d) (*sonderposten mit rucklageanteil*)	Deferred tax related to an item reported in the STRGL Reported in the STRGL (*FRS 19* effective from 23 January 2002)
	Common practice	Common practice	Not frequent practice

Table 2.1 (continned) - Reporting of Comprehensive Income and Dirty Surplus Accounting

	U.S.	*IASB*
Panel A: Reporting of comprehensive income and/or movements in shareholders' funds		
Form of disclosure	Reporting of comprehensive income in a main financial statement	Statement of Changes in Equity
Requirements	Required after 15 December 1997 (*SFAS 130*)	Required to present opening, closing figures and reconciliations of movements in equity Required after 1 July 1998 (*IAS 1*)
Panel B: Regulation on dirty surplus accounting and companies' practice		
Goodwill write-off	Write-off against equity not allowed Goodwill is capitalised and impaired (*SFAS 142* effective from 15 December 2001)	Write-off against equity not allowed Goodwill is capitalised and amortised (*IAS 22* effective from 1 July 1999)
Revaluation of assets	Not allowed	Write-off to revaluation reserve (*IAS 16* effective after 1 July 1999)
Foreign currency translation differences	Differences arising when the functional currency of the subsidiary is not USD and it is not located in a high-inflation rate country are registered in equity (*SFAS 52* effective from 15 December 1982) Reported as 'other comprehensive income' Common practice	Differences arising on monetary items that forms part of an net investment in a foreign entity (*IAS 21* effective from 1 January 1995)
Prior year adjustments and restatements	Restataments resulting from corrections of a material errors and recognition of certain tax benefits are adjusted in the opening balance of reserves (*SFAS 16* effective from 15 October 1977) Not frequent practice	Restaments resulting from changes in accounting policies or correction of fundamental errors are adjusted in the opening balance of reserves (*IAS 8* effective after 1 January 1995)

Table 2.1 (continued) - Reporting of Comprehensive Income and Dirty Surplus Accounting

	U.S.	*IASB*
Panel B: Sources of dirty surplus accounting and practice		
Unrealised gains and losses in financial instruments	Gains and losses on available for sale securities and derivatives designated as hedge in a net investment in a foreign entity or as hedge in the cash flow of a transaction are registered in equity Reported as 'other comprehensive income' (*SFAS 115* effective from 15 December 1993) (*SFAS 133* effective from 15 June 1999) Common practice	Gains and losses on available for sale financial assets and on certain hedging instruments are registered in equity Reported in the statement of changes in equity (*IAS 39* effective after 1 January 2001)
Pension adjustments	Additional minimum pension liabilities are registered in equity Reported as 'other comprehensive income' (*SFAS 87* effective from 15 December 1986) Not frequent practice	Actuarial gains and losses related to retirement benefits can be registered in equity Reported in the statement of changes in equity (*IAS 39* effective from 1 January 1999)
Merger (pooling-of-interests)	Allowed in certain conditions before *SFAS 141* Not allowed after *SFAS 141* effective from 30 June 2001 Common practice	Allowed in certain conditions: if combination is a uniting of interests (*IAS 22* effective from 1 July 1999)
Other dirty surplus flows	Some adjustments resulting from accounting changes and corrections of errors (*APB 20*) Changes in accounting for contingencies (*SFAS 11*) Some tax benefits (*SFAS 109*) Deferred compensation related to employee stock options and stock (*APB 25* and *SFAS 123*) Rare practice Items not classified as 'other comprehensive income' under *SFAS 130*	

Notes to table 2.1:

a. The table summarises the accounting regulation regarding the reporting of movements in shareholders' funds and dirty surplus accounting. It also refers to the occurrence of each type of dirty surplus flow in the financial reports of eighty companies of each country representative of different industry and size groups.

b. Abbreviations are as follows: *CRC* denotes *Comité de Réglementation Comptable* (French Accounting Standards Committee), *GAS* denotes German Accounting Standard, *FRS* denotes Financial Reporting Standard, *FRED* denotes Financial Reporting Exposure Draft, *SFAS* denotes Statement of Financial Accounting Standards, *IAS* denotes International Accounting Standard and *APB* denotes Accounting Principals Board Opinion.

c. Usually provisions for tax purposes, which must be recorded in reserves to be tax deductible.

d. Hybrid item with a reserve component and a liability component. Usually related to tax-deductible depreciation and tax benefits.

e. Sources used: TRANSACC (2001); Lewis, R. and Pendrill, D. (2000); Delaney, P., Epstein, B., Adler, J. and Foran, M. (1999); Ordelheide, D. and Pfaff, D. (1994); Scheid, J. and Walton, P. (1992).

Appendix 2.1 - Example of special item with an equity portion in Germany

CREATON AG

Extract of balance sheet		(000 EUR)
Equity and Liabilities	**2001**	**2000**
Shareholders' equity		
Subscribed capital		
Ordinary shares	10,752	10,752
Preferred shares	7,168	7,168
Capital reserves	37,774	37,774
Revenue reserves		
Reserves for own shares	9,100	6,790
Other revenue reserves	241	2,551
Accumulated loss	-5,770	-11,221
	59,265	53,814
Special reserves with an equity component		
Depreciation under section 4, Law Promoting Regional Economy Activity	26,243	32,715
Special item for investment subsidies	846	
Special item for investment grants	2,914	4,341
	30,003	37,056

Chapter 3

Dirty Surplus Accounting: International Evidence

3.1 Introduction

In this chapter I provide evidence on the magnitude and characteristics of dirty surplus accounting flows in four accounting regimes (France, Germany, the U.K. and the U.S.) as reported in companies' financial statements. I also provide evidence on the accuracy of different data sources and methods of measuring dirty surplus flows.

Under the clean surplus relationship (CSR), defined in the second chapter, all contemporaneous changes in book value from non-owner sources are included in net income. Accounting rules in various GAAP regimes allow certain violations of the CSR (termed dirty surplus accounting) and some authors have raised concerns that such dirty surplus accounting practices might hinder the usefulness of accounting numbers for the purpose of cross-country comparisons (Frankel and Lee, 1999). However, there is little evidence as to the level of dirty surplus accounting practices and the cross-country variation therein. In this chapter, I present evidence relevant to the concerns about dirty surplus accounting by documenting the magnitude and the nature of dirty surplus accounting flows in France, Germany, the U.K. and the U.S. during the period 1993 to 2001. I find evidence of considerable dirty surplus accounting practices, in particular related to goodwill, and that such practices vary in magnitude and nature across accounting regimes.

For the same countries, I also explore the reliability of the methods used in previous empirical research to measure dirty surplus flows. Specifically, I test the accuracy of the methods that apply simplified algorithms to the data provided by commercial databases. I test a set of algorithms previously used in the empirical literature. I conclude that algorithm-based measures of dirty surplus flows are often incorrect, which is in many cases a consequence of inconsistencies in the database data. Databases' failure to provide accurate data can be traced to the opacity of financial reporting regarding dirty surplus accounting, in particular in France and Germany.

The chapter is organised as follows. The next section describes the sources of data on dirty surplus flows. The third section presents the sample and the process of data collection. Results on the dirty surplus accounting practices are reported in the section four. Section five discusses the reliability of measures based on algorithms and section six concludes.

3.2 Sources of data on dirty surplus flows

3.2.1 Commercial databases

Previous empirical studies that have sought to measure dirty surplus flows typically rely on computer-readable sources of data such as Compustat, Datastream or Global Vantage. For example, Dhaliwal, *et al.* (1999) compute dirty surplus flows for a sample of non-financial U.S. companies as the summation of foreign currency translation differences, adjustments for marketable securities, and adjustments related to minimum pension liabilities using data provided by Compustat.[12] To establish the reliability of the commercial databases data, I select a number of company-years from the countries and period covered in the study and compare the data collected from the databases with the corresponding financial statements. I conclude that utilizing commercially available data to measure dirty surplus flows could result in large errors because the databases often fail to identify such flows accurately. In some cases the figures reported by databases are incorrect and in others the data is simply not available. Specifically, for the countries and period covered by the study, I found that Datastream (a commonly used source of European data) does not provide data on dirty

[12] See section 5 for details on the measure used in Dhaliwal, *et al.* (1999).

surplus related-items such as goodwill (#1103 and #1102), currency translation differences (#1098) and asset revaluations (#1099) for German and French companies. For the U.K., those items are available in Datastream but only for non-financial companies.[13] For the U.S., Compustat, provides information on dirty surplus related-items such as retained earnings related to foreign currency translation differences (#230) or retained earnings related to marketable securities (#238). The fact that Datastream and Compustat do a better job in providing data on dirty surplus flows for U.K non-financials and U.S. companies, respectively, is a consequence of the accounting standards in these countries. The components of changes in shareholders' funds reported by Datastream are based on data derived from the Statement of Movements in Shareholders' Funds required under U.K. GAAP as part of *Financial Reporting Standard (FRS) 3: Reporting Financial Performance*. In the U.S., *Statement of Financial Accounting Standard (SFAS) 130: Reporting Comprehensive Income* requires disclosure of comprehensive income and its components, comprising of foreign currency translation differences, unrealised gains and losses in marketable securities, and minimum pension liability adjustments, as part of a primary financial statement, which constitute the source for the items reported by Compustat. Because *FRS 3*, *SFAS 130* or any similar reporting requirement does not apply to U.K. financial companies, or to French and German companies, most of the relevant items are coded as missing by Datastream for these companies. Hence, the only reliable source of articulated data on capital movements and components of dirty surplus flows for U.K. financial, French and German companies is the notes to their published financial statements.[14]

[13] Note that Worlscope standardised Company Accounts set of data replaced Datastream Company Accounts data from April 2004.
[14] I also investigated the data provided by Global Vantage and concluded similarly.

An important issue when using the commercial databases concerns the reliability of data on dirty surplus flows. In the case of U.K. non-financial and the U.S. companies, it is possible to use the databases to collect a reasonable amount of accounting data. However, I found that some of the data provided are inaccurate. For example, for the U.S. company *Enron Corporation* I compared the data obtained via Compustat with the information reported in the financial statements for fiscal years 1998, 1999 and 2000. Compustat does not capture any dirty surplus flows (appendix 3.1, panel A) whereas the financial statements report foreign currency translation differences of –14, –579 and –307 million USD for the years 1998, 1999 and 2000, respectively (appendix 3.1, panel B). Consequently, using Compustat data to measure the company's dirty surplus flows, as in Dhaliwal, *et. al* (1999), will result in a measurement error (appendix 3.1, panel C).

One reason for commercial databases' failure is the difficulty to correctly disaggregate capital movements and dirty surplus flows, which in many cases is a consequence of unclear and uninformative financial reporting.[15] Capital movements can include complex transactions such as mergers and acquisitions, conversion of shares and restatements of previous years' accounts, which together with unclear financial statements results in incorrect reporting in the databases. A typical example is the Datastream item 'other changes in shareholders' funds' (#1104). Datastream reports this item as part of movements in shareholders' funds although it often contains both capital movements and dirty surplus movements. The database does not provide indications on how to classify 'other changes in shareholders' funds' and therefore the understanding and correct classification of this item can only be achieved by a detailed analysis of the financial statements. For example, for the U.K. company

[15] However this reason does not justify the Compustat error in the case of *Enron Corporation* presented in appendix 3.1.

Smith & Nephew Plc for the year 2001, Datastream reports 'other changes in shareholders' funds' (#1104) of 15.8 million pounds (appendix 3.2, panel A). Since there is no indication of the nature of this amount it is the researcher's task to decide whether to classify it as a capital movement or a dirty surplus flow. Only by directly investigating the financial statements, namely note 23 to the financial statements which contains a description of movements in reserves during the year (appendix 3.2, panel B), it is possible to see that part of the amount (17.9 million pounds) corresponds to goodwill on a joint venture (dirty surplus flow) and the remaining part (-2.1 million pounds) corresponds to a reduction of shares in the Qualified Employee Share Ownership Trust (capital movement).

Another situation that gives rise to the databases' inaccurate reporting of dirty surplus flows relates to adjustments or restatements to previous years' accounts. Both Datastream and Compustat do not have a 'prior-year adjustments' item, making it difficult to identify such dirty surplus flows. In the case of Datastream, it is only possible to detect prior-year adjustments by reconciling the shareholders' funds at the year-end (#1107) with the shareholders' funds at the beginning of the subsequent year (#1106). As shown in the example in appendix 3.2, panel B, note 23 of *Smith & Nephew Plc* financial statements for the year 2001, the company reports an adjustment of -61.6 million pounds to the accounts of year 2000 as a result of the introduction of *FRS 19: Deferred Tax*. The prior-year adjustment has to be obtained by computing the difference between closing shareholders' funds of 2000 and opening shareholders' funds of 2001 (appendix 3.2, panel C). For the U.S., Compustat reports restated figures although inspection reveals that the restatement items are often incorrect or not available. Given the limitations described above and in order to provide consistent evidence on dirty surplus accounting practice, most of the data used in this study was hand-collected from published financial statements in order to make good the gaps and discrepancies in the available machine-readable data.

3.2.2 Companies' financial statements

The most reliable source of information on dirty surplus flows seems to be companies' financial statements. However, since collecting data on dirty surplus flows from financial statements is a difficult task that requires time and knowledge, few previous studies used this approach (an exception is O'Hanlon and Pope, 1999).

The transactions that give rise to such flows are usually complex and not reported in a transparent way (e.g. mergers and acquisitions, reserves required by special legislation, consolidation movements). Correct classification and measurement requires expertise on the transactions and accounting methods applied. Further, the information regarding dirty surplus flows is sometimes spread across different parts of the financial statements such as the notes, the statement of movements in shareholders funds', and even the management report. Sometimes, the company does not clearly state whether an item is a dirty surplus flow or a capital movement. Thus, the classification between dirty surplus flows and capital movements can depend on the user's interpretation. Finally, the nature and level of dirty surplus flows allowed by accounting standards varies across GAAP regimes making it difficult to develop a single method to capture such flows. These situations are particularly common for French and German companies either because the accounting standards do not require disclosure of movements of shareholders' funds as in the U.K. and the U.S., or because investors often have alternative sources of information on the business thereby reducing the need for clear financial reporting. The financial reports of French and German companies frequently fail to provide details about capital and reserve movements and all movements in shareholders' funds have to be derived from the balance sheet figures. This makes identification of dirty surplus flows extremely complicated. For example, in the 1999 financial statements of the German company *Kromschroeder AG*, the only reference to movements in shareholders' funds is given in note 5. This note presents end-of-year figures and states that during the year the company engaged in equity increases and reclassification of reserves followed by a decrease in reserves. No other information is provided regarding the nature and amounts of the movements. Given all these limitations, it is not surprising that commercial databases, such as Datastream, Global Vantage or Compustat, do not capture the dirty surplus flows correctly and do not supply data on movements in shareholders' funds for France and Germany.

Is therefore a skilled and labour-intensive task collecting reliable data on dirty surplus flows from the published financial statements. This coupled with the fact that many of the financial statements are not prepared in English language, limits the potential scope of the analysis. For these reasons I restrict my analysis to four countries: France, Germany, the U.K. and the U.S. In addition to being economically significant, these countries boast a substantial number of publicly quoted companies, and within this group of countries there has been substantial variation in the range of permitted dirty surplus accounting practices over the test period. Restricting the focus to these four countries also ensures availability of a comprehensive archive of published financial statements on the Global Access database.

3.3 Sample and data collection

3.3.1 Sample selection

Table 3.1 provides details of the selection process. The sample selection procedure for each country begins with the identification of all stock exchange-listed financial and non-financial companies, active and non-active, for which data are available on either Datastream (in the case of the U.K., France and Germany) or Compustat (in the case of the U.S.) in 1997 (the mid-point of the sample period). Financial companies are retained because prior research indicates that dirty surplus flows in the U.S. tend to be significant in such companies (Dhaliwal, *et al.*, 1999, p. 47). I attempt to control for differences in industry composition and in relative within-country company size by assigning companies in a given country to one of four broad industry categories (basic - resources, basic and general industries and utilities; goods - consumer goods; services - services, information and technology; and financials) and one of four size categories. A typical size measure used in the literature is market value. However, because some of my subsequent analyses use market data, selecting companies based on market value could induce endogeneity problems. Accordingly, I use a non-market-based size measure. For non-financial companies, size is measured by total sales.[16] For financial companies, size is measured as the number of employees because Datastream and Compustat often do not report sales for financial companies.[17] Five companies from each of the resulting sixteen industry-size categories are then randomly selected to produce a final sample of eighty companies per country.

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[16] Datastream #104 for French, German and U.K. companies, and Compustat #A12 for U.S. companies.
[17] Datastream #219 for French, German and U.K. companies, and Compustat #A29 for U.S. companies. Pearson correlation coefficients between number of employees and fiscal year-end market values are 0.88 for France, 0.84 for Germany, 0.76 for the U.K. and 0.58 for the U.S.

A particularly important issue in this study is ensuring that companies in the sample accurately reflect the domestic set of accounting rules and practices. Given the internationalisation of capital markets and the movement towards the use of U.S. GAAP and international accounting standards, it is possible that selected companies may not report under national GAAP. I therefore check each set of financial statements to determine which GAAP sample companies report under. I find that in the case of France and Germany, a number of sample companies switched from domestic GAAP to international accounting standards or U.S. GAAP during the sample period. Other companies use their domestic GAAP but they state these rules are also in line with international accounting standards. As an example, the following statement was extracted from the French company *Hermes Int.* 1993 financial reports (notes to the consolidated financial statements, accounting policies):

> "The consolidated financial statements have been prepared in accordance with the principles stipulated by law of January 3rd 1985 and decree of February 17, 1986 concerning the consolidated financial statements of trading companies. These principles and methods comply with the international accounting standards of IASC."

Finally, I encountered cases where international accounting standards or U.S. GAAP were used in combination with domestic GAAP. For example, another French company, *Eridania Beghin Say*, states in the financial statements of years 1995 to 1999:

> "The consolidated financial statements have been prepared in accordance with French legislation on consolidated financial reporting and the current standards formulated by International Accounting Standards Committee, with the exception of the IAS 22 concerning

amortisation periods for goodwill and IAS 12 concerning the recording of provisions for deferred taxes on contingencies."

To ensure that I only select companies reporting under domestic GAAP, companies that switched to international accounting standards or U.S. GAAP or cases where it is unclear under which GAAP they report are removed from the sample and replaced with another company from the appropriate industry-size portfolio. This process is repeated until the French and German samples each contain eighty domestic GAAP companies. To limit the number of replacements to a manageable level, I treat as domestic GAAP companies as those that changed from domestic GAAP to international accounting standards or U.S. GAAP at the end of the test period (i.e. 2000 or 2001). For these cases, the last one or two periods in which domestic GAAP were not used are disregarded.

Another peculiarity evident in the data concerns cases where German subsidiary companies establish contracts to transfer their profits to their parent company.[18] As a consequence, these companies set the earnings figure in the profit and loss account to zero. In order to avoid companies with systematic net income of zero, I replace these subsidiary companies with alternative companies from the same industry-size portfolio.

3.3.2 Data construction

To examine cross-country variation in the level and type of dirty surplus accounting practices, I construct a fully articulated dataset of movements in shareholders' funds. The data is obtained from Datastream for European countries and Compustat for the

[18] Examples of companies with contracts to transfer earnings are: *Duewag*, 1996 (Datastream code: 936476) and *Friatec*, 1999 (Datastream code: 309899).

U.S., supplemented with extensive hand-collected data taken from the companies' published financial statements (via Thomson Research / Global Access).

I obtain a set of fully articulated data on book values, net incomes, dirty surplus flows and net distributions for each company and year in the following way. (For ease of notation, company subscripts are suppressed. All variables should be interpreted as realisations for company *i*.). First, the sources of periodic changes in shareholders' funds are assigned to one of three categories at time *t*: net income (*NI*), net capital distributions (*D*), or total dirty surplus flows (*TDSF*). Second, the dirty surplus flow category is decomposed into five categories as described below. Decomposing the CSR yields the following identity:

$$\begin{aligned} B_t &= B_{t-1} + X_t - D_t \\ &= B_{t-1} + NI_t + TDSF_t - D_t \\ &= B_{t-1} + NI_t + PYA_t - GW_t - GM_t + AR_t + OTH_t - D_t, \end{aligned} \tag{3.1}$$

where:

B	=	Book value of shareholders' funds;
X	=	Clean surplus earnings;
D	=	Dividends net of equity issues;
NI	=	Net income or clean surplus earnings excluding dirty surplus flows;
PYA	=	Prior-year adjustments (i.e. differences between the opening book value of equity at the start of a period and the corresponding closing book value of equity at the end of the previous period);
GW	=	Goodwill written-off, net of goodwill written back on disposal;
GM	=	Issue of equity unrecognised due to merger accounting, measured as the excess of the market value of equity issued in respect of transactions accounted for as mergers over the increase in equity recognised in the financial statements in respect of the mergers;

AR = Asset revaluations;

OTH = 'Other dirty surplus flows' (including foreign currency translation differences, adjustments for marketable securities, adjustments related to minimum pension liabilities, subsidies, and certain consolidation adjustments);

$TDSF$ = Total dirty surplus flows, as previously defined, equal to $PYA - GW - GM + AR + OTH$.

I employ the general expression (3.1) as the basis to measure the dirty surplus flows for each company and year using the data that it is possible to obtain via the databases. This is supplemented with hand-collected data from the financial statements in order to correct database errors and obtain the missing data. Since components of dirty surplus flows and disclosure requirements vary across countries, different data collection procedures are required for different countries. The following sub-sections outline the procedures used for each country examined.

<u>3.3.2.1 U.S. data</u>

For U.S. companies it was possible to collect a large part of the data from Compustat. The data were then checked and corrected in accordance with the published financial statements. Based on previous attempts to measure dirty surplus items in the U.S. (Dhaliwal, *et al.*, 1999; Hand and Landsman, 1998; Biddle and Choi, 2002), expression (3.1) is redefined as follows (Compustat items in parentheses):

$$\begin{aligned} B_t = B_{t-1} + NI_t - DV_t + CST_t + CSU_t - TRS_t + CUR_t \\ + MSEC_t + PEN_t + DIF_t + GM_t - GM_t, \end{aligned} \quad (3.2)$$

where:

B = Book value of common shareholders' funds (#60);

NI = Net income (#172) after deducting preferred dividends (#19);

DV = Common dividends (#21);

CST = Movements in common stock (change in #85);

CSU = Movements in capital surplus (change in #210);

TRS = Movements in treasury stock (change in #88);

CUR = Foreign currency translation differences (change in #230);

MSEC = Adjustment for marketable securities (change in #238); [19]

PEN = Adjustments related to minimum pension liabilities: measured as the change in additional minimum pension liability in excess of unrecognised prior service costs (#297 - #298, if negative);[20]

DIF = Other movements in shareholders' funds, measured as the difference between the flows referred to above and the change in book value between the end of the prior period and the end of the current period, as reported by Compustat. Because this residual item may include both capital transactions (including changes in the book value of equity due to mergers) and dirty surplus flows, I investigate its nature in each case by checking the published financial statements and reclassifying *DIF* where appropriate;

GM = Issue of equity unrecognised due to merger (pooling-of-interests) accounting. This item enters in expression (3.2) twice, once as a positive item to be treated as part of equity issues, and once as a negative item to be treated as a negative dirty surplus flow akin to a write-off of purchased goodwill. This item is equal to the excess of (1)

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[19] In some cases I observe that Compustat items #230 and #238 are not in accordance with the published financial statements. In these cases, I correct Compustat data #230 and #238 to be in accordance with the figures reported in the financial statements.

[20] This calculation operationalises pension costs in accordance with *SFAS 130*, section P16, paragraph 131.

the proceeds of the share issue related to the merger, estimated by reference to data from Center for Research in Security Prices (CRSP), on numbers of shares in issue and share price, over (2) the increase in the book value of equity relating to the merger, as obtained by inspection of the financial statements.

Items in expression (3.2) feed into those in expression (3.1) as follows next. The net income item (*NI*) in expression (3.1) comprises the corresponding item in expression (3.2). The prior-year adjustment item (*PYA*) comprises components of *DIF* in (3.2) that were identified as relating to prior-year adjustments. The item 'issue of equity unrecognised due to merger accounting' (*GM*) comprises the corresponding item in (3.2). The 'other dirty surplus flows' item (*OTH*) comprises the items described as *CUR*, *MSEC*, *PEN* and certain components of *DIF* from (3.2). The item 'dividend net of equity issues' (*D*) in expression (3.1) comprises the following items from (3.2): *DV* plus *TRS* less *GM* less *CST* less *CSU*. Goodwill write-offs and asset revaluations are not permitted in the U.S.

3.3.2.2 U.K. data

The data for U.K non-financial companies was available via Datastream. Nevertheless, it was necessary to analyse the financial statements in order to reclassify the residual item 'other changes in shareholders' funds' as either capital movements or dirty surplus flows. For U.K. financial companies, most of the data is hand-collected from the financial statements. Based on expression (3.1), U.K. data are collected using the expression below (Datastream items in parentheses):

$$\begin{aligned} B_t = {} & B_{t-1} + NI_t - DV_t + CAP_t + PYA_t - GW_t \\ & + AR_t + OTHER_t + OCBV_t + GM_t - GM_t, \end{aligned} \tag{3.3}$$

where:

B = Book value of common shareholders' funds. This is obtained from Datastream for non-financials(#1107), and collected manually from published financial statements for financials. The book value is adjusted to include the creditor for ordinary dividend payable;[21]

NI = Net income. Obtained from Datastream for non-financials (#1087) and collected manually from published financial statements for financials;

DV = Ordinary dividends (#187), less the increase in the creditor for ordinary dividend payable (see definition of BV above);

CAP = Capital issues (exclusive of movements in non-common capital). Obtained from Datastream for non-financials (#1101 – [change in #306 + change in #302]) and collected manually from published financial statements for financials;

PYA = Prior-year adjustments. Identified from Datastream in the case of non-financials and collected manually from published financial statements for financials;

GW = Goodwill written-off, net of goodwill written back on disposal. Obtained from Datastream for non-financials (#1103 – #1102) and collected manually from published financial statements for financials;

AR = Asset revaluations. Obtained from Datastream for non-financials (#1099) and collected manually from published financial statements for financials;

[21] Market value at year-end reflects the cum-dividend value of the company at that date but, in accordance with U.K. GAAP, U.K. companies report year-end book value net of dividends payable. In order to make book value consistent with market value, I estimate the creditor for ordinary dividend by multiplying the total dividend payable (#382) by the ratio of (1) ordinary dividend expense in the year (#187) to (2) total dividend expense in the year (#187+#181).

OTHER = Other flows. Obtained from Datastream for non-financials (#1098 + #1100) and collected manually from published financial statements for financials;

OCBV = Other changes in book value. This Datastream item (#1104) comprises both dirty surplus flows and capital items. All items in this category are reclassified, either to 'other dirty surplus flows' or to 'capital issues';

GM = Issue of equity unrecognised due to merger accounting. The issue of equity unrecognised due to merger (pooling-of-interests) accounting is dealt with as with the U.S. data. In the case of the U.K., the proceeds of the share issue related to the merger are estimated by reference to data on numbers of shares in issue and share price obtained from Datastream.

The items described in expression (3.1) as net income (*NI*), prior-year adjustments (*PYA*), goodwill (*GW*), issue of equity unrecognised due to merger accounting (*GM*), and asset revaluations (*AR*) comprise the corresponding items from expression (3.3). The 'other dirty surplus flows' item (*OTH*) comprises *OTHER* and certain components of *OCBV* from (3.3). The item 'dividend net of equity issues' (*D*) in (3.1) comprises the following items from (3.3): *DV* less *CAP* less *GM* less certain components of *OCBV*.

3.2.2.3 French and German data

The majority of the data were collected manually from the financial statements for the French and German companies. The framework used for collection of data is the same as that represented in expression (3.3), except for two items. First, as no instances of merger accounting arise in the data for either country, the item denoted *GM* is unnecessary and therefore omitted. Second, there is an additional term (*EUR*) that captures small changes in book value arising from the introduction of the single currency in January 1999, where Datastream converts all pre-1999 data reported in domestic currencies into Euros using a fixed exchange rate.[22] The expression to obtain the dirty surplus flows for France and Germany is as follows:

$$\begin{aligned} B_t &= B_{t-1} + NI_t - DV_t + CAP_t + PYA_t - GW_t \\ &\quad + AR_t + OTHER_t + OCBV_t + EUR_t \ . \end{aligned} \tag{3.4}$$

The item *OTHER* in expression (3.4) represents one of the more material dirty surplus flow categories for French and German companies. For French companies, this category includes items such as currency translation differences, subsidies, regulated provisions (provisions or reserves required by regulators for taxes, pensions and retirement purposes), consolidation adjustments and changes in accounting policies as a result of new accounting regulations (e.g. CRC 99-02).[23] For German companies, it includes unrealised appreciation in investments and various consolidation adjustments.

As with the U.K., the items described in expression (3.1) as net income (*NI*), prior-year adjustments (*PYA*), goodwill (*GW*), and asset revaluations (*AR*) comprise the corresponding items in expression (3.4). The 'other dirty surplus flows' item (*OTH*) comprises *OTHER, EUR* and certain components of *OCBV* from (3.4). The item 'dividend net of equity issues' (*D*) comprises the following items from (3.4): *DV* less *CAP* less certain components of *OCBV.*

[22] I use the same exchange rate to convert data that are manually collected from financial statements published in domestic currencies.
[23] This regulation deals with consolidation issues.

3.3.3 Period covered

I use data from the period 1993 to 2001. The choice of a nine-year sample window represents a compromise between the desire for a long-horizon on the one hand, and the need to ensure that the data collection task is manageable on the other. The start date is chosen because it coincides with the introduction by Datastream, our main machine-readable source for non-U.S. accounting data, of the systematic provision of information on dirty surplus flows. The start of the systematic provision of such data was occasioned by the introduction in the U.K. of *FRS 3*, which required a more transparent reporting of dirty surplus items than had hitherto been required. Choosing the year 1993 as the first year of the analysis ensures that, at least for U.K. non-financial companies, I obtain a reasonable amount of articulated data on movements in shareholders' funds from Datastream. I then apply the *FRS 3*-type template, as reported in Datastream for U.K non-financials, to all other companies in order to apply expression (3.3), which represents the movements in shareholders' funds.

For each sample company I collect net income, book value and dirty surplus flow data for all available years within the nine-year timeframe. Companies with less than nine years of data are retained to avoid biasing the country samples towards established and surviving companies. The final sample consists of 2,410 company-year observations for 320 companies. The distribution of observations across the four countries ranges from a high of 612 company-years for the U.K. to a low of 597 company-years for the U.S. The minimum number of years per company is two (two cases) and the maximum is 10 (two cases).[24]

[24] As a consequence of changes in the fiscal year-end two companies report financial statements twice in a year.

3.3.4 Special situations

3.3.4.1 German financial reporting

Notes to German financial statements are sometimes vague about the types of transaction that generate movements in shareholders' funds. This often limits readers' ability to decompose aggregate dirty surplus flows for German companies into their constituent components. For example, while the company *Walter Bau AG* states in the notes to its financial statements that it is company policy to set off differences resulting from currency translation against reserves, no information is provided on whether any such translations occur in the reporting period. Given the lack of clarity about movements on capital and reserves, many of the flows have to be obtained by reconciling the balance sheet figures supplemented by any available information disclosed in the notes to the financial statements. Consider the case of *Grammer AG* in year 1998 (appendix 3.3). The only way to construct and classify the movements in the reserves during the year is to analyse the balance sheet and income statement (appendix 3.3, panel A), consult note 7 to find the information on currency translation differences (appendix 3.3, panel B), and finally compute the difference between current year reserves and previous year reserves plus the identified movements (appendix 3.3, panel C). It is worthwhile noting the opacity of notes 7 (revenue reserves) and 7a (minority interests). These notes contain a description of the corresponding items and associated legal issues, but give no useful indication of the movements of the year, except for the currency translation differences.

German companies' balance sheets sometimes also include 'special items with a reserve component' or 'special items with an equity portion' (*Sonderposten mit Rucklageanteil).* These special items usually result from differences between tax accounting and financial accounting, government grants and subsidies, and tax benefits from promoting regional economy. As mentioned in chapter 2, section 3.2, there is no consensus whether these special items should be treated as equity or liabilities and the financial reports often do not clearly indicate which category such items belong to. As a consequence, commercial databases deal with these special items in different ways. For example, Datastream item #2018 (shareholders' equity) excludes special reserves, whereas Worldscope includes them with the designation 'WS.non-equity reserves'. The results reported in this study are based on data that exclude the special items from shareholders' funds. However, in the next chapter I consider the inclusion of these items as part of shareholders' funds (see chapter 4, section 7).

3.3.4.2 Merger (pooling-of-interests) accounting

I also consider the issue of equity unrecognised in the financial statements due to merger (pooling-of-interests) accounting. This dirty surplus flow is particularly important in the U.S. sample since merger accounting has been widely used in the U.S., especially in the financial sector (Moehrle and Reynolds-Moehrle, 2001). In the sample considered in this study, all cases of merger accounting relate to U.S. companies with the exception of one case in the U.K. Appendix 3.4 provides details about the companies in the U.S. sample and amounts related to merger accounting activity.

Merger accounting can be characterised as involving the non-recording of two exactly compensating items, an equity issue and an immediate write-off of associated goodwill, which results from the difference between the market value of the transaction and the corresponding book value. The market value of the transaction is given by the change in the company market value at the date of the transaction. That is: $\left(Sh_{after} \times P_{after}\right) - \left(Sh_{before} \times P_{before}\right)$, where Sh_{before} and Sh_{after} is the number of shares outstanding before and after the transaction, respectively, and P_{before} and P_{after} is the corresponding price of the shares before and after the transaction. Data on these variables are collected from CRSP. The date and the book value of the transaction are obtained from the financial statements.

I treat the 'issue of equity unrecognised due to merger accounting' as both a negative dirty surplus flow, akin to an immediate write-off of goodwill (dirty surplus flow) and an exactly compensating issue of equity (capital movement).

3.3.4.3 Currency uniformity

To ensure comparability across countries, all data are converted to Euros. For France and Germany, I follow the procedure used in Datastream and apply the fixed exchange rate between the local currency (French francs - FF and Deutschmarks - DM) and the Euro, established at 1st of January 1999, to all historical data. As a result of this conversion, some minor rounding differences occur when companies' accounts started to be presented in Euros. However, such differences are negligible and economically insignificant. For the U.K. and the U.S., data is converted from pounds Sterling (£) and U.S. dollars to Euros using the average exchange rate from December 1992 to December 2001.

3.4 Dirty surplus accounting practices in four countries

Table 3.2 reports summary statistics for market values, shareholders' funds and the movements therein for the pooled data and for each country separately. The figures for total dirty surplus flows and for dividends net of capital issues are each shown both inclusive and exclusive of the unrecognised issue of equity under merger accounting. Panel A reports mean and median unscaled values for the data items used in the analysis, measured in thousand Euros. Panel B reports the ratios of the aggregate items to the corresponding aggregate reported net income. Aggregate values are computed as the summation of all company-year observations for an item divided by the summation of all company-year observations for net income. Panel C reports means and medians of the individual company-year dirty surplus flows scaled by market value and tests of cross-country variation.

The results in table 3.2, panel A suggest that total dirty surplus flows across all four countries (either inclusive or exclusive of the merger accounting item) are negative on average. Dirty surplus flows are largest in France, followed by Germany, the U.K. and finally the U.S. However, when the merger accounting item is treated as a dirty surplus flow, aggregate flows are largest for the U.S. Nevertheless, it should be noted that, of the very large numbers reported in respect of the merger-related item for the U.S., approximately 95% relate to one company that undertook a number of very large mergers within the sample period.[25]

The ratio of aggregate dirty surplus flows to aggregate net income (panel B) varies substantially across countries. Exclusive (inclusive) of the merger accounting item, the ratio is -1% (-106%) for U.S. companies, -12% (-13%) for U.K. companies, -26% (-26%) for French companies and -32% (-32%) for German companies. In the U.K., France and Germany, the largest contributor to total dirty surplus flows is goodwill. In these countries, the ratio of this negative item to net income is 17%, 26% and 22%, respectively.[26] Other important classes of dirty surplus flows in the U.K. include prior-year adjustments (-4% of net income) and asset revaluations (11% of net

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[25] The company is *Union Planters Corporation*: a financial company (see appendix 3.4 for details on merger accounting in the U.S.).

[26] U.S. companies were not permitted to write-off goodwill directly to equity during the sample period.

income). In France, asset revaluations and 'other dirty surplus flows' are the most important sources of dirty surplus accounting after goodwill (-1% of net income and 1% of net income, respectively). In Germany, the second most important category of flows after goodwill is ‘other dirty surplus flows’ (-9% of net income), which includes consolidation adjustments and currency translation differences. In the U.S., merger accounting is the primary source of dirty surplus accounting flows (106% of net income). Apart from this category, dirty surplus accounting is relatively small, with ‘other dirty surplus flows’ representing the second most important source (-1% of net income). A decomposition and cross-country comparison of the ‘other dirty surplus flows’ category is presented in appendix 3.5. It is worthwhile noting that goodwill-related items (the most important category of dirty surplus flows) are being eliminated in some accounting regimes. Accounting regulators, for example in the U.S., restrict the use of merger (pooling-of-interests) accounting and require that goodwill be capitalised and depreciated (or subjected to periodic impairment tests).

Table 3.2, panel C reports means and medians for the individual company-year dirty surplus flows scaled by market value at fiscal year-end. For each item in each country, I report results of non-parametric signed-rank tests of the null hypothesis that the distribution of the item is centred on zero. I use non-parametric tests because of the relatively small samples used in this study and the consequent potential for large outliers to be influential. Rejections of the null hypothesis that the distribution of the dirty surplus flow item is centred on zero occur as follows: goodwill for the pooled sample and for France, Germany and the U.K.; unrecognised issues of equity under merger accounting for the pooled sample and for the U.S.; asset revaluations for the pooled sample and for France and the U.K.; 'other dirty surplus flows' for the U.S.; and total dirty surplus flows (both including and excluding the merger-related item) for the pooled sample, and for Germany and the U.S. These results provide evidence of significant dirty surplus accounting practices in all the four countries.

Panel C also reports probability values for non-parametric Kruskal-Wallis tests of the null hypothesis of equality across countries in the mean rank of each class of scaled dirty surplus flow. The null hypothesis of equality of mean rank is rejected at the 5% level for goodwill, merger-related flows, asset revaluations and total dirty surplus flows excluding the merger-related flow.

Overall, the results presented in table 3.2 suggest that dirty surplus flows are economically significant and that their incidence and magnitude vary significantly across the four sample countries.

3.5 Accuracy of algorithm-based estimates of dirty surplus flows

Many of the previous studies that have attempted to evaluate the dirty surplus flows apply simplified algorithms to data provided by the commercial databases (e.g. Dhaliwal, *et al.*, 1999; Wang, 2003). As shown above, the opacity of financial reporting, in particular in France and Germany, makes data collection from the financial statements a difficult task. Algorithms applied to commercial database data offer a faster and easier solution even though the databases do not always provide reliable and complete information about dirty surplus flows. In this section, I test the consistency of such dirty surplus flows measures. Since I obtain accurate measures of dirty surplus flows based on direct observation of the published financial statements, I am able to provide evidence on the reliability of algorithm-based dirty surplus flows.

3.5.1 Algorithm based on changes in shareholders' funds

A method commonly used in the empirical literature is to measure aggregate total dirty surplus flows ($TDSF_t$) as the difference between book value of shareholders' funds at the beginning (B_{t-1}) and end (B_t) of the accounting period after adding reported net income (NI_t) and capital transactions (CAP_t) and deducting dividends (DV_t), as follows:

$$TDSF_t = B_t - \left(B_{t-1} + NI_t - DV_t + CAP_t\right), \quad (3.5)$$

Examples of studies that use this type of algorithm include Hand and Landsman (1998), Wang (2003) and Chen, Jorgensen and Yoo (2004). As evidence of the magnitude of the error generated by applying this type of algorithm, table 3.3 reports summary statistics for the pooled and individual country samples for total dirty surplus flows computed using the financial statements and the above algorithm. Total dirty surplus flows based on financial statements are obtained as described in section 3, with extensive analysis of the financial statements, and two measures are reported: total dirty surplus flows inclusive and exclusive of the merger related item. The algorithm values are obtained by applying expression (3.5) to data obtained exclusively from the commercial databases without any correction based on financial statements. For the U.S., data is collected from Compustat. For France, Germany and the U.K. data is collected from Global Vantage. Besides being commonly used in international empirical studies that measure the dirty surplus flows (e.g. Cheng, 2005; Wang, 2003), Global Vantage also offers larger coverage than Datastream of the necessary items to construct the algorithm, particularly in the case of France and Germany. Thus I use Global Vantage for the three non-U.S. countries and Compustat for the U.S. Because I only have access to Global Vantage up to 1999, the analysis covers only the period 1993 to 1999, which results in a reduction of the sample size from 2,410 (as reported in table 3.2) to 1,416 company-year observations.

Table 3.3 shows a large difference between the value of total dirty surplus flows based on analysis of the financial statements and the value derived from the algorithm (denoted algoritm1). For the pooled sample, mean total dirty surplus flows excluding (including) the merger-related item is –10.5 (-51.2) million Euros, whereas mean total dirty surplus flows using the algorithm is 30.6 million Euros. The main difference occurs in the case of the U.S. because the algorithm does not capture the merger category of dirty surplus flows, which is the most important category of dirty surplus flows in that country. The other important case is France where analysis of the financial statements produces mean total dirty surplus flows of –35.3 million Euros whereas the algorithm yields a mean of 0.1 million Euros. The differences between the 'correct' total dirty surplus flows (both inclusive and exclusive of the merger-related item) and the algorithm-based total dirty surplus flows are statistically significant for all cases, except for Germany. Non-parametric Wilcoxon matched-pairs signed rank tests of the null hypothesis that the median of the difference of the ranks of the two measures is null is also rejected for all countries taken together and for France, the U.K. and the U.S. individually. Overall, the results in table 3.3 provide evidence that the type of algorithm typically applied in the empirical literature to compute dirty surplus flows might result in substantial measurement error.

3.5.2 Algorithm based on comprehensive income and net income

Another algorithm employed in previous studies such as Dhaliwal, *et al.*, 1999; Biddle and Choi, 2002 and Chen, *et al.*, 2004, computes total dirty surplus flows as the difference between comprehensive income and net income. The comprehensive income concept, presented in the chapter 2, section 2, is defined by the FASB as the change in equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources (*Statement of Financial Accounting Concepts (SFAC) 3: Elements of Financial Statements of Business Enterprises* and in *SFAC 6: Elements of Financial Statements).* Comprehensive income (CI_t) contains net income (NI_t) and other components of comprehensive, namely the dirty surplus flows. Therefore, the difference between the two concepts of income gives the total dirty surplus flows as follows:

$$TDSF_t = CI_t - NI_t, \tag{3.6}$$

The difficulty with this algorithm is that comprehensive income is not defined in many GAAP regimes and consequently companies do not report it. In the U.S., it is possible to use *SFAS 130* definition of comprehensive income and it is also possible to obtain that figure from companies' financial statements. However, in Europe accounting standards do not require the disclosure of comprehensive income and, with the exception of the U.K where *FRS 3* requires companies to present the Statement of Total Recognised Gains and Losses, it is not an easy task to compute a measure of comprehensive income. Commercial databases do not report a comprehensive income item, hence it has to be constructed either from combinations of other database items or by investigating the financial statements (thus reducing the benefit of using algorithms). The previous studies referred to above choose the first alternative. Dhaliwal, *et al.* (1999) and Biddle and Choi (2002) construct two measures of comprehensive income for U.S. companies using Compustat: one based on *SFAS 130* and other computed as the change from year *t-1* to year *t* of retained earnings (#36) adjusted for common dividends (#21). Because changes in retained earnings and other reserves can contain both dirty surplus flows and capital movements, the measurement of total dirty surplus flows based on comprehensive income might result in the exclusion of some dirty surplus flows or inclusion of capital flows. This is particularly important for countries other than the U.S. and the U.K. where more adjustments to retained earnings are necessary in order to construct comprehensive income. For example, Chen, *et al.* (2004) compute comprehensive income for a non-U.S. sample by adding items such as 'other equity reserves' and 'consolidation reserves' to retained earnings, which are likely to contain both capital and dirty surplus flows.[27] For this reason, I replicate the algorithm above for the U.S. sample only where it is likely to perform better.

In table 3.4, I report statistics on total dirty surplus flows for the U.S. sample obtained from the algorithm in expression (3.6), denoted algorithm2, and from extensive analysis of the financial statements described in the section 3. The mean total dirty surplus flows computed using algorithm2, is 33.2 million Euros, whereas the correct total dirty surplus exclusive (inclusive) of the merger- related item is –1.2 (-97.4) million Euros. The difference between the two measures is statistically and economically significant. Similar to the previous algorithm based on changes in shareholders' funds, the algorithm based on comprehensive income also provides an inaccurate measure of total dirty surplus flows.

3.5.3 Algorithms based on the summation of individual dirty surplus flows

The algorithms presented in expressions (3.5) and (3.6) do not provide information about individual dirty surplus flows. One way to obtain the individual categories of

[27] Chen *et al.* (2004) compute comprehensive income for non-U.S. companies as the sum of retained earnings (Global Vantage #131), unappropriated net profit (#132), other equity reserves (#133), cumulative translation adjustment (#134), legal reserves (#141) and consolidation reserves (#144) adding common dividends (#36).

dirty surplus flows is to use an additive algorithm that captures total dirty surplus flows by adding all dirty surplus items provided in the commercial databases. For example, Dhaliwal, *et al.* (1999) compute total dirty surplus flows as the summation of the dirty surplus flows defined in *SFAS 130*, foreign currency translation differences (CUR_t), marketable securities adjustments ($MSEC_t$) and pension liabilities adjustments (PEN_t):

$$TDSF_t = CUR_t + MSEC_t + PEN_t . \tag{3.7}$$

Table 3.4 compares total dirty surplus flows for the U.S. sample obtained using extensive analysis of the financial statements and using algorithm2 and the above algorithm, denoted algorithm3. The mean of total dirty surplus flows based on algorithm3 (-1,1 million Euros) does not differ significantly from the mean value based on the extensive analysis of the financial statements when the merger-related item is not considered. However, when the merger item is taken into account, the algorithm value becomes significantly different from the correct value obtained from detailed analysis of the financial statements. This result is not surprising as the unrecognised issue of equity under merger accounting is the most important dirty surplus item in the U.S., in the period analysed, and the remaining dirty surplus flows are relatively small when compared with the other sample countries (see table 3.2).

3.5.4 Correlation analysis

I investigate the association between total dirty surplus flows based on the financial statements and based on the three previous algorithms. Although algorithms do not produce accurate measures of dirty surplus flows, if algorithm-based values are strongly associated with the correct values they might still be useful in contexts where the researcher is interested in obtaining proxies of dirty surplus flows in a simple way.

Table 3.5 reports Spearman rank-order correlation coefficients between the financial statements-based and algorithm-based total dirty surplus flows values. I report Spearman coefficients because they consider the ranks of the observations instead of the observations themselves and do not require the normality assumption, which can be problematic given the potential influence of extreme observations. For algorithm1, results for the pooled sample indicate that the correlation between the ranks of the two total dirty surplus flows measures is approximately 0.5 (either including or excluding the issue of unrecognised equity under merger accounting). The cases where the coefficient is closer to one, thus showing a strongest association are the U.K. (0.78) and Germany (0.74). The cases where the coefficient is closer to zero (weakest association) are the U.S. [0.43 (0.35) excluding (including) the merger item] and France (0.36). For the U.S. sample, algorithm3 that uses individual categories of dirty surplus flows shows the highest association of all three algorithms [correlation of 0.83 (0.76) excluding (including) the merger item].

Generally, the correlation analysis reveals a positive and significant association between total dirty surplus flows computed with extensive inspection of financial statements and computed from the three algorithms based on database data. The association is particularly strong for the U.K. and the German sample when using an algorithm based on changes in shareholders' funds. For the U.S., the association with the true measure of total dirty surplus flows is strongest if the algorithm is based on individual categories of dirty surplus flows instead of changes shareholders' funds. This is not surprising as using individual items eliminates the possibility of polluting the measurement of dirty surplus flows with capital movements. However, the disadvantage of this approach is its limited applicability to the countries where such individual items are disclosed in the financial reports and commercial databases.

Overall, the analysis in this section reveals that employing the algorithms aforementioned will yield significantly different amounts of dirty surplus flows as compared to the amounts reported in the companies' financial statements. Therefore, it is only possible to obtain accurate measures of dirty surplus flows by investigating the financial reports. Nevertheless, the results show that in some cases there is a strong association between financial statements-based and algorithms-based values. Results also suggest that different algorithms might perform better in different countries. The algorithms can thus be used if one is interested in generating a relative ranking of companies other than measuring the precise value of dirty surplus flows.

3.6 Conclusion

This chapter discusses the methods used to measure dirty surplus flows and presents evidence on the magnitude and nature of dirty surplus accounting practice in four accounting regimes (France, Germany, the U.K. and the U.S.) during the period 1993 to 2001.

After inspecting the data provided in the commercial databases, I conclude that such data is often not a reliable source of information regarding dirty surplus flows either because these flows are not reported or because they are netted against capital transactions. To overcome the gaps encountered in the databases, I hand-collect data from published financial statements and verify the articulation of the data by reconciling all movements in shareholders' funds. This permits the correct identification of all movements in shareholders' funds and consequently the desegregation into capital flows and different categories of dirty surplus flows.

Detailed analysis of the financial statements also provides evidence that reporting of dirty surplus flows is still unclear in certain accounting regimes such as France and Germany and that this opacity is one of the reasons why commercial databases fail to provide accurate information about these flows.

Based on the unique set of data gathered from extensive analysis of the companies' financial statements, I present evidence that the distributions of classes of dirty surplus flows are often not centred on zero, and that there is significant cross-country variation in such flows. Dirty surplus flows are on average negative across the four countries and goodwill-related items are the most important flows.

Finally, I compare the total dirty surplus flows obtained using the financial statements with those that would be obtained by using simplified algorithms applied to commercial database data. I conclude that employing commonly used algorithms might result in large measurement errors of total dirty surplus flows but that there is a strong correlation between the algorithm-based and the financial statement-based measures. Given the intricacy of collecting information from published financial reports, algorithms can offer a simpler solution if the user's intention is merely to obtain a measure associated with the 'correct' dirty surplus accounting flows. Even so, an accurate measure of dirty surplus accounting can only be assessed by observing the companies' financial reports.

Table 3.1 - Sample selection

	France	*Germany*	*U.K.*	*U.S.*	*All*
Companies in databases lists at May 2002					
Active	425	822	1,469	11,827	14,543
Non-active	1,138	3,307	2,909	9,893	17,247
Duplicates	-1	-7	-7		-15
Total	1,562	4,122	4,371	21,720	31,775
Companies with availability of data on *sales or nr. employees* at 1997	321	561	1,381	9,105	11,368
Random selection of 5 companies of each of the 16 industry - size classifications [a]	80	80	80	80	320
Companies with:					
10 years of data [b]			2		2
9 years of data	31	38	38	46	153
8 years of data	19	13	8	2	42
7 years of data	9	8	7	7	31
6 years of data	8	5	14	7	34
5 years of data	6	11	9	7	33
4 years of data	5	3	2	8	18
3 years of data	2			3	3
2 years of data		2			2
Total number of observations	598	603	612	597	2,410

Notes to table 3.1:

a. The table reports the number of observations in each stage of the sample selection process. The sample was divided into four industry classifications and within those into four size classification resulting in a total of sixteen industry/ size classifications. Industry classifications are as follows:

. Basic:	Resources, basic and general industries and utilities
. Goods:	Consumer goods
. Services	Services, information and technology
. Financials	

b. As a consequence of changes in the fiscal year-end two companies report financial statements twice in a year.

Table 3.2 - Summary statistics

Panel A: Mean (median) values of variables (in thousand Euros)

Country	*Number of company-years*	*Market value*	B_{t-1}	*Accounting flows during accounting period t*										B_t
				NI_t	D_t *excluding* GM_t	D_t *including* GM_t	PYA_t	GW_t	GM_t	AR_t	OTH_t	$TDSF_t$ *excluding* GM_t	$TDSF_t$ *including* GM_t	
All	2,410	1,322,922.1	484,789.75	61,567.29	-23,890.09	-47,773.37	-322.19	9,152.86	23,883.28	383.02	-885.85	-9,977.88	-33,861.16	560,269.25
		(117,856.8)	(52,201.25)	(5,011.50)	(613.04)	(611.04)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(58,527.38)
France	598	1,984,302.3	880,414.83	98,701.35	-50,393.74	-50,393.74	5.63	25,590.58	0.00	-1,121.56	1,174.39	-25,532,12	-25,532.12	1,003,977.80
		(230,551.5)	(150,668.00)	(13,142.50)	(2,013.00)	(2,013.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(164,379.00)
Germany	603	873,670.4	362,348.27	32,275.00	-15,237.10	-15,237.10	-295.40	6,967.45	0.00	0.00	-3,049.96	-10,312.81	-10,312.81	399,547.56
		(93,055.0)	(33,042.00)	(3,626.00)	(1,076.00)	(1,076.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(35,281.00)
U.K.	612	500,641.1	191,596.85	24,363.36	2,709.93	2,539.35	-957.73	4,172.96	170.58	2,604.18	-495.33	-3,021,84	-3,192.42	210,228.44
		(43,448.7)	(22,544.02)	(2,198.99)	(516.51)	(516.51)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(25,981.38)
U.S.	597	1,957,142.3	512,733.56	92,096.43	-33,350.33	-129,588.73	-26.09	0.00	96,238.40	0.00	-1,164.01	-1.190,10	-97,428.50	636,990.22
		(121,757.47)	(54,624.06)	(4,584.48)	(-20.93)	(-20.93)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(62,250.63)

Table 3.2 (continued) - Summary statistics

Panel B: Aggregate of items scaled by aggregate net income

		Accounting flows during accounting period t									
Country	B_{t-1}	NI_t	D_t excluding GM_t	D_t including GM_t	PYA_t	GW_t	GM_t	AR_t	OTH_t	$TDSF_t$ excluding GM_t	$TDSF_t$ including GM_t	B_t
All	7.8741	1.0000	-0.3880	-0.7759	-0.0052	0.1487	0.3879	0.0062	-0.0144	-0.1621	-0.5500	9.1000
France	8.9200	1.0000	-0.5106	-0.5106	0.0001	0.2593	0.0000	-0.0114	0.0119	-0.2587	-0.2587	10.1719
Germany	11.2269	1.0000	-0.4721	-0.4721	-0.0092	0.2159	0.0000	0.0000	-0.0945	-0.3196	-0.3196	12.3794
U.K.	7.8641	1.0000	0.1112	0.1042	-0.0393	0.1713	0.0070	0.1069	-0.0203	-0.1240	-0.1310	8.6289
U.S.	5.5674	1.0000	-0.3621	-1.4071	-0.0003	0.0000	1.0450	0.0000	-0.0126	-0.0129	-1.0579	6.9166

Table 3.2 (continued) - Summary statistics

Panel C: Individual dirty surplus flow observations scaled by market value and tests of cross-country variation

Country		*Accounting flows during accounting period t*						
		PYA_t	GW_t	GM_t	AR_t	OTH_t	$TDSF_t$ *excluding* GM_t	$TDSF_t$ *including* GM_t
All	*Mean*	0.0000	0.0086	0.0024	0.0017	0.0012	-0.0057	-0.0081
	Median	0.0000	0.0000*	0.0000*	0.0000*	0.0000	0.0000*	0.0000*
France	*Mean*	0.0000	0.0067	0.0000	-0.0001	0.0009	-0.0059	-0.0059
	Median	0.0000	0.0000*	0.0000	0.0000*	0.0000	0.0000	0.0000
Germany	*Mean*	0.0007	0.0118	0.0000	0.0000	0.0014	-0.0097	-0.0097
	Median	0.0000	0.0000*	0.0000	0.0000	0.0000	0.0000*	0.0000*
U.K.	*Mean*	-0.0005	0.0155	0.0012	0.0066	-0.0002	-0.0096	-0.0108
	Median	0.0000	0.0000*	0.0000	0.0000*	0.0000	0.0000	0.0000
U.S.	*Mean*	-0.0002	0.0000	0.0083	0.0000	0.0027	0.0025	-0.0058
	Median	0.0000	0.0000	0.0000*	0.0000	0.0000*	0.0000*	0.0000*
p-value for difference [d]		0.344	**<0.001**	**<0.001**	**0.001**	0.307	**0.025**	0.307

Notes to Table 3.2:

a. The table reports summary statistics and tests of dirty surplus flows. Notation is as follows: *B* denotes book value of common shareholders' funds, *NI* denotes net income, *D* denotes ordinary dividends net of capital issues (positive (negative) sign denotes a positive (negative) net dividend), *PYA* denotes prior-year adjustments, *GW* denotes goodwill, *GM* denotes the unrecognised issue of equity under merger accounting, *AR* denotes asset revaluations, *OTH* denotes 'other dirty surplus flows', *TDSF excluding GM* denotes total dirty surplus flows exclusive of the merger-related item (= *PYA - GW + AR + OTH*), *TDSF including GM* denotes total dirty surplus flows inclusive of the merger-related item (= *PYA - GW - GM + AR + OTH*). Subscripts t-1 and t denote the beginning and end of the accounting period. For each row of aggregate and mean statistics, opening book value plus net income less net dividends plus total dirty surplus flows equals closing book value.

b. Data for the U.K. and the U.S. in Panel A are converted to Euros using the average exchange rate from December 1992 to December 2001.

c. In Panel C, * against the median indicates that one can reject at the 5% level the null hypothesis that the distribution is centred on zero (signed-rank test).

d. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank across the four countries.

Table 3.3 - Mean (median) of total dirty surplus flows obtained from financial statements and from the algorithm: $TDSF_t = B_t - (B_{t-1} + NI_t - DV_t - CAP_t)$

Country	*Number of Company-years*	*$TDSF_t$ (in thousand Euros)*			*p-value for difference[b] excluding GM*	*p-value for difference[b] including GM*
		Fin.statements excluding GM	*Fin.statements including GM*	*Algorithm1*		
All	1,416	-10,508.31 (0.00)	-51,157.13 (0.00)	30,577.51 (0.00)	**0.001**	**0.001**
France	302	-35,326.44 (0.00)	-35,326.44 (0.00)	102.00 (-1,170.50)	**<0.001**	**<0.001**
Germany	204	-11,325.72 (-9.50)	-11,325.72 (-9.50)	-9,974.13 (-183.00)	0.587	0.587
U.K.	313	3,802.74 (0.00)	-4,136.26 (0.00)	-4,702.11 (-128.00)	**0.003**	**0.005**
U.S.	597	-1,190.09 (0.00)	-97,428.49 (0.00)	78,347.45 (42.72)	**<0.001**	**<0.001**

Notes to Table 3.3:

a. The table reports mean, median and tests of measures of total dirty surplus flows. The financial statements values are obtained from extensive analysis of the published financial statements. Financial statements excluding *GM* denotes total dirty surplus flows ($TDSF_t$) excluding the unrecognised issue of equity under merger accounting (= *PYA* - *GW* + *AR* + *OTH*), *PYA* denotes prior-year adjustments, *GW* denotes goodwill, *AR* denotes asset revaluations, *OTH* denotes 'other dirty surplus flows'. Financial statements including *GM* denotes total dirty surplus flows including the unrecognised issue of equity under merger accounting (= *PYA* - *GW* - *GM* + *AR* + *OTH*). The algorithm values are obtained using exclusively database data. For France, Germany and the U.K., data is obtained from Global Vantage. For the US, data is obtained from Compustat. Algorithm1 is computed as follows: $TDSF_t = B_t - (B_{t-1} + NI_t - D_t - CAP_t)$, where *B* denotes book value of common shareholders' funds, *NI* denotes net income, *D* denotes ordinary dividends and *CAP* denotes capital transactions. Subscripts *t*-1 and *t* denote the beginning and end of the accounting period.

b. Probability values based on a Wilcoxon matched-pairs signed ranks test of the null hypothesis of median difference of ranks equal to zero. Probability values of 0.05 (5%) or less are printed in bold type.

Table 3.4 - Mean (median) of total dirty surplus flows for the U.S. sample obtained from financial statements and from algorithms

	$TDSF_t$ *(in thousand Euros)*			
Number of *company-years:597*	*Fin.statements excluding GM*	*Fin.statements including GM*	*Algorithm2*	*Algorithm3*
	-1,190.09 (0.00)	-97,428.49 (0.00)	33,162.61 (0.00)	-1,091.97 (0.00)
p-value for difference[b]				
Algorithm1	**<0.001**	**<0.001**		
Algorithm2	0.101	**0.002**		

Notes to Table 3.4:

a. The table reports mean, median and tests of measures of total dirty surplus flows. The financial statements values are obtained from extensive analysis of the published financial statements. Financial statements excluding *GM* denotes total dirty surplus flows ($TDSF_t$) excluding the unrecognised issue of equity under merger accounting (=*OTH*), *OTH* denotes 'other dirty surplus flows' and comprises of currency translation differences (*CUR*), adjustments for marketable securities (*MSEC*) and adjustments related to minimum pension liabilities (*PEN*). Financial statements including *GM* denotes total dirty surplus flows including the unrecognised issue of equity under merger accounting (=*OTH* + *GM*). Algorithms values are obtained using exclusively data from Compustat. Algorithm2 is computed as follows: $TDSF_t = CI_t - NI_t$, where *CI* denotes comprehensive income defined changes in retained earnings plus common dividends and *NI* denotes net income. Algorithm3 is computed as follows: $TDSF_t = CUR_t + MSEC_t + PEN_t$. Subscripts *t*-1 and *t* denote the beginning and end of the accounting period.

b. Probability values based on a Wilcoxon matched-pairs signed ranks test of the null hypothesis of median difference of ranks equal to zero. Probability values of 0.05 (5%) or less are printed in bold type.

Table 3.5 - Spearman correlation coefficients between total dirty surplus flows obtained from financial statements and from algorithms

	Number of company-years	*Fin.statements excluding GM*	*Fin.statements including GM*
Algorithm1: $TDSF_t = B_t - (B_{t-1} + NI_t - DV_t - CAP_t)$			
All	1,416	0.532 **(<0.001)**	0.500 **(<0.001)**
France	302	0.363 **(<0.001)**	0.363 **(<0.001)**
Germany	204	0.741 **(<0.001)**	0.741 **(<0.001)**
U.K.	313	0.781 **(<0.001)**	0.767 **(<0.001)**
U.S.	597	0.428 **(<0.001)**	0.354 **(<0.001)**
Algorithm2: $TDSF_t = CI_t - NI_t$			
U.S.	597	0.646 **(<0.001)**	0.595 **(<0.001)**
Algorithm3: $TDSF_t = CUR_t + MSEC_t + PEN_t$			
U.S.	597	0.832 **(<0.001)**	0.764 **(<0.001)**

Notes to table 3.5:

a. The table reports Spearman correlation coefficients and probability values of different measures of total dirty surplus flows. Notation is as follows: *TDSF* denotes total dirty surplus flows, financial statements excluding *GM* denotes total dirty surplus flows excluding the unrecognised issue of equity under merger accounting, financial statements including GM denotes total dirty surplus flows including the unrecognised issue of equity under merger accounting, *B* denotes book value of common shareholders' funds, *NI* denotes net income, *DV* denotes ordinary dividends, *CAP* denotes capital transactions, *CI* denotes comprehensive income, *CUR* denotes currency translation differences, *MSEC* denotes adjustments for marketable securities and *PEN* denotes adjustments related to minimum pension liabilities. Subscripts t-1 and t denote the beginning and end of the accounting period.

b. Probability values of the null hypothesis of Spearman correlation coefficients equal to zero are given beneath the coefficients. Probability values of 0.05 (5%) or less are printed in bold type.

Appendix 3.1 - Calculation of dirty surplus flows using the DST algorithm and the financial statements for U.S. company *Enron Corporation*

Panel A: Data obtained from Compustat

ENRON CORP				
(in million USD)	Compustat item	2000	1999	1998
Net Income (Loss)	#172	979	893	703
Ret Earn-Cum Translation Adj	#230	0	0	0
Marketable Securities Adj	#238	0	0	0
Pens-Unrcg Prior Srv Cst Udr	#297	@NA	@NA	@NA
Pension-Addl Minimum Liablty	#298	@NA	@NA	@NA

Source: Compustat – Research Insight

Panel B: Data obtained from the company financial statements

ENRON CORP. and Subsidiaries Consolidated Statement of Comprehensive Income			
	Year ended December 31,		
(in million USD)	2000	1999	1998
Net Income	979	893	703
Other comprehensive income:			
Foreign currency translation differences and other	-307	-579	-14
Total Comprehensive Income	672	314	689

Source: Enron Corp. published financial statements

Panel C: Comparison of dirty surplus flows computed using an algorithm applied to Compustat data and the financial statements

	Year ended December 31,		
(in million USD)	2000	1999	1998
1. Total dirty surplus flows using DST method applied to Compustat data (panel A):			
Foreign currency translation differences = change in Compustat item #230	0	0	0
Adjustments for marketable securities = change in Compustat item #238	0	0	0
Minimum pension liability adjustments = 0.65 × change Compustat items [(#297 - #298) if < 0]	0	0	0
Total dirty surplus flows	0	0	0
2. Correct value of total dirty surplus flows as reported in the financial statements (panel B):	-307	-579	-14
3. Error in measuring total dirty surplus flows using Compustat data (1 – 2):	307	579	14

Notes: DST denotes the algorithm used in Dhaliwal, Subramanyam and Trezevant (1999).

Appendix 3.2 - Calculation of dirty surplus flows using data from Datastream and data from the financial statements for U.K. company *Smith & Nephew Plc*

Panel A: Data obtained from Datastream (DS)

Smith &Nephew Plc

(in million pounds)	DS item	Year 2000	Year 2001
Opening shareholders' funds	#1106	551.7	268.0
Profit for the year	#1087	205.2	129.6
Ordinary dividends	#187	456.9	42.9
Currency translation differences	#1098	-9.9	-8.8
Other recogn. gains and losses	#1100	0	31.8
Capital issues	#1101	7.7	11.1
Goodwill on acquisitions	#1102	0	0
Goodwill on disposals	#1103	31.8	0
Other changes in shareholders' funds	#1104	0	15.8
Closing shareholders' funds	#1107	329.6	404.6

Source: Datastream

Panel B: Data obtained from the company financial statements

Note 23 Reserves from Smith &Nephew Plc financial statements of 2001

(in million pounds)	Share premium	Profit and loss account
At 1 January 2001 (as previously reported)	125.4	91.5
Prior year adjustment		-61.6
At 1 January 2001 (restated)	125.4	29.9
Exchange adjustment		-8.8
Retained profit for the year		86.7
Movements related to the QUEST		-2.1
Unrealised gain on formation of joint venture		31.8
Goodwill on operations contributed to joint venture		17.9
Share options and convertible bonds	10.4	
At 31 December 2001	135.8	155.4

Note as in the financial statements: the prior year adjustment at 1 January 2001 relates to the adoption of FRS 19.

Appendix 3.2 (continued) - Calculation of dirty surplus flows using data from Datastream and data from the financial statements for U.K. company *Smith & Nephew Plc*

Panel C: Dirty surplus flows calculation using Datastream and the financial statements

(in million pounds)	As reported in the financial statements (panel B)	As reported in Datastream (panel A)
Prior year adjustments:	-61.6	
This item does not exist in DS		
Needs to be calculated as:		
Datastream item #1106 - Datastream item #1107		268.0
		329.6
		-61.6
Currency translation differences:	-8.8	
Directly obtained from DS item #1098		-8.8
Gain in join venture:	31.8	
Reported in DS item #1100 as 'Other gains and losses'. It is necessary to check the financial statements to assess the nature of the item		31.8
Goodwill:	17.9	
DS item #1102 'Goodwill on acquisitions' is null. It is necessary to check the financial statements to conclude that goodwill is included in DS item #1104 'Other changes in shareholders' funds' as follows:		
17.9 (goodwill) – 2.1 (capital to QUEST) =		15.8

Appendix 3.3 - Calculation of dirty surplus flows using the financial statements for German company *Grammer AG*

Panel A: Data obtained from the balance sheet and income statement

Grammer AG *(in thousand DM)*	Notes	Year 1997	Year 1998
BALANCE SHEET			
Share capital and reserves:			
Subscribed capital		35,000	35,000
Capital reserve		46,000	46,000
Revenue reserve	(7)	9,738	16,490
Unappropriated earnings		28,867	28,834
Difference from capital consolidation		5,250	3,839
Ajustment item for minority interests		3,438	3,667
INCOME STATEMENT			
Net income for the year		21,090	18,378
Third-party claims in net income for the year		-487	-530
Third-party claims in loss for the year		37	85
Grammer profits carried forward		20,390	28,867
Allocation to other reserves		-6,213	-5,966
Allocation to other revenue reserves		0	-5,000
Disbursement		-5,950	-7,000

Panel B: Information on movements in shareholders' funds from the notes to the financial statements

Note (7) Revenue reserves

"The mandatory reserve remains unchanged at DM 2,314 thousand, as against DM 2,314 thousand in 1997. The mandatory reserves and the capital reserves in keeping with section 272 para. 2 Nos. 1 through 3 HGB together comprise more than one tenth of the share capital. The articles of incorporation do not foresee a level that deviates from that stipulated by law.

Other Group revenue reserves have been raised by an allocation of DM 5,000 thousand and they thus totalled DM 7,434 thousand as at Dec. 31, 1998. At that date they contained the partial netting of goodwill from first-time consolidation amounting to DM 7,007 thousand, identical to the 1997 figure, the Group portion of the revenue reserves and the balance sheet income of the subsidiaries included, as well as the differences from currency translation of ***–DM 7,583 thousand***, as against ***–DM 1,439 thousand the prior year***. The netting differences from consolidation of debts such as impacted on earnings and the elimination of intra-group earnings from the prior year are likewise part of revenue reserves. The respective change of prior year has been booked to Group net income for the year."

Appendix 3.3 (continued) - Calculation of dirty surplus flows using the financial statements for German company *Grammer AG*

Panel C: Reconciliation of movements in shareholders' funds and calculation of dirty surplus flows

(in thousand DM)	Subscribed capital	Capital reserves	Revenue reserves	Difference in capital consolidation
Balance at the end of 1997	35,000	46,000	9,738	5,250
Movements of the year 1998:				
Allocation from profit				
From income statement – Panel A			+5,966	
Allocation from profit				
From income statement – panel A			+5,000	
Currency translation difference				
At end of 1997 (from note 7 - panel B)			-1,439	
At end of 1998 (from note 7 - panel B)			-7,583	
Currency difference of the year			**-6,144**	
Consolidation difference[a]				**-1,411**
Other[b]			**1,930**	
Balance at the end of 1998	35,000	46,000	16,490	3,839
Dirty surplus flows of 1998:		-6,144 + 1,930 –1,411 = -5,625		

Notes to panel C:

a. Obtained by difference between consolidation difference at the end of 1998 and at the end of 1997 as follows: 3,839 – 5,250.

b. Obtained by difference comparing revenue reserves at the end of 1998 with reserves at the end of 1997 plus movements of the year 1998 as follows: 16,490 – (9,738 + 5,966 + 5,000 – 6,144).

Appendix 3.4 - Merger accounting in the U.S. sample

(in million Euros)

Company name	*Year*	*Industry*	*Size*	*Unrecognised issue of equity*
Incara pharmaceuticals	1998	Basic	1	-11.84
Cuisine Solutions	2000	Goods	1	17.70
Titan Corp.	1998	Services	3	87.48
	2000	Services	3	384.71
Norrel Corp.	1996	Services	4	-2.4
Citigroup Inc	1997	Financials	4	5,611.26
	1998			31,197.88
	2000			17,749.12
Old Kent Financial	1995	Financials	4	33.74
	1998			-71.40
	1999			179.17
Oxford Health Plans	1995	Financials	4	62.56
Union Planters	1993	Financials	4	27.75
	1994			199.31
	1995			76.34
	1996			272.71
	1997			596.96
	1998			1,043.23
Total				57,454.28
By industry:				
Basic	-0.02%			-11.84
Goods	0.03%			17.70
Services	0.82%			469.79
Financials	99.17%			56,978.63
				57,454.28

Appendix 3.5 - Other dirty surplus flows (*OTH*)

(in thousand Euros)

Item	*France*	*Germany*	*U.K.*	*U.S.*
Other gains and losses	-542,697.0	1,883,567.0[28]	57,159.9	91,029.6
Foreign currency translation differences	2,931,760.0	44,444.0	-360,304.7	-1,816,371.1
Subsidies	-1,776.0			
Provisions required by legislation	-94,845.0			
Changes in accounting methods	-1,475,368.0			
Consolidation changes	-114,790.0			
Pension adjustments				-45,927.7
Adjustments for marketable securities				1,076,357.1
Total	702,284.0	-1,839,123.0	-303,144.8	-694,912.0
N	598	603	612	597
Mean	1,174.39	-3,049.96	-495.33	-1,164.01

[28] The main items are related to consolidation adjustments and changes in consolidation scope. Examples of other items included in this category are adjustments to conform to legislation and unrealised appreciation in investments. Note that due to the lack of clear information in the financial reports it is not possible to fully discriminate this category.

Chapter 4

The Impact of Dirty Surplus Flows on Performance Measurement

4.1 Introduction

In the previous chapter I document that dirty surplus accounting practices can be of large magnitude and that the magnitude varies across accounting regimes. In this chapter, I seek evidence on the impact, and cross-country variation therein, of such dirty surplus accounting practices within the context of an accounting-based measure of performance. The countries considered are France Germany, the U.K. and the U.S. during the period 1993 to 2001, as in chapter 3.

For decades, academics and regulators have been discussing the desirability and consequences of dirty surplus accounting. They usually point out that dirty surplus accounting practices may create opportunities for earnings management and may limit the usefulness of accounting numbers in measurement of periodic performance (Littleton, 1940; *Statement of Financial Accounting Standards (SFAS) No. 130: Reporting Comprehensive Income*; Linsmeier, *et al.*, 1997). Concerns have also been raised in the context of business valuation. Authors such as Linsmeier, *et al.* (1997) and Francis, Olsson and Oswald (2000), claim that dirty surplus accounting may interfere with the applicability of the residual income valuation model (RIVM) since the equivalence between the dividend valuation model and RIVM relies on the assumption that earnings forecasts obey the clean surplus relationship (CSR). It has been further suggested that cross-country variation in the level of CSR violations may cause problems when accounting-based measures are used for international comparisons, in particular in cross-country implementations of the RIVM (Frankel and Lee, 1999). These concerns have motivated regulators in recent years to eliminate dirty surplus accounting practices or to require such practices to be reported in a more transparent way.[29]

[29] See detailed discussion on the regulatory development about dirty surplus accounting in chapter 2.

Although is it recognised in the literature that dirty surplus accounting might have implications for performance measurement, there is little evidence on the issue. In this chapter I present evidence on the impact of omitting dirty surplus flows from accounting-based information used to measure multi-period abnormal performance. I do so by assessing the effect of disregarding dirty surplus flows in a measure of abnormal performance denoted Excess Value Created (EVC). I find that omission of dirty surplus flows creates bias in the measures of abnormal performance, and cross-country variation therein, but that this is largely attributed to goodwill-related flows. More importantly, the omission of dirty surplus flows results in significant inaccuracy in abnormal performance measurement for all categories of dirty surplus flows and on all four accounting regimes studied, for a range of different horizons.

The chapter is organised as follows. The next section presents the abnormal performance measure used to evaluate the impact of omitting dirty surplus flows. Section three presents the measures of EVC errors. Section four discusses the results. Section five analyses the effect of increase in the horizon length on which EVC is measured. Section six presents the relationship between EVC and the residual income valuation model. Robustness checks are reported in the section seven and section eight concludes.

4.2 An accounting-based measure of abnormal performance

I investigate the impact of dirty surplus accounting flows using an accounting-based measure of abnormal performance. Specifically, I observe the cross-country effect of the omission of categories of dirty surplus flows in measuring abnormal performance using a measure termed Excess Value Created (EVC) that equals the excess of economic value generated by the company during a given time period over the invested capital at the end of that period.

O'Hanlon and Peasnell (2002) show that EVC can be written as the terminal value of the realised clean surplus residual incomes arising during a multi-period interval, appropriately adjusted by the beginning-of-interval and end-of-interval differences between economic value and accounting book value. Since the identity between EVC and the residual income-based formulation thereof relies on the CSR, it provides a natural framework for examining the effect of disregarding dirty surplus flows when using accounting earnings to measure abnormal economic performance.

Another natural framework in which to evaluate the impact of dirty surplus accounting practices is the residual income valuation model (RIVM). The RIVM and EVC formulations represent different perspectives of the business but they are directly related as they both rely on the clean surplus residual income concept.[30] Contrary to EVC, which measures performance at the end of the multi-period interval (*ex-post*), the RIVM is a forward-looking measure that estimates an intrinsic value of the business at the beginning of the interval based on expectations of future flows (*ex-ante*). Thus, EVC is based on realised values of accounting flows whereas the RIVM uses projections of future flows. This may constitute a practical disadvantage of the RIVM approach *vis-à-vis* the EVC because forecasts of earnings (or residual income) are sometimes not available and are subjective by nature. Analysts often adjust the earnings numbers to produce their forecasts, which may result in measurement error. For example, Sougiannis and Yaekura (2001) conclude that there is information missing from analysts' forecasts and that impairs the performance of valuation models. Further, as some of the dirty surplus flows are difficult to predict and do not

[30] See section 6 for discussion of the relationship between EVC and RIVM.

occur systematically, analysts might assume them to be zero in the future whereas reported dirty surplus flows might be non-zero on average. Realisations of flows, on the other hand, are observable and do not require assumptions about the future although there is a risk of potential influence of extreme observations.[31] The use of *ex-post* realisations also guarantees the availability of data on dirty surplus flows and allows a check on the articulation between the relevant accounting stocks and flows and the transactions with owners that are used in the analysis. For the mentioned reasons, I explore the issue of the impact of disregarding dirty surplus flows within the performance measurement perspective. In section 7, I show that a valuation perspective would yield similar conclusions.

Using market value of equity as a measure of economic value, EVC from an equity perspective over a multi-period measurement interval beginning at time b and ending at time e, denoted EVC_e^b, is defined as follows:

$$EVC_e^b = MV_e - I_e^b, \tag{4.1}$$

where MV_e is market value at the end of the measurement interval and I_e^b is the end-of-interval measure of the capital invested by shareholders. (For ease of notation, company subscripts are suppressed where possible. Where no company subscript appears, all variables should be interpreted as realisations for company i). End-of-interval capital invested is defined as the beginning-of-interval market value of shareholders' equity less dividends paid (net of equity contributions) during the interval, all inclusive of the required return, as follows:

$$I_e^b = MV_b \prod_{k=1}^{e-b} \left(1 + r_{b+k}\right) - \sum_{s=1}^{e-b-1} D_{b+s} \prod_{k=1}^{e-(b+s)} \left(1 + r_{b+s+k}\right) - D_e, \tag{4.2}$$

[31] A possible way to overcome the influence of extreme observations is to average the realisations of flows of individual companies in portfolios Penman and Sougiannis (1998).

where D denotes dividend net of capital contributions and r denotes the cost of equity capital. Clean surplus residual income for period $b+s$, denoted $X^a_{CS,b+s}$, is defined as follows:

$$X^a_{CS,b+s} = X_{b+s} - r_{b+s}B_{b+s-1}, \tag{4.3}$$

where B denotes book value of shareholders' funds and X is clean surplus earnings as defined in the second chapter:

$$X_{b+s} = D_{b+s} + \left(B_{b+s} - B_{b+s-1}\right). \tag{CSR}$$

Re-arranging CSR as

$$B_{b+s} = B_{b+s-1} + X_{b+s} - D_{b+s},$$

and substituting (4.3) into this rearranged formulation of CSR, the evolution of book value is as follows:

$$\begin{aligned}
B_{b+1} &= B_b\left(1+r_{b+1}\right) + X^a_{CS,b+1} - D_{b+1} \\
B_{b+2} &= B_{b+1}\left(1+r_{b+2}\right) + X^a_{CS,b+2} - D_{b+2} \\
&= B_b\left(1+r_{b+1}\right)\left(1+r_{b+2}\right) - D_{b+1}\left(1+r_{b+2}\right) - D_{b+2} + X^a_{CS,b+1}\left(1+r_{b+2}\right) + X^a_{b+2} \\
&\quad \ldots \; etc. \; .
\end{aligned}$$

Generalising, the book value of shareholders' funds at the end of a multi-period interval starting at time b and ending at time e is:

$$\begin{aligned}
B_e &= B_b \prod_{k=1}^{e-b}\left(1+r_{b+k}\right) \\
&- \sum_{s=1}^{e-b-1} D_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right) - D_e \\
&+ \sum_{s=1}^{e-b-1} X^a_{CS,b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right) + X^a_{CS,e} \; .
\end{aligned} \tag{4.4}$$

Substituting (4.2) and (4.4) into (4.1), the EVC abnormal performance measure can be written as the terminal value of the within-interval clean surplus residual incomes, as adjusted by terms reflecting the beginning-of-interval and end-of-interval market-to-book premia:

$$\begin{aligned} EVC^b_{CS,e} &= MV_e - I^b_e \\ &\equiv \sum_{s=1}^{e-b-1} X^a_{CS,b+s} \prod_{k=1}^{e-(b+s)} \left(1 + r_{b+s+k}\right) + X^a_{CS,e} \\ &+ \left(MV_e - B_e\right) - \left(MV_b - B_b\right) \prod_{k=1}^{e-b} \left(1 + r_{b+k}\right). \end{aligned} \tag{4.5}$$

The relationship in (4.5) relates directly to performance measures proposed by Stern Stewart and Co. within their Economic Value Added (EVA®) performance measurement system (Ehrbar, 1998; Young and O'Byrne, 2001).[32] EVA® is a special case of residual income, which Stern Stewart propose as a business performance measure to be used in determining executive remuneration. The cumulative residual income terms in (4.5), $\sum_{s=1}^{e-b-1} X^a_{CS,b+s} \prod_{k=1}^{e-(b+s)} \left(1 + r_{b+s+k}\right) + X^a_{CS,e}$, correspond to a multi-period measure of EVA®, which Stern Stewart propose as a basis for calculating executive bonuses.[33] Further, the end-of-interval market-to-book premium corresponds to Stern Stewart's Market Value Added (MVA), which is proposed as a measure of wealth creation.[34] Finally, the beginning-of-interval market-to-book premium corresponds to beginning-of-interval MVA, which can provide a basis for

[32] EVA® is a registered trademark of Stern Stewart and Co.
[33] Ehrbar (1998, chapter 7), a former Senior Vice-President of Stern Stewart and Co., argues that EVA®-based executive bonuses should not be paid immediately, but should be accumulated in a bonus bank. Bonuses should then be paid on the basis of the cumulative balance in the bonus bank. This is equivalent to using a multi-period accumulation of EVA® as a basis for calculating bonuses. However, Ehrbar does not suggest that 'interest' should be added to the bonus bank balance.
[34] Ehrbar (1998, chapter 3) defines MVA as the excess of market value over adjusted book value, and argues that it is a measure of wealth creation. Young and O'Byrne (2001, chapter 2) correctly observe that MVA is not in itself a satisfactory performance measure.

estimating beginning-of-interval expectations regarding future EVA®, against which within-interval EVA® outcomes can be compared.[35]

A measure of abnormal performance in which residual income is calculated as in expression (4.5), except for the omission of a class (or classes) of dirty surplus flows may be written as follows:

$$\begin{aligned} EVC_{DS,e}^{b} = & \sum_{s=1}^{e-b-1}\left(X_{CS,b+s}^{a} - DS_{b+s}\right)\prod_{k=1}^{e-(b+s)}\left(1+r_{b+s+k}\right)+\left(X_{CS,e}^{a} - DS_{e}\right) \\ & +\left(MV_{e} - B_{e}\right)-\left(MV_{b} - B_{b}\right)\prod_{k=1}^{e-b}\left(1+r_{b+k}\right), \end{aligned} \tag{4.6}$$

where $EVC_{DS,e}^{b}$ is an erroneous measure of EVC for the multi-period interval from b to e that omits dirty surplus flows, and DS denotes the omitted class or classes of dirty surplus flows. The error in measuring EVC is therefore equal to the terminal value at time e of the omitted dirty surplus flows arising in the interval from b to e, times minus one:

$$EVC_{DS,e}^{b} - EVC_{CS,e}^{b} = -\left(\sum_{s=1}^{e-b-1} DS_{b+s}\prod_{k=1}^{e-(b+s)}\left(1+r_{b+s+k}\right)+DS_{e}\right). \tag{4.7}$$

4.3 Measuring the impact of dirty surplus flows on abnormal performance

4.3.1 EVC error measures

Using the same data and sample described in chapter 3, section 3, I construct seven types of EVC error based on expression (4.7), for each country and for measurement intervals of three and eight years. Each error measures the effect of omitting one of the

[35] Young and O'Byrne (2001, chapter 8) propose such a procedure. Their argument is based on the residual income valuation model, according to which the market-to-book premium is equal to the present value of expected future residual incomes.

following seven classes of dirty surplus flows (detailed definitions of the items can be found in chapter 3, section 3.2):

- Prior-year adjustments (*PYA*);
- Goodwill write-offs (net of write-backs) (*GW*);
- Issues of equity unrecognised due to merger accounting (*GM*);
- Goodwill write-offs (net of write-backs) plus issues of equity unrecognised due to merger accounting, taken together (*GW+GM*);
- Asset revaluations (*AR*);
- Other dirty surplus flows (*OTH*);
- All dirty surplus flows, equal to prior-year adjustments less goodwill write-offs less issues of equity unrecognised due to merger accounting plus asset revaluations plus other dirty surplus flows (*ALL*).

I explore the impact of disregarding dirty surplus flows by computing signed (bias) and absolute (inaccuracy) cumulative abnormal performance measurement errors associated with the omission of each of the seven classes of dirty surplus flows. Two alternative scaling variables are used to facilitate cross-sectional analysis: beginning-of-interval market value and the absolute value of the true EVC measure ($EVC^b_{CS,e}$). The first scaling procedure produces numbers that can be interpreted as errors in the measurement of the excess rate of return earned over the interval on the beginning-of-interval market value. The second can be interpreted as the proportionate error in the EVC measure.

$$\text{Signed error:} \quad \frac{EVC^b_{DS,e} - EVC^b_{CS,e}}{MV^b}\ ;\ \frac{EVC^b_{DS,e} - EVC^b_{CS,e}}{\left|EVC^b_{CS,e}\right|} \qquad (4.8)$$

Absolute error: $\frac{\left|EVC_{DS,e}^{b} - EVC_{CS,e}^{b}\right|}{MV^{b}}$; $\frac{\left|EVC_{DS,e}^{b} - EVC_{CS,e}^{b}\right|}{\left|EVC_{CS,e}^{b}\right|}$. (4.9)

Seven versions of expressions (4.8) and (4.9) are calculated, each corresponding to one omitted class of dirty surplus flow. For expression (4.8) the seven versions are as follows:

$$\frac{-\left(\sum_{s=1}^{e-b-1} PYA_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+PYA_{e}\right)}{MV^{b}} ; \frac{-\left(\sum_{s=1}^{e-b-1} PYA_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+PYA_{e}\right)}{\left|EVC_{CS,e}^{b}\right|} \quad \text{(i)}$$

$$\frac{-\left(\sum_{s=1}^{e-b-1} GW_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+GW_{e}\right)}{MV^{b}} ; \frac{-\left(\sum_{s=1}^{e-b-1} GW_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+GW_{e}\right)}{\left|EVC_{CS,e}^{b}\right|} \quad \text{(ii)}$$

$$\frac{-\left(\sum_{s=1}^{e-b-1} GM_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+GM_{e}\right)}{MV^{b}} ; \frac{-\left(\sum_{s=1}^{e-b-1} GM_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+GM_{e}\right)}{\left|EVC_{CS,e}^{b}\right|} \quad \text{(iii)}$$

$$\frac{-\left(\sum_{s=1}^{e-b-1} \left(GW_{b+s}+GM_{b+s}\right) \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+\left(GW_{e}+GM_{e}\right)\right)}{MV^{b}} ;$$

$$\frac{-\left(\sum_{s=1}^{e-b-1} \left(GW_{b+s}+GM_{b+s}\right) \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+\left(GW_{e}+GM_{e}\right)\right)}{\left|EVC_{CS,e}^{b}\right|} \quad \text{(iv)}$$

$$\frac{-\left(\sum_{s=1}^{e-b-1} AR_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+AR_{e}\right)}{MV^{b}} ; \frac{-\left(\sum_{s=1}^{e-b-1} AR_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+AR_{e}\right)}{\left|EVC_{CS,e}^{b}\right|} \quad \text{(v)}$$

$$\frac{-\left(\sum_{s=1}^{e-b-1} OTH_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+OTH_{e}\right)}{MV^{b}} ; \frac{-\left(\sum_{s=1}^{e-b-1} OTH_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+OTH_{e}\right)}{\left|EVC_{CS,e}^{b}\right|} \quad \text{(vi)}$$

$$\frac{-\left(\sum_{s=1}^{e-b-1} ALL_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+ALL_{e}\right)}{MV^{b}} ; \frac{-\left(\sum_{s=1}^{e-b-1} ALL_{b+s} \prod_{k=1}^{e-(b+s)} \left(1+r_{b+s+k}\right)+ALL_{e}\right)}{\left|EVC_{CS,e}^{b}\right|} . \quad \text{(vii)}$$

For the EVC absolute errors given in (4.9) the expressions are identical to expressions (i) to (vii), except that the numerators are absolute values and therefore the sign of the expressions becomes positive.

To seek evidence on the impact of omitting dirty surplus accounting flows in measuring abnormal performance and cross-country variation therein, I apply non-parametric statistical tests to these measures.

4.3.2 Cost of equity capital

The abnormal performance measure in expression (4.6) is calculated using a time-varying cost of equity capital based on a time-varying risk free rate plus a constant equity premium of 5%, as follows:

$$r_{b+s} = rf_{b+s} + rp, \qquad (4.10)$$

where:

rf_{b+s} = Country-specific risk-free rate at fiscal year $b+s$. This is computed as the 12-month moving average for the year ended at the balance sheet date of the relevant annualised 3-month Treasury bill rate[36];

rp = Equity risk premium, assumed to be 5%.

The cost of equity for country j at time $b+s$ is estimated to be the annualised 3-month Treasury Bill rate for country j for time $b+s$, plus an assumed risk premium of 5%. The rates are adjusted for accounting periods that are of other than 12-months duration, using the standard formula $(1+r_{365})^{p/365}-1$, where r_{365} is the annual rate, on a 365-day basis, and p is the period, in days, for which the rate needs to be adjusted. For example, for an accounting period of eight months, which can occur if a company

[36] In order to use comparable short-term risk free rates across the four countries I used the 3-month Treasury Bill rates reported by the International Monetary Fund available in Datastream.

changes its year-end, the cost of equity capital is adjusted to an eight-month equivalent.

The method used to estimate the cost of equity capital is similar to that employed in previous studies such as Frankel and Lee (1998). Other studies such as Francis, *et al.* (2000) and Penman and Sougiannis (1998) employ more sophisticated methodologies to estimate the cost of equity. However, the evidence in these studies and in Sougiannis and Yaekura (2001) suggests that value estimates are relatively insensitive to the choice of discount rate.

The choice of 5% for the equity risk premium is based on recent evidence suggesting that the *ex ante* equity premium value lies somewhere in the region of 4% to 6%. For example, Claus and Thomas (2001) find that the risk premium in US, U.K. Canada, France, Germany and Japan, during the period 1985 to 1998 lies between 2% and 4%. Similar results are reported by Easton, *et al.* (2002), who find an equity premium of 5.3%. Lamdin (2002) estimates an average risk premium between 4.7% and 5.7%. Using a long-term and short-term risk free rate during the period 1981 to 2000 Copeland, Koller and Murrin (2000) suggest similar values: between 4.5% and 5%.

The procedure used to estimate the cost of equity capital allows variability through time in line with interest rates but assumes that all companies have a beta equal to one and that the market risk premium is constant at 5%. I test the robustness of the results to changes in the cost of equity capital, namely by allowing for beta to vary across industry and country and by changing the equity risk premium (see section 7).

4.3.3 Alignment of year-end book value and market value

I compute the EVC values using market value as at three months after fiscal year-end (MV_{BS3}). This is achieved by adjusting the market value at the balance sheet date (MV_{BS}) by the total return on the company's stock for the three months after the balance sheet date ($Re\,t_3$):[37]

$$MV_{BS3} = MV_{BS} \times Re\,t_3, \tag{4.11}$$

where $Re\,t_3$ is the three-month return given by the ratio of the return index at three months after the balance sheet to the return index at the balance sheet data.[38] This procedure ensures that the market value is likely to reflect information from the annual financial statements whilst remaining comparable with the balance sheet value of shareholders' funds. The analysis was repeated for market value at the fiscal year-end. Results are similar to those obtained for market value three months after year-end and therefore are not reported for reasons of economy of space.

Another necessary alignment between year-end book value and market value relates to the issue of accounting for dividends. Because of the accrual principle of accounting, the dividend expense can be recognised in book value at the end of the year whereas the payment may occur in the following year (this is the case in the U.K. and the U.S. but not in France and Germany, where the dividend is accounted for on a cash basis). This accrual accounting movement generates a dividend liability in the balance sheet, which is cancelled when payment occurs. Hence, at fiscal year-end, book value is an ex-dividend figure whereas market value is cum-dividend value. In these cases, and when necessary data is available, I overcome the discrepancy by

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[37] In a small number of cases where the first year of data coincides with the IPO of the company, market value data were not available until shortly after the start of the first accounting period. In these cases I used the first available data.

[38] Return indexes are obtained from Datastream (code *RI*) and from CRSP for some U.S. companies.

transforming book value into a cum-dividend figure. To achieve this, I add the creditor for ordinary dividend to reported book value. The creditor for ordinary dividend is estimated by multiplying the total dividend creditor by the ratio of (1) ordinary dividend charged in the year to (2) total dividend charged in the year.[39]

4.3.4 Measurement interval

I calculate EVC in expressions (4.5) and (4.6) for a short-term and a long-term horizon using a three-year and eight-year horizon length, respectively. The maximum horizon length of eight years is chosen to guarantee a relatively large number of observations in the sample. Results based on a smaller sample of nine years and results based on a medium-term horizon of six years are consistent with those reported for the eight-year horizon. In section 5, I test the sensitivity of the results to changes in the horizon length.

To avoid including the same accounting data in more than one EVC calculation for a given horizon length, I report results based on non-overlapping horizons. For example, for a company with data for nine years (1993 to 2001), I compute three separate three-year horizon EVC measures: 1993 to 1995, 1996 to 1998 and 1999 to 2001. Across the four countries, the total number of non-overlapping intervals is 738 for the three-year interval length (e-b = 3) and 197 for the eight-year interval length (e-b = 8).

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[39] Recall from footnote 21 that for U.K. companies, creditor for ordinary dividend is computed as (Datastream codes in parentheses): Total dividend payable (#382) × Ordinary dividend expense (#187) / [Ordinary dividend expense (#187) + Preferred dividend expense (#181)]. For U.S. companies, it was not possible to obtain the creditor for ordinary dividends from Compustat.

4.4 Results

4.4.1 EVC signed error

Table 4.1 reports means and medians of the EVC signed errors from omission of dirty surplus flows for each class of dirty surplus flow and for each country. Panel A reports signed errors for the three-year measurement interval; panel B reports those for the eight-year measurement interval. The errors are scaled both by beginning-of-interval market value and by the absolute value of the correct (clean surplus) measure of EVC as defined in expressions (4.8) and (4.9). The first scaling procedure gives the error in measurement of the excess rate of return on the beginning-of-interval market value; the second gives the proportionate error in the EVC measure. Each panel reports, for each country and for each dirty surplus EVC measure, the result of a non-parametric signed-rank test of the null hypothesis that the distribution of signed errors is centred on zero. Each panel also reports test statistics for non-parametric Kruskal-Wallis tests of the null hypothesis that the average rank of signed errors across countries is equal. This test is performed for the seven classes of dirty surplus flows both for all four countries together, and for each paired combination of countries.

For the three-year interval, table 4.1, panel A shows that the null hypothesis that the distribution of errors is centred on zero is rejected for all dirty surplus flows in three cases (Germany, U.K., U.S.) for both the market value-scaled and EVC-scaled errors. For goodwill, it is rejected in three cases (France, Germany, U.K.) for the market value-scaled errors and in two cases (Germany and U.K.) for the EVC-scaled errors. For the merger-related item, it is rejected in one case (U.S.) for both the market value-scaled and EVC-scaled errors. For goodwill inclusive of the merger-related item, it is rejected in all four cases for the market value-scaled errors and in three cases (Germany, U.K. and U.S.) for the EVC-scaled errors. For asset revaluations, prior-year adjustments and 'other dirty surplus flows', it is never rejected, which indicates that the bias introduced in the EVC measure by disregarding dirty surplus flows is mostly attributed to goodwill-related items. The relevance of the goodwill items is confirmed by results of the non-parametric Kruskal-Wallis tests of the null hypothesis of the equality of mean rank in signed errors across countries. For both the market value-scaled and EVC-scaled errors, the null hypothesis is rejected only for goodwill and goodwill inclusive of the merger-related items.

The results of the tests of equality of mean rank across pairs of countries are similar for both scaling methods. Results indicate that there are more cases of significant differences in the signed errors for the goodwill category. Significant differences occur for the pairs France/Germany, France/U.K., France/U.S., Germany/U.S., U.K./U.S (for market value scaled-errors) and France/Germany, France/U.K., Germany/U.S., U.K./U.S. (for EVC scaled-errors). The next most important category regarding the number of pairs of countries for which the null hypothesis is rejected is the goodwill inclusive of the merger-related item. The hypothesis is rejected four times (France/Germany, France/U.K., Germany/U.S., U.K./U.S.) for both scaling methods. Significant differences arise also in the category 'all dirty surplus flows' for the pairs France/Germany, France/U.K, for both scaling methods. No rejections arise in the case of asset revaluations, prior-year adjustments or other dirty surplus flows.

For the eight-year horizon, reported in panel B of table 4.1, the null hypothesis that the distribution of the signed errors is centred on zero is rejected twice (Germany, U.S.) when all dirty flows are omitted, regardless of the scaling method. For goodwill, it is rejected in two cases (Germany, U.K.) for both scaling methods. Rejections for the same two countries arise for the goodwill inclusive of the merger-related item category (for both market-scaled and EVC-scaled errors). However, this result seems to be attributable entirely to the goodwill item, as I find no rejections when considering the merger-related item separately. For the other classes of dirty surplus flows, there are few rejections. For asset revaluations, rejection occurs once for the U.K. in the case of the EVC-scaled errors. For prior-year adjustments it is never rejected. For 'other dirty surplus flows', it is rejected once (U.K.) for both scaling methods.

Similar to the three-year interval, the null hypothesis of equality of mean rank in errors across all four countries is rejected for the goodwill items. For both scaling methods, is rejected for goodwill, the merger-related item and goodwill inclusive of the merger-related item, but not in any other case. Regarding differences in the signed errors across pairs of countries, the results of the Kruskal-Wallis tests reveal that rejections of the null hypothesis are identical regardless of whether the errors are scaled by market value or EVC. Rejections occur for goodwill in four cases (France/Germany, France/U.K., Germany/U.S. and U.K./U.S.), for the merger-related item in two cases (France/U.S. and Germany/U.S.), for goodwill inclusive of the merger-related item in four cases (France/Germany, France/U.K., Germany/U.S. and U.K./U.S.), and finally for 'other dirty surplus flows' in the case of Germany/U.K.

The overall impression conveyed by table 4.1 is that bias in the measures of abnormal performance caused by omission of dirty surplus flows, and cross-country variation therein, arise largely as a result of the merger item (which is treated here similarly to a goodwill write-off) and goodwill. The influence of asset revaluations, prior-year adjustments and 'other dirty surplus flows' in creating such effects is relatively small. This conclusion is not surprising given the findings reported in the previous chapter that goodwill and goodwill related to merger accounting are the main contributors to dirty surplus accounting in the countries and period studied. Disregarding the goodwill-related dirty surplus flows from performance measures based on abnormal residual income results in overestimates of the measures (as goodwill has a negative sign thus reducing net income). This positive bias can have economic consequences as it may overstate business performance, managers' bonuses or any other assessment based on EVC-type of measures. It is worthwhile mentioning again that the problem posed by the goodwill-related items in this context is being removed as regulators restrict the use of merger (pooling-of-interests) accounting and goodwill write-offs and therefore the impact of disregarding dirty surplus flows in creating bias in performance measurement may be limited to the period analysed.[40]

4.4.2 EVC absolute errors

Table 4.2 reports statistics and tests for cross-country variation in the EVC absolute errors. Absolute errors assess the inaccuracy in abnormal performance measurement. The null hypothesis that the distribution of errors is centred on zero is not tested for the absolute values of errors, as all values must be non-negative.

Contrary to the effects observed in the signed errors, which are largely due to goodwill-related items, all classes of dirty surplus flows give rise to significant cross-country differences in absolute errors. For both scaling measures, and for both horizon intervals of three and eight years, the null hypothesis of equality of mean ranks in errors across the four countries is rejected for all classes of dirty surplus flows. The tests of equality of mean ranks across pairs of countries reveal that the level of

[40] For example, in the U.S. the FASB introduced, in force from June 2001, SFAS No.141 *Accounting for Business Combinations* and SFAS 142 No. *Accounting for Goodwill and Intangible Assets*, which prohibit the pooling-of-interests method of accounting for business combinations and require a purchase accounting method where goodwill should be capitalised and depreciated (or subjected to periodic impairment tests).

rejections of the null hypothesis, at the 5% significance level, is generally not sensitive to the scale measure used. For the three-year interval the only situation where the null hypothesis is not rejected simultaneously for the market value and EVC scale is for the 'other dirty surplus flows' category for the pair U.K./U.S. For the eight-year interval, this situation occurs for total dirty surplus flows for Germany/U.S., and for 'other dirty surplus flows' for France/U.K., Germany/U.S. and U.K/U.S.

Next, I analyse the level of rejections of the null hypothesis of equality of mean ranks across pairs of countries for each of the seven classes of dirty surplus flows. For the three-year horizon, the hypothesis is rejected for all possible pairs of countries in the case of goodwill. For the EVC measure that disregards all dirty surplus flows, it is rejected for five pairs of countries (France/U.K., France/U.S, Germany/U.K, Germany/U.S. and U.K./U.S). For the merger-related item, it is rejected for all pairs with the U.S. (France/U.S., Germany/U.S. and U.K./U.S.), reflecting the fact that merger accounting is mostly a U.S. accounting practice. For goodwill inclusive of the merger-related item, the hypothesis is rejected for all pairs except France/U.S. For asset revaluations, it is rejected for all pairs except Germany/U.S., as asset revaluation are not permitted in these countries. For prior year adjustments, rejections occur for four pairs (France/Germany, France/U.K., Germany/U.K. and U.K/U.S.). Finally, for the 'other dirty surplus flows' category the hypothesis is rejected for the five pairs (France/Germany, France/U.K., France/U.S., Germany/U.S. and U.K./U.S.) when the errors are market-scaled and four pairs (France/Germany, France/U.K., France/U.S. and Germany/U.S.) when the errors are EVC-scaled.

For the longer horizon of eight-years, the null hypothesis of equality of mean ranks across pairs of countries is rejected for all pairs for goodwill. For the category all dirty surplus flow, the null hypothesis is rejected for four pairs of countries (France/U.K., France/U.S., Germany/U.K. and U.K./U.S.) in the case of market-scaled errors and for five pairs (France/U.K., France/U.S., Germany/U.K., Germany/U.S. and U.K./U.S.) in the case of EVC-scaled errors. The null hypothesis is rejected for all pairs in the case of goodwill. For the merger-related item, it is rejected twice (France/U.S. and Germany/U.S.). For goodwill inclusive of the merger-related item, it is rejected for all pairs except France/U.S. For asset revaluations, it is rejected for all pairs except Germany/U.S. For prior-year adjustments, it is rejected for the pairs France/U.K., Germany/U.K. and U.K./U.S. For 'other dirty surplus flows', it is rejected twice (France/U.S. and U.K./U.S.) for errors scaled by market value, and three times for errors scaled by EVC (France/U.K., France/U.S. and Germany/U.S.).

In summary, regarding inaccuracy in EVC, the results show significant cross-country variation for all classes of dirty surplus flows. Contrary to bias, inaccuracy in EVC is not only attributable to the omission of goodwill-related items but to all types of dirty surplus flows. Further, inaccuracy in EVC seems to occur for all accounting regimes and for different horizons. This is particularly important for business and managerial performance measurement based on residual income-type formulae. Disregarding dirty surplus flows will result in inaccurate calculations of cumulative residual income over a multi-period interval. Consequently, using this measure to evaluate business performance, establish management remuneration schemes, determine value creation over a time-interval, or as a basis for any business decision may lead to incorrect assessments. Furthermore, using residual income-type measures of performance that disregard dirty surplus flows in international comparisons may result in misleading conclusions as results suggest cross-country variation particularly regarding inaccuracy.

4.5 The impact of the horizon length

I now explore the issue of whether the impact of omitting dirty surplus flows from EVC abnormal performance measure diminishes as the time-interval lengthens. Previous studies provide some indication of a reduced importance of dirty surplus flows over longer time-intervals. For example, O'Hanlon and Pope (1999) test the value relevance of dirty surplus in the U.K. and find little evidence that dirty surplus flows are value-relevant for long intervals (up to 20 years). A decline in the impact of dirty surplus flows over time may occur because dirty surplus flows are of opposite sign and thus cancel over time, or because EVC calculations become dominated by the other inputs (namely earnings and book value) over longer intervals.

I investigate this issue by analysing whether the number of rejections of the null hypothesis that the distribution of EVC errors is centred on zero changes with increases in the length of the horizon. To avoid the possibility that differences in sample sizes associated with different horizons might give rise to differences in the number of rejections at different horizons, I hold the sample size constant across the two horizons of three and eight-years. Tables 4.3 and 4.4 repeat the analysis reported in tables 4.1 and 4.2 using only those observations (197) for which eight-year horizon EVC estimates are available. Comparison of the number of rejections of the null hypothesis in panel B of tables 4.1 and 4.2 with those in tables 4.3 and 4.4, where the sample is held constant for three and eight-year interval, provides evidence as to whether the number of rejections reduces as the horizon increases.

I focus first on the signed values of errors. There is no strong evidence that the number of rejections decreases for the longer horizon. In the case of the signed rank test of the null hypothesis that the distribution of the signed errors is centred on zero, the number of rejections is similar for both intervals (seven cases for the three-year interval for both scales and seven (eight) cases for the eight-year interval for the market-value scaled errors (EVC-scaled errors)). For the non-parametric Kruskal-Wallis tests of the null hypothesis that the average rank of differences in EVC across countries is equal, I find some indication that the number of rejections decreases for the eight-year interval. The hypothesis of equality across countries in the EVC measure scaled by beginning-of-interval market value for calculations that omit all dirty surplus flows, that omit prior-year adjustments (only for the market value-scaled errors), and that omit 'other dirty surplus flows', is rejected at the 5% level for the three-year horizon but not for the eight-year horizon. Likewise, the numbers of rejections for paired errors also decreases for the longer interval. For example, where all dirty surplus flows are excluded, the tests fail to reject the null for all pairs of countries for both the market value-scaled and the EVC-scaled errors for the eight-year interval, whereas it is rejected in four (three) cases for the market value-scaled (EVC-scaled) errors for the three-year interval. These results favour the possibility that cross-country differences in the impact of omitting dirty surplus flows on abnormal performance measures declines as the measurement interval lengthens. For longer intervals the international differences regarding dirty surplus accounting practices seem to have less impact on abnormal performance measured by EVC.

Regarding the absolute values of the errors, I find no evidence of a reduction in the number of rejections for the tests of equality of mean rank across the four countries. For the three-year interval, the equality is rejected for all cases, except for the merger-related item. For the eight-year interval, the hypothesis of equality is rejected in all cases. For tests comparing pairs of countries, the numbers of rejections is even higher for the eight-year interval. For the EVC scaled errors, the number of rejections increases from 24 cases for the three-year interval to 29 for the eight-year interval.

In summary, results reported in tables 4.3 and 4.4 provide no strong evidence that the number of rejections reduces as the horizon increases as would be expected if the dirty surplus flows cancel or become relatively less important over longer periods. Only in the case of cross-regime variation in the signed errors is there some indication of such an effect. The results are in line with the findings reported earlier and the impact of dirty surplus flows on abnormal performance measurement persists for longer measurement intervals.

4.6 The relationship between EVC and RIVM in measuring the impact of dirty surplus flows

The RIVM is directly related to EVC as it also depends on the concept of residual income that obeys CSR. In fact, residual income can be interpreted both from a performance measurement perspective, where realised earnings can be seen as a measure of achieved profitability and the required return on book value can be viewed as the required profitability, and from a valuation perspective, where residual income is viewed as a measure of future value creation. The EVC formulation assumes the first perspective: measuring performance at the end of a period based on realised numbers. The RIVM assumes the second perspective: estimating the intrinsic value of the business at the beginning of the interval based on expectations of the future.

Given the direct link between the two formulations, the impact of omitting dirty surplus flows can also be assessed from the valuation perspective using the RIVM. In that case, a clean surplus RIVM value estimate is as follows (expectations operator is omitted for ease of notation):

$$IV_{CS,b}^{e} = B_b + \sum_{s=1}^{e-b} \left(\frac{X_{b+s} - r_{b+s} B_{b+s-1}}{\prod_{k=1}^{s} (1 + r_{b+k})} \right) + \frac{MV_e - B_e}{\prod_{k=1}^{e-b} (1 + r_{b+k})}, \tag{4.12}$$

where X is clean surplus earnings, r denotes the cost of equity, B denotes book value of shareholders' funds and $MV_e - B_e$, the market-to-book premium at time e. For ease of notation, company subscripts are suppressed and all variables are to be interpreted as realisations for company *i*.

Dirty surplus RIVM value estimates can be constructed by disregarding a class or classes of dirty surplus flows (*DS*) from clean surplus earnings:

$$IV_{DS,b}^{e} = B_b + \sum_{s=1}^{e-b} \left(\frac{(X_{b+s} - DS_{b+s}) - r_{b+s} B_{b+s-1}}{\prod_{k=1}^{s} (1 + r_{b+k})} \right) + \frac{MV_e - B_e}{\prod_{k=1}^{e-b} (1 + r_{b+k})}. \tag{4.13}$$

The effect of omitting dirty surplus flows from RIVM clean surplus value estimates is equal to the difference between dirty surplus RIVM value estimates and clean surplus RIVM value estimates:

$$IV_{DS,e}^{b} - IV_{CS,e}^{b} = -\sum_{s=1}^{e-b} \frac{DS_{b+s}}{\prod_{k=1}^{s} (1 + r_{b+k})}. \tag{4.14}$$

If *ex-post* realisations are used as perfect-foresight forecasts of future flows in the RIVM, EVC and RIVM will yield equivalent measures of errors by disregarding dirty surplus flows. Expression (4.14) that measures the RIVM error is similar to expression

(4.7) that measures the EVC error, except that the former is the present value at time *b* of the omitted flows while the later is the terminal value at time *e*. This is a direct consequence of the fact that the RIVM assumes an *ex-ante* perspective while the EVC presents an *ex-post* perspective.

Given this correspondence between the two measures, it is to be expected that the results and conclusions obtained for the valuation framework are similar to those obtained for the abnormal performance measure. I performed the analysis for the RIVM perspective and the results obtained were indeed as expected. Therefore, I do not tabulate or discuss these results any further.

4.7 Robustness checks

I test the sensitivity of the results to variations in the methodology and find that the general pattern of results does not change after the following robustness checks:

i) Market value at the balance sheet date: I used the market value of the company at the year-end instead of the market value at three-months after the year-end.

ii) Medium-term horizons: I perform the analysis for a six-year horizon. The use of non-overlapping valuation horizons introduces the potential for arbitrariness with respect to the start date of horizons. Because of the length of the available data series (nine years), this problem is a minor one in the case of three- and eight-year horizons but is potentially important in the case of six-year horizons. For six-year horizons, I select for each company the six-year period commencing with the first year of available data, since this gives the largest number of observations. However, I also perform the six-year horizon tests on the basis of periods commencing with the second and third year of available data.

iii) Inclusion of 'special items with a reserve component' in the book value of German companies: As mentioned in chapter 3, section 3.4.1, some German companies report a special item that may or may not be considered part of equity. I repeat the analysis including this item in the opening and closing book value of such German companies. The variations on the special items are considered as an additional dirty surplus flow included in the 'other dirty surplus flow' category.

iv) Different cost of equity capital: I allow for different calculations of the cost of equity. More specifically, I compute the cost of equity in three different ways: (1) allowing beta to vary across industry and country whilst assuming a market risk premium of 5%; (2) assuming a constant beta of one while varying the equity risk premium; and (3) considering a cost of equity equal to zero. Even though the general inferences drawn from using different costs of equity did not change, because of the potential importance that the discount rate might have in this type of studies, it is worth highlighting the specific differences that did arise.

Using an industry- and country-specific beta plus a constant equity risk premium is a common procedure in the valuation literature (Lee, Myers and Swaminathan, 1999; Francis, *et al.*, 2000) and it allows for some cross-sectional variation in discount rates. Alternatively, company-specific discount rates could be used but two reasons justify not using them: first, it is argued that industry costs of equity capital are more precise than company-specific ones (Fama and French, 1997); second, it has been shown that using company-specific discount rates leads to similar results as using industry-specific ones in implementations of residual income-type measures (Francis, *et al.*, 2000). I use as the beta for industry *m* in country *j*, the median of the betas collected from Datastream in early 2004 for all active companies in industry *m* in country *j*. Results using country-industry specific betas (reported in tables 4.5 and 4.6) are very similar to results shown in tables 4.1 and 4.2. Generally, all tests yield similar results for both the signed and absolute errors and for both scaling measures.

Next, I test the robustness of the results to different equity premia using 3% and 7%. Results are not tabulated for reasons of economy of space, but they yield the same inferences drawn from tables 4.1 and 4.2 in both cases.

Finally, I repeat the analysis using a cost of equity capital equal to zero. In this case EVC becomes a measure of total money return that can be written in terms of aggregate clean surplus earnings plus the increase in the market-to-book premium over the interval. Using expression (4.5) above and setting the cost of equity capital (*r*) equal to zero gives:

$$EVC_{CS,e}^{b} = \sum_{s=1}^{e-b} X_{b+s} + (MV_e - B_e) - (MV_b - B_b). \tag{4.15}$$

Note that clean surplus residual income (X_{CS}^{a}) defined in expression (4.3) is equal to clean surplus earnings (X), since the capital charge on book value is equal to zero.

Similarly, for the dirty surplus EVC measure defined in expression (4.6), I obtain:

$$EVC_{DS,e}^{b} = \sum_{s=1}^{e-b} (X_{b+s} - DS_{b+s}) + (MV_e - B_e) - (MV_b - B_b). \tag{4.16}$$

Results (not tabulated) are generally similar to the ones reported in tables 4.1 and 4.2. These results are in line with previous findings in the literature showing that changes in the discount rate have little impact on the results obtained from residual income-type of measures (Penman and Sougiannis, 1998; Francis, *et al.*, 2000).

4.8 Conclusion

For decades dirty surplus accounting practices have been a source of misgivings among accounting researchers and accounting regulators. It is well known that such practices can result in the exclusion from net income of potentially material flows, and that the incidence of such excluded flows can vary across GAAP regimes. However, there is little evidence as to whether such practices, and cross-country variation therein, actually matter in a practical context. This study provides evidence in this regard by examining the impact of dirty surplus accounting practices in contexts where theory explicitly suggests that they could matter, namely an accounting-based performance measure. The analysis is performed for France, Germany, the U.K. and the U.S. during the period 1993 to 2001.

I explore the potential impact of dirty surplus accounting flows in the context of performance measurement. I use a measure of multi-period abnormal performance denoted Excess Value Created that can be correctly written in terms of within-interval residual incomes if all dirty surplus flows are included, but which will give rise to error if dirty surplus flows are omitted. I examine the effect of the omission of various classes of dirty surplus flows in creating error in this measure of abnormal performance. The EVC error committed by disregarding classes of dirty surplus flows is equal to the terminal value of the omitted dirty surplus flows occurring during a time-interval. I observe the bias (signed error) and the inaccuracy (absolute error). As regards bias, the effects of omitting dirty surplus flows and cross-country variation therein are largely limited to goodwill-related flows, which regulators are eliminating as a dirty surplus item. As regards inaccuracy, I find that all classes of dirty surplus flows give rise to some significant cross-country variation and that such effects do not diminish when the measurement interval lengthens. The results suggest that omission of dirty surplus flows may cause problems as regards the accuracy of performance measures and therefore using such measures for performance evaluation and contracting purposes may result in incorrect business decisions. Further, the omission of dirty surplus flows may lead to incorrect inferences when comparing performance measures across accounting regimes.

Table 4.1 - Signed values of errors from measurement of excess value created (EVC) omitting dirty surplus flows (errors scaled by beginning-of-interval market value and absolute value of EVC)

Panel A: 3-year Measurement Interval (*e-b* = 3)

		Scaled by beginning market value [a]					Scaled by absolute value of EVC [a]				
		France	*Germany*	*U.K.*	*U.S.*	*All four*[b]	*France*	*Germany*	*U.K.*	*U.S.*	*All four*[b]
	N	*178*	*180*	*191*	*189*	*738*	*178*	*180*	*191*	*189*	*738*
ALL	*mean*	0.017	0.073	0.120	0.050		0.072	4.410	0.077	0.395	
	median	0.000	**0.000**	**0.004**	**0.000**	0.051	0.000	**0.000**	**0.004**	**0.000**	0.054
Pairs [c]:											
France			**0.023**	**0.038**	0.139			**0.015**	**0.036**	0.076	
Germany				0.489	0.190				0.829	0.285	
U.K.					0.133					0.304	
GW	*mean*	0.015	0.076	0.134	0.000		0.016	4.075	0.208	0.000	
	median	**0.000**	**0.000**	**0.000**	0.000	**<0.001**	0.000	**0.000**	**0.000**	0.000	**<0.001**
Pairs [c]:											
France			**<0.001**	**0.031**	**0.042**			**<0.001**	**0.026**	0.093	
Germany				0.891	**<0.001**				0.562	**<0.001**	
U.K.					**0.003**					**0.003**	
GM	*mean*	0.000	0.000	0.006	0.054		0.000	0.000	0.007	0.386	
	median	0.000	0.000	0.000	**0.000**	0.058	0.000	0.000	0.000	**0.000**	0.059
Pairs [c]:											
France			1.000	0.334	0.088			1.000	0.334	0.088	
Germany				0.332	0.086				0.332	0.086	
U.K.					0.155					0.156	
GW+GM	*mean*	0.015	0.076	0.140	0.054		0.016	4.075	0.215	0.386	
	median	**0.000**	**0.000**	**0.000**	**0.000**	**<0.001**	0.000	**0.000**	**0.000**	**0.000**	**<0.001**
Pairs [c]:											
France			**<0.001**	**0.018**	0.819			**<0.001**	**0.016**	0.963	
Germany				0.965	**<0.001**				0.683	**<0.001**	
U.K.					**0.016**					**0.017**	
AR	*mean*	0.001	0.000	-0.021	0.000		0.001	0.000	-0.146	0.000	
	median	0.000	0.000	0.000	0.000	0.672	0.000	0.000	0.000	0.000	0.641
Pairs [c]:											
France			0.702	0.406	0.695			0.250	0.360	0.239	
Germany				0.474	1.000				0.563	1.000	
U.K.					0.464					0.555	
PYA	*mean*	0.000	-0.001	0.002	0.001		0.000	-0.003	0.003	0.001	
	median	0.000	0.000	0.000	0.000	0.540	0.000	0.000	0.000	0.000	0.708
Pairs [c]:											
France			0.655	0.366	1.000			0.655	0.476	1.000	
Germany				0.308	0.722				0.411	0.724	
U.K.					0.400					0.507	
OTH	*mean*	0.001	-0.002	-0.002	-0.006		0.056	0.338	0.005	0.008	
	median	0.000	0.000	0.000	0.000	0.426	0.000	0.000	0.000	0.000	0.254
Pairs [c]:											
France			0.415	0.178	0.158			0.398	0.080	0.110	
Germany				0.428	0.554				0.299	0.479	
U.K.					0.697					0.660	

Table 4.1 (continued) - Signed values of errors from measurement of excess value created (EVC) omitting dirty surplus flows (errors scaled by beginning-of-interval market value and absolute value of EVC)

Panel B: 8-year Measurement Interval (*e-b* = 8)

		Scaled by beginning market value [a]					Scaled by absolute value of EVC [a]				
		France	*Germany*	*U.K.*	*U.S.*	*All four*[b]	*France*	*Germany*	*U.K.*	*U.S.*	*All four*[b]
N		*50*	*51*	*48*	*48*	*197*	*50*	*51*	*48*	*48*	*197*
ALL	mean	0.080	0.076	1.476	0.532		0.052	1.239	27.284	-0.514	
	median	0.000	**0.000**	0.051	**0.000**	0.376	0.000	**0.000**	0.037	**0.000**	0.730
Pairs [c]:											
France			0.249	0.128	0.257			0.388	0.410	0.350	
Germany				0.430	0.859				0.911	0.893	
U.K.					0.402					0.436	
GW	mean	0.091	0.064	1.608	0.000		0.030	1.452	23.219	0.000	
	median	0.000	**0.000**	**0.031**	0.000	**<0.001**	0.000	**0.000**	**0.023**	0.000	**<0.001**
Pairs [c]:											
France			**0.025**	**0.012**	0.151			**0.012**	**0.009**	0.151	
Germany				0.125	**<0.001**				0.493	**<0.001**	
U.K.					**0.001**					**0.001**	
GM	mean	0.000	0.000	0.084	0.610		0.000	0.000	0.036	0.254	
	median	0.000	0.000	0.000	0.000	**0.007**	0.000	0.000	0.000	0.000	**0.007**
Pairs [c]:											
France			1.000	0.307	**0.020**			1.000	0.307	**0.020**	
Germany				0.303	**0.019**				0.303	**0.019**	
U.K.					0.092					0.095	
GW+GM	mean	0.091	0.064	1.692	0.610		0.030	1.452	23.255	0.254	
	median	0.000	**0.000**	**0.031**	0.000	**0.009**	0.000	**0.000**	**0.023**	0.000	**0.007**
Pairs [c]:											
France			**0.025**	**0.012**	0.700			**0.012**	**0.009**	0.700	
Germany				0.122	**0.041**				0.476	**0.024**	
U.K.					**0.025**					**0.023**	
AR	mean	0.002	0.000	-0.196	0.000		0.002	0.000	-0.097	0.000	
	median	0.000	0.000	0.000	0.000	0.227	0.000	0.000	**0.000**	0.000	0.217
Pairs [c]:											
France			0.398	0.147	0.412			0.398	0.136	0.412	
Germany				0.212	1.000				0.212	1.000	
U.K.					0.224					0.224	
PYA	mean	-0.000	-0.001	-0.036	0.007		-0.000	-0.009	-0.017	0.003	
	median	0.000	0.000	0.000	0.000	0.586	0.000	0.000	0.000	0.000	0.557
Pairs [c]:											
France			1.000	0.341	0.325			1.000	0.336	0.325	
Germany				0.333	0.315				0.308	0.315	
U.K.					0.683					0.639	
OTH	*mean*	-0.013	0.013	0.016	-0.085		0.020	-0.204	4.143	-0.771	
	median	0.001	0.000	**0.005**	0.000	0.094	0.001	0.000	**0.002**	0.000	0.130
Pairs [c]:											
France			0.586	0.084	0.864			0.273	0.260	0.912	
Germany				**0.025**	0.197				**0.025**	0.159	
U.K.					0.080					0.170	

Notes to table 4.1:

a. The table reports mean and median signed differences between EVC measures over the interval from b to e, calculated exclusive of dirty surplus flows and denoted $EVC_{DS,e}^{b}$, and the correct EVC measure denoted EVC_{e}^{b}, as given by expression (4.7) in the text:

$$EVC_{DS,e}^{b} - EVC_{CS,e}^{b} = -\left(\sum_{s=1}^{e-b-1} DS_{b+s} \prod_{k=1}^{e-(b+s)} \left(1 + r_{b+s+k}\right) + DS_{e} \right).$$

Panel A reports these errors for three-year measurement intervals (e-b=3); Panel B reports these errors for eight-year measurement intervals (e-b=8). The errors in measurement of EVC are scaled both by market value at the start of the measurement interval (left side of each panel) and by the absolute value of the correct EVC measure (right side of each panel). The various dirty surplus-based measures differ from each other with respect to the classes of dirty surplus flows that are omitted. Notation is as follows:

- *ALL*: all dirty surplus flows are omitted;
- *GW*: goodwill only is omitted;
- *GM*: the unrecognised issue of equity under merger (pooling-of-interests) accounting only is omitted;
- *GW+GM*: both goodwill and the unrecognised issue of equity under merger (pooling-of-interests) accounting are omitted;
- *AR*: asset revaluations only are omitted;
- *PYA*: prior-year adjustments only are omitted;
- *OTH*: 'other dirty surplus flows' only are omitted.

The median printed in bold indicates that one can reject at the 5% level the null hypothesis that the distribution is centred on zero (signed-rank test).

b. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank in signed errors across all four countries. Probability values of 0.05 (5%) or less are printed in bold type.

c. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank in signed errors across pairs of countries. Probability values of 0.05 (5%) or less are printed in bold type.

Table 4.2 - Absolute values of errors from measurement of excess value created (EVC) omitting dirty surplus flows (errors scaled by beginning-of-interval market value and absolute value of EVC)

Panel A: 3-year Measurement Interval (*e-b* = 3)

		Scaled by beginning market value [a]					Scaled by absolute value of EVC [a]				
		France	*Germany*	*U.K.*	*U.S.*	*All four*[b]	*France*	*Germany*	*U.K.*	*U.S.*	*All four*[b]
	N	*178*	*180*	*191*	*189*	*738*	*178*	*180*	*191*	*189*	*738*
ALL	mean	0.050	0.105	0.270	0.076		0.347	4.790	0.829	0.452	
	median	0.013	0.009	0.074	0.001	**<0.001**	0.023	0.023	0.100	0.001	**<0.001**
Pairs [c]:											
France			0.261	**<0.001**	**<0.001**			0.306	**<0.001**	**<0.001**	
Germany				**<0.001**	**<0.001**				**<0.001**	**<0.001**	
U.K.					**<0.001**					**<0.001**	
GW	mean	0.017	0.089	0.220	0.000		0.077	4.419	0.572	0.000	
	median	0.000	0.000	0.011	0.000	**<0.001**	0.000	0.000	0.022	0.000	**<0.001**
Pairs [c]:											
France			**<0.001**	**<0.001**	**<0.001**			**<0.001**	**<0.001**	**<0.001**	
Germany				**<0.001**	**<0.001**				**<0.001**	**<0.001**	
U.K.					**<0.001**					**<0.001**	
GM	mean	0.000	0.000	0.006	0.055		0.000	0.000	0.007	0.387	
	median	0.000	0.000	0.000	0.000	**<0.001**	0.000	0.000	0.000	0.000	**<0.001**
Pairs [c]:											
France			1.000	0.334	**0.001**			1.000	0.334	**0.001**	
Germany				0.332	**0.001**				0.332	**0.001**	
U.K.					**0.002**					**0.002**	
GW+GM	mean	0.017	0.088	0.225	0.055		0.077	4.419	0.578	0.387	
	median	0.000	0.000	0.011	0.000	**<0.001**	0.000	0.000	0.022	0.000	**<0.001**
Pairs [c]:											
France			**<0.001**	**<0.001**	0.623			**<0.001**	**<0.001**	0.585	
Germany				**<0.001**	**<0.001**				**<0.001**	**<0.001**	
U.K.					**<0.001**					**<0.001**	
AR	mean	0.001	0.000	0.038	0.000		0.001	0.000	0.230	0.000	
	median	0.000	0.000	0.000	0.000	**<0.001**	0.000	0.000	0.000	0.000	**<0.001**
Pairs [c]:											
France			**<0.001**	**<0.001**	**<0.001**			**<0.001**	**<0.001**	**<0.001**	
Germany				**<0.001**	1.000				**<0.001**	1.000	
U.K.					**<0.001**					**<0.001**	
PYA	mean	0.000	0.002	0.016	0.001		0.000	0.006	0.048	0.002	
	median	0.000	0.000	0.000	0.000	**<0.001**	0.000	0.000	0.000	0.000	**<0.001**
Pairs [c]:											
France			**0.025**	**<0.001**	0.051			**0.025**	**<0.001**	0.051	
Germany				**<0.001**	0.673				**<0.001**	0.668	
U.K.					**<0.001**					**<0.001**	
OTH	*mean*	0.033	0.032	0.018	0.020		0.271	0.538	0.062	0.128	
	median	0.011	0.003	0.002	0.000	**<0.001**	0.018	0.008	0.003	0.000	**<0.001**
Pairs [c]:											
France			**<0.001**	**<0.001**	**<0.001**			**0.001**	**<0.001**	**<0.001**	
Germany				0.183	**0.001**				0.098	**0.002**	
U.K.					**0.045**					0.111	

Table 4.2 (continued) - Absolute values of errors from measurement of excess value created (EVC) omitting dirty surplus flows (errors scaled by beginning-of-interval market value and absolute value of EVC)

Panel B: 8-year Measurement Interval (*e-b* = 8)

		Scaled by beginning market value [a]					Scaled by absolute value of EVC [a]				
		France	*Germany*	*U.K.*	*U.S.*	*All four*[b]	*France*	*Germany*	*U.K.*	*U.S.*	*All four*[b]
N		*50*	*51*	*48*	*48*	*197*	*50*	*51*	*48*	*48*	*197*
ALL	*mean*	0.180	0.143	2.108	0.739		0.120	1.321	27.643	1.056	
	median	0.036	0.064	0.357	0.005	**<0.001**	0.035	0.051	0.170	0.005	**<0.001**
Pairs [c]:											
France			0.822	**<0.001**	**0.017**			0.428	**<0.001**	**0.013**	
Germany				**<0.001**	0.092				**0.012**	**0.018**	
U.K.					**<0.001**					**<0.001**	
GW	*mean*	0.099	0.109	1.847	0.000		0.059	1.455	23.433	0.000	
	median	0.000	0.004	0.134	0.000	**<0.001**	0.000	0.004	0.089	0.000	**<0.001**
Pairs [c]:											
France			**0.001**	**<0.001**	**0.004**			**<0.001**	**<0.001**	**0.004**	
Germany				**<0.001**	**<0.001**				**0.001**	**<0.001**	
U.K.					**<0.001**					**<0.001**	
GM	*mean*	0.000	0.000	0.084	0.610		0.000	0.000	0.036	0.254	
	median	0.000	0.000	0.000	0.000	**0.007**	0.000	0.000	0.000	0.000	**0.007**
Pairs [c]:											
France			1.000	0.307	**0.020**			1.000	0.307	**0.020**	
Germany				0.303	**0.019**				0.303	**0.019**	
U.K.					0.092					0.095	
GW+GM	*mean*	0.099	0.109	1.931	0.610		0.059	1.455	23.47	0.254	
	median	0.000	0.004	0.134	0.000	**<0.001**	0.000	0.004	0.089	0.000	**<0.001**
Pairs [c]:											
France			**0.001**	**<0.001**	0.515			**<0.001**	**<0.001**	0.492	
Germany				**<0.001**	**<0.001**				**0.001**	**<0.001**	
U.K.					**<0.001**					**<0.001**	
AR	*mean*	0.002	0.000	0.216	0.000		0.002	0.000	0.106	0.000	
	median	0.000	0.000	0.000	0.000	**<0.001**	0.000	0.000	0.000	0.000	**<0.001**
Pairs [c]:											
France			**0.011**	**<0.001**	**0.014**			**0.011**	**<0.001**	**0.014**	
Germany				**<0.001**	1.000				**<0.001**	1.000	
U.K.					**<0.001**					**<0.001**	
PYA	*mean*	0.000	0.001	0.065	0.009		0.000	0.009	0.026	0.004	
	median	0.000	0.000	0.000	0.000	**<0.001**	0.000	0.000	0.000	0.000	**<0.001**
Pairs [c]:											
France			1.000	**<0.001**	0.276			1.000	**<0.001**	0.286	
Germany				**<0.001**	0.277				**<0.001**	0.295	
U.K.					**0.001**					**0.001**	
OTH	*mean*	0.078	0.128	0.092	0.133		0.059	1.022	4.177	0.799	
	median	0.026	0.018	0.019	0.003	**0.014**	0.026	0.038	0.009	0.003	**0.002**
Pairs [c]:											
France			0.373	0.538	**0.001**			0.656	**0.045**	**0.001**	
Germany				0.883	0.053				0.084	**0.005**	
U.K.					**0.012**					0.071	

Notes to table 4.2:

a. The table reports mean and median signed differences between EVC measures over the interval from b to e, calculated exclusive of dirty surplus flows and denoted $EVC^{b}_{DS,e}$, and the correct EVC measure denoted EVC^{b}_{e}, as given by expression (4.7) in the text:

$$EVC^{b}_{DS,e} - EVC^{b}_{CS,e} = -\left(\sum_{s=1}^{e-b-1} DS_{b+s} \prod_{k=1}^{e-(b+s)} \left(1 + r_{b+s+k}\right) + DS_{e} \right).$$

Panel A reports these errors for three-year measurement intervals (*e-b*=3). Panel B reports these errors for eight-year measurement intervals (*e-b*=8). The errors in measurement of EVC are scaled both by market value at the start of the measurement interval (left side of each panel) and by the absolute value of the correct EVC measure (right side of each panel). The various dirty surplus-based measures differ from each other with respect to the classes of dirty surplus flows that are omitted. Notation is as follows:

- *ALL*: all dirty surplus flows are omitted;
- *GW*: goodwill only is omitted;
- *GM*: the unrecognised issue of equity under merger (pooling-of-interests) accounting only is omitted;
- *GW+GM*: both goodwill and the unrecognised issue of equity under merger (pooling-of-interests) accounting are omitted;
- *AR*: asset revaluations only are omitted;
- *PYA*: prior-year adjustments only are omitted;
- *OTH*: 'other dirty surplus flows' only are omitted.

b. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank in absolute errors across all four countries. Probability values of 0.05 (5%) or less are printed in bold type.

c. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank in absolute errors across pairs of countries. Probability values of 0.05 (5%) or less are printed in bold type.

Table 4.3 - Signed values of errors from measurement of excess value created (EVC) omitting dirty surplus flows (errors scaled by beginning-of-interval market value and absolute value of EVC)
Using only those companies for which 8-year horizons are available

		3-year Measurement Interval (*e-b* = 3)									
		Scaled by beginning market value [a]					Scaled by absolute value of EVC [a]				
		France	*Germany*	*U.K.*	*U.S.*	*All four*[b]	*France*	*Germany*	*U.K.*	*U.S.*	*All four*[b]
N		*50*	*51*	*48*	*48*	*197*	*50*	*51*	*48*	*48*	*197*
ALL	*mean*	0.020	-0.000	0.275	0.018		0.570	0.277	0.139	1.245	
	median	**0.008**	0.000	**0.014**	0.000	**0.002**	**0.012**	0.000	**0.034**	0.000	**0.002**
Pairs [c]:											
France			**0.015**	0.481	**<0.001**			**0.009**	0.822	**<0.001**	
Germany				**0.036**	0.566				0.053	0.486	
U.K.					**0.013**					**0.025**	
GW	mean	0.003	0.019	0.273	0.000		0.108	0.050	0.149	0.000	
	median	0.000	**0.000**	**0.004**	0.000	**<0.001**	0.000	**0.000**	**0.005**	0.000	**<0.001**
Pairs [c]:											
France			**0.041**	**<0.001**	0.568			**0.018**	**0.001**	0.568	
Germany				0.051	**0.012**				0.065	**0.004**	
U.K.					**<0.001**					**<0.001**	
GM	mean	0.000	0.000	0.000	0.021		0.000	0.000	0.000	1.328	
	median	0.000	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000	0.100
Pairs [c]:											
France			1.000	1.000	0.147			1.000	1.000	0.147	
Germany				1.000	0.143				1.000	0.143	
U.K.					0.155					0.155	
GW+GM	mean	0.003	0.019	0.273	0.021		0.1076	0.050	0.149	1.328	
	median	0.000	**0.000**	**0.004**	0.000	**<0.001**	0.0000	**0.000**	**0.005**	0.000	**<0.001**
Pairs [c]:											
France			**0.041**	**<0.001**	0.615			**0.018**	**0.001**	0.641	
Germany				0.051	0.072				0.065	**0.023**	
U.K.					**0.001**					**0.001**	
AR	mean	0.000	0.000	0.007	0.000		0.001	0.000	-0.006	0.000	
	median	0.000	0.000	0.000	0.000	0.636	0.000	0.000	0.000	0.000	0.612
Pairs [c]:											
France			1.000	0.451	1.000			0.305	0.714	0.320	
Germany				0.361	1.000				0.361	1.000	
U.K.					0.375					0.375	
PYA	mean	0.000	0.000	0.000	-0.000		0.000	0.000	0.001	-0.002	
	median	0.000	0.000	0.000	0.000	**0.026**	0.000	0.000	0.000	0.000	0.269
Pairs [c]:											
France			1.000	0.074	0.307			1.000	0.300	0.307	
Germany				0.071	0.303				0.295	0.303	
U.K.					**0.045**					0.177	
OTH	*mean*	0.017	-0.019	-0.005	-0.002		0.462	0.227	-0.005	-0.081	
	median	**0.008**	0.000	0.000	0.000	**<0.001**	**0.012**	0.000	0.000	0.000	**<0.001**
Pairs [c]:											
France			**<0.001**	**<0.001**	**<0.001**			**<0.001**	**<0.001**	**<0.001**	
Germany				0.268	0.424				0.189	0.458	
U.K.					0.495					0.403	

Notes to table 4.3:

a. The table reports mean and median signed differences between EVC measures over the interval from b to e, calculated exclusive of dirty surplus flows and denoted $EVC^b_{DS,e}$, and the correct EVC measure denoted EVC^b_e, as given by expression (4.7) in the text:

$$EVC^b_{DS,e} - EVC^b_{CS,e} = -\left(\sum_{s=1}^{e-b-1} DS_{b+s} \prod_{k=1}^{e-(b+s)} \left(1 + r_{b+s+k}\right) + DS_e \right).$$

Panel A reports these errors for three-year measurement intervals (e-b=3). Panel B reports these errors for eight-year measurement intervals (e-b=8). The errors in measurement of EVC are scaled both by market value at the start of the measurement interval (left side of each panel) and by the absolute value of the correct EVC measure (right side of each panel). The various dirty surplus-based measures differ from each other with respect to the classes of dirty surplus flows that are omitted. Notation is as follows:

- *ALL*: all dirty surplus flows are omitted;
- *GW*: goodwill only is omitted;
- *GM*: the unrecognised issue of equity under merger (pooling-of-interests) accounting only is omitted;
- *GW+GM*: both goodwill and the unrecognised issue of equity under merger (pooling-of-interests) accounting are omitted;
- *AR*: asset revaluations only are omitted;
- *PYA*: prior-year adjustments only are omitted;
- *OTH*: 'other dirty surplus flows' only are omitted.

The median printed in bold indicates that one can reject at the 5% level the null hypothesis that the distribution is centred on zero (signed-rank test).

b. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank in signed errors across all four countries. Probability values of 0.05 (5%) or less are printed in bold type.

c. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank in signed errors across pairs of countries. Probability values of 0.05 (5%) or less are printed in bold type.

Table 4.4 - Absolute values of errors from measurement of excess value created (EVC) omitting dirty surplus flows (errors scaled by beginning-of-interval market value and absolute value of EVC)
Using only those companies for which 8-year horizons are available

		3-year Measurement Interval (e-b = 3)									
		Scaled by beginning market value [a]					Scaled by absolute value of EVC [a]				
		France	*Germany*	*U.K.*	*U.S.*	*All four*[b]	*France*	*Germany*	*U.K.*	*U.S.*	*All four*[b]
	N	*50*	*51*	*48*	*48*	*197*	*50*	*51*	*48*	*48*	*197*
ALL	*mean*	0.048	0.039	0.362	0.025		0.603	0.358	0.230	1.267	
	median	0.019	0.009	0.056	0.000	**<0.001**	0.046	0.019	0.124	0.000	**<0.001**
Pairs [c]:											
France			0.207	**0.003**	**<0.001**			0.190	0.079	**<0.001**	
Germany				**<0.001**	**0.005**				**0.001**	**0.022**	
U.K.					**<0.001**					**<0.001**	
GW	*mean*	0.008	0.020	0.338	0.000		0.117	0.061	0.211	0.000	
	median	0.000	0.000	0.021	0.000	**<0.001**	0.000	0.000	0.029	0.000	**<0.001**
Pairs [c]:											
France			**<0.001**	**<0.001**	0.086			**<0.001**	**<0.001**	0.086	
Germany				**<0.001**	**<0.001**				**0.001**	**<0.001**	
U.K.					**<0.001**					**<0.001**	
GM	*mean*	0.000	0.000	0.000	0.021		0.000	0.000	0.000	1.328	
	median	0.000	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000	0.100
Pairs [c]:											
France			1.000	1.000	0.147			1.000	1.000	0.147	
Germany				1.000	0.143				1.000	0.143	
U.K.					0.155					0.155	
GW+GM	*mean*	0.008	0.020	0.338	0.021		0.117	0.061	0.211	1.328	
	median	0.000	0.000	0.021	0.000	**<0.001**	0.000	0.000	0.029	0.000	**<0.001**
Pairs [c]:											
France			**<0.001**	**<0.001**	0.723			**<0.001**	**<0.001**	0.682	
Germany				**<0.001**	**<0.001**				**0.001**	**<0.001**	
U.K.					**<0.001**					**<0.001**	
AR	*mean*	0.000	0.000	0.036	0.000		0.001	0.000	0.034	0.000	
	median	0.000	0.000	0.000	0.000	**<0.001**	0.000	0.000	0.000	0.000	**<0.001**
Pairs [c]:											
France			**0.021**	**0.015**	**0.025**			**0.021**	**0.016**	**0.025**	
Germany				**<0.001**	1.000				**<0.001**	1.000	
U.K.					**<0.001**					**<0.001**	
PYA	*mean*	0.000	0.000	0.000	0.000		0.0000	0.0000	0.001	0.002	
	median	0.000	0.000	0.000	0.000	**0.029**	0.0000	0.0000	0.000	0.000	**0.029**
Pairs [c]:											
France			1.000	**0.038**	0.307			1.000	**0.038**	0.307	
Germany				**0.036**	0.303				**0.036**	0.303	
U.K.					0.183					0.183	
OTH	*mean*	0.040	0.041	0.012	0.008		0.486	0.335	0.027	0.194	
	median	0.014	0.003	0.002	0.000	**<0.001**	0.029	0.004	0.002	0.000	**0.001**
Pairs [c]:											
France			**0.041**	**0.003**	**<0.001**			**0.045**	**0.001**	**<0.001**	
Germany				0.390	**0.039**				0.264	0.106	
U.K.					0.145					0.292	

Notes to table 4.4:

a. The table reports mean and median signed differences between EVC measures over the interval from b to e, calculated exclusive of dirty surplus flows and denoted $EVC_{DS,e}^{b}$, and the correct EVC measure denoted EVC_{e}^{b}, as given by expression (4.7) in the text:

$$EVC_{DS,e}^{b} - EVC_{CS,e}^{b} = -\left(\sum_{s=1}^{e-b-1} DS_{b+s} \prod_{k=1}^{e-(b+s)} \left(1 + r_{b+s+k}\right) + DS_{e} \right).$$

Panel A reports these errors for three-year measurement intervals (e-b=3). Panel B reports these errors for eight-year measurement intervals (e-b=8). The errors in measurement of EVC are scaled both by market value at the start of the measurement interval (left side of each panel) and by the absolute value of the correct EVC measure (right side of each panel). The various dirty surplus-based measures differ from each other with respect to the classes of dirty surplus flows that are omitted. Notation is as follows:

- *ALL*: all dirty surplus flows are omitted;
- *GW*: goodwill only is omitted;
- *GM*: the unrecognised issue of equity under merger (pooling-of-interests) accounting only is omitted;
- *GW+GM*: both goodwill and the unrecognised issue of equity under merger (pooling-of-interests) accounting are omitted;
- *AR*: asset revaluations only are omitted;
- *PYA*: prior-year adjustments only are omitted;
- *OTH*: 'other dirty surplus flows' only are omitted.

b. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank in absolute errors across all four countries. Probability values of 0.05 (5%) or less are printed in bold type.

c. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank in absolute errors across pairs of countries. Probability values of 0.05 (5%) or less are printed in bold type.

Table 4.5 - Signed values of errors from measurement of excess value created (EVC) omitting dirty surplus flows (errors scaled by beginning-of-interval market value and absolute value of EVC)
Using median country-industry betas to estimate the cost of equity capital

Panel A: 3-year Measurement Interval (*e-b* = 3)

		Scaled by beginning market value [a]					Scaled by absolute value of EVC [a]				
		France	*Germany*	*U.K.*	*U.S.*	*All four*[b]	*France*	*Germany*	*U.K.*	*U.S.*	*All four*[b]
N		*178*	*180*	*191*	*189*	*738*	*178*	*180*	*191*	*189*	*738*
ALL	*mean*	0.016	0.072	0.120	0.049		0.158	0.611	0.260	-0.082	
	median	0.000	**0.000**	**0.003**	**0.000**	0.051	0.000	**0.000**	**0.004**	**0.000**	0.057
Pairs [c]:											
France			**0.025**	**0.037**	0.140			**0.022**	**0.044**	0.109	
Germany				0.467	0.195				0.788	0.198	
U.K.					0.129					0.172	
GW	*mean*	0.015	0.075	0.134	0.000		0.022	0.543	0.224	0.000	
	median	**0.000**	**0.000**	**0.000**	0.000	**<0.001**	**0.000**	**0.000**	**0.000**	0.000	**<0.001**
Pairs [c]:											
France			**<0.001**	**0.025**	**0.042**			**<0.001**	**0.027**	0.093	
Germany				0.939	**<0.001**				0.511	**<0.001**	
U.K.					**0.002**					**0.003**	
GM	*mean*	0.000	0.000	0.006	0.053		0.000	0.000	0.007	0.059	
	median	0.000	0.000	0.000	**0.000**	0.058	0.000	0.000	0.000	**0.000**	0.059
Pairs [c]:											
France			1.000	0.334	0.088			1.000	0.334	0.088	
Germany				0.332	0.086				0.332	0.086	
U.K.					0.155					0.156	
GW+GM	*mean*	0.015	0.075	0.140	0.053		0.022	0.543	0.232	0.059	
	median	**0.000**	**0.000**	**0.000**	**0.000**	**<0.001**	**0.000**	**0.000**	**0.000**	**0.000**	**<0.001**
Pairs [c]:											
France			**<0.001**	**0.014**	0.818			**<0.001**	**0.016**	0.968	
Germany				0.917	**<0.001**				0.628	**<0.001**	
U.K.					**0.013**					**0.016**	
AR	*mean*	0.001	0.000	-0.020	0.000		0.001	0.000	-0.064	0.000	
	median	0.000	0.000	0.000	0.000	0.672	0.000	0.000	0.000	0.000	0.639
Pairs [c]:											
France			0.702	0.407	0.695			0.250	0.357	0.239	
Germany				0.474	1.000				0.563	1.000	
U.K.					0.464					0.555	
PYA	*mean*	0.000	-0.001	0.002	0.001		0.000	-0.017	0.013	0.001	
	median	0.000	0.000	0.000	0.000	0.540	0.000	0.000	0.000	0.000	0.705
Pairs [c]:											
France			0.655	0.366	1.000			0.655	0.476	1.000	
Germany				0.308	0.722				0.408	0.724	
U.K.					0.400					0.506	
OTH	*mean*	0.001	-0.002	-0.002	-0.006		0.135	0.085	0.0790	-0.142	
	median	0.000	0.000	0.000	0.000	0.424	0.000	0.000	**0.000**	0.000	0.257
Pairs [c]:											
France			0.435	0.173	0.172			0.497	0.072	0.145	
Germany				0.394	0.585				0.243	0.583	
U.K.					0.595					0.443	

Table 4.5 (continued) - Signed values of errors from measurement of excess value created (EVC) omitting dirty surplus flows (errors scaled by beginning-of-interval market value and absolute value of EVC)
Using median country-industry betas to estimate the cost of equity capital

Panel B: 8-year Measurement Interval (*e-b* = 8)

	Scaled by beginning market value [a]					Scaled by absolute value of EVC [a]				
	France	*Germany*	*U.K.*	*U.S.*	*All four*[b]	*France*	*Germany*	*U.K.*	*U.S.*	*All four*[b]
N	*50*	*51*	*48*	*48*	*197*	*50*	*51*	*48*	*48*	*197*
ALL *mean*	0.077	0.073	1.436	0.508		0.134	0.392	0.652	2.726	
median	0.001	**0.000**	0.045	**0.000**	0.414	0.000	**0.000**	0.038	**0.000**	0.592
Pairs [c]:										
France		0.253	0.141	0.279			0.307	0.263	0.227	
Germany			0.486	0.807				0.911	0.796	
U.K.				0.438					0.630	
GW *mean*	0.089	0.057	1.567	0.000		0.030	0.287	0.737	0.000	
median	0.000	**0.000**	**0.031**	0.000	**<0.001**	0.000	**0.000**	**0.023**	0.000	**<0.001**
Pairs [c]:										
France		**0.025**	**0.013**	0.151			**0.010**	**0.007**	0.151	
Germany			0.126	**<0.001**				0.530	**<0.001**	
U.K.				**0.001**					**0.001**	
GM *mean*	0.000	0.000	0.083	0.581		0.000	0.000	0.040	2.802	
median	0.000	0.000	0.000	0.000	**0.007**	0.000	0.000	0.000	0.000	**0.007**
Pairs [c]:										
France		1.000	0.307	**0.020**			1.000	0.307	**0.020**	
Germany			0.303	**0.019**				0.303	**0.019**	
U.K.				0.092					0.095	
GW+GM *mean*	0.089	0.057	1.650	0.581		0.030	0.287	0.777	2.802	
median	0.000	**0.000**	**0.031**	0.000	**0.009**	0.000	**0.000**	**0.023**	0.000	**0.006**
Pairs [c]:										
France		**0.025**	**0.012**	0.700			**0.010**	**0.007**	0.691	
Germany			0.122	**0.041**				0.493	**0.024**	
U.K.				**0.024**					**0.022**	
AR *mean*	0.002	0.000	-0.194	0.000		0.001	0.000	-0.132	0.000	
median	0.000	0.000	0.000	0.000	0.092	0.000	0.000	**0.000**	0.000	0.132
Pairs [c]:										
France		0.305	0.086	0.320			0.167	0.100	0.180	
Germany			0.127	1.000				0.194	1.000	
U.K.				0.137					0.206	
PYA *mean*	-0.000	-0.001	-0.035	0.007		-0.000	-0.005	-0.023	0.003	
median	0.000	0.000	0.000	0.000	0.750	0.000	0.000	0.000	0.000	0.725
Pairs [c]:										
France		1.000	0.477	0.325			1.000	0.471	0.325	
Germany			0.469	0.315				0.437	0.315	
U.K.				0.858					0.792	
OTH *mean*	-0.014	0.017	0.015	-0.080		0.103	0.110	0.030	-0.078	
median	0.001	0.000	**0.005**	0.000	0.087	0.000	0.000	**0.003**	0.000	0.114
Pairs [c]:										
France		0.698	0.062	0.764			0.423	0.149	0.531	
Germany			**0.027**	0.194				**0.029**	0.083	
U.K.				0.077					0.294	

Notes to table 4.5:

a. The table reports mean and median signed differences between EVC measures over the interval from b to e, calculated exclusive of dirty surplus flows and denoted $EVC^b_{DS,e}$, and the correct EVC measure denoted EVC^b_e, as given by expression (4.7) in the text:

$$EVC^b_{DS,e} - EVC^b_{CS,e} = -\left(\sum_{s=1}^{e-b-1} DS_{b+s} \prod_{k=1}^{e-(b+s)} \left(1 + r_{b+s+k}\right) + DS_e \right).$$

Panel A reports these errors for three-year measurement intervals (e-b=3). Panel B reports these errors for eight-year measurement intervals (e-b=8). The errors in measurement of EVC are scaled both by market value at the start of the measurement interval (left side of each panel) and by the absolute value of the correct EVC measure (right side of each panel). The various dirty surplus-based measures differ from each other with respect to the classes of dirty surplus flows that are omitted. Notation is as follows:

- *ALL*: all dirty surplus flows are omitted;
- *GW*: goodwill only is omitted;
- *GM*: the unrecognised issue of equity under merger (pooling-of-interests) accounting only is omitted;
- *GW+GM*: both goodwill and the unrecognised issue of equity under merger (pooling-of-interests) accounting are omitted;
- *AR*: asset revaluations only are omitted;
- *PYA*: prior-year adjustments only are omitted;
- *OTH*: 'other dirty surplus flows' only are omitted.

The median printed in bold indicates that one can reject at the 5% level the null hypothesis that the distribution is centred on zero (signed-rank test).

b. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank in signed errors across all four countries. Probability values of 0.05 (5%) or less are printed in bold type.

c. Probability value based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank in signed errors across pairs of countries. Probability values of 0.05 (5%) or less are printed in bold type.

Table 4.6 - Absolute values of errors from measurement of excess value created (EVC) omitting dirty surplus flows (errors scaled by beginning-of-interval market value and absolute value of EVC)
Using median country-industry betas to estimate the cost of equity capital

Panel A: 3-year Measurement Interval (*e-b* = 3)

		Scaled by beginning market value [a]					Scaled by absolute value of EVC [a]				
		France	*Germany*	*U.K.*	*U.S.*	*All four*[b]	*France*	*Germany*	*U.K.*	*U.S.*	*All four*[b]
	N	*178*	*180*	*191*	*189*	*738*	*178*	*180*	*191*	*189*	*738*
ALL	*mean*	0.049	0.105	0.268	0.075		0.360	0.797	1.282	0.239	
	median	0.013	0.009	0.073	0.001	**<0.001**	0.022	0.029	0.106	0.001	**<0.001**
Pairs [c]:											
France			0.444	**<0.001**	**<0.001**			0.668	**<0.001**	**<0.001**	
Germany				**<0.001**	**<0.001**				**<0.001**	**<0.001**	
U.K.					**<0.001**					**<0.001**	
GW	*mean*	0.017	0.087	0.219	0.000		0.027	0.658	1.054	0.000	
	median	0.000	0.000	0.011	0.000	**<0.001**	0.000	0.000	0.021	0.000	**<0.001**
Pairs [c]:											
France			**<0.001**	**<0.001**	**<0.001**			**<0.001**	**<0.001**	**<0.001**	
Germany				**<0.001**	**<0.001**				**<0.001**	**<0.001**	
U.K.					**<0.001**					**<0.001**	
GM	*mean*	0.000	0.000	0.006	0.055		0.000	0.000	0.007	0.061	
	median	0.000	0.000	0.000	0.000	**<0.001**	0.000	0.000	0.000	0.000	**<0.001**
Pairs [c]:											
France			1.000	0.334	**0.001**			1.000	0.334	**0.001**	
Germany				0.332	**0.001**				0.332	**0.001**	
U.K.					**0.002**					**0.002**	
GW+GM	*mean*	0.017	0.087	0.224	0.055		0.027	0.658	1.060	0.061	
	median	0.000	0.000	0.011	0.000	**<0.001**	0.000	0.000	0.021	0.000	**<0.001**
Pairs [c]:											
France			**<0.001**	**<0.001**	0.764			**<0.001**	**<0.001**	0.603	
Germany				**<0.001**	**<0.001**				**<0.001**	**<0.001**	
U.K.					**<0.001**					**<0.001**	
AR	*mean*	0.001	0.000	0.038	0.000		0.001	0.000	0.259	0.000	
	median	0.000	0.000	0.000	0.000	**<0.001**	0.000	0.000	0.000	0.000	**<0.001**
Pairs [c]:											
France			**0.007**	**<0.001**	**0.006**			**0.007**	**<0.001**	**0.006**	
Germany				**<0.001**	1.000				**<0.001**	1.000	
U.K.					**<0.001**					**<0.001**	
PYA	*mean*	0.000	0.002	0.016	0.001		0.000	0.018	0.046	0.002	
	median	0.000	0.000	0.000	0.000	**<0.001**	0.000	0.000	0.000	0.000	**<0.001**
Pairs [c]:											
France			**0.025**	**<0.001**	0.051			**0.025**	**<0.001**	0.051	
Germany				**<0.001**	0.674				**<0.001**	0.670	
U.K.					**<0.001**					**<0.001**	
OTH	*mean*	0.032	0.031	0.018	0.020		0.333	0.244	0.132	0.181	
	median	0.011	0.003	0.002	0.000	**<0.001**	0.018	0.009	0.003	0.000	**<0.001**
Pairs [c]:											
France			**<0.001**	**<0.001**	**<0.001**			**0.006**	**<0.001**	**<0.001**	
Germany				0.184	**0.001**				0.079	**<0.001**	
U.K.					**0.038**					0.062	

Table 4.6 (continued) - Absolute values of errors from measurement of excess value created (EVC) omitting dirty surplus flows (errors scaled by beginning-of-interval market value and absolute value of EVC)
Using median country-industry betas to estimate the cost of equity capital

Panel B: 8-year Measurement Interval (e-b = 8)

		Scaled by beginning market value [a]					Scaled by absolute value of EVC [a]				
		France	*Germany*	*U.K.*	*U.S.*	*All four*[b]	*France*	*Germany*	*U.K.*	*U.S.*	*All four*[b]
N		*50*	*51*	*48*	*48*	*197*	*50*	*51*	*48*	*48*	*197*
ALL	*mean*	0.169	0.138	2.060	0.704		0.210	0.464	1.049	3.001	
	median	0.034	0.063	0.337	0.005	**<0.001**	0.030	0.040	0.159	0.006	**<0.001**
Pairs [c]:											
France			0.924	**<0.001**	**0.017**			0.432	**<0.001**	**0.031**	
Germany				**<0.001**	0.079				**0.008**	**0.025**	
U.K.					**<0.001**					**<0.001**	
GW	*mean*	0.096	0.103	1.802	0.000		0.039	0.290	0.888	0.000	
	median	0.000	0.004	0.123	0.000	**<0.001**	0.000	0.002	0.097	0.000	**<0.001**
Pairs [c]:											
France			**0.001**	**<0.001**	**0.004**			**<0.001**	**<0.001**	**0.004**	
Germany				**<0.001**	**<0.001**				**0.002**	**<0.001**	
U.K.					**<0.001**					**<0.001**	
GM	*mean*	0.000	0.000	0.083	0.581		0.000	0.000	0.040	2.802	
	median	0.000	0.000	0.000	0.000	**0.007**	0.000	0.000	0.000	0.000	**0.007**
Pairs [c]:											
France			1.000	0.307	**0.020**			1.000	0.307	**0.020**	
Germany				0.303	**0.019**				0.303	**0.019**	
U.K.					0.092					0.095	
GW+GM	*mean*	0.096	0.103	1.886	0.581		0.039	0.290	0.929	2.802	
	median	0.000	0.004	0.123	0.000	**<0.001**	0.000	0.002	0.097	0.000	**<0.001**
Pairs [c]:											
France			**0.001**	**<0.001**	0.515			**<0.001**	**<0.001**	0.515	
Germany				**<0.001**	**<0.001**				**0.001**	**<0.001**	
U.K.					**<0.001**					**<0.001**	
AR	*mean*	0.002	0.000	0.213	0.000		0.001	0.000	0.142	0.000	
	median	0.000	0.000	0.000	0.000	**<0.001**	0.000	0.000	0.000	0.000	**<0.001**
Pairs [c]:											
France			**0.040**	**<0.001**	**0.047**			**0.021**	**<0.001**	**0.025**	
Germany				**<0.001**	1.000				**<0.001**	1.000	
U.K.					**<0.001**					**<0.001**	
PYA	*mean*	0.000	0.001	0.064	0.008		0.000	0.005	0.033	0.005	
	median	0.000	0.000	0.000	0.000	**<0.001**	0.000	0.000	0.000	0.000	**<0.001**
Pairs [c]:											
France			1.000	**<0.001**	0.276			1.000	**<0.001**	0.286	
Germany				**<0.001**	0.277				**<0.001**	0.295	
U.K.					**0.001**					**0.001**	
OTH	*mean*	0.071	0.120	0.090	0.126		0.170	0.258	0.061	0.195	
	median	0.026	0.015	0.019	0.003	**0.014**	0.015	0.026	0.009	0.003	**0.011**
Pairs [c]:											
France			0.443	0.651	**0.001**			0.703	0.130	**0.003**	
Germany				0.833	0.055				0.141	**0.011**	
U.K.					**0.009**					0.076	

Notes to table 4.6:

a. The table reports mean and median signed differences between EVC measures over the interval from b to e, calculated exclusive of dirty surplus flows and denoted $EVC_{DS,e}^{b}$, and the correct EVC measure denoted EVC_{e}^{b}, as given by expression (4.7) in the text:

$$EVC_{DS,e}^{b} - EVC_{CS,e}^{b} = -\left(\sum_{s=1}^{e-b-1} DS_{b+s} \prod_{k=1}^{e-(b+s)} \left(1 + r_{b+s+k}\right) + DS_{e} \right).$$

Panel A reports these errors for three-year measurement intervals (e-b=3). Panel B reports these errors for eight-year measurement intervals (e-b=8). The errors in measurement of EVC are scaled both by market value at the start of the measurement interval (left side of each panel) and by the absolute value of the correct EVC measure (right side of each panel). The various dirty surplus-based measures differ from each other with respect to the classes of dirty surplus flows that are omitted. Notation is as follows:

- *ALL*: all dirty surplus flows are omitted;
- *GW*: goodwill only is omitted;
- *GM*: the unrecognised issue of equity under merger (pooling-of-interests) accounting only is omitted;
- *GW+GM*: both goodwill and the unrecognised issue of equity under merger (pooling-of-interests) accounting are omitted;
- *AR*: asset revaluations only are omitted;
- *PYA*: prior-year adjustments only are omitted;
- *OTH*: 'other dirty surplus flows' only are omitted.

b. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank in absolute errors across all four countries. Probability values of 0.05 (5%) or less are printed in bold type.

c. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank in absolute errors across pairs of countries. Probability values of 0.05 (5%) or less are printed in bold type.

Chapter 5

The Effect of Omitting Dirty Surplus Flows on RIVM and AEGM Intrinsic Value Estimates

5.1 Introduction

Finance theory defines the value of equity of a company as the present value of the expected future stream of dividends discounted at the cost of equity capital (PVED). If projected accounting numbers obey the clean surplus relationship (CSR) and if the projected closing and opening book values of equity are consistent across periods, PVED can be written as the book value of equity at the valuation date plus the present value of expected future residual incomes (Peasnell, 1982; Ohlson, 1995). This reformulation of the PVED is referred to as the residual income valuation model (RIVM). If there is consistency across periods in expected earnings, earnings changes and retained earnings, PVED can also be written as capitalised next-period projected earnings plus the present value of a measure of subsequent abnormal earnings growth (Ohlson and Juettner-Nauroth, 2000; Ohlson, 2003; Juettner-Nauroth and Skogsvik, 2005). This reformulation of the PVED is known as the abnormal earnings growth model (AEGM). Because the two accounting-based valuation models, RIVM and AEGM, are equivalent to the PVED it is expected that they provide the same intrinsic value estimates as the PVED. However, empirical implementations of the accounting-based models may result in intrinsic value estimates that differ from the PVED if based on implicit assumptions about future flows that are inconsistent with the PVED. In the particular case of the RIVM, a potential source of difference between PVED and accounting-based value estimates is violation of the CSR. Because the CSR is the mechanism that assures the equivalence of RIVM with PVED, CSR violations in the accounting numbers used to obtain expected future flows might cause error in the

RIVM intrinsic value estimates (Ohlson and Juettner-Nauroth, 2000; Ohlson, 2003; Juettner-Nauroth and Skogsvik, 2005).[41]

Empirical studies typically implement accounting-based models using forecasts of earnings provided by analysts as proxy for expected future earnings (e.g. Francis, *et al.*, 2000). Because analysts sometimes omit components of earnings that are unusual or difficult to predict (as shown in Cheng, 2005), such forecasts are likely to violate the CSR, which will cause error in the RIVM intrinsic value estimates. Further, when using intrinsic value estimates derived from the RIVM for international comparisons, the error may vary across countries because there may be cross-country variation in violations of CSR contained in analyst' forecasts of earnings as the magnitude and nature of CSR violations varies across accounting regimes (Frankel and Lee, 1999). Because of the potential problems with the RIVM caused by its dependence on the CSR, it is sometimes suggested that the AEGM will work better in the presence of significant CSR violations (Ohlson and Juettner-Nauroth, 2000; Ohlson, 2003; Chen, *et al.*, 2004; Jeuttner-Nauroth and Skogsvik, 2005).

The importance of dirty surplus flows in valuation is likely to depend on their relationship with the present value of expected future dividends, which is expected to depend in part on the expected magnitude and persistence of the flows. For example, if market participants believe that expected future dirty surplus flows are unrelated to the present value of expected future dividends because they are small on average, or are transitory, or are likely to affect dividends only in the distant future, then such flows are likely to be relatively unimportant in forecast-based valuation. However, if investors believe that such flows are likely to be significant in magnitude and are

[41] Another dimension to the problem might arise if the model is applied on a per-share basis. Even when accounting numbers obey CSR in aggregate, the may violate it on a per-share basis if it is expected that a future issue will be made at a price that differs from the projected book value per share at the date of the issue (Ohlson and Juettner-Nauroth, 2000; Ohlson, 2003).

likely to have an impact on dividends within their forecast horizon, then omission of expected future dirty surplus flows in a valuation model might result in significant valuation errors. For example, investors may expect some financial companies to have persistent gains and losses related to financial instruments and that dividends will be affected by these flows.

There is little evidence that dirty surplus flows are important for equity valuation. Previous studies such as Dhaliwal, *et al.* (1999) and Biddle and Choi (2002) measure the association between share price and contemporaneous dirty surplus flows in the U.S. and find limited evidence of an association. O'Hanlon and Pope (1999) also find a weak association between long-window stock returns and corresponding long-interval accumulations of dirty surplus flows in the U.K. Isidro *et al.* (2004) explore the association between market-to-book premia and perfect-foresight forecasts of dirty surplus flows in France, Germany, the U.K. and the U.S., finding only a weak association. Despite studying the association between market value and dirty surplus flows, these studies do not provide direct evidence as to how the incidence of dirty surplus flows relates to valuation errors from standard implementations of accounting-based valuation models. I seek to provide some evidence on the issue in this chapter.

I explore analytically and empirically the effect of omitting expected future dirty surplus flows from earnings forecasts used to obtain RIVM and AEGM intrinsic value estimates. I show that empirical implementation of the RIVM and the AEGM yield identical intrinsic value estimates provided that there is consistency in assumptions about projected earnings, projected dividends and projected book values and CSR holds in the accounting numbers. This calls into question the argument that the AEGM might be expected to work better than the RIVM in the presence of dirty surplus flows. An important contribution of this analysis is that it demonstrates that the error resulting from omitting dirty surplus flows in standard implementations of the RIVM and AEGM is identical for both models.

I then investigate empirically the relationship between valuation errors (differences between intrinsic value estimates and observed share price at the valuation date, scaled by the later) and total dirty surplus flows, together with cross-country and cross-industry variation herein. I use two sets of data to conduct the empirical analysis. This is motivated by the desire to use a large sample for countries in which dirty surplus flows can be measured relatively reliably by applying algorithms to machine readable data, and the desire to include in the study countries for which dirty surplus flows can only reliably be measured by direct reference to financial statements. The large-sample study is limited to the U.S. and the U.K during the period 1994 to 2003; for the small-sample study, I use data from France, Germany, the U.K. and the U.S. during the period 1994 to 2001. Data for the small-sample study are previously used in chapters 3 and 4. Results for the large sample, provide some evidence of a positive and significant association between absolute valuation errors and absolute total dirty surplus flows (inaccuracy), but only for the U.S. However, the results do not confirm the predicted negative relationship between signed valuation errors and signed total dirty surplus flows (bias). In fact, results suggest an association but in the opposite direction. For the U.S. sample, I find significant cross-industry differences in the relationship, namely between financial companies and other industry groups. Results for the small sample indicate a significant relationship between valuation errors and total dirty surplus flows for both signed and absolute valuation errors, but only in the case of U.S. companies. There is also some evidence of cross-country differences but again, only in relation to the U.S. However, conclusions based on the small-sample analysis should be interpreted with caution given the relative small sizes of the sample employed. In general, the results provide some support of a relationship between valuation errors and total dirty surplus flows in the case of the U.S. sample. Nevertheless, taking all results together, I conclude that the relationship is weak.

The remainder of the chapter is organised as follows. The next section presents the general formulations of forecast-based models and in particular the PVED. Section three introduces the general formulation of the RIVM and AEGM accounting-based valuation models and explores analytically the effect on the models' intrinsic value estimates of omitting expected dirty surplus flows from earnings forecasts. Section four presents empirical implementations of the accounting-based valuation models and describes the tests used to explore the relationship between valuation errors and total dirty surplus flows. Section five describes the data and sample. Section six discusses the results for the large sample-study while section seven presents results for the small-sample study. Section eight reports robustness checks. Section nine concludes.

5.2 Forecast-based valuation models

A wide variety of valuation methods can be found in the academic literature as well as in practice.[42] This study focuses on forecast-based models. Forecast-based models, considered to be the core of valuation (Kothari, 2001), define company value as the expected future cash flows discounted at the appropriate rate. That is:

$$V_t = \frac{E_t(CF_1)}{(1+r_d)^1} + \frac{E_t(CF_2)}{(1+r_d)^2} + \frac{E_t(CF_3)}{(1+r_d)^3} + \ldots \quad (5.1)$$

or

[42] See for example Fernandez (2002, p.21) for a list of some commonly used valuation methods.

$$V_t = \sum_{s=1}^{\infty} E_t\left[CF_{t+s}\right](1+r_d)^{-s},$$

where:

V_t	=	Value of the company at valuation time t;
$E_t[\cdot]$	=	Expectations operator at time t;
CF	=	Stream of future cash flows;
r_d	=	Risk-adjusted discount rate.

Different types of cash flows can be used in forecast-based models, depending on whether the valuation is performed from an entity or an equity perspective. From the shareholders' point of view (equity perspective), dividends are regarded as the future cash flows. This way, the equity value of the company is the present value of expected future dividends (Copeland and Weston, 1992, p.20), defined as follows:

$$V_t = \sum_{s=1}^{\infty} E_t\left[d_{t+s}\right](1+r)^{-s} \qquad \text{(PVED)}$$

where:

d	=	Expected future dividends net of equity issues;
r	=	Cost of equity capital.

Although the PVED is a standard valuation model, it is sometimes argued that it may not perform well in capturing equity value because it relies on forecasts of future dividends, which might not be a good indicator of future value creation. The same holds for free cash flows.[43] Free cash flows would adequately measure value if matched with the cash investments that generate them. But the cash inflows returned from investments are recognised in periods after the recognition of the cash outflows

[43] Free cash flows can be calculated as operating income after tax less the change in net operating assets. This calculation requires that income is comprehensive so that comprehensive operating income and the change in book value of the net operating assets explain the cash flow from the operating activities to the financing activities (Penman, 2001, p.310).

to fund investments. Only accrual accounting matches the inflows received from the company's operations with the outflows that generate them. That is why accounting-based models, such as the RIVM and the AEGM, have been suggested in the valuation literature as providing a more reliable way of measuring equity value (e.g Ohlson, 1995; Penman, 2001, p. 182). The attractiveness of the RIVM and AEGM lies in their direct link to accounting numbers, specifically earnings. Another attractive feature is that contrary to the PVED, which is based only on a flow component, the RIVM and AEGM are anchored in current book value and capitalised next period earnings, respectively, thereby giving less weight to the forecasted portion and consequently reducing the potential influence of forecast errors in the value estimates (Francis, *et al.*, 2000). Finally, another practical advantage of the accounting-based models is that analysts typically forecast earnings, an accounting variable, not dividends or free cash flows. The association between earnings and prices is well documented in the accounting literature (e.g. Ball and Brown, 1968; Francis, Schipper and Vincent, 2003).

However, the properties of accounting may not always be beneficial. Certain accounting practices might distort book value and earnings. It is usually argued that accounting methods do not affect value estimates because the immediate impact of such methods will ultimately revert in future periods (Healy and Palepu, 2001, p.11-6). However, when implementing the models for finite horizons it is difficult to accurately capture the effects and contra-effects of accounting methods in the post-horizon terms. A particular case that has preoccupied valuation researchers concerns dirty surplus accounting practices. Violations of the CSR are allowed in most GAAP regimes and they could interfere with the intrinsic value estimates derived from the RIVM, whose equivalence with the PVED relies on the CSR (Frankel and Lee, 1999).

I study the implications for RIVM and AEGM intrinsic value estimates of using earnings forecasts that do not follow CSR.

5.3 Dirty surplus flows and accounting-based valuation models

5.3.1 The equivalence between the PVED, RIVM and AEGM

The RIVM and the AEGM can each be derived from the PVED, defined above, by adding to PVED the following zero-sum expression:

$$0 = y_t + (1+r)^{-1}\left(y_{t+1} - (1+r)y_t\right) + (1+r)^{-2}\left(y_{t+2} - (1+r)y_{t+1}\right) + \ldots$$

or

$$0 = y_t + \sum_{s=1}^{\infty} E_t\left[y_{t+s} - (1+r)y_{t+s-1}\right](1+r)^{-s} \ , \tag{5.2}$$

where $y_s(1+r)^{-s} \to 0$ as $s \to \infty$. Alternatively, y could be a finite series ending at time $t+T$, where $y^{t+T} = 0$. The addition of expression (5.2) to PVED gives:

$$V_t = y_t + \sum_{s=1}^{\infty} E_t\left[y_{t+s} + d_{t+s} - (1+r)y_{t+s-1}\right](1+r)^{-s} . \tag{5.3}$$

RIVM can be derived if y in expression (5.2) is defined as book value of equity, denoted b, as follows:

$$V_t = b_t + \sum_{s=1}^{\infty} E_t\left[b_{t+s} + d_{t+s} - (1+r)b_{t+s-1}\right](1+r)^{-s} . \tag{5.4}$$

Consider the CSR defined in chapter 2. If CSR holds, net income, denoted x, comprises all changes in the book value of equity other than dividends net of equity issues:

$$x_{t+s} = b_{t+s} + d_{t+s} - b_{t+s-1} \ . \tag{CSR}$$

Provided that CSR holds, the second term on the right-hand side of expression (5.4) reduces to the present value of expected future residual incomes. Under CSR, residual income, denoted x^a, is as follows:

$$\begin{aligned} x^a_{t+s} &= b_{t+s} + d_{t+s} - b_{t+s-1} - rb_{t+s-1} \\ &= b_{t+s} + d_{t+s} - (1+r)b_{t+s-1} \ . \end{aligned} \qquad (5.5)$$

Substitution of (5.5) into (5.4) gives the RIVM:

$$V_t = b_t + \sum_{s=1}^{\infty} E_t\left[x^a_{t+s}\right](1+r)^{-s} \ . \qquad \text{(RIVM)}$$

The AEGM expresses the intrinsic value of equity as the capitalized next-period expected earnings plus the present value of the capitalized subsequent abnormal earnings growth, where abnormal earnings growth is the difference between year-on-year earnings change and a normal return on previous-year retained earnings. To derive the AEGM, define y_{t+s} in expression (5.2) as the expectation at time t of earnings at time t+s+1, capitalized as a perpetuity as at time t+s (Ohlson and Juettner-Nauroth, 2000):

$$y_{t+s} = \frac{E_t\left[x_{t+s+1}\right]}{r} \ . \qquad (5.6)$$

Substitution of (5.6) into (5.3) gives the AEGM:

$$\begin{aligned} V_t &= \frac{E_t\left[x_{t+1}\right]}{r} + \sum_{s=1}^{\infty} E_t\left[\frac{E_t\left[x_{t+s+1}\right]}{r} + d_{t+s} - (1+r)\frac{E_t\left[x_{t+s}\right]}{r}\right](1+r)^{-s} \\ &= \frac{E_t\left[x_{t+1}\right]}{r} + \sum_{s=1}^{\infty} \frac{1}{r} E_t\left[\left(x_{t+s+1} - x_{t+s}\right) - r\left(x_{t+s} - d_{t+s}\right)\right](1+r)^{-s}. \end{aligned} \qquad \text{(AEGM)}$$

The RIVM and the AEGM are each equivalent to PVED and they can be derived by adding to PVED a zero-sum expression in which the terms are defined to be accounting items. For the RIVM, the valuation anchor is book value and the residual income is the flow that determines the premium over the anchor. For the AEGM, the valuation anchor is capitalised earnings and abnormal earnings growth is the flow that determines the premium. As a consequence, the models differ with respect to their dependence on CSR in linking with the PVED. Residual income needs to be defined in accordance with CSR, otherwise a non-zero-sum item would be added to PVED in the RIVM derivation, and therefore the RIVM intrinsic value estimate would differ from the PVED intrinsic value estimate. Equivalence of AEGM with PVED does not require earnings to be defined in accordance with CSR, but requires consistency across successive periods in projected earnings, earnings changes and retained earnings. It is the fact that the RIVM and the AEGM differ with respect to their reliance on CSR for their equivalence to the PVED that supports the view that the AEGM may be preferable to RIVM where CSR violations are particularly severe.

5.3.2 The relationship between RIVM intrinsic value estimates and AEGM intrinsic value estimates

The equivalence of the RIVM and AEGM with the PVED and the difference between the two models with respect to their reliance on CSR are based on the premise that expectations regarding future dividends are given, and are not affected by accounting projections represented by the zero-sum expression (5.2). However, in forecast-based implementations of accounting-based valuation models it is standard practice to derive dividend projections from earnings projections assuming a dividend payout ratio. Typically, in implementations of the RIVM, projections of future book values per-share are derived using projected earnings per share, projected payouts and the assumption that CSR holds on a per-share basis (Frankel and Lee, 1998; Lee, *et al.*, 1999; Gebhardt, Lee and Swaminathan, 2001; Gode and Mohanram, 2003; Chen, *et al.*, 2004; Daske, 2005). Similarly, in implementations of the AEGM, projections of retained earnings are based on projected future earnings net of an estimated payout ratio (Gode and Mohanram, 2003; Chen, *et al.*, 2004). Such procedures, in which earnings projections drive dividend projections, are consistent with the fact that, over the whole life of the company, the aggregate of all accounting gains and losses must equal the aggregate of net distributions to shareholders.

Before considering the possible effect of CSR violation on intrinsic value estimates from the models, I first consider the relationship between standard applications of the two models. The intrinsic value estimate from the RIVM is as follows:

$$\begin{aligned} vps_t^{RIVM} &= bps_t + \sum_{s=1}^{\infty}\left[xps_{t+s} - rbps_{t+s-1}\right](1+r)^{-s} \\ &= bps_t + \sum_{s=1}^{\infty} xps_{t+s}^{a}(1+r)^{-s}, \end{aligned} \tag{5.7}$$

where vps_t^{RIVM} is the estimate of intrinsic value per share from RIVM at time *t*, bps_t is book value per share at time *t*, bps_{t+s} for $s > 0$ is the time-*t* projection of book value per share for time *t+s*, xps_{t+s} is the time-*t* projection of earnings per share for time *t+s*, and xps_{t+s}^{a} is the time-*t* projection of residual income per share for time *t+s*. Projected residual incomes per share are as follows, where book values per share for *t*+1 onwards are projected from time *t* book value per share, subsequent projections of earnings per share and subsequent projections of dividend per share (dps_{t+s}):

$$\begin{aligned} xps_{t+1}^{a} &= xps_{t+1} - rbps_t \\ xps_{t+2}^{a} &= xps_{t+2} - r\left(bps_t + xps_{t+1} - dps_{t+1}\right) \\ xps_{t+3}^{a} &= xps_{t+3} - r\left(bps_t + xps_{t+1} + xps_{t+2} - dps_{t+1} - dps_{t+2}\right) \\ &etc. \end{aligned} \tag{5.8}$$

The projected dividends per share in expression (5.8) are given by applying an assumed dividend payout ratio to projections of earnings per share. The AEGM is implemented as follows using the same CSR-compliant earnings and dividend projections that are used in implementing the RIVM:

$$vps_t^{AEGM} = \frac{xps_{t+1}}{r} + \sum_{s=1}^{\infty} \frac{\left[\left(xps_{t+s+1} - xps_{t+s}\right) - r\left(xps_{t+s} - dps_{t+s}\right)\right]}{r}\left(1+r\right)^{-s}. \quad (5.9)$$

Note that $xps_{t+1} = xps_{t+1}^a + rbps_t$. Note also that, since projections are formulated under the assumption that CSR holds,

$$xps_{t+s} - dps_{t+s} = b_{t+s} - b_{t+s-1}.$$

Therefore,

$$\begin{aligned}\left(xps_{t+s+1} - xps_{t+s}\right) - r\left(xps_{t+s} - dps_{t+s}\right) &= \left(xps_{t+s+1} - rb_{t+s}\right) - \left(xps_{t+s} - rb_{t+s-1}\right)\\ &= xps_{t+s+1}^a - xps_{t+s}^a.\end{aligned}$$

Expression (5.9) can thus be expanded as follows:

$$\begin{aligned}vps_t^{AEGM} &= \frac{rbps_t + xps_{t+1}^a}{r} + \frac{\left(xps_{t+2}^a - xps_{t+1}^a\right)}{r}\left(1+r\right)^{-1}\\ &+ \frac{\left(xps_{t+3}^a - xps_{t+2}^a\right)}{r}\left(1+r\right)^{-2} + \frac{\left(xps_{t+3}^a - xps_{t+2}^a\right)}{r}\left(1+r\right)^{-3} \ldots\\ &= bps_t +\\ &+ xps_{t+1}^a\left[\left(1+r\right)^{-1} + \left(1+r\right)^{-2} + \left(1+r\right)^{-3} + \ldots\right]\\ &+ \left(xps_{t+2}^a - xps_{t+1}^a\right)\left[\left(1+r\right)^{-2} + \left(1+r\right)^{-3} + \ldots\right]\\ &+ \left(xps_{t+3}^a - xps_{t+2}^a\right)\left[\left(1+r\right)^{-3} + \ldots\right]\\ &+ \ldots\end{aligned}$$

Collecting terms, it can be seen that this formulation of the AEGM gives an intrinsic value estimate identical to vps_t^{RIVM}:

$$\begin{aligned}vps_t^{AEGM} &= bps_t + xps_{t+1}^a\left(1+r\right)^{-1} + xps_{t+2}^a\left(1+r\right)^{-2} + xps_{t+3}^a\left(1+r\right)^{-3} + \ldots\\ &= vps_0^{RIV}.\end{aligned} \quad (5.10)$$

Hence, if accounting projections obey CSR and are used consistently in the RIVM and AEGM, then the RIVM and AEGM must give identical intrinsic value estimates and, therefore, identical valuation errors with respect to PVED.[44] In the next subsection I discuss this valuation error.

5.3.3 The effect of expected future dirty surplus flows in the valuation error in the RIVM and AEGM

In this subsection, I define the valuation error that would arise from the omission of a projected dirty surplus flow for time *t+s*, denoted f_{t+s}, in implementing the two accounting-based models. I assume that any dirty surplus flow will have a dividend impact of δf_{t+s} at the time at which it arises, where $0 \leq \delta \leq 1$, and a dividend impact at time *t+s+z* of $(1-\delta)f_{t+s}$, where $z > 0$. This setting assumes that dirty surplus flows will be reflected in dividends at some point in time, but imposes no restriction with regard to when that time will happen. For example, it allows for the dividend impact of a dirty surplus flow to be expected to arise in the distant future and to have a present value of zero. In such a setting, it is expected that the omission of a single expected future dirty surplus flow from a valuation model would result in the following valuation error:[45]

$$-f_{t+s}\left[\delta(1+r)^{-s}+(1-\delta)(1+r)^{-(s+z)}\right]. \tag{5.11}$$

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[44] The consistent use of accounting projections includes the use of consistent growth assumptions in terminal value terms.

[45] This simple setting could be made more complicated by allowing a dirty surplus flow to be associated with a more complicated stream of dividends, but the inferences would not change significantly. Alternatively, this simplified setting can be justified by defining f_{t+s} to be a component of a dirty surplus flow that has an impact of δf_{t+s} on the dividend at time *t+s* and an impact of $(1-\delta)f_{t+s}$ on the dividend at time *t+s+z*.

I now demonstrate that the valuation error described in expression (5.11) would arise from implementations of both the RIVM and AEGM. I consider the effect on the RIVM intrinsic value estimate, vps_t^{RIVM} as given in expression (5.7), of omitting f_{t+s} from the projected earnings per share for time $t+s$. First, projected residual income per share for time $t+s$ will be less than it would otherwise have been by the quantity f_{t+s}. The present value of this effect is:

$$-f_{t+s}(1+r)^{-s}.$$

Second, the projected book values per share from time $t+s$ to time $t+s+z-1$ will be less by $f_{t+s}(1-\delta)$. This will cause the projected capital charge per share for time $t+s+1$ to time $t+s+z$ to be less by $r.f_{t+s}(1-\delta)$.[46] The present value of this effect is:

$$r.f_{t+s}\left[(1-\delta)(1+r)^{-(s+1)}+(1-\delta)(1+r)^{-(s+2)}+\ldots+(1-\delta)(1+r)^{-(s+z)}\right].$$

The sum of these two items is:

$$-f_{t+s}\left[(1+r)^{-s}-(1-\delta)(1+r)^{-(s+1)}-(1-\delta)(1+r)^{-(s+2)}-\ldots-(1-\delta)(1+r)^{-(s+z)}\right].$$

This expression resumes to the following, which is equal to the valuation error given in expression (5.11):

$$\begin{aligned}&-f_{t+s}\left[(1+r)^{-s}-(1-\delta)\left((1+r)^{-s}-(1+r)^{-(s+z)}\right)\right]\\&=-f_{t+s}\left[\delta(1+r)^{-s}+(1-\delta)(1+r)^{-(s+z)}\right].\end{aligned}$$

I now consider the effect on the AEGM intrinsic value estimate, vps_t^{AEGM} as given in expression (5.9), of omitting f_{t+s} from the projected earnings per share for time $t+s$.

[46] The capital charge is the product of the cost of equity and the opening book value of equity, which is deducted from net income to arrive at residual income.

First, projected earnings per share for time s will be less by f_{t+s}. The present value of this effect is:

$$-\frac{f_{t+s}}{r}(1+r)^{-(s-1)}.$$

Second, because the time t+s earnings reduces by f_{t+s} and the time t+s retained earnings reduces by $f_{t+s}(1-\delta)$, the abnormal earnings growth for time t+s+1 increases by $f_{t+s}(1+r(1-\delta))$. The present value of this effect is:

$$\frac{f_{t+s}}{r}(1+r)^{-s}+f_{t+s}(1-\delta)(1+r)^{-s}.$$

Third, because of the omitted year t+s+z dividend, $f_{t+s}(1-\delta)$, arising from the omission of the year t+s earnings component, the projected abnormal earnings growth of year s+z+1 reduces by $r.f_{t+s}(1-\delta)$. The present value of this effect is:

$$-f_{t+s}(1-\delta)(1+r)^{-(s+z)}.$$

The sum of these three items is:

$$-\frac{f_{t+s}}{r}(1+r)^{-(s-1)}+\frac{f_{t+s}}{r}(1+r)^{-s}+f_{t+s}(1-\delta)(1+r)^{-s}-f_{t+s}(1-\delta)(1+r)^{-(s+z)}.$$

As with RIVM, this expression resumes to the following, which is equal to the valuation error given in expression (5.11):

$$-f_{t+s}\left[\delta(1+r)^{-s}+(1-\delta)(1+r)^{-(s+z)}\right].$$

In summary and as expected, I have shown that the valuation error given in expression (5.11) would arise in empirical implementations of both the RIVM and AEGM. Generalising the valuation error for the omission of series of expected future dirty surplus leads to the following expression:

$$-\sum_{s=1}^{\infty} f_{t+s}\left[\delta(1+r)^{-s}+(1-\delta)(1+r)^{-(s+z)}\right] . \qquad (5.12)$$

The effect of omitted expected dirty surplus flows on valuation errors from the RIVM and AEGM can be easily inferred from expression (5.12). If valuation errors are defined as the excess of the intrinsic value estimate over the observed price, scaled by the later, they should be negatively associated with dirty surplus flows, with the effect being driven by the magnitudes of δ and z. For example, a high value of δ and a small value of z would mean that f_{t+s} would have a relatively important effect on the present value of expected future dividends, and that omission of that flow might therefore cause a relatively large valuation error. In contrast, a low value of δ combined with a very high value of z, consistent with the dividend impact of f_{t+s} being largely reduced to the effect on the liquidating dividend of the company, would mean that f_{t+s} would have little effect on the present value of expected future dividends, and that its omission would be unlikely to generate significant valuation error. In subsequent sections, I explore empirically whether the incidence of dirty surplus flows is associated with valuation errors.

5.3.4 The relationship between omitted expected future dirty surplus flows and valuation error

Assuming that a share's market price is the best measure of its intrinsic value, deviations of value estimates from observed price, designated valuation errors, are attributed to errors in the intrinsic value estimates derived from the RIVM and AEGM. Based on expression (5.12), I develop predictions regarding the relationship between valuation errors and expected future dirty surplus flows omitted from earnings projections used to obtain RIVM and AEGM intrinsic value estimates. I test the relationship both in terms of signed valuation errors (bias) and absolute valuation errors (inaccuracy).

From expression (5.12), one can easily infer that the omitted dirty surplus flows are negatively associated with bias in the valuation errors and positively associated with inaccuracy in the valuation errors. Hence, in situations where projected earnings omit larger expected future dirty surplus flows it is expected a larger effect on the valuation errors.

Typically, empirical applications of the RIVM and AEGM make use of analyst' forecasts of earnings to obtain projections of earnings for future periods (Frankel and Lee, 1998; Lee, *et al.*, 1999; Francis, *et al.*, 2000; Gebhardt, *et al.*, 2001; Easton, *et al.*, 2002; Gode and Mohanram, 2003; Chen, *et al.*, 2004; Daske, 2005). If such forecasts do not obey CSR, one would expect the intrinsic value estimates derived from the accounting-based models to contain error. Empirical research has acknowledged this problem. For example, Frankel and Lee (1999) and Chen *et al.* (2004) point that RIVM intrinsic value estimates can be distorted if analysts' forecasts of earnings systematically violate the CSR. There is some empirical evidence that analysts' forecasts are not constructed in accordance with the CSR. For example, Cheng (2005, p.2) states that "the inefficiency of analysts' forecasts is largely due to their underestimation or ignoring the effects of ... transitory earnings when predicting future earnings". Chen *et al.*, (2004) also provide evidence of CSR violations in consensus analyst' forecasts of earnings and show that the extent of such violations varies across the following countries: Australia, Canada, France, Germany, Japan, the U.K. and the U.S. Therefore, it is expected that as the level of dirty surplus flows increases, analysts' forecasts of earnings will deviate more from clean surplus earnings resulting in errors in the models' intrinsic value estimate. Further, since the magnitude and nature of dirty surplus accounting practices varies across countries (Isidro, *et al.*, 2004), violations of CSR contained in analysts' forecasts of earnings might vary accordingly (Chen, *et al.*, 2004), inducing cross-country variation in the relationship between valuation errors and total dirty surplus flows.

Previous studies such as *Dhaliwal, et al.*, (1999), and the study presented in chapter 3 provide some indication of larger dirty surplus accounting practice in the financial sector. I therefore, also consider whether the relationship between valuation errors and total dirty surplus flows differs across industries, in particular between financial and non-financial sectors.

5.4. Empirical implementation of the RIVM and AEGM

In this section I develop empirical applications of the RIVM and AEGM using explicit analyst forecasts of earnings for two-years-ahead and a terminal value term. I then assess the relationship between bias and inaccuracy in the models' value estimates and the sign and magnitude of total dirty surplus flows.

5.4.1. Projections of future flows and terminal values

Similar to previous studies, I implement the RIVM and AEGM using both explicit forecasts of earnings over a short period, and implicit forecasts of earnings and dividends beyond that period as projections of future flows (Frankel and Lee, 1998; Lee, *et al.*, 1999; Francis, *et al.*, 2000; Gebhardt, *et al.*, 2001; Easton, *et al.*, 2002; Gode and Mohanram, 2003; Chen, *et al.*, 2004; Daske, 2005). Explicit forecasts of earnings are obtained using consensus analysts' forecasts of earnings per share from I/B/E/S for one and two-years-ahead. Implicit forecasts of earnings for year three onwards are computed by applying an assumed expected *roe* to previous-year expected future book value. Projections of book value for year one and beyond are derived from previous year book value, forecasts of earnings and forecasts of dividends and the assumption that CSR holds. Implicit forecasts of dividends are derived from forecasts of earnings multiplied by an estimated expected payout ratio.

The intrinsic value estimate at valuation time 0 from the RIVM is given by the following expression:

$$vps_0^{RIVM} = bps_0 + \frac{(xps_1 - rbps_0)}{(1+r)} + \frac{(xps_2 - rbps_1)}{(1+r)^2} + TV, \tag{5.13}$$

where:

bps_0 = Common book value per share at valuation time 0 obtained as follows. Common book value from the most recent published financial statements (Compustat: #60 for U.S. companies and Worldscope: Ws.03501 for French, German and U.K. companies) divided by the number of common shares outstanding at valuation date 0 obtained from I/B/E/S;

xps = Forecasted earnings per share. For the first two years, xps is the I/B/E/S mean consensus forecasts of earnings per share one- and two-years-ahead. For year three and beyond, xps is estimated applying an expected *roe* (discussed below) to previous year book value: $xps_s = roe \times bps_{s-1}$;

bps_s = Common book value per share for year one and beyond obtained using the CSR as follows. $bps_s = bps_{s-1} + xps_s - dps_s$, where dps_s is the forecasted dividend per share equal to $dp \times xps_s$, being dp the implicit expected dividend payout ratio (discussed below);

r = Expected cost of equity capital (discussed below);

TV = Terminal value term estimated as: $\frac{xps_3 - rbps_2}{(r-g)(1+r)^2}$;

g = Expected post-horizon growth rate equal to $roe(1-dp)$.

For the AEGM the value estimate at valuation date 0 is obtained as follows:

$$vps_0^{AEGM} = \frac{xps_1}{r} + \frac{(xps_2 - xps_1) - r(xps_1 - dps_1)}{r(1+r)} + \frac{(xps_3 - xps_2) + r(xps_2 - dps_2)}{r(1+r)^2} + TV, \qquad (5.14)$$

where:

TV = Terminal value term estimated as: $\frac{(xps_4 - xps_3) - r(xps_3 - dps_3)}{r(r-g)(1+r)^2}$.

As demonstrated above, empirical applications of the RIVM and AEGM that use a consistent set of accounting forecasts should yield identical intrinsic value estimates. Implementations of the models using short-term forecasts and a terminal value term should also result in identical intrinsic value estimates, so long as consistent post-horizon forecasts of growth are applied to residual income and abnormal earnings growth (first difference in residual income). This can be demonstrated for expressions (5.13) and (5.14). Expression (5.14) for the AEGM can be written in the form of expression (5.10) as follows:

$$vps_0^{AEGM} = bps_0 + \frac{xps_1^a}{(1+r)} + \frac{xps_2^a}{(1+r)^2} + \frac{xps_3^a}{(1+r)^3} + \frac{xps_4^a}{(r-g)(1+r)^3}.$$

Since $xps_4^a = xps_3^a(1+g)$, the AEGM intrinsic value estimates becomes identical to the RIVM intrinsic value estimate:

$$\begin{aligned} vps_0^{AEGM} &= bps_0 + \frac{xps_1^a}{(1+r)} + \frac{xps_2^a}{(1+r)^2} + \frac{xps_3^a}{(r-g)(1+r)^2} \\ &= vps_0^{RIVM}. \end{aligned}$$

Expanding the term xps^a, I obtain the RIVM intrinsic value estimate as presented in expression (5.13):

$$vps_0^{AEGM} = bps_0 + \frac{xps_1^a}{(1+r)} + \frac{xps_2^a}{(1+r)^2} + \frac{xps_3^a}{(r-g)(1+r)^2}$$
$$= vps_0^{RIVM}.$$

Appendix 5.1 demonstrates the equivalence between the RIVM and AEGM intrinsic value estimates for the U.K company *AEA Tecnology Plc* for the financial year 1997. As my application is consistent across both models, intrinsic value estimates are identical and therefore only one set of intrinsic value estimates is reported. Consistent with previous valuation studies, negative value estimates are set to zero (e.g. Francis, *et al.*, 2000).

<u>*5.4.1.2 Explicit analysts' earnings forecasts*</u>

To ensure that the one-year-ahead earnings forecast are based only on publicly available information, I select one-year-ahead mean forecasts of earnings made 'x' months after the fiscal year-end so that they post-date publication of the most recent financial statements. Because the time lag between the financial statements date and the public reporting date varies from one country to another, I allow 'x' to vary across the countries considered in this study. Based on the reporting date provided in the I/B/E/S files, I find that the longest reporting lag occurs in Germany where the majority of companies publish financial statements between four and six months after the year- end. The shortest reporting lag is in the U.S.: two to three months after the fiscal year-end. For France and the U.K., the lag is on average three months. Thus, I consider the I/B/E/S analysts' mean forecasts of one-year-ahead earnings made at three months after the current fiscal year-end in the case of French, U.K. and U.S.

companies and five months after the current fiscal year-end in the case of German companies. Whenever I/B/E/S does not provide earnings forecasts exactly at these dates I select the forecasts closest to that date within a limit of 90 days. If forecasts do not exist within that limit the company-year is not selected.

5.4.1.3 Return on equity

The implicit forecasts of earnings after year two for use in the terminal value term require an estimate of expected *roe*. Estimated *roe* is computed by dividing aggregate current-year income before extraordinary items for all company-years in the industry by aggregate previous year common book value for all company-years in the industry (Compustat: #18 divided by #60 for U.S. companies and Worldscope: Ws.inc.bef.extr. divided by Ws.03501 for French, German and U.K. companies).[47] I assume that the company *roe* in the post-horizon period is equal to the average industry *roe* as in Lee, *et al.* (1999). Also similar to previous studies industry *roe* values are estimated as a moving average of the previous seven years of data (e.g. Gode and Mohanram, 2003). Specifically, I use data from the previous seven years up to the valuation date to compute the average *roe* for each of the following broad industry groups: basic (consisting of resources, basic and general industries and utilities), goods (consisting of consumer goods industries), services (consisting of services, information and technology industries), and financials (consisting of financial industries). As in previous studies, to avoid extreme values and inconsistent value estimates, I impose that estimated *roe* for each company-year is equal or higher than the cost of equity capital (e.g. Gode and Mohanram, 2003). Negative book value observations are not considered in the estimation of the industry *roe*.

[47] I use the ratio of the aggregate figures to avoid the potential influence of extreme values.

5.4.1.4 Cost of equity capital

The cost of equity capital (r) used to discount future flows to the valuation date is based on a time-varying risk-free rate plus an industry beta applied to a 5% risk premium. This is a standard procedure in the valuation literature (e.g. Lee, *et al.*, 1999; Francis, *et al.*, 2000).

$$r = rf + \beta \times rp \tag{5.15}$$

where:

rf = Country-specific risk-free rate at the valuation month. This is computed as the 12-month moving average Treasury bond rate obtained from the International Monetary Fund;

β = Country-specific mean industry beta for each of the four industry groups defined in section 5.4.1.3. Company betas are current betas as at 31 December 2003 obtained from Datastream;

rp = Equity risk premium, assumed to be 5%.

5.4.1.5 Dividend payout ratio

Dividend payout ratio (*dp*) is computed by dividing aggregate common dividends for all company-years in the industry by aggregate net income for all company-years in the industry over the same period (Compustat: #21 divided by #172 for U.S. companies and Worldscope: Ws.05376 divided by Ws.01751 for French, German and U.K. companies). Expected payout ratios are proxied by the industry average dividend payout. Adopting a similar procedure to the one used for *roe*, I measure the average dividend payout for each of the four industry groups as the moving average of the previous seven years of data up to each valuation date. Companies experiencing negative earnings are included in the calculations to avoid bias towards profitable companies. Consistent with other studies (e.g. Lee, *et al.*, 1999; Gode and Mohanram, 2003), I winsorise estimated payout ratios to lie between 0 and 1. In order to avoid distortion due to companies making distribution to shareholders through share repurchases, I eliminate non-paying dividend companies as in prior studies (e.g. Lee, *et al.*, 1999). According to Grullon and Michaely (2002), U.S. companies currently expend more on share repurchases than on dividend payments. Moreover, they show that share repurchase activity has experienced higher growth than dividends (26.1% versus 6.8% during the period 1980 to 2000). Given these findings, it is possible that U.S. companies in the sample showing no dividend payments are in fact engaged in payouts to shareholders through share repurchases. Including those companies in the computation of dividend payout ratios as if they did not distribute cash to shareholders would influence the estimated payout ratios downwards. Ideally, one should obtain a share repurchase payout ratio but, as pointed out for example in Lee, *et al.* (1999), it is difficult to determine the likelihood of the future occurrence of share repurchases.

5.4.2 Relationship between valuation errors and expected future total dirty surplus flows

I explore the predictions that bias in valuation errors from accounting-based valuation models are negatively associated with signed expected future dirty surplus flows, and that inaccuracy in valuation errors is positively associated with the absolute value of expected future dirty surplus flows. As projections of dirty surplus flows are not available I use company-averages of current dirty surplus flows as a proxy. Using individual company-year observations could lead to extreme values of valuation errors and total dirty surplus flows occurring in particular years influencing the analysis. For this reason, I perform the analysis with company-average values computed using all available observations during the sample period 1994 to 2003. Company-average values are likely to be a better proxy for the company's normal pattern in terms of valuation errors and total dirty surplus flows. Nevertheless, I test the sensitivity of the results to this procedure by repeating the analysis for the following situations: (1) using company-median values for valuation errors and total dirty surplus flows, (2) using individual company-year observations, and (3) using company-average total dirty surplus flows computed as the average of the previous three years up to the valuation date. Results of these robustness checks are reported in section 8.

I analyse the regression results of the following regression models, for signed and absolute valuation errors.

For signed valuation errors: $AVE_i = \alpha_0 + \beta_0 ATDSF_i + \varepsilon_i$. (5.16.i)

For absolute valuation errors: $|AVE_i| = \alpha_0 + \beta_0 |ATDSF_i| + \varepsilon_i$, (5.16.ii)

where:

AVE_i = Signed and absolute company-average valuation error. Signed valuation error is defined as $(V_0 - P_0) / P_0$. Absolute valuation error is defined as $|V_0 - P_0| / P_0$. The variables are defined as follows: V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at valuation time 0. Negative value estimates are set to zero;

$ATDSF_i$ = Signed and absolute company-average total dirty surplus flows (*TDSF*) scaled by market value at the beginning of the fiscal year (MV_0). For U.S. companies MV_0 is obtained from Compustat: closing price #199 × number of shares outstanding #25; for French, German and U.K. companies, MV_0 is obtained from Worldscope: Ws.08001;

α_0 = Regression intercept;

β_0 = Regression coefficient of $ATDSF_i$;

ε_i = Error term.

For reasons explained in the next section, the analysis is performed separately on a large sample of U.K. and U.S. companies, and on a small sample of French, German, U.K. and U.S. companies. The method used for measuring total dirty surplus flows differs between (1) the large-sample study, for which algorithms based on machine-readable databases are used, and (2) the small-sample study, for which data on total dirty surplus flows are hand-collected from published financial statements. For the large-sample study, the algorithms used to measure total dirty surplus flows are as follows. For the U.K., $TDSF = PYA - GW + AR + CUR$, where *PYA* denotes prior-year adjustments (Extel: ir_rsm), *GW* denotes goodwill written-off, net of write-backs (Extel: ir_gw), *AR* denotes asset revaluations (Extel: ir_rvl) and *CUR* denotes currency translation differences (Extel: ir_fx). For the U.S., $TDSF = CUR + MSEC + PEN$, where *CUR* denotes currency translation differences (Compustat: change in #230), *MSEC* denotes adjustments for marketable securities (Compustat: change in #238) and *PEN* denotes adjustments related to minimum pension liabilities (Compustat: #297 - #298, if negative).[48] As demonstrated in chapter 3, section 5, total dirty surplus flows obtained from algorithms applied to machine-readable data are likely to be subject to measurement error. Nevertheless, direct algorithms based on the summation of individual dirty surplus flows, are less inaccurate than indirect algorithms based on changes in shareholders' funds. For this reason, I apply the first type of algorithm to compute total dirty surplus flows for the large-sample study. For the small-sample study, total dirty surplus flows are measured by direct reference to published financial

[48] Details on algorithm-based calculations can be found in chapter 3.

reports using the same data as in the study presented in chapter 3. Recall that for this sample total dirty surplus flows are computed as: *TDSF* = *PYA* - *GW* - *GM* + *AR* + *OTH*, where *GM* denotes the unrecognised issue of equity under merger accounting, and *OTH* denotes 'other dirty surplus flows', which includes currency translation differences, adjustments for marketable securities, consolidation adjustments, etc.[49] The remaining variables are as defined above.

5.5 Data and sample

I perform the empirical analysis separately on two samples: a large sample of U.K. and U.S. companies and a small sample of French, German, U.K. and U.S. companies. The use of two sets of observations represents a compromise between using a large sample of international companies on the one hand and obtaining a reliable measure of dirty surplus flows on the other. As discussed in chapter 3, making use of the data provided by commercial databases to measure dirty surplus flows based on algorithms provides the researcher with a large sample and is also in line with the methodology used in previous studies. However, algorithm-based measures of dirty surplus flows can be very noisy, and result in substantial errors. Appendices 5.2 and 5.3 exemplify the type of errors in algorithm-based estimates of dirty sample flows for two companies in both samples. The best way to assess accurately dirty surplus flows is to analyse directly the companies' financial reports, which is only feasible for a relatively small number of cases. This approach ensures that dirty surplus flows are computed accurately but substantially decreases the sample size, thereby reducing the power of the tests. For these reasons, I develop the analysis using two data sets. A large sample of U.K. and U.S companies during the period 1994 to 2003, for which

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[49] In section 8, I repeat the analysis excluding the merger-related item (*GM*). Consistent with chapter 3, the 'special items with an equity portion' is not included as a dirty surplus flow in the case of German companies.

algorithms perform relatively well (in comparison with French and German companies), in capturing dirty surplus flows. A small sample of French, German, U.K. and U.S. companies with available data on true dirty surplus flows hand-collected from the published financial statements during the period 1994 to 2001 (as described in chapter 3).

The sample selection process is summarised in table 5.1. For the large sample, I start by collecting all available one- and two-year-ahead earnings forecasts for U.K. and U.S. companies between year 1994 and 2003 in the I/B/E/S files (U.K.: 318,458 and U.S.: 1,204,438 company-year observations). From these, I eliminate the observations that fall into one of the following categories: (1) missing data; (2) ADR and cross-listed companies and; (3) companies reporting under non-domestic GAAP.[50] For the resulting sample, I select only two mean earnings forecasts for each valuation date, corresponding to one- and two-year-ahead forecasts. From the available I/B/E/S forecasts for one- and two-year- ahead, I choose the ones reported at the closest date to the valuation date, within a 90-day interval. Next, I combine the I/B/E/S data with accounting and market data collected from Worldscope (for the U.K.) and Compustat (for the U.S.) The matching process results in 10,978 observations for the U.K. and 58,074 observations for the U.S., which produces 5,489 and 29,037 intrinsic value estimates, respectively. From these, I eliminate observations falling in the most extreme 2% of the distribution for valuation errors and total dirty surplus flows, which resulted in 4,509 observations for the U.K. and 26,333 observations for the U.S. I then compute company-averages for valuation errors and total dirty surplus flows using all

[50] In the case of U.K., companies not reporting under U.K. GAAP during the sample period are typically cross-listed companies. Before 2005, the year when companies listed in a European Union stock exchange are obliged to report under international accounting standards, few U.K. companies switched to international accounting standards. Cross-listed companies can be identified in the I/B/E/S files as I/B/E/S provides indication about the stock exchange where the shares are traded. Additionally, I/B/E/S also identifies ADR companies, international accounting standards followers and U.S. GAAP followers (usually adding an indication to the company's name). I attempt to control for non-U.K. GAAP companies by eliminating the ones with the above indications.

available observations during the sample period. The final part of table 5.1 presents a frequency count of the number of years used to compute company-averages. The final number of company-average observations to carry out the analysis is 8,126 (1,212 for the U.K. and 6,914 for the U.S.).

For the small sample of French, German, U.K. and U.S. companies, I follow a similar process to that described for the large sample. Table 5.1 provides details on the number of observations in each step of the sample selection process. The number of value estimates obtained for the U.K. and the U.S. is the same as for the large sample (5,489 for the U.K. and 29,037 for the U.S.). For France and Germany, I obtain 1,978 and 2,096 intrinsic values estimates, respectively. From these value estimates, I select only the ones corresponding to companies and years for which data on true total dirty surplus flows is available from chapter 3. This additional filter reduces the sample to 784 company-year observations.[51] After eliminating the 2% extremes of the distribution of valuation errors and total dirty surplus flows the number of observations is 714. From these, I compute company-specific averages using the available observations during the sample period. The final number of company-average observations used in the analysis for the small sample is 190 (France: 51, Germany: 46, the U.K.: 43 and the U.S.: 50).

Two further issues with respect to the data are worthy of note: adjustments in I/B/E/S earnings forecasts and currency uniformity. Earnings forecasts obtained from I/B/E/S are stock-split adjusted because I/B/E/S keeps their figures comparable over time. In order to use earnings forecasts produced on the same basis as book value reported in the financial statements, I undo the stock-split adjustments applying the cumulative adjustment factors computed from I/B/E/S adjustment factors. I also take

[51] Note that by selecting only the companies and years used previously in chapter 3, I ensure that only domestic GAAP companies are included in the sample as that is a selection criterion in chapter 3.

into consideration that some earnings forecasts are reported on a diluted basis. I convert diluted to basic earnings using I/B/E/S dilution factors. The data obtained in currencies other than Euros (i.e., from I/B/E/S and Compustat) are converted to Euros using the Euro-fixed rate (as established in the 1st of January 1999) for French Francs and Deutschmarks, and the average exchange rate from December 1993 to December 2003 for pounds Sterling and US dollars.

I collect accounting data from Worldscope and Extel databases. I use Worldscope to obtain data on common book value, common net income and common dividends because this database provides ready-to-use items for common shareholders. I use Extel instead of Worldscope as the data source for algorithm-based measures of dirty surplus flows as the later does not provide data on the flows or movements of the year but rather on the cumulative items on shareholders' funds.

5.6 Results for a large sample of U.K. and U.S. companies

5.6.1 Summary statistics and tests

Table 5.2 reports summary statistics of the primary variables by country and industry. The means for net income, book value and market value are 71.24 million Euros, 726.85 million Euros and 2,383.44 million Euros, respectively, for the pooled sample. U.S. companies report larger book values and net income and have higher market value than U.K. companies. Among the four industry groups, financial companies are associated with higher net income, book value and market value in both countries.

Summary statistics of the variables used in the analysis, yearly valuation errors and total dirty surplus are presented in table 5.3. The average values for return on equity (*roe*), cost of equity capital (*r*), and dividend payout ratio (*dp*) are 13%, 11%

and 53%, respectively, for the pooled sample. Mean and median *roe*, *r* and *dp* are similar in both countries.

For the overall sample, the mean signed valuation error is 0.247. However, the median signed valuation error is –0.252, indicating the presence of extreme positive valuation errors, particularly in the U.S. sample. The median value is consistent with findings in Francis, *et al.* (2000) indicating that the models underestimate equity value as measured by share price. At the country level, median signed (absolute) valuation errors are –0.317 (0.554) for the U.K. and –0.240 (0.541) for the U.S. Findings for the U.S. are in line those reported by Francis, *et al.* (2000).

Signed total dirty surplus flows are negative on average (-0.001), consistent with the results reported in chapter 3. Also consistent with results in chapter 3, mean signed and absolute total dirty surplus flows are larger in the U.K. (-0.004 and 0.012) than in the U.S. (-0.001 and 0.004).[52] Again similar to previous results, median values are very close to zero as a result of many companies reporting no dirty surplus flows. It is worth mentioning that while mean and median total dirty surplus flows are close to zero, dirty surplus flows can be very large for some individual companies. I also report total dirty surplus flows excluding the goodwill category. Statistics for the U.S. remain unchanged since goodwill write-offs are not permitted in that jurisdiction. For the U.K, the removal of goodwill from total dirty surplus flows increases the mean signed total dirty surplus flows and reduces mean absolute total dirty surplus flows, consistent with goodwill being negative on average. Overall, excluding goodwill has little effect in the mean and median values of total dirty surplus for the U.K. On average signed values remain negative (-0.002) and median values remain close to zero.

[52] In chapter 3, I show that U.S. companies can report larger total dirty surplus flows when merger (pooling-of-interests) accounting is taken into consideration. However, merger accounting is not included in these computations as the algorithm does not capture such movements.

Table 5.4 examines the link between company-average valuation errors and company-average total dirty surplus flows. Signed mean and median valuation errors and signed mean and median total dirty surplus flows are significantly different from zero in all cases except one.[53] Median absolute valuation errors are larger in the U.K. than in the U.S., as are total dirty surplus flows but this pattern is not observable for the signed valuation errors. Statistical tests of the null hypothesis of equality of mean and median values of valuation errors and mean and median values of total dirty surplus flows across countries indicate significant cross-country differences. These results provide some indication that cross-country differences in dirty surplus flows might be associated with cross-country differences in valuation errors.

Table 5.5 provides similar statistics and tests as reported in table 5.4, by industry. I aim to analyse whether valuation errors and total dirty surplus flows follow a similar pattern across the four industry groups in each country. Signed and absolute company-average valuation errors appear to be larger for financial companies, particularly in the U.S. Company-average absolute total dirty surplus flows are also larger for financial companies, for both the U.S. and the U.K. Results for the U.S. sample are in line with the evidence presented in chapter 3 and in previous studies such as Dhaliwal, *et. al.* (1999) that dirty surplus accounting is more severe in the financial sector. Overall, results reported in table 5.5 suggest some industry effects in the relationship between valuation errors and total dirty surplus flows. Regarding cross-industry variation, tests of the null hypothesis of equality of mean and median values of valuation errors and mean and median values of total dirty surplus flows across industry groups, indicate that mean and median valuation errors as well as mean and median total dirty surplus flows are significantly different across the four

[53] I do not report tests of the null hypothesis that the distribution of absolute valuation errors and absolute total dirty surplus flows is centred on zero as absolute values must be non-negative.

industry groups in each of the individual countries. Tests of cross-country differences in valuation errors and total dirty surplus flows for each industry group (reported in panel B of table 5.5) reveal that for each industry there is some evidence of significant cross-country differences in both variables.

5.6.2 Relationship between valuation errors and total dirty surplus flows

In this section I test the relationship between valuation errors and total dirty surplus flows both in terms of bias (signed values) and inaccuracy (absolute values). Table 5.6 presents results for the univariate regression analysis of the relationship between valuation errors and total dirty surplus using models (5.16.i) and (5.16.ii) above for the pooled sample and the individual countries. In terms of inaccuracy results reveal a positive and significant association between valuation errors and total dirty surplus flows. For the pooled sample, the coefficient of total dirty surplus flows is 8.285 suggesting that the effect is both statistically and economically significant. These results are consistent with the predictions that the magnitude of total dirty surplus flows is positively associated with absolute valuation errors. In terms of bias, results indicate a statistically significant relationship between valuation errors and total dirty surplus flows. However, the coefficient on total dirty surplus flows, for the pooled sample, is 8.775, contradicting the prediction of a negative relationship.

On the country level, I find evidence of a statistically and economically significant positive relationship between absolute valuation errors and absolute total dirty surplus flows, in the case of the U.S. (the coefficient is 16.309). For the U.K., the relationship is positive but not statistically significant. As with the pooled sample, the relationship for signed valuation errors is significant but contrary to the predicted sign for both countries. Tests of cross-country differences in the coefficients on total dirty surplus flows reveal significant differences between the U.K. and the U.S. sample, in the case of absolute valuation errors.[54]

I now repeat the same regression tests but excluding the goodwill item from total dirty surplus flows. The reason for this procedure is that goodwill (the most important dirty surplus flow in the U.K. during the sample period), although negative in sign, may be interpreted as a positive signal in that it is associated with growth opportunities. This may cause interference with the signed tests, because market participants might evaluate goodwill differently from other dirty surplus flows. Contrary to items like currency translation differences that have no repercussion in future periods, investors might perceive goodwill write-offs resulting from mergers and acquisitions as signalling future positive flows or future growth. Results, reported in table 5.7, are generally similar to the ones presented in table 5.6. The relationship between bias in valuation errors and signed total dirty surplus remains positive, for the U.K. Note that goodwill is non-existent in the U.S. and therefore it is not expected the coefficient of total dirty surplus flows to alter materially.[55]

In order to investigate the reasons underlying the relatively weak results, I perform some additional analysis. First, I apply the regression model to individual components of total dirty surplus flows to examine the possibility of results being influenced by particular dirty surplus flows categories. Results, reported in table 5.8 for the U.K. and table 5.9 for the U.S. show no systematic evidence of a negative association between signed valuation errors and signed individual dirty surplus flows

[54] Tests of cross-country differences are based on the following extended version of model (5.16): $AVE_i = \alpha_0 + \alpha_1 UK + \beta_0 ATDSF_i + \beta_1 UK.ATDSF_i + \varepsilon_i$, where $U.K.$ is a dummy variable that takes a value of one if the company belongs to the U.K. and zero otherwise. Regression results for this model are not reported, as they are identical to the ones reported in tables 5.6 and 5.7 for the individual countries.

[55] The difference in the coefficients of total dirty surplus flows for the U.S. between table 5.6 and table 5.7 is entirely due to the change in the number of observations used in the regression tests, which is a consequence of the trimming process.

in both countries. For the U.K, the main contributor for the association between total dirty surplus flows and valuation errors is asset revaluations, both for bias and inaccuracy. For the U.S, such association is mostly due to the adjustments for marketable securities items, both for bias and inaccuracy.

Second, I inspect whether there are differences in the relationship between valuation errors and total dirty surplus flows across the sample period. I regress company-year valuation errors on company-average total dirty surplus for each year.[56] Maintaining total dirty surplus flows identical for each yearly company valuation error allows checking for variation in the valuation errors during the sample period. Results reported in table 5.10 show some mixed evidence. For the U.K., the significant positive relationship between signed valuation errors and signed total dirty surplus flows occurs only in the first two years of the sample. For absolute valuation errors, only for fiscal years 2000 and 2001 I do find a positive and significant relationship consistent with predictions. For the U.S., results are more in line with the predictions. The relationship for signed valuation errors is negative for years 1998 to 2001, but only statistically significant for fiscal year 1999. The relationship for absolute valuations errors is significantly positive in 1995 and after 1997. I repeat the yearly regressions using company-average total dirty surplus flows computed as the average of the previous three years with respect to the valuation date. This procedure ensures that I only use past information regarding total dirty surplus. Again, the results (not tabulated) are mixed and in line with the ones reported in table 5.10.

Finally, I perform other robustness tests but for reasons of economy of space, results are not tabulated. A summary of these tests is described in section 8.

[56] I drop observations for year 2003, the last year in the sample, as there are relatively few observations.

5.6.2.1 Industry effects

Table 5.11 considers the possibility of differences in the relationship between valuation errors and total dirty surplus flows across industry groups. Panel A presents regression results by industry group for the pooled sample and individual countries. Panel B reports tests of equality of coefficients of total dirty surplus flows across all industry pairs.[57]

For the pooled sample and for signed valuation errors, results indicate a significant relationship between valuation errors and total dirty surplus flows for industry groups goods and financials. However, contrary to predictions, the corresponding regression coefficients are of positive sign. For absolute valuation errors, there is a positive and significant relationship in the case of industry group basic.

For the U.K., results generally do not support the predictions. There is a significant relationship between valuation errors and of total dirty surplus flows in the cases of industry group basic, goods and services but only for signed valuation errors and of contrary to the predicted sign. For the U.S., I find evidence consistent with the predictions in the case of industry group basic for signed valuation errors.

Despite the weak regression results for individual industry groups, tests of cross-industry differences in the relationship between valuation errors and total dirty surplus flows, reported in panel B of table 5.11, reveal significant differences between industry groups. Particularly, I find significant differences between financial and non-

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[57] Tests of cross-industry differences are based on the following extended version of models (5.16.i) and (5.16.ii) for signed and absolute values:

$AVE_i = \alpha_0 + \alpha_1 Basic + \alpha_2 Goods + \alpha_3 Services + \beta_0 ATDSF_i + \beta_1 Basic.ATDSF_i + \beta_2 Goods.ATDSF_i + \beta_3 Services.ATDSF_i + \varepsilon_i$,

where *Basic*, *Goods* and *Services* are dummy variables that take a value of one if the company belongs to industry group basic (resources, basic and general industries and utilities), industry group goods (consumer goods), industry group services (services, information and technology), respectively, and zero otherwise. Regression results for this model are not report as they are identical to the ones reported in panel A of table 5.11 for the individual industry groups.

financial companies. These industry differences are driven by the U.S. sample where significant differences arise between financials and other industry groups in all cases except for industry goods for signed valuation errors.

In summary, regression tests of the relationship between valuation errors and total dirty surplus flows reveal that only in the case of U.S. companies the omission of dirty surplus flows from expected future flows might result in some inaccuracy in the RIVM and AEGM intrinsic value estimates. For U.S. companies, implementations of the accounting-based models that omit such flows may result in incorrect estimates of equity value. Further, because inaccuracy in the models' intrinsic value estimates varies between financial and non-financial companies in the U.S., comparisons across these companies based on RIVM and AEGM estimates of equity value might result in errors. For U.K. companies, there is no clear evidence that the omission of dirty surplus flows could cause problems in accounting-based estimates of equity value.

5.7 Results for a small sample of French, German, U.K. and U.S. companies

In this section I report results for a small sample of French, German U.K. and U.S. companies for which total dirty surplus flows are computed using data hand-collected from the companies' published financial reports. The sample is previously used in chapter 3, which restricts the analysis to eighty companies per country during the period 1994 to 2001. The sample is further reduced by the non-availability of earnings forecasts in the I/B/E/S files. Given the relatively small sample size, the results discussed in this section should be interpreted with due caution.

5.7.1 Summary statistics and tests

Table 5.12 reports mean and median values of net income, book value and market value by country and industry. Consistent with statistics presented in table 5.2, U.S. companies are associated with the higher mean values for net income, book value and market value. Also in line with the summary statistics in table 5.2, financial companies are associated with the higher values of the three variables, in all countries.

Table 5.13 presents summary statistics of input variables used to obtain value intrinsic estimates, valuation errors, and total dirty surplus flows. Average return on equity (*roe*) for the pooled sample is approximately 12%. This rate is approximately 13% for the U.K. and U.S. and approximately 11% for France and Germany. A similar ranking can be observed for the average cost of equity capital (*r*), which is approximately 11% in the U.K. and U.S. compared with 10% in France and Germany. The estimated values for average *roe* and *r* are similar to those reported in Chen, *et al.* (2004) for the pooled sample and for the individual countries. The average dividend payout ratio (*dp*) for the overall sample is 50%. French companies have the lowest average payout ratio (43%) whereas German, U.K. and U.S. companies pay out approximately 52% of earnings as dividends.

For the pooled sample, the mean signed valuation error is close to zero (0.001) but the median is –0.315. In the case of absolute valuation errors, the mean (median) is 0.660 (0.497). At the country level, summary statistics reveal some country variation in valuation errors. The mean signed valuation error is negative in France (-0.284) and Germany (-0.095), and positive in the U.K. (0.058) and the U.S. (0.221). For absolute valuation errors, mean values are higher in the U.S. (0.794), followed by the U.K. (0.736), Germany (0.548) and France (0.488). The results for the U.K and the U.S. are similar to those reported in table 5.3 for the large sample.

Consistent with findings reported in chapter 3, statistics in table 5.13 show that the signed total dirty surplus flows are negative on average and in all countries with the exception of France where the average is zero. Also consistent with findings for the large sample, results reveal that, despite the relatively low value for the mean and median, total dirty surplus flows can be of large magnitude for individual companies. For the pooled sample, absolute total dirty surplus flows have a mean (median) value of 0.017 (0.003). Again, I observe some cases with large absolute total dirty surplus. The magnitude of total dirty surplus flows varies across countries. Average absolute total dirty surplus flows are largest in the U.K. (0.030), followed by Germany (0.018), France (0.011) and the U.S. (0.010).[58] Medians follow the same pattern. Mean signed (absolute) total dirty surplus flows excluding goodwill are slightly larger (smaller) that these values because goodwill is negative on average, as shown in chapter 3.

Mean and median values of company-average valuation errors and total dirty surplus flows are reported in table 5.14. Mean and median signed (absolute) valuation errors are 0.028 and -0.245 (0.696 and 0.551) for the pooled sample. For the individual countries, I find that valuation errors are significantly different from zero in all countries with the exception of the U.K.[59] Panel B of table 5.14 reports tests of the null hypothesis of equality of mean rank of company-average signed and absolute valuation errors across pairs of countries based on a Kruskal-Wallis test. These tests do not show significant country variation in valuation errors.

[58] For the U.S., total dirty surplus flows include the merger (pooling-of-interests) accounting category of dirty surplus flows. As shown in chapter 3, this type of dirty surplus flow can be quite large, in particular for financial companies. The mean values of signed and absolute total dirty surplus flows for the U.S., excluding the merger accounting item are -0.002 and 0.007, respectively. The median values do not alter. Overall, the rank order of countries in terms of total dirty surplus flows remains the same. Nevertheless, I repeat the analysis excluding the merger accounting category and obtain similar results as described in section 8.

[59] Similarly to the large-sample study I do not test the null hypothesis that the distribution of absolute valuation errors and absolute total dirty surplus flows is centred on zero.

Total dirty surplus flows are on average -0.009 for the pooled sample and are significantly different from zero, in accordance with the results for the large sample. The mean and median absolute total dirty surplus flows for the pooled sample are 0.018 and 0.007, respectively. Statistics suggest larger median total dirty surplus flows (signed and absolute) in the U.K. (-0.004 and 0.021), followed by Germany (-0.003 and 0.009), France (0.001 and 0.004) and the U.S. (0.000 and 0.003). Overall and for all countries, company-average total dirty surplus flows are not centred on zero and there is evidence of significant cross-country variation in signed and in absolute values.

Panel B of table 5.14, reports results of tests of the null hypothesis of equality in the mean rank of company-average total dirty surplus flows across pairs of countries. I find evidence of significant differences in absolute total dirty surplus flows for all pairs of countries except France/Germany. For signed total dirty surplus flows, only the pairs France/Germany and France/U.K. exhibit significant differences. Consistent with the results reported in panel A, I find no evidence of significant differences in company-average valuation errors for all pairs of countries.

Next, I examine cross-industry variation in company-average valuation errors and total dirty surplus flows. Table 5.15 panel A reports means and medians of company-average valuation errors and total dirty surplus flows by country and industry and tests of equality of values across industry groups. Panel B reports tests of equality of values across countries for a given industry group. Generally, median results suggest larger total dirty surplus flows for financial companies for all countries except Germany, where financial companies are associated with the lowest values among the four industry groups. Regarding valuation errors, results are mixed. For the U.S. financial companies have the largest mean and median values for signed and absolute valuation errors (signed: 1.153 and 1.103; absolute: 1.318 and 1.103). For Germany, financial companies exhibit larger mean and median absolute valuation errors (0.606 and 0.622) than non-financial companies. However, for the pooled sample, for France and for the U.K., financial companies do not reveal such pattern. In summary, results do not provide strong evidence of cross-industry differences in valuation errors and in total dirty surplus flows. In the case of valuation errors, I find systematic evidence of significant differences across the four industry groups only for France. For total dirty surplus flows, tests indicate significant industry differences for the U.S. but only for absolute values. In respect to cross-country variation for each industry group, tests of the null hypotheses of equality of mean and median company-average valuation errors and total dirty surplus flows across countries in each individual industry, reported in panel B of table 5.15, reveal significant differences across the four countries in signed and absolute valuation errors in the case of companies in the services sector. For signed total dirty surplus flows, I find significant cross-country differences for basic industry group. Finally, for absolute total dirty surplus flows there is some evidence of significant cross-country differences in all industry groups. Note however, that given the relatively small sample size, these findings should be taken with due caution.

5.7.2 Relationship between valuation errors and dirty surplus flows

Table 5.16 presents regression results of the relationship between valuation errors and total dirty surplus using models (5.16.i) and (5.16.ii). Panel A reports regression results for the pooled sample and the individual countries and panel B reports tests of the null hypothesis of equality of coefficients of total dirty surplus flows across pairs of countries.[60]

Results reveal a significant negative relationship between signed valuation errors and signed total dirty surplus flows, in accordance with the prediction, for the pooled sample, France and the U.S. However, only in the case of the U.S. is the relationship statistically and economically significant. Also only in the case of the U.S., do I find consistent evidence of a positive and significant relationship between absolute valuation errors and absolute total dirty surplus flows. Tests of cross-country differences in the relationship, reported in panel B, provide indication of differences between the U.S. and the other countries, both for signed and absolute valuation errors. Results for the small-sample study confirm the results for the large-sample study regarding inaccuracy in valuation errors for the U.S. sample. I repeat the regression analysis disregarding the goodwill category from total dirty surplus flows. Table 5.17 presents the results, which are in line with the ones presented in table 5.16. Only in the case of U.S. companies, do I find supportive evidence of a negative (positive) association between signed (absolute) valuation errors and signed (absolute) total dirty surplus flows.[61]

Similarly to the large-sample study, I do some supplementary tests reported in tables 5.18 and 5.19. First, I perform the regression analysis using individual categories of dirty surplus flows. Results reported in table 5.18 provide some evidence consistent with the predictions, but only in the case of the U.S. For this country, the

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[60] Tests of cross-country differences are based on the following extended version of the regression models (5.16.i) and (5.16.ii) for signed and absolute values:
$AVE_i = \alpha_0 + \alpha_1 UK + \alpha_2 FR + \alpha_3 GE + \beta_0 ATDSF_i + \beta_1 UK.ATDSF_i + \beta_2 FR.ATDSF_i + \beta_3 GE.ATDSF_i + \varepsilon_i$,
where *U.K.*, *FR* and *GE* are dummy variables that take a value of one if the company belongs to the U.K., France, Germany, respectively, and zero otherwise. Regression results for this model are not report as they are identical to the ones reported in panel A of table 5.16 for the individual countries.
[61] The coefficient of total dirty surplus flows for the U.S. sample differs in tables 5.13 and 5.14 as a result of the trimming process.

coefficient of items 'other dirty surplus flows' and merger accounting are significant and negative, for signed valuation errors. For absolute valuation errors, the coefficient of 'other dirty surplus flows' is significant and positive. Recall from chapter 3 that 'other dirty surplus flows' include currency translation differences, adjustments for marketable securities, and pension adjustments. Regarding other countries, only the coefficient of prior-year adjustments for Germany for signed valuation errors, and the coefficient of goodwill for France for absolute valuation errors are consistent with the predictions.

Second, I perform regression tests for each individual sample year. Results presented in table 5.19, show weak evidence of a relationship between valuation errors and total dirty surplus flows. Signed results for the pooled sample show that the coefficients of total dirty surplus flows are of the predicted sign (negative) in all years except 1994. However, the coefficients are not statistically significant. Absolute results for the pooled sample indicate a positive relationship for year 1997 and beyond, but the relationship is only statistically significant for year 2000. I do not report results for each individual country due to the relatively low number of observations per country-year.

5.7.2.1 Industry effects

Similar to the large-sample study, I test for cross-industry variation in the relationship between valuation errors and total dirty surplus flows. I perform the tests only for the pooled sample given the small number of country-industry observations. Table 5.20, panel A reports regression results for the individual industry groups and panel B presents tests of equality of coefficients of total dirty surplus flows across pairs of industries.[62] Similar to the results for the large sample (table 5.11), I find no systematic evidence of a negative association for signed valuation errors and positive association for absolute valuation errors across industry groups. Contrary to the large-sample results, where there are significant industry differences with respect to financial companies, for the small sample there is no conclusive evidence of such cross-industry differences. Tests reported in panel B of table 5.20, indicate significant differences between industry groups basic/goods, and industry groups goods/financials for signed valuation errors. For absolute valuation errors, differences arise in the pairs of industry groups goods/services and goods/financials.

In general, the results for the small sample confirm the limited evidence of a relationship between valuation errors and total dirty surplus flows found for the large-sample study. The findings in this section suggest that for U.S. companies, the omission of expected future dirty surplus flows might interfere with the value estimates obtained from the RIVM and AEGM by causing bias and inaccuracy. However, for French, German and U.K. companies there is no clear evidence that omission of such flows could result in errors in the accounting-based estimates of equity value. This might have implications for international comparisons based on RIVM and AEGM intrinsic value estimates because the omission of dirty surplus flows from earnings forecasts used to obtain such estimates may affect U.S. companies but not non-U.S. ones.

5.8 Robustness checks

I test the sensitivity of results reported in the previous sections for both samples to variations in the methodology and find that these do not alter materially the findings

[62] Tests of cross-industry differences are performed as in section 5.6.2.1 for the large sample.

and conclusions. A brief summary of the sensitivity tests follows (results not tabulated).

i) Terminal value terms with a linear fade rate to the industry mean roe: Akin to previous studies, I compute the terminal value term in expressions (5.13) and (5.14) allowing the company *roe* at the last period of explicit forecasts (two-year ahead) to fade linearly over four years (from year three to year six) to a target industry *roe* equal to its mean (e.g. Lee, *et al.*, 1999; Chen, *et al.*, 2004).

ii) Trimming criterion: I repeat the analysis using a less restrictive trimming criterion by eliminating observations falling into the most extreme 1% of the distribution of valuation errors and total dirty surplus flows.

iii) Elimination of influential observations: I re-estimate all regressions eliminating influential observations. These are defined using the Belsley, Kuh and Welsch (1980) size-adjusted cutoff measure equal to $2\sqrt{p/n}$, where n is the number of observations and p the number of regression parameters.

iv) Winsorising and trimming large valuation errors: I perform the regression analysis winsoring or trimming valuation errors above 100% in order to obtain a more normal-like distribution of valuation errors. I do this for the regression analysis including and excluding goodwill from total dirty surplus flows.

v) Rank regression: I apply Ordinary Least Squares (OLS) regressions to the ranks of the observations instead of the corresponding values to check for the possibility that results are influenced by extreme observations.

vi) Exclusion of merger (pooling-of-interests) accounting for the U.S. sample: I consider the possibility of the results for the U.S. being influenced by large values of immediate write-offs of equity resulting from mergers accounted for using the pooling-of-interests method. I exclude this dirty surplus flow category when calculating total dirty surplus flows in the case of the small sample.

vii) Company-median values: I test the sensitivity of the method used to compute company-specific valuation errors and total dirty surplus flows by computing median values per company instead of average values.

viii) Company-average total dirty surplus flows of the previous three years up to the valuation date: I repeat the regression analysis for yearly regressions using company-average total dirty surplus flows computed as the moving average of the previous three years up to the valuation date.

5.9 Conclusion

This chapter investigates the valuation implications of implementing accounting-based models using forecasts of earnings that disregard expected future dirty surplus flows. In particular, it investigates the relationship between dirty surplus flows and valuation errors from standard implementations of the RIVM and the AEGM. I show analytically that both models should yield identical intrinsic value estimates providing that there is consistency in the projections of accounting numbers used. I then explore empirically the association between bias and inaccuracy in valuation errors and total dirty surplus flows using both a large sample of U.K. and U.S. companies and a small sample of French, German, U.K. and U.S. companies. For the large-sample study, I find evidence of a positive relationship for absolute valuation errors (inaccuracy), in the case of the U.S. For signed valuation errors (bias) and contrary to the predictions, I find no consistent evidence of a negative relationship in both countries. Results also indicate cross-country differences in the coefficients on total dirty surplus flows in the case of absolute valuation errors, and cross-industry differences between financial companies and other industry groups within the U.S. sample.

For the small-sample study, which uses data on dirty surplus flows directly collected for financial statements, results confirm the predictions with respect to bias and inaccuracy only in the case of the U.S. Small-sample results also confirm the large-sample results of differences in the relationship between valuation errors and total dirty surplus flows between the U.S. and other countries.

Overall, the results provide some indication of an association between valuation errors and dirty surplus flows, in the case of U.S. companies. But taking all countries together, this study finds that association to be weak in line with previous studies. The findings in this chapter suggest that omission of dirty surplus flows from expected future flows might cause errors in the RIVM and AEGM intrinsic value estimates for U.S. companies. In particular, the omission of dirty surplus flows may cause problems regarding inaccuracy in the models' estimates and that may vary between financial and non-financial companies within the U.S. Therefore, only in comparative analysis between financial companies and companies from other sectors in the U.S., and between U.S. and non-U.S. companies based on the models' value estimates the omission of dirty surplus flows might lead to incorrect conclusions. There is no evidence in this chapter that omission of dirty surplus flows may interfere with accounting-based estimates of equity value in other contexts.

Table 5.1 - Sample selection

	France	Germany	U.K.	U.S.	All
Panel A: Sample selection process					
1. IBES data on earnings forecasts					
Initial sample with one- and two-year-ahead forecasts for years 1994 to 2003	123,190	130,083	318,458	1,204,438	1,776,169
After eliminating missings, ADRs and non-domestic GAAP companies	60,624	69,404	157,412	713,389	1,000,829
After selecting cases with two or more forecasts per valuation date	5,702	6,120	19,072	81,854	112,748
2. Compustat and Worldscope accounting and market data					
Initial sample for years 1994 to 2003	15,430	13,310	51,060	245,355	325,155
After eliminating missing values, ADR and non-domestic GAAP companies	7,967	6,944	18,695	192,672	226,278
3. Intersection of usable IBES and Compustat/Worldscope data	3,956	4,192	10,978	58,074	77,200
4. Value estimates obtained[b]	1,978	2,096	5,489	29,037	38,600
5. Large sample for U.K. and U.S. companies during the period 1994 to 2003[c]					
After eliminating the 2% extreme observations for valuation errors and total dirty surplus flows			4,509	26,333	30,842
6. Small sample for French, German, U.K. and U.S. Companies during the period 1994 to 2001[d]					
Intersection of value estimates and *TDSF* data from Chapter 3	172	150	203	259	784
After eliminating the 2% extreme observations for valuation errors and total dirty surplus flows	167	141	171	235	714
Panel B: Frequency of number of years used to compute company-averages					
Large sample for U.K. and U.S. companies during the period 1994 to 2003[c]					
Total number of company-averages[e]:			1,212	6,914	8,126
10 years of data			22		22
9 years of data			35	566	601
8 years of data			54	383	437
7 years of data			69	365	434
6 years of data			105	417	522
5 years of data			133	531	664
4 years of data			125	804	929
3 years of data			196	1,078	1,274
2 years of data			203	1,243	1,446
1 year of data			270	1,527	1,797
Small sample for French, German, U.K. and U.S. companies during the period 1994 to 2001[d]					
Total number of company-averages[f]:	51	46	43	50	190
8 years of data	2		2	8	12
7 years of data	2	2	3	9	16
6 years of data	4	2	4	6	16
5 years of data	6	3	7	5	21
4 years of data	7	10	9	4	30
3 years of data	10	11	8	4	33
2 years of data	5	9	5	5	24
1 year of data	15	9	5	9	38

Notes to table 5.1:

a. The table reports the number of observations in each stage of the sample selection process.

b. The number of value estimates is half the number of observations available because each value estimate requires two observations, corresponding to forecasts of flows one- and two-years ahead.

c. Sample for U.K. and U.S. companies during the period 1994 to 2003, for which total dirty surplus flows (*TDSF*) are obtained using algorithms applied to database data.

d. Sample for French, German, U.K. and U.S. companies during the period 1994 to 2001, for which data on total dirty surplus flows (*TDSF*) used chapter 3 are available. The sample consists of eighty companies for each country representing four industry and four size groups.

e. Number of cases with 10 to 1 years of data to compute the averages per company of valuation errors and total dirty surplus flows.

f. Number of cases with 8 to 1 years of data to compute the averages per company of valuation errors and total dirty surplus flows.

Table 5.2 - Summary statistics of primary variables for the large sample

(in million Euros)

Country *Industry*	*Number of company-years*	*Net income*		*Book value*		*Market value*	
		Mean	*Median*	*Mean*	*Median*	*Mean*	*Median*
All	34,526	71.24	9.83	726.85	123.34	2,383.44	301.01
Basic	18,474	69.77	9.68	747.33	129.06	2,565.01	324.63
Goods	3,777	64.61	11.74	509.21	123.69	1,740.29	249.99
Services	6,322	9.25	3.72	408.78	73.33	2,020.12	247.27
Financials	5,953	145.85	19.60	1,139.11	201.16	2,606.84	330.19
U.K.	5,489	57.63	9.28	717.46	79.66	1,786.98	191.51
Basic	2,693	50.46	10.85	847.41	93.64	2,190.16	227.45
Goods	843	47.12	9.01	367.96	65.02	781.03	131.40
Services	1,216	9.92	4.78	148.72	38.20	611.87	134.51
Financials	737	174.48	16.59	1,580.52	251.57	3,434.46	300.32
U.S.	29,037	73.82	9.99	728.62	132.90	2,496.60	326.71
Basic	15,781	73.06	9.46	730.26	135.80	2,629.13	345.30
Goods	2,934	69.63	13.06	549.84	146.34	2,013.84	297.20
Services	5,106	9.09	3.43	470.72	85.25	2,366.57	292.66
Financials	5,216	141.80	20.03	1,076.68	195.25	2,492.02	334.75

Notes to table 5.2:

a. The table reports statistics on primary variables (in million Euros) for a large sample of U.K. and U.S. companies during the period 1994 to 2003. Variables are obtained at fiscal year-end. Book value is common book value. Net income is income before extraordinary items.

b. Data in US dollars are converted to euros using the average exchange rate from December 1993 to December 2003. Data for the U.K. are obtained originally in Euros.

Table 5.3 - Summary statistics of input variables, valuation errors and total dirty surplus flows for the large sample

Country	Number of company-years		Input variables						Valuation errors		Total dirty surplus flows (TDSF)			
			return on equity	cost of equity capital	dividend payout	book value	forecast eps_1	forecast eps_2	signed valuation errors	absolute valuation errors	signed TDSF	absolute TDSF	signed TDSF excl.GW	absolute TDSF excl.GW
			roe	r	dp	bps_0/P_0	xps_1/P_0	xps_2/P_0	$(V_0-P_0)/P_0$	$\lvert V_0-P_0\rvert/P_0$	$TDSF/MV_0$	$\lvert TDSF\rvert/MV_0$	$TDSF/MV_0$	$\lvert TDSF\rvert/MV_0$
All	30,842	*Mean*	0.133	0.108	0.531	0.575	0.053	0.076	0.247	0.867	-0.001	0.005	0.000	0.004
		Median	0.132	0.109	0.548	0.458	0.063	0.077	-0.252	0.543	0.000	0.000	0.000	0.000
		Std.dev.	0.009	0.011	0.107	0.506	0.102	0.083	1.473	1.216	0.013	0.012	0.010	0.009
		Q1	0.129	0.100	0.428	0.269	0.038	0.052	-0.576	0.301	-0.001	0.000	0.000	0.000
		Q3	0.137	0.115	0.629	0.727	0.088	0.104	0.423	0.810	0.000	0.004	0.000	0.003
		P1	0.100	0.082	0.315	0.014	-0.275	-0.172	-0.959	0.035	-0.056	0.000	-0.038	0.000
		P99	0.152	0.132	0.681	2.577	0.201	0.240	6.822	6.822	0.045	0.063	0.035	0.045
U.K.	4,509	*Mean*	0.130	0.109	0.550	0.614	0.073	0.092	0.026	0.707	-0.004	0.012	-0.002	0.006
		Median	0.131	0.101	0.555	0.454	0.075	0.086	-0.317	0.554	0.000	0.003	0.000	0.001
		Std.dev.	0.015	0.015	0.084	0.601	0.128	0.113	1.063	0.795	0.021	0.018	0.012	0.011
		Q1	0.125	0.096	0.500	0.242	0.053	0.064	-0.614	0.307	-0.006	0.000	-0.003	0.000
		Q3	0.138	0.127	0.584	0.807	0.102	0.115	0.271	0.785	0.001	0.015	0.000	0.007
		P1	0.093	0.092	0.402	-0.019	-0.178	-0.127	-0.955	0.036	-0.074	0.000	-0.044	0.000
		P99	0.160	0.137	0.799	2.706	0.242	0.287	4.587	4.587	0.062	0.074	0.042	0.049
U.S.	26,333	*Mean*	0.134	0.108	0.528	0.568	0.050	0.073	0.285	0.894	-0.001	0.004	-0.001	0.004
		Median	0.132	0.109	0.548	0.459	0.061	0.075	-0.240	0.541	0.000	0.000	0.000	0.000
		Std.dev.	0.007	0.010	0.110	0.488	0.096	0.077	1.529	1.273	0.011	0.010	0.011	0.010
		Q1	0.129	0.100	0.410	0.273	0.036	0.051	-0.569	0.300	0.000	0.000	0.000	0.000
		Q3	0.137	0.114	0.629	0.717	0.085	0.102	0.445	0.814	0.000	0.003	0.000	0.003
		P1	0.113	0.082	0.302	0.019	-0.293	-0.178	-0.960	0.035	-0.046	0.000	-0.046	0.000
		P99	0.149	0.128	0.669	2.523	0.191	0.231	6.948	6.948	0.038	0.056	0.038	0.056

Notes to table 5.3:

a. The table reports mean, median, standard deviation, first quartile (Q1), third (Q2), 1st percentile (P1) and 99th percentile (P99) of the variables and for a large sample of U.K. and U.S. companies during the period 1994 to 2003. The definition of the variables is as follows. Return on equity (*roe*), used to obtain earnings forecasts beyond time 2, is current year income before extraordinary items divided by previous year common book value. For each company and valuation date roe is defined as the industry moving average roe of the previous seven years. Cost of equity capital (r), used to discount the flows to time 0, is the 12-month moving average Treasury bond rate plus the average industry beta applied to a 5% risk premium. Dividend payout ratio (*dp*), used to obtain forecasts of dividends necessary to compute forecasts of book values, is common dividends divided by net income over the same period. For each company and valuation date *dp* is obtained as the industry moving average *dp* of the previous seven years. Book value per share (bps_0) is common book value at valuation time 0 obtained from the most recent published financial statements divided by the number of common shares outstanding at the valuation time 0. Forecast eps at time 1 (xps_1) and forecast eps at time 2 (xps_2) are the mean consensus analyst forecasts of earnings per share one- and two-years-ahead. Valuation error $(V_0 - P_0)/P_0$ is the difference between the value estimate obtained from the valuation model (V_0) and the observed price per share at valuation time 0 (P_0), scaled by the later. Negative value estimates are set to zero. *TDSF* is total dirty surplus flows scaled by market value at the beginning of the fiscal year (MV_0). For the U.K., $TDSF = PYA - GW + AR + CUR$, where *PYA* denotes prior-year adjustments, *GW* denotes goodwill, *AR* denotes asset revaluations and *CUR* denotes currency translation differences. For the U.S., $TDSF = CUR + MSEC + PEN$, where *MSEC* denotes adjustments for marketable securities and *PEN* denotes adjustments related to minimum pension liabilities. *TDSF* excl. *GW* denotes *TDSF* excluding goodwill. Variables are for company i and for years from 1994 to 2003. All variables, except *roe*, r and *dp*, are scaled by price (or market value). For valuation errors and *TDSF*, observations that fall in the most extreme 2% of the distribution are eliminated.

Table 5.4 - Mean and median company-average valuation errors and company-average total dirty surplus flows by country for the large sample

Country	*Number of company-averages*		*Company-average valuation errors (AVE_i)*		*Company-average TDSF ($ATDSF_i$)*	
			Signed	*Absolute*	*Signed*	*Absolute*
All	8,126	*Mean*[b]	0.322*	0.934	-0.001*	0.005
		Median[c]	-0.144	0.586	0.000*	0.001
U.K.	1,212	*Mean*[b]	0.054*	0.716	-0.003*	0.011
		Median[c]	-0.180*	0.593	0.000*	0.006
U.S.	6,914	*Mean*[b]	0.369*	0.972	0.000*	0.004
		Median[c]	-0.137*	0.585	0.000*	0.000
p-value for differences across countries		*Mean*[d]	**<0.001**	**0.004**	**<0.001**	**<0.001**
		Median[e]	**<0.001**	**<0.001**	**<0.001**	**<0.001**

Notes to table 5.4:

a. The table reports statistics and tests on company-average valuation errors (AVE_i) and of company-average total dirty surplus flows ($ATDSF_i$) by country for a large sample of U.K. and U.S. companies. Averages are computed for company i over the available years in the period 1994 to 2003. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. *TDSF* is total dirty surplus flows scaled by market value (MV_0) at the valuation time 0. For the U.K., $TDSF = PYA - GW + AR + CUR$, where *PYA* denotes prior-year adjustments, *GW* denotes goodwill written off, AR denotes asset revaluations and CUR denotes currency translation differences. For the U.S., $TDSF = CUR + MSEC + PEN$, where *MSEC* denotes adjustments for marketable securities and *PEN* denotes adjustments related to minimum pension liabilities. Observations that fall in the most extreme 2% of the distribution are eliminated.

b. Probability values based on a t-test of the null hypothesis of mean company-average valuation error (mean company-average total dirty surplus flows) equal to zero. Probability values of 0.05 (5%) or less are printed in bold type.

c. Probability values based on a signed-rank test of the null hypothesis that the distribution of company-average valuation errors (company-average total dirty surplus flows) is centred on zero. Probability values of 0.05 (5%) or less are printed in bold type.

d. Probability values based on a t-test of the null hypothesis of equality of mean company-average valuation errors (mean company-average total dirty surplus) across countries. Probability values of 0.05 (5%) or less are printed in bold type.

e. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank of company-average valuation errors (mean rank of company-average total dirty surplus flows) across countries. Probability values of 0.05 (5%) or less are printed in bold type.

Table 5.5 - Mean and median company-average valuation errors and company-average total dirty surplus flows by industry for the large sample

Country *Industry*	*Number of company-averages*		*Company-average valuation errors* (AVE_i)		*Company-average TDSF* ($ATDSF_i$)	
			Signed	*Absolute*	*Signed*	*Absolute*
Panel A: Industry differences by country						
All						
Basic	4,062	*Mean*[b]	-0.091*	0.611	-0.001*	0.005
		Median[c]	-0.260*	0.508	0.000*	0.001
Goods	853	*Mean*[b]	0.447*	0.876	-0.001*	0.004
		Median[c]	0.153*	0.598	0.000*	0.000
Services	1,790	*Mean*[b]	-0.196*	0.700	-0.001*	0.003
		Median[c]	-0.422*	0.602	0.000*	0.000
Financials	1,421	*Mean*[b]	2.078*	2.188	0.000	0.010
		Median[c]	1.696*	1.711	0.000	0.004
p-value for differences across industries		*Mean*[d]	**<0.001**	**<0.001**	**<0.001**	**<0.001**
		Median[e]	**<0.001**	**<0.001**	**<0.001**	**<0.001**
U.K.						
Basic	562	*Mean*[b]	0.181*	0.788	-0.004*	0.012
		Median[c]	-0.058	0.618	-0.001*	0.009
Goods	189	*Mean*[b]	0.215*	0.706	-0.004*	0.011
		Median[c]	-0.046	0.535	-0.001*	0.006
Services	307	*Mean*[b]	-0.347*	0.618	-0.004*	0.009
		Median[c]	-0.480*	0.605	-0.001*	0.003
Financials	154	*Mean*[b]	0.190*	0.660	0.002	0.017
		Median[c]	-0.029	0.537	0.000	0.010
p-value for differences across industries		*Mean*[d]	**<0.001**	0.376	**<0.001**	**<0.001**
		Median[e]	**<0.001**	**<0.001**	**0.012**	**0.001**
U.S.						
Basic	3,500	*Mean*[b]	-0.135*	0.582	-0.001*	0.004
		Median[c]	-0.277*	0.492	0.000*	0.000
Goods	664	*Mean*[b]	0.513*	0.924	0.000*	0.002
		Median[c]	0.226*	0.623	0.000*	0.000
Services	1,483	*Mean*[b]	-0.164*	0.717	0.000	0.002
		Median[c]	-0.409*	0.601	0.000	0.000
Financials	1,267	*Mean*[b]	2.307*	2.374	0.000	0.010
		Median[c]	2.030*	2.049	0.000	0.004
p-value for differences across industries		*Mean*[d]	**<0.001**	**<0.001**	**<0.001**	**<0.001**
		Median[e]	**<0.001**	**<0.001**	**<0.001**	**<0.001**
Panel B: Cross-country differences for each industry group						
p-value for differences across countries for:						
Basic		*Mean*[f]	**<0.001**	**0.008**	**<0.001**	**<0.001**
		Median[g]	**0.005**	0.662	**<0.001**	**<0.001**
Goods		*Mean*[f]	**0.047**	0.246	**<0.001**	**<0.001**
		Median[g]	0.052	0.279	**<0.001**	**<0.001**
Services		*Mean*[f]	**0.006**	**0.046**	**<0.001**	**<0.001**
		Median[g]	0.090	0.585	**<0.001**	**<0.001**
Financials		*Mean*[f]	**<0.001**	**<0.001**	**0.002**	0.114
		Median[g]	**<0.001**	**<0.001**	**0.011**	0.522

Notes to table 5.5:

a. The table reports statistics and tests on company-average valuation errors (AVE_i) and on company-average total dirty surplus flows ($ATDSF_i$) by country and industry for a large sample of U.K. and U.S. companies during the period 1994 to 2003. Averages are computed for company i over the available years in the period 1994 to 2003. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. *TDSF* is total dirty surplus flows scaled by market value (MV_0) at the valuation time 0. For the U.K., $TDSF = PYA - GW + AR + CUR$, where *PYA* denotes prior-year adjustments, *GW* denotes goodwill, *AR* denotes asset revaluations and *CUR* denotes currency translation differences. For the U.S., $TDSF = CUR + MSEC + PEN$, where *MSEC* denotes adjustments for marketable securities and *PEN* denotes adjustments related to minimum pension liabilities. Observations that fall in the most extreme 2% of the distribution are eliminated. Industry groups are denoted as: basic (resources, basic and general industries and utilities) goods (consumer goods), services (services, information and technology) and financials.

b. Probability values based on a t-test of the null hypothesis of mean company-average valuation error (mean company-average total dirty surplus flows) equal to zero. Probability values of 0.05 (5%) or less are printed in bold type.

c. Probability values based on a signed-rank test of the null hypothesis that the distribution of company-average valuation errors (company-average total dirty surplus flows) is centred on zero. Probability values of 0.05 (5%) or less are printed in bold type.

d. Probability values based on a F-test of the null hypothesis of equality of mean company-average valuation errors (mean company-average total dirty surplus) across industries in a given country. Probability values of 0.05 (5%) or less are printed in bold type.

e. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank of company-average valuation errors (mean rank of company-average total dirty surplus flows) across industries in a given country. Probability values of 0.05 (5%) or less are printed in bold type.

f. Probability values based on a F-test of the null hypothesis of equality of mean company-average valuation errors (mean company-average total dirty surplus) across countries in a given industry. Probability values of 0.05 (5%) or less are printed in bold type.

g. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank of company-average valuation errors (mean rank of company-average total dirty surplus flows) across countries in a given industry. Probability values of 0.05 (5%) or less are printed in bold type.

Table 5.6 - Regression tests of the relationship between company-average valuation errors and company-average total dirty surplus flows for the large sample

Country	*Number of company-averages*	*Signed valuation errors*			*Absolute valuation errors*		
		Intercept α_0	*ATDSF*$_i$ β_0	R^2	*Intercept* α_0	*ATDSF*$_i$ β_0	R^2
All	8,126	0.330	8.775	0.003	0.891	8.285	0.005
		(20.887)	***(4.082)***		*(63.144)*	***(5.130)***	
		[<0.001]	***[<0.001]***		*[<0.001]*	***[<0.001]***	
U.K.	1,212	0.071	6.866	0.014	0.710	0.344	0.000
		(2.659)	***(4.020)***		*(29.862)*	*(0.280)*	
		[0.008]	***[<0.001]***		*[<0.001]*	*[0.779]*	
U.S.	6,914	0.374	8.121	0.002	0.905	16.309	0.014
		(20.990)	***(2.336)***		*(57.482)*	***(6.872)***	
		[<0.001]	***[0.020]***		***[<0.001]***	***[<0.001]***	
p-value for differences on coefficients of *ATDSF*$_i$ across countries[c]			*0.746*			***<0.001***	

Notes to table 5.6:

a. The table reports the regression coefficients, t-statistics, probability values and R^2 for the regression tests for a large sample of U.K. and U.S. companies for the following model: $AVE_i = \alpha_0 + \beta_0 ATDSF_i + \varepsilon_i$. AVE_i is the company-average valuation error over the available years in the period 1994 to 2003. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. $ATDSF_i$ is the company-average, over the available years in the period 1994 to 2003, of total dirty surplus flows (*TDSF*) scaled by market value at the beginning of the fiscal year (MV_0). For the U.K., *TDSF* = *PYA* - *GW* + *AR* + *CUR*, where *PYA* denotes prior-year adjustments, *GW* denotes goodwill, *AR* denotes asset revaluations and *CUR* denotes currency translation differences. For the U.S., *TDSF* = *CUR* + *MSEC* + *PEN*, where *MSEC* denotes adjustments for marketable securities and *PEN* denotes adjustments related to minimum pension liabilities. The term α_0 is the regression intercept. The term β_0 is the regression coefficient of $ATDSF_i$. The term ε_i is an error term.

b. t-statistics within ( ) and probability values within [ ] are given beneath the regression coefficients. These are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). In the case of β_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the regression coefficient is zero. t-statistics and probability values marked as bold indicates that one can reject at the 5% level the null hypothesis that the coefficients β_0 is zero. In the case of α_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the intercept coefficient is zero.

c. Probability values based on a t-test of the null hypothesis that the coefficient of $ATDSF_i$ is equal across countries. This is obtained by testing the null hypothesis that the coefficient β_1 of the model below is equal to zero. Probability values of 0.05 (5%) or less are printed in bold type. Probability values are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). The regression model is as follows: $AVE_i = \alpha_0 + \alpha_1 UK + \beta_0 ATDSF_i + \beta_1 UK.ATDSF_i + \varepsilon_i$. The term α_1 is the regression coefficient of *U.K.*, which is a dummy variable that takes a value of one if the company belongs to the U.K. and zero otherwise. The term β_1 is the regression coefficient of $ATDSF_i$ interacted with the dummy variable.

d. Regression models are applied to data reported in table 5.4.

Table 5.7 - Regression tests of the relationship between company-average valuation errors and company-average total dirty surplus flows excluding goodwill for the large sample

Country	*Number of company-averages*	*Signed valuation errors*			*Absolute valuation errors*		
		Intercept α_0	*ATDSF*$_i$ β_0	R^2	*Intercept* α_0	*ATDSF*$_i$ β_0	R^2
All	8,106	0.322	14.311	0.005	0.872	15.561	0.010
		(20.536)	***(3.821)***		*(59.530)*	***(6.176)***	
		[<0.001]	***[<0.001]***		*[<0.001]*	***[<0.001]***	
U.K.	1,213	0.037	7.262	0.006	0.687	4.653	0.004
		(1.406)	***(2.134)***		*(32.467)*	*(1.895)*	
		[0.160]	***[0.033]***		*[<0.001]*	*[0.058]*	
U.S.	6,893	0.371	15.840	0.004	0.896	21.273	0.015
		(20.905)	***(3.144)***		*(54.438)*	***(6.780)***	
		[<0.001]	***[0.002]***		*[<0.001]*	***[<0.001]***	
p-value for differences on coefficients of *ATDSF*$_i$ across countries[c]			*0.158*			***<0.001***	

Notes to table 5.7:

a. The table reports the regression coefficients, t-statistics, probability values and R^2 for the regression tests for a large sample of U.K. and U.S. companies for the following model: $AVE_i = \alpha_0 + \beta_0 ATDSF_i + \varepsilon_i$. AVE_i is the company-average valuation error over the available years in the period 1994 to 2003. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. $ATDSF_i$ is the company-average, over the available years in the period 1994 to 2003, of total dirty surplus flows (*TDSF*) excluding goodwill, scaled by market value at the beginning of the fiscal year (MV_0). For the U.K., *TDSF* = *PYA* + *AR* + *CUR*, where *PYA* denotes prior-year adjustments, *AR* denotes asset revaluations and *CUR* denotes currency translation differences. For the U.S., *TDSF* = *CUR* + *MSEC* + *PEN*, where *MSEC* denotes adjustments for marketable securities and *PEN* denotes adjustments related to minimum pension liabilities. The term α_0 is the regression intercept. The term β_0 is the regression coefficient of $ATDSF_i$. The term ε_i is an error term.

b. t-statistics within ( ) and probability values within [ ] are given beneath the regression coefficients. These are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). In the case of β_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the regression coefficient is zero. t-statistics and probability values marked as bold indicates that one can reject at the 5% level the null hypothesis that the coefficients β_0 is zero. In the case of α_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the intercept coefficient is zero.

c. Probability values based on a t-test of the null hypothesis that the coefficient of $ATDSF_i$ is equal across countries. This is obtained by testing the null hypothesis that the coefficient β_1 of the model below is equal to zero. Probability values of 0.05 (5%) or less are printed in bold type. Probability values are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). The regression model is as follows: $AVE_i = \alpha_0 + \alpha_1 UK + \beta_0 ATDSF_i + \beta_1 UK.ATDSF_i + \varepsilon_i$. The term α_1 is the regression coefficient of *U.K.*, which is a dummy variable that takes a value of one if the company belongs to the U.K. and zero otherwise. The term β_1 is the regression coefficient of $ATDSF_i$ interacted with the dummy variable.

d. Regression models are applied to data reported in table 5.4.

Table 5.8 - Regression tests of the relationship between company-average valuation errors and company-average individual dirty surplus flows items for the large U.K. sample

Number of company-averages: 1,233	*Intercept* α_0	$APYA_i$ β_0	AGW_i β_1	AAR_i β_2	$ACUR_i$ β_3	R^2
Signed valuation errors	-0.061	2.091	1.945	7.080	-2.691	0.083
	(-3.064)	***(2.610)***	***(2.456)***	***(8.647)***	*(-1.691)*	
	[0.002]	***[0.009]***	***[0.014]***	***[<0.001]***	*[0.091]*	
Absolute valuation errors	0.626	0.688	-0.642	2.300	0.948	0.033
	(49.177)	*(1.881)*	*(-1.777)*	***(3.667)***	*(1.110)*	
	[<0.001]	*[0.060]*	*[0.076]*	***[<0.001]***	*[0.267]*	

Notes to table 5.8:

a. The table reports the regression coefficients, t-statistics, probability values and R^2 for the regression tests for a large sample of U.K. companies for the following model: $AVE_i = \alpha_0 + \beta_0 APYA_i + \beta_1 AGW_i + \beta_2 AAR_i + \beta_3 ACUR_i + \varepsilon_i$. AVE_i is the company-average valuation error. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. $APYA_i$ is the company-average of prior-year adjustments. AGW_i is the company-average of goodwill. AAR_i is the company-average of asset revaluations. $ACUR_i$ is the company-average of currency translation differences. Dirty surplus flows variables are scaled by market value at the beginning of the fiscal year (MV_0). Averages are computed for company *i* over the available years in the period 1994 to 2003. The term α_0 is the regression intercept. The term β_0 is the regression coefficient of $APYA_i$. The term β_1 is the regression coefficient of AGW_i. The term β_2 is the regression coefficient of AAR_i. The term β_3 is the regression coefficient of $ACUR_i$. The term ε_i is an error term.

b. t-statistics within ( ) and probability values within [ ] are given beneath the regression coefficients. These are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). In the case of $\beta_0, \beta_1, \beta_2$ and β_3 the t-statistics are in respect of a two-sided test of the null hypothesis that the regression coefficient is zero. t-statistics and probability values marked as bold indicates that one can reject at the 5% level the null hypothesis that the coefficient $\beta_0, \beta_1, \beta_2$ and β_3 is zero. In the case of α_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the intercept coefficient is zero.

Table 5.9 - Regression tests of the relationship between company-average valuation errors and company-average individual dirty surplus flows for the large U.S. sample

Number of company-averages: 6,878	*Intercept* α_0	$ACUR_i$ β_0	$AMSEC_i$ β_1	$APEN_i$ β_2	R^2
Signed valuation errors	0.385 *(20.986)* *[<0.001]*	0.533 *(0.125)* *[0.901]*	22.627 ***(2.794)*** ***[0.005]***	5.413 *(0.493)* *[0.622]*	0.003
Absolute valuation errors	0.945 *(56.644)* *[<0.001]*	-21.163 ***(-6.628)*** ***[<0.001]***	52.644 ***(10.439)*** ***[<0.001]***	-14.082 *(-1.543)* *[0.123]*	0.044

Notes to table 5.9:

a. The table reports the regression coefficients, t-statistics, probability values and R^2 for the regression tests for a large sample of U.S. companies for the following model: $AVE_i = \alpha_0 + \beta_0 ACUR_i + \beta_1 AMSEC_i + \beta_2 APEN_i + \varepsilon_i$. AVE_i is the company-average valuation error. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. $ACUR_i$ is the company-average of currency translation differences. $AMSEC_i$ is the company-average of adjustments for marketable securities. $APEN_i$ is the company-average of adjustments related to minimum pension liabilities. Dirty surplus flows variables are scaled by market value at the beginning of the fiscal year (MV_0). Averages are computed for company i over the available years in the period 1994 to 2003. The term α_0 is the regression intercept. The term β_0 is the regression coefficient of $ACUR_i$. The term β_1 is the regression coefficient of $AMSEC_i$. The term β_2 is the regression coefficient of $APEN_i$. The term ε_i is an error term. Observations that fall in the most extreme 2% of the distribution are eliminated.

b. t-statistics within ( ) and probability values within [ ] are given beneath the regression coefficients. These are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). In the case of β_0, β_1 and β_2 the t-statistics are in respect of a two-sided test of the null hypothesis that the regression coefficient is zero. t-statistics and probability values marked as bold indicates that one can reject at the 5% level the null hypothesis that the coefficient β_0, β_1 and β_2 is zero. In the case of α_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the intercept coefficient is zero.

Table 5.10 - Regression tests of the relationship between yearly company valuation errors and company-average total dirty surplus flows for the large sample

Country Year	*Number of observations*	*Signed valuation errors*			*Absolute valuation errors*		
		Intercept α_0	*ATDSF$_i$* β_0	R^2	*Intercept* α_0	*ATDSF$_i$* β_0	R^2
All							
1994	2,856	-0.355	1.839	0.001	0.468	-3.504	0.013
		(-50.213)	*(1.234)*		*(86.653)*	***(-6.539)***	
		[<0.001]	*[0.217]*		*[<0.001]*	***[<0.001]***	
1995	3,134	-0.316	12.451	0.014	0.513	2.120	0.004
		(-35.366)	***(5.340)***		*(93.394)*	***(3.243)***	
		[<0.001]	***[<0.001]***		*[<0.001]*	***[0.001]***	
1996	3,653	-0.342	5.063	0.002	0.501	-1.806	0.002
		(-45.825)	***(2.794)***		*(99.377)*	***(-3.012)***	
		[<0.001]	***[0.005]***		*[<0.001]*	***[0.003]***	
1997	3,828	-0.308	5.930	0.002	0.523	-0.146	0.000
		(-36.144)	***(2.697)***		*(98.978)*	*(-0.190)*	
		[<0.001]	***[0.007]***		*[<0.001]*	*[0.849]*	
1998	3,754	1.398	36.622	0.001	1.362	115.030	0.038
		(20.173)	***(1.982)***		*(20.778)*	***(8.829)***	
		[<0.001]	***[0.048]***		*[<0.001]*	***[<0.001]***	
1999	3,735	0.355	-9.665	0.001	0.909	24.558	0.019
		(13.859)	*(-1.358)*		*(43.975)*	***(6.643)***	
		[<0.001]	*[0.174]*		*[<0.001]*	***[<0.001]***	
2000	3,334	0.793	3.259	0.000	1.069	32.679	0.018
		(25.043)	*(0.369)*		*(35.797)*	***(6.830)***	
		[<0.001]	*[0.712]*		*[<0.001]*	***[<0.001]***	
2001	3,202	0.648	18.554	0.002	0.975	19.007	0.009
		(22.814)	***(2.264)***		*(36.154)*	***(4.616)***	
		[<0.001]	***[0.024]***		*[<0.001]*	***[<0.001]***	
2002	3,113	1.171	44.364	0.005	1.359	31.278	0.009
		(27.381)	***(3.754)***		*(30.961)*	***(4.274)***	
		[<0.001]	***[<0.001]***		*[<0.001]*	***[<0.001]***	

Table 5.10 (continued) - Regression tests of the relationship between yearly company valuation errors and company-average total dirty surplus flows for the large sample

Country Year	*Number of observations*	*Signed valuation errors*			*Absolute valuation errors*		
		Intercept α_0	$ATDSF_t$ β_0	R^2	*Intercept* α_0	$ATDSF_t$ β_0	R^2
U.K.							
1994	361	-0.385	4.159	0.027	0.438	0.730	0.001
		(-22.412)	***(3.505)***		*(22.168)*	*(0.657)*	
		[<0.001]	***[0.001]***		*[<0.001]*	*[0.511]*	
1995	441	-0.534	2.231	0.011	0.555	0.136	0.000
		(-42.587)	***(2.416)***		*(33.519)*	*(0.146)*	
		[<0.001]	***[0.016]***		*[<0.001]*	*[0.884]*	
1996	557	-0.538	0.392	0.000	0.578	-2.245	0.011
		(-44.365)	*(0.423)*		*(36.454)*	***(-2.437)***	
		[<0.001]	*[0.673]*		*[<0.001]*	***[0.015]***	
1997	594	-0.385	1.062	0.001	0.534	-3.229	0.018
		(-20.817)	*(0.589)*		*(34.838)*	***(-3.384)***	
		[<0.001]	*[0.556]*		*[<0.001]*	***[0.001]***	
1998	619	0.031	0.907	0.000	0.658	-0.319	0.000
		(0.882)	*(0.235)*		*(21.831)*	*(-0.140)*	
		[0.378]	*[0.814]*		*[<0.001]*	*[0.888]*	
1999	605	0.462	2.864	0.000	0.893	8.284	0.007
		(8.259)	*(0.495)*		*(15.077)*	*(1.766)*	
		[<0.001]	*[0.621]*		*[<0.001]*	*[0.078]*	
2000	564	0.581	2.435	0.000	0.879	12.586	0.015
		(10.162)	*(0.381)*		*(16.957)*	***(2.988)***	
		[<0.001]	*[0.703]*		*[<0.001]*	***[0.003]***	
2001	458	0.295	-0.202	0.000	0.604	11.679	0.025
		(6.173)	*(-0.032)*		*(13.440)*	***(2.859)***	
		[<0.001]	*[0.974]*		*[<0.001]*	***[0.004]***	
2002	463	0.074	6.382	0.007	0.491	2.468	0.003
		(2.111)	*(1.489)*		*(18.143)*	*(1.157)*	
		[0.035]	*[0.137]*		*[<0.001]*	*[0.248]*	

Table 5.10 (continued) - Regression tests of the relationship between yearly company valuation errors and company-average total dirty surplus flows for the large sample

Country Year	*Number of observations*	*Signed valuation errors*			*Absolute valuation errors*		
		Intercept α_0	$ATDSF_i$ β_0	R^2	*Intercept* α_0	$ATDSF_i$ β_0	R^2
U.S.							
1994	2,491	-0.352 *(-46.662)* *[<0.001]*	1.981 *(0.773)* *[0.440]*	0.000	0.472 *(83.711)* *[<0.001]*	-5.359 ***(-8.036)*** ***[<0.001]***	0.021
1995	2,690	-0.294 *(-30.281)* *[<0.001]*	20.567 ***(4.579)*** ***[<0.001]***	0.015	0.510 *(86.557)* *[<0.001]*	2.865 ***(3.061)*** ***[0.002]***	0.004
1996	3,095	-0.321 *(-39.455)* *[<0.001]*	1.316 *(0.350)* *[0.727]*	0.000	0.498 *(91.941)* *[<0.001]*	-3.995 ***(-4.589)*** ***[<0.001]***	0.007
1997	3,229	-0.306 *(-33.267)* *[<0.001]*	4.267 *(0.963)* *[0.335]*	0.001	0.522 *(90.978)* *[<0.001]*	0.774 *(0.676)* *[0.499]*	0.000
1998	3,134	1.549 *(19.570)* *[<0.001]*	-28.806 *(-0.740)* *[0.459]*	0.000	1.298 *(17.549)* *[<0.001]*	224.107 ***(10.897)*** ***[<0.001]***	0.084
1999	3,115	0.325 *(11.705)* *[<0.001]*	-34.838 ***(-2.875)*** ***[0.004]***	0.004	0.894 *(39.639)* *[<0.001]*	36.331 ***(6.687)*** ***[<0.001]***	0.027
2000	2,771	0.813 *(22.783)* *[<0.001]*	-21.251 *(-1.479)* *[0.139]*	0.001	1.093 *(31.956)* *[<0.001]*	44.480 ***(6.433)*** ***[<0.001]***	0.021
2001	2,741	0.680 *(21.548)* *[<0.001]*	-3.073 *(-0.232)* *[0.817]*	0.000	1.019 *(33.840)* *[<0.001]*	24.489 ***(4.531)*** ***[<0.001]***	0.009
2002	2,652	1.309 *(27.373)* *[<0.001]*	20.769 *(0.998)* *[0.318]*	0.001	1.422 *(29.212)* *[<0.001]*	64.249 ***(6.207)*** ***[<0.001]***	0.023

Notes to table 5.10:

a. The table reports the regression coefficients, t-statistics, probability values and R^2 for the regression tests for a large sample of U.K. and U.S. companies for the following model: $VE_i = \alpha_0 + \beta_0 ATDSF_i + \varepsilon_i$, obtained for each individual year during the period 1994 to 2002. Results for year 2003 are not reported given the small number of observations available to perform the regression tests. VE_i is the company-year valuation error. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. $ATDSF_i$ is the company-average, over the available years in the period 1994 to 2003, of total dirty surplus flows (*TDSF*) scaled by market value at the beginning of the fiscal year (MV_0). For the U.K., *TDSF* = *PYA* - *GW* + *AR* + *CUR*, where *PYA* denotes prior-year adjustments, *GW* denotes goodwill, *AR* denotes asset revaluations and *CUR* denotes currency translation differences. For the U.S., *TDSF* = *CUR* + *MSEC* + *PEN*, where *MSEC* denotes adjustments for marketable securities and *PEN* denotes adjustments related to minimum pension liabilities. The term α_0 is the regression intercept. The term β_0 is the regression coefficient of $ATDSF_i$. The term ε_i is an error term. Observations that fall in the most extreme 2% of the distribution are eliminated for each year.

b. t-statistics within ( ) and probability values within [ ] are given beneath the regression coefficients. These are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). In the case of β_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the regression coefficient is zero. t-statistics and probability values marked as bold indicates that one can reject at the 5% level the null hypothesis that the coefficients β_0 is zero. In the case of α_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the intercept coefficient is zero.

Table 5.11 - Regression tests of the relationship between company-average valuation errors and company-average total dirty surplus flows by industry for the large sample

Country *Industry*	*Number of company-averages*	*Signed valuation errors*			*Absolute valuation errors*		
		Intercept α_0	$ATDSF_i$ β_0	R^2	*Intercept* α_0	$ATDSF_i$ β_0	R^2
Panel A: Regression tests by country and industry							
All							
Basic	4,062	-0.096	-3.286	0.001	0.599	2.331	0.001
		(-7.910)	*(-1.726)*		*(63.490)*	***(2.130)***	
		[<0.001]	*[0.084]*		*[<0.001]*	***[0.033]***	
Goods	853	0.448	8.323	0.003	0.881	-3.753	0.001
		(12.239)	***(2.321)***		*(27.705)*	*(-1.444)*	
		[<0.001]	***[0.021]***		*[<0.001]*	*[0.149]*	
Services	1,790	-0.195	1.551	0.000	0.698	-0.042	0.000
		(-9.812)	*(0.594)*		*(44.283)*	*(-0.021)*	
		[<0.001]	*[0.552]*		*[<0.001]*	*[0.983]*	
Financials	1,421	2.088	9.920	0.005	2.361	-15.622	0.014
		(39.659)	***(2.705)***		*(37.622)*	***(-4.375)***	
		[<0.001]	***[0.007]***		*[<0.001]*	***[<0.001]***	
U.K.							
Basic	562	0.202	7.465	0.012	0.805	-1.560	0.001
		(4.382)	***(2.515)***		*(19.929)*	*(-0.808)*	
		[<0.001]	***[0.012]***		*[<0.001]*	*[0.420]*	
Goods	189	0.244	7.582	0.015	0.705	-0.267	0.000
		(3.670)	***(2.031)***		*(12.131)*	*(-0.087)*	
		[<0.001]	***[0.044]***		*[<0.001]*	*[0.931]*	
Services	307	-0.329	3.010	0.005	0.602	1.743	0.004
		(-10.006)	*(1.004)*		*(27.134)*	*(1.139)*	
		[<0.001]	*[0.316]*		*[<0.001]*	*[0.256]*	
Financials	154	0.172	7.342	0.037	0.619	2.272	0.004
		(2.443)	***(2.258)***		*(6.878)*	*(0.651)*	
		[0.016]	***[0.025]***		*[<0.001]*	*[0.516]*	
U.S.							
Basic	3,500	-0.142	-8.911	0.006	0.580	0.413	0.000
		(-11.898)	***(-3.451)***		*(60.402)*	*(0.290)*	
		[<0.001]	***[0.001]***		*[<0.001]*	*[0.771]*	
Goods	664	0.498	-5.973	0.000	0.904	5.444	0.001
		(11.738)	*(-0.625)*		*(24.796)*	*(0.846)*	
		[<0.001]	*[0.532]*		*[<0.001]*	*[0.398]*	
Services	1,483	-0.166	-7.381	0.001	0.710	2.373	0.000
		(-7.300)	*(-1.548)*		*(38.623)*	*(0.522)*	
		[<0.001]	*[0.122]*		*[<0.001]*	*[0.602]*	
Financials	1,267	2.313	13.960	0.009	2.503	-12.744	0.009
		(42.161)	***(3.211)***		*(37.831)*	***(-3.052)***	
		[<0.001]	***[0.001]***		*[<0.001]*	***[0.002]***	

Table 5.11 (continued) - Regression tests of the relationship between company-average valuation errors and company-average total dirty surplus flows by industry for the large sample

Panel B: Tests of cross-industry differences

Country	*Signed valuation errors*			*Absolute valuation errors*		
Industry	*Goods*	*Services*	*Financials*	*Goods*	*Services*	*Financials*
All						
Basic	**0.004**	0.134	**0.001**	**0.031**	0.296	**<0.001**
Goods		0.127	0.756		0.257	**0.007**
Services			0.063			**<0.001**
U.K.						
Basic	0.980	0.291	0.978	0.722	0.180	0.337
Goods		0.340	0.961		0.559	0.585
Services			0.327			0.890
U.S.						
Basic	0.766	0.778	**<0.001**	0.445	0.681	**0.003**
Goods		0.895	0.058		0.697	**0.018**
Services			**0.001**			**0.014**

Notes to table 5.11:

a. The table reports the regression coefficients, t-statistics, probability values, R^2 and tests for a large sample of U.K. and U.S. companies for the following model:
$AVE_i = \alpha_0 + \beta_0 ATDSF_i + \varepsilon_i$. AVE_i is the company-average valuation error over the available years in the period 1994 to 2003. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. $ATDSF_i$ is the company-average, over the available years in the period 1994 to 2003, of total dirty surplus flows (*TDSF*) scaled by market value at the beginning of the fiscal year (MV_0). For the U.K., *TDSF* = *PYA* - *GW* + *AR* + *CUR*, where *PYA* denotes prior-year adjustments, *GW* denotes goodwill, *AR* denotes asset revaluations and *CUR* denotes currency translation differences. For the U.S., *TDSF* = *CUR* + *MSEC* + *PEN*, where *MSEC* denotes adjustments for marketable securities and *PEN* denotes adjustments related to minimum pension liabilities. The term α_0 is the regression intercept. The term β_0 is the regression coefficient of $ATDSF_i$. The term ε_i is an error term.

b. Panel A reports regression results. t-statistics within ( ) and probability values within [ ] are given beneath the regression coefficients. These are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). In the case of β_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the regression coefficient is zero. t-statistics and probability values marked as bold indicates that one can reject at the 5% level the null hypothesis that the coefficients β_0 is zero. In the case of α_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the intercept coefficient is zero.

c. Panel B reports probability values based on a t-test of the null hypothesis of equality of coefficients of $ATDSF_i$ across pairs of industries. This is obtained by performing tests on the regression coefficients of the model below. Probability values of 0.05 (5%) or less are printed in bold type. Probability values are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). The regression model is as follows:
$AVE_i = \alpha_0 + \alpha_1 Basic + \alpha_2 Goods + \alpha_3 Services + \beta_0 ATDSF_i + \beta_1 Basic.ATDSF_i + \beta_2 Goods.ATDSF_i + \beta_3 Services.ATDSF_i + \varepsilon_i$
The terms α_1, α_2 and α_3 are the regression coefficients of *Basic*, *Goods* and *Services*. *Basic*, *Goods* and *Services* are dummy variables that take a value of one if the company belongs to industry group basic (resources, basic and general industries and utilities), industry group goods (consumer goods), industry group services (services, information and technology), respectively, and zero otherwise. The terms β_1, β_2 and β_3 are the regression coefficients of $ATDSF_i$ interacted with the dummy variables.

d. Regression models are applied to the data reported in table 5.4.

Table 5.12 - Summary statistics of primary variables for the small sample

(in millions Euros)

Country *Industry*	*Number of company-years*	*Net income*		*Book value*		*Market value*	
		Mean	*Median*	*Mean*	*Median*	*Mean*	*Median*
All	784	106.24	13.70	810.96	148.64	1,897.76	296.35
Basic	404	32.08	10.70	342.53	123.95	777.67	252.27
Goods	119	25.69	9.68	229.50	130.25	572.67	181.55
Services	91	23.59	8.88	119.88	57.46	591.85	190.70
Financials	170	386.39	72.66	2,723.65	657.69	6,235.33	1,082.41
France	172	101.52	10.70	966.39	96.65	1,721.39	249.58
Basic	122	50.83	10.51	509.14	99.46	869.01	182.97
Goods	12	18.54	7.63	245.40	42.48	606.53	132.33
Services	16	15.97	5.81	50.36	58.70	463.55	140.04
Financials	22	528.97	101.56	4,921.05	1,271.29	7,971.10	1,272.25
Germany	150	48.45	9.07	605.83	153.19	1,258.62	224.61
Basic	82	8.31	5.64	120.61	95.60	262.35	156.71
Goods	22	48.30	21.99	395.52	206.42	870.89	296.72
Services	11	8.19	4.08	101.95	24.45	322.47	123.92
Financials	35	155.24	91.01	2,033.21	1,089.88	4,130.69	2,714.96
U.K.	203	51.13	14.88	383.67	114.91	962.64	276.18
Basic	67	31.44	9.68	222.54	70.66	687.05	232.24
Goods	62	30.70	12.61	203.99	153.59	611.78	193.45
Services	25	6.31	2.11	59.46	15.85	225.53	43.48
Financials	49	126.80	67.88	996.76	463.87	2,159.48	886.18
U.S.	259	186.00	20.85	1,162.65	191.70	3,151.87	462.02
Basic	133	29.88	19.57	386.97	180.70	1,063.70	529.22
Goods	23	-5.72	9.34	131.16	112.41	164.33	130.58
Services	39	42.15	21.27	192.18	147.16	964.84	331.19
Financials	64	666.99	50.80	3,736.69	372.86	10,090.94	775.60

Notes to table 5.12:

a. The table reports statistics of primary variables (in millions Euros) for a small sample of French, German, U.K. and U.S. companies during the period 1994 to 2001. Variables are obtained at fiscal year-end. Book value is common book value. Net income is income before extraordinary items.

b. Data in US dollars obtained from Compustat are converted to euros using the average exchange rate from December 1992 to December 2001. Data for France, Germany and the U.K. are obtained from Worldscope in Euros.

Table 5.13 - Summary statistics of input variables, valuation errors and total dirty surplus flows for the small sample

Country	*Number of company-years*		*Input variables*						*Valuation errors*		*Total dirty surplus flows (TDSF)*			
			return on equity	*cost of equity capital*	*dividend payout*	*book value*	*forecast eps1*	*forecast eps2*	*signed valuation errors*	*absolute valuation errors*	*signed TDSF*	*absolute TDSF*	*signed TDSF excl. GW*	*absolute TDSF excl. GW*
			roe	*r*	*dp*	bps_0/P_0	xps_1/P_0	xps_2/P_0	$(V_0-P_0)/P_0$	$\|V_0-P_0\|/P_0$	$TDSF/MV_0$	$\|TDSF\|/MV_0$	$TDSF/MV_0$	$\|TDSF\|/MV_0$
All	714	*Mean*	0.123	0.106	0.502	0.608	0.069	0.086	0.001	0.660	-0.008	0.017	-0.001	0.007
		Median	0.127	0.103	0.491	0.471	0.067	0.078	-0.315	0.497	0.000	0.003	0.000	0.002
		Std.dev.	0.018	0.012	0.095	0.535	0.044	0.081	0.998	0.749	0.041	0.038	0.015	0.013
		Q1	0.107	0.096	0.431	0.276	0.048	0.058	-0.564	0.275	-0.006	0.000	-0.003	0.000
		Q3	0.134	0.114	0.571	0.769	0.090	0.104	0.151	0.730	0.002	0.014	0.001	0.008
		P1	0.092	0.087	0.320	0.033	-0.066	0.000	-0.920	0.035	-0.204	0.000	-0.060	0.000
		P99	0.160	0.134	0.685	2.532	0.213	0.251	4.354	4.354	0.074	0.204	0.052	0.063
France	167	*Mean*	0.107	0.104	0.434	0.594	0.067	0.081	-0.284	0.488	0.000	0.011	0.002	0.008
		Median	0.103	0.101	0.450	0.534	0.068	0.077	-0.382	0.463	0.000	0.003	0.000	0.003
		Std.dev.	0.011	0.010	0.061	0.379	0.041	0.036	0.605	0.455	0.028	0.026	0.014	0.012
		Q1	0.098	0.098	0.393	0.308	0.048	0.061	-0.591	0.244	-0.001	0.001	-0.001	0.001
		Q3	0.115	0.109	0.471	0.771	0.088	0.099	-0.156	0.651	0.006	0.012	0.006	0.011
		P1	0.091	0.091	0.290	0.062	-0.012	-0.047	-0.923	0.029	-0.120	0.000	-0.057	0.000
		P99	0.137	0.127	0.569	1.835	0.159	0.190	2.010	2.010	0.078	0.120	0.052	0.057
Germany	141	*Mean*	0.109	0.097	0.529	0.674	0.063	0.087	-0.095	0.548	-0.011	0.018	-0.002	0.007
		Median	0.101	0.096	0.542	0.491	0.060	0.068	-0.315	0.454	-0.001	0.005	0.000	0.002
		Std.dev.	0.019	0.009	0.092	0.686	0.035	0.159	0.777	0.557	0.039	0.036	0.014	0.013
		Q1	0.097	0.093	0.446	0.332	0.043	0.051	-0.533	0.249	-0.014	0.001	-0.004	0.000
		Q3	0.114	0.101	0.588	0.810	0.084	0.094	0.151	0.689	0.001	0.017	0.001	0.008
		P1	0.089	0.083	0.357	0.071	-0.066	0.004	-0.919	0.029	-0.193	0.000	-0.061	0.000
		P99	0.190	0.118	0.697	4.852	0.158	0.230	3.137	3.137	0.081	0.193	0.043	0.061

Table 5.13 (continued) - Summary statistics of input variables, valuation errors and total dirty surplus flows for the small sample

Country	*Number of company -years*		*Input variables*						*Valuation errors*		*Total dirty surplus flows (TDSF)*			
			return on equity	*cost of equity capital*	*dividend payout*	*book value*	*forecast eps_1*	*forecast eps_2*	*signed valuation errors*	*absolute valuation errors*	*signed TDSF*	*absolute TDSF*	*signed TDSF excl. GW*	*absolute TDSF excl.GW*
			roe	*r*	*dp*	bps_0/P_0	xps_1/P_0	xps_2/P_0	$(V_0-P_0)/P_0$	$\|V_0-P_0\|/P_0$	$TDSF/MV_0$	$\|TDSF\|/MV_0$	$TDSF/MV_0$	$\|TDSF\|/MV_0$
U.K.	171	*Mean*	0.133	0.111	0.512	0.616	0.079	0.090	0.058	0.736	-0.014	0.030	0.000	0.009
		Median	0.132	0.103	0.510	0.445	0.069	0.083	-0.304	0.563	0.000	0.006	0.000	0.001
		Std.dev.	0.010	0.015	0.063	0.522	0.057	0.058	1.024	0.711	0.060	0.054	0.019	0.017
		Q1	0.127	0.096	0.466	0.212	0.046	0.055	-0.615	0.304	-0.009	0.001	-0.004	0.000
		Q3	0.136	0.127	0.561	0.971	0.104	0.112	0.406	0.834	0.002	0.031	0.000	0.009
		P1	0.105	0.092	0.383	-0.020	-0.095	-0.055	-0.930	0.035	-0.257	0.000	-0.082	0.000
		P99	0.160	0.137	0.654	2.470	0.286	0.322	3.910	3.910	0.081	0.257	0.068	0.082
U.S.	235	*Mean*	0.135	0.109	0.527	0.572	0.067	0.086	0.221	0.794	-0.006	0.010	-0.006	0.010
		Median	0.133	0.109	0.548	0.442	0.065	0.079	-0.239	0.504	0.000	0.001	0.000	0.001
		Std.dev.	0.007	0.009	0.112	0.536	0.040	0.040	1.242	0.978	0.030	0.029	0.030	0.029
		Q1	0.129	0.101	0.409	0.262	0.049	0.061	-0.535	0.310	-0.003	0.000	-0.003	0.000
		Q3	0.141	0.114	0.629	0.665	0.090	0.106	0.472	0.748	0.000	0.008	0.000	0.008
		P1	0.123	0.089	0.330	0.046	-0.091	0.000	-0.857	0.040	-0.186	0.000	-0.186	0.000
		P99	0.149	0.132	0.669	2.956	0.186	0.223	4.867	4.867	0.028	0.186	0.028	0.186

Notes to table 5.13:

a. The table reports mean, median, standard deviation, first quartile (Q1), third (Q2), 1^{st} percentile (P1) and 99^{th} percentile (P99) of the variables and for a small sample of French, German, U.K. and U.S. companies during the period 1994 to 2001. The definition of the variables is as follows. Return on equity (*roe*), used to obtain earnings forecasts beyond time 2, is current year income before extraordinary items divided by previous year common book value. For each company and valuation date roe is defined as the industry moving average roe of the previous seven years. Cost of equity capital (r), used to discount the flows to time 0, is the 12-month moving average Treasury bond rate plus the average industry beta applied to a 5% risk premium. Dividend payout ratio (*dp*), used to obtain forecasts of dividends necessary to compute forecasts of book values, is common dividends divided by net income over the same period. For each company and valuation date *dp* is obtained as the industry moving average dp of the previous seven years. Book value per share (bps_0) is common book value at valuation time 0 obtained from the most recent published financial statements divided by the number of common shares outstanding at the valuation time 0. Forecast eps at time 1 (xps_1) and forecast eps at time 2 (xps_2) are the mean consensus analyst forecasts of earnings per share one- and two-years-ahead. Valuation error $(V_0 - P_0)/P_0$ is the difference between the value estimate obtained from the valuation model (V_0) and the observed price per share at valuation time 0 (P_0), scaled by the later. Negative value estimates are set to zero. *TDSF* is total dirty surplus flows obtained from published financial reports scaled by market value at the beginning of the fiscal year (MV_0) (see chapter 3 for details on computing *TDSF*). *TDSF* excl. *GW* denotes *TDSF* excluding goodwill. Variables are for company i and for years from 1994 to 2003. For valuation errors and *TDSF*, observations that fall in the most extreme 2% of the distribution are eliminated. Variables are for company i and for years from 1994 to 2001. All variables, except *roe*, r and *dp*, are scaled by price (or market value). For valuation errors and *TDSF*, observations that fall in the most extreme 2% of the distribution are eliminated.

b. The data reported are for the subsample of company-years used in chapter 3 and for which data on true total dirty surplus flows as reported in the published financial statements is available, consisting of a subsample of eighty companies for each country representing four industry and four size categories.

Table 5.14 - Mean and median company-average valuation errors and company-average total dirty surplus flows for the small sample

Panel A: Statistics and tests for individual countries and across the four countries

Country	*Number of company-averages*		*Company-average valuation errors* (AVE_i)		*Company-average TDSF* $(ATDSF_i)$	
			Signed	*Absolute*	*Signed*	*Absolute*
All	190	*Mean*[b]	0.028	0.696	-0.009*	0.018
		Median[c]	-0.245*	0.551	0.000*	0.007
France	51	*Mean*[b]	-0.302*	0.515	0.001	0.010
		Median[c]	-0.420*	0.465	0.001*	0.004
Germany	46	*Mean*[b]	-0.168*	0.568	-0.011*	0.018
		Median[c]	-0.354*	0.517	-0.003*	0.009
U.K.	43	*Mean*[b]	0.243	0.830	-0.021*	0.038
		Median[c]	-0.021	0.690	-0.004*	0.021
U.S.	50	*Mean*[b]	0.360*	0.884	-0.007*	0.010
		Median[c]	0.099	0.604	0.000*	0.003
p-value for difference		*Mean*[d]	**0.044**	0.282	**0.001**	**<0.001**
		Median[e]	0.177	0.640	**0.011**	**<0.001**

Panel B: Tests for pairs of countries

	Company-average valuation errors[f] (AVE_i)						*Company-averageTDSF*[f] $(ATDSF_i)$					
	Signed			*Absolute*			*Signed*			*Absolute*		
	Germany	*U.K.*	*U.S.*	*Germany*	*U.K.*	*U.S.*	*Germany*	*U.K.*	*U.S.*	*Germany*	*U.K.*	*U.S.*
France	0.907	0.401	0.066	0.669	0.696	0.187	**0.033**	**0.004**	0.136	0.769	**<0.001**	**0.012**
Germany		0.368	0.056		0.982	0.418		0.078	0.502		**<0.001**	**0.020**
U.K.			0.301			0.465			0.052			**<0.001**

Notes to table 5.14:

a. The table reports statistics and tests on company-average valuation errors (AVE_i) and of company-average total dirty surplus flows ($ATDSF_i$) by country for a small sample of French, German, U.K. and U.S. companies during the period 1994 to 2001. Averages are computed for company *i* over the available years in the period 1994 to 2001. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. *TDSF* is total dirty surplus flows obtained from published financial reports scaled by market value at the beginning of the fiscal year (MV_0) (see chapter 3 for details on computing *TDSF*). Observations that fall in the most extreme 2% of the distribution are eliminated.

b. Probability values based on a t-test of the null hypothesis of mean company-average valuation error (mean company-average total dirty surplus flows) equal to zero. Probability values of 0.05 (5%) or less are printed in bold type.

c. Probability values based on a signed-rank test of the null hypothesis that the distribution of company-average valuation errors (company-average total dirty surplus flows) is centred on zero. Probability values of 0.05 (5%) or less are printed in bold type.

d. Probability values based on a F-test of the null hypothesis of equality of mean company-average valuation errors (mean company-average total dirty surplus) across countries. Probability values of 0.05 (5%) or less are printed in bold type.

e. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank of company-average valuation errors (mean rank of company-average total dirty surplus flows) across countries. Probability values of 0.05 (5%) or less are printed in bold type.

f. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank of company-average valuation errors (mean rank of company-average total dirty surplus flows) across pairs of countries. Probability values of 0.05 (5%) or less are printed in bold type.

Table 5.15 - Mean and median company-average valuation errors and company-average total dirty surplus flows and by country and industry for the small sample

Country / *Industry*	*Number of company-averages*		*Company-average valuation errors* (AVE_i)		*Company-average TDSF* ($ATDSF_i$)	
			Signed	*Absolute*	*Signed*	*Absolute*
Panel A: Industry differences by country						
All						
Basic	94	*Mean*[b]	-0.041	0.657	-0.008*	0.017
		Median[c]	-0.351*	0.524	0.000*	0.005
Goods	28	*Mean*[b]	0.287*	0.788	-0.005	0.014
		Median[c]	0.304	0.726	-0.001	0.008
Services	24	*Mean*[b]	-0.382*	0.630	-0.010	0.017
		Median[c]	-0.582*	0.639	0.000	0.006
Financials	44	*Mean*[b]	0.233	0.756	-0.013	0.025
		Median[c]	-0.062	0.501	-0.001	0.008
p-value for differences across industries		*Mean*[d]	0.127	0.596	0.961	0.837
		Median[e]	**0.001**	0.268	0.649	0.437
France						
Basic	30	*Mean*[b]	-0.418*	0.464	0.004	0.009
		Median[c]	-0.445*	0.464	0.001*	0.005
Goods	5	*Mean*[b]	0.577	1.002	-0.003	0.003
		Median[c]	0.403	0.929	0.000	0.001
Services	6	*Mean*[b]	-0.747	0.747	-0.015	0.020
		Median[c]	-0.732*	0.732	0.000	0.002
Financials	10	*Mean*[b]	-0.129	0.287	0.004	0.011
		Median[c]	-0.160	0.267	0.001	0.005
p-value for differences across industries		*Mean*[d]	**<0.001**	**0.008**	0.975	0.510
		Median[e]	**<0.001**	**0.008**	0.979	0.599
Germany						
Basic	25	*Mean*[b]	-0.102	0.586	-0.013	0.024
		Median[c]	-0.338	0.537	-0.003*	0.010
Goods	6	*Mean*[b]	-0.137	0.513	-0.012	0.017
		Median[c]	-0.245	0.429	-0.007*	0.013
Services	3	*Mean*[b]	0.121	0.380	-0.009	0.014
		Median[c]	-0.038	0.403	-0.013	0.016
Financials	12	*Mean*[b]	-0.395*	0.606	-0.007*	0.008
		Median[c]	-0.451	0.622	-0.002*	0.006
p-value for differences across industries		*Mean*[d]	0.802	0.678	0.803	0.532
		Median[e]	0.158	0.206	0.966	0.414

Table 5.15 (continued) - Mean and median company-average valuation errors and company-average total dirty surplus flows by country and industry for the small sample

Country / Industry	Number of company-averages		Company-average valuation errors (AVEi) Signed	Absolute	Company-average TDSF (ATDSFi) Signed	Absolute
U.K.						
Basic	15	*Mean*[b]	0.584	1.027	-0.032*	0.042
		Median[c]	0.385	0.740	-0.004*	0.031
Goods	12	*Mean*[b]	0.125	0.721	-0.005	0.021
		Median[c]	0.233	0.713	-0.002	0.019
Services	6	*Mean*[b]	-0.377	0.716	-0.016	0.034
		Median[c]	-0.617	0.711	-0.004	0.017
Financials	10	*Mean*[b]	0.247	0.731	-0.029	0.054
		Median[c]	0.028	0.436	-0.014	0.040
p-value for differences across industries		*Mean*[d]	0.303	0.758	0.728	0.487
		Median[e]	0.235	0.920	0.853	0.702
U.S.						
Basic	24	*Mean*[b]	0.102	0.742	-0.002*	0.004
		Median[c]	-0.227	0.466	-0.001*	0.002
Goods	5	*Mean*[b]	0.894	1.066	0.001	0.001
		Median[c]	0.888	1.051	0.000	0.000
Services	9	*Mean*[b]	-0.308	0.580	-0.004	0.005
		Median[c]	-0.528	0.601	0.000	0.002
Financials	12	*Mean*[b]	1.153*	1.318	-0.021	0.029
		Median[c]	1.103*	1.103	-0.006	0.013
p-value for differences across industries		*Mean*[d]	0.095	0.817	0.106	**0.004**
		Median[e]	**0.007**	0.669	0.299	**0.004**
Panel B: Cross-country differences for each industry group						
p-value for differences across countries for:						
Basic		*Mean*[f]	0.128	0.377	**0.000**	**0.000**
		Median[g]	0.420	0.691	**0.039**	**0.000**
Goods		*Mean*[f]	0.136	0.831	0.318	0.085
		Median[g]	0.085	0.817	0.077	**0.005**
Services		*Mean*[f]	**0.021**	**0.013**	0.307	**0.031**
		Median[g]	**0.038**	**0.040**	0.746	**0.018**
Financials		*Mean*[f]	0.054	0.415	0.263	**0.006**
		Median[g]	0.009	0.364	0.606	0.058

Notes to table 5.15:

a. The table reports statistics and tests on company-average valuation errors (AVE_i) and of company-average total dirty surplus flows ($ATDSF_i$) by country and industry. Averages are computed for company i over the available years in the period 1994 to 2001. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. *TDSF* is total dirty surplus flows obtained from published financial reports scaled by market value at the beginning of the fiscal year (MV_0) (see chapter 3 for details on computing *TDSF*). Observations that fall in the most extreme 2% of the distribution are eliminated. Industry groups are denoted as: basic (resources, basic and general industries and utilities) goods (consumer goods), services (services, information and technology) and financials.

b. Probability values for a t-test of the null hypothesis that the mean company-average valuation error (mean company-average total dirty surplus flows) is zero. Probability values of 0.05 (5%) or less are printed in bold type.

c. Probability values for a signed-rank test of the null hypothesis that the distribution of company-average valuation errors (company-average total dirty surplus flows) is centred on zero. Probability values of 0.05 (5%) or less are printed in bold type.

d. Probability values based on a F-test of the null hypothesis of equality of mean company-average valuation errors (mean company-average total dirty surplus) across industries in a given country. Probability values of 0.05 (5%) or less are printed in bold type.

e. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank of company-average valuation errors (mean rank of company-average total dirty surplus flows) across industries in a given country. Probability values of 0.05 (5%) or less are printed in bold type.

f. Probability values based on a F-test of the null hypothesis of equality of mean company-average valuation errors (mean company-average total dirty surplus) across countries in a given industry. Probability values of 0.05 (5%) or less are printed in bold type.

g. Probability values based on a Kruskal-Wallis test of the null hypothesis of equality of mean rank of company-average valuation errors (mean rank of company-average total dirty surplus flows) across countries in a given industry. Probability values of 0.05 (5%) or less are printed in bold type.

Table 5.16 - Regression tests of the relationship between company-average valuation errors and company-average total dirty surplus flows for the small sample

Country	*Number of company-averages*	*Signed valuation errors*			*Absolute valuation errors*		
		Intercept α_0	*ATDSF$_i$* β_0	R^2	*Intercept* α_0	*ATDSF$_i$* β_0	R^2
Panel A: Regression tests by country							
All	190	0.030 *(0.452)* *[0.652]*	-0.085 *(-0.042)* *[0.966]*	0.000	0.695 *(15.489)* *[<0.001]*	0.133 *(0.085)* *[0.932]*	0.000
France	51	-0.301 *(-4.455)* *[<0.001]*	-0.853 *(-0.305)* *[0.762]*	0.001	0.522 *(10.186)* *[<0.001]*	-0.612 *(-0.360)* *[0.720]*	0.001
Germany	46	-0.155 *(-1.609)* *[0.115]*	1.216 *(0.575)* *[0.568]*	0.004	0.583 *(10.370)* *[<0.001]*	-0.843 *(-0.707)* *[0.483]*	0.005
U.K.	43	0.328 *(1.927)* *[0.061]*	3.971 *(1.817)* *[0.076]*	0.050	0.946 *(8.196)* *[<0.001]*	-3.072 ***(-2.217)*** ***[0.032]***	0.050
U.S.	50	0.262 *(1.689)* *[0.098]*	-17.392 ***(-3.570)*** ***[0.001]***	0.104	0.764 *(7.090)* *[<0.001]*	13.288 ***(3.240)*** ***[0.002]***	0.139

Panel B: Tests of cross-country differences

	Signed valuation errors			*Absolute valuation errors*		
Country	*France*	*Germany*	*U.S*	*France*	*Germany*	*U.S*
U.K.	0.174	0.365	**<0.001**	0.262	0.222	**<0.001**
France		0.555	**0.003**		0.912	**0.002**
Germany			**0.001**			**0.001**

Notes to table 5.16:

a. The table reports the regression coefficients, t-statistics, probability values and R^2 for the regression tests for a small sample of French, German, U.K. and U.S. companies for the following model: $AVE_i = \alpha_0 + \beta_0 ATDSF_i + \varepsilon_i$. AVE_i is the company-average valuation error over the available years in the period 1994 to 2001. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. $ATDSF_i$ is the company-average, over the available years in the period 1994 to 2003, of total dirty surplus flows (*TDSF*) obtained from published financial reports scaled by market value at the beginning of the fiscal year (MV_0) (see chapter 3 for details on computing *TDSF*). The term α_0 is the regression intercept. The term β_0 is the regression coefficient of $ATDSF_i$. The term ε_i is an error term.

b. Panel A reports regression results. t-statistics within ( ) and probability values within [ ] are given beneath the regression coefficients. These are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). In the case of β_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the regression coefficient is zero. t-statistics and probability values marked as bold indicates that one can reject at the 5% level the null hypothesis that the coefficients β_0 is zero. In the case of α_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the intercept coefficient is zero.

c. Panel B reports probability values based on a t-test of the null hypothesis that the coefficient of $ATDSF_i$ is equal across pairs of countries. This is obtained by performing tests on the regression coefficients of the model below. Probability values of 0.05 (5%) or less are printed in bold type. Probability values are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). The regression model is as follows: $AVE_i = \alpha_0 + \alpha_1 UK + \alpha_2 FR + \alpha_3 GE + \beta_0 ATDSF_i + \beta_1 UK.ATDSF_i + \beta_2 FR.ATDSF_i + \beta_3 GE.ATDSF_i + \varepsilon_i$. The terms α_1, α_2 and α_3 are the regression coefficient of *U.K.*, *FR* and *GE*. *U.K.*, *FR* and *GE* are dummy variables that take a value of one if the company belongs to the U.K., France, Germany, respectively, and zero otherwise. The terms β_1, β_2 and β_3 are the regression coefficient of $ATDSF_i$ interacted with the dummy variable.

d. Regression models are applied to data reported in table 5.14, panel A.

Table 5.17 - Regression tests of the relationship between company-average valuation errors and company-average total dirty surplus flows excluding goodwill for the small sample

Country	*Number of company-averages*	*Signed valuation errors*			*Absolute valuation errors*		
		Intercept α_0	$ATDSF_i$ β_0	R^2	*Intercept* α_0	$ATDSF_i$ β_0	R^2
Panel A: Regression tests by country							
All	189	-0.004 *(-0.073)* *[0.942]*	-11.115 *(-1.887)* *[0.061]*	0.023	0.649 *(13.907)* *[<0.001]*	4.503 *(0.945)* *[0.346]*	0.009
France	50	-0.277 *(-3.896)* *[<0.001]*	-10.206 *(-1.239)* *[0.221]*	0.020	0.572 *(9.251)* *[<0.001]*	-8.891 *(-2.241)* *[0.030]*	0.056
Germany	46	-0.168 *(-1.727)* *[0.091]*	1.879 *(0.250)* *[0.803]*	0.002	0.581 *(11.472)* *[<0.001]*	-2.494 *(-0.832)* *[0.410]*	0.007
U.K.	43	0.146 *(1.147)* *[0.258]*	-8.429 *(-0.861)* *[0.394]*	0.015	0.764 *(8.662)* *[<0.001]*	1.118 *(0.220)* *[0.827]*	0.001
U.S.	50	0.320 *(2.082)* *[0.043]*	-16.652 ***(-2.484)*** ***[0.017]***	0.037	0.769 *(7.314)* *[<0.001]*	18.621 ***(4.158)*** ***[<0.001]***	0.104

Panel B: Tests of cross-country differences

	Signed valuation errors			*Absolute valuation errors*		
Country	*France*	*Germany*	*U.S*	*France*	*Germany*	*U.S*
U.K.	0.890	0.403	0.488	0.121	0.541	**0.010**
France		0.278	0.544		0.198	**<0.001**
Germany			0.066			**<0.001**

Notes to table 5.17:

a. The table reports the regression coefficients, t-statistics, probability values and R^2 for the regression tests for a small sample of French, German, U.K. and U.S. companies for the following model: $AVE_i = \alpha_0 + \beta_0 ATDSF_i + \varepsilon_i$. AVE_i is the company-average valuation error over the available years in the period 1994 to 2001. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. $ATDSF_i$ is the company-average, over the available years in the period 1994 to 2001, of total dirty surplus flows (*TDSF*) excluding goodwill obtained from published financial reports, scaled by market value at the beginning of the fiscal year (MV_0) (see chapter 3 for details on computing *TDSF*). The term α_0 is the regression intercept. The term β_0 is the regression coefficient of $ATDSF_i$. The term ε_i is an error term.

b. Panel A reports regression results. t-statistics within ( ) and probability values within [ ] are given beneath the regression coefficients. These are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). In the case of β_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the regression coefficient is zero. t-statistics and probability values marked as bold indicates that one can reject at the 5% level the null hypothesis that the coefficients β_0 is zero. In the case of α_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the intercept coefficient is zero.

c. Panel B reports probability values based on a t-test of the null hypothesis that the coefficient of $ATDSF_i$ is equal across pairs of countries. This is obtained by performing tests on the regression coefficients of the model below. Probability values of 0.05 (5%) or less are printed in bold type. Probability values are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). The regression model is as follows: $AVE_i = \alpha_0 + \alpha_1 UK + \alpha_2 FR + \alpha_3 GE + \beta_0 ATDSF_i + \beta_1 UK.ATDSF_i + \beta_2 FR.ATDSF_i + \beta_3 GE.ATDSF_i + \varepsilon_i$. The terms α_1, α_2 and α_3 are the regression coefficient of *U.K.*, *FR* and *GE*. *U.K.*, *FR* and *GE* are dummy variables that take a value of one if the company belongs to the U.K., France, Germany, respectively, and zero otherwise. The terms β_1, β_2 and β_3 are the regression coefficient of $ATDSF_i$ interacted with the dummy variable.

d. Regression models are applied to data reported in table 5.14, panel A.

Table 5.18 - Regression tests of the relationship between company-average valuation errors and company-average individual dirty surplus flows for the small sample

Country	*Number of company-averages*	*Intercept* α_0	$APYA_i$ β_0	AGW_i β_1	AGM_i β_2	AAR_i β_3	$AOTH_i$ β_4	R^2
Panel A: Signed valuation errors								
All	190	0.010 *(0.154)* *[0.878]*	6.124 *(0.181)* *[0.857]*	1.642 *(1.162)* *[0.247]*	-17.719 ***(-6.098)*** ***[<0.001]***	12.553 *(0.972)* *[0.332]*	-14.033 ***(-2.466)*** ***[0.015]***	0.087
France	51	-0.273 *(-3.798)* *[<0.001]*		3.405 ***(5.123)*** ***[<0.001]***		48.905 *(0.468)* *[0.642]*	-6.712 ***(-2.481)*** ***[0.017]***	0.040
Germany	46	-0.154 *(-1.442)* *[0.157]*	-30.830 ***(-4.234)*** ***[<0.001]***	2.448 *(1.268)* *[0.212]*			-2.802 *(-0.405)* *[0.688]*	0.027
U.K.	43	0.293 *(1.903)* *[0.065]*	75.555 *(1.705)* *[0.096]*	2.581 *(1.382)* *[0.175]*		12.235 *(1.089)* *[0.283]*	-17.438 *(-0.785)* *[0.437]*	0.124
U.S.	50	0.264 *(1.704)* *[0.095]*	63.210 *(0.803)* *[0.426]*		-14.603 ***(-3.680)*** ***[0.001]***		-20.006 ***(-3.929)*** ***[<0.001]***	0.109
Panel B: Absolute valuation errors								
All	190	0.663 *(12.574)* *[<0.001]*	-1.118 *-(0.121)* *[0.904]*	-2.807 ***(-3.473)*** ***[0.001]***	7.504 ***(4.781)*** ***[<0.001]***	10.876 *(1.344)* *[0.181]*	5.176 *(0.953)* *[0.342]*	0.075
France	51	0.537 *(9.618)* *[<0.001]*		1.168 ***(2.716)*** ***[0.009]***		-262.994 ***(-3.714)*** ***[0.001]***	-2.508 *(-0.837)* *[0.407]*	0.022
Germany	46	0.583 *(9.544)* *[<0.001]*	1.432 *(0.297)* *[0.768]*	-1.020 *(-0.888)* *[0.380]*			-0.445 *(-0.112)* *[0.911[*	0.006
U.K.	43	0.951 *(8.043)* *[<0.001]*	-38.695 *(-1.480)* *[0.147]*	-5.417 ***(-4.285)*** ***[<0.001]***		7.554 *(0.900)* *[0.374]*	0.472 *(0.059)* *[0.953]*	0.180
U.S.	50	0.760 *(6.952)* *[<0.001]*	-46.353 *(-0.596)* *[0.554]*		2.218 *(1.177)* *[0.245]*		19.437 ***(8.239)*** ***[<0.001]***	0.179

Notes to table 5.18:

a. The table reports the regression coefficients, t-statistics, probability values and R^2 for the regression tests for a small sample of French, German, U.K. and U.S. companies for the following model: $AVE_i = \alpha_0 + \beta_0 APYA_i + \beta_1 AGW_i + \beta_2 AGM_i + \beta_3 AAR_i + \beta_4 AOTH_i + \varepsilon_i$. AVE_i is the company-average valuation error. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. $APYA_i$ is the company-average of prior-year adjustments. AGW_i is the company-average of goodwill. AGM_i is the company-average of unrecognised issue of equity under merger accounting. AAR_i is the company-average of asset revaluations. $AOTH_i$ is the company-average of 'other dirty surplus flows'. Dirty surplus flows variables are obtained from published financial statements and they are scaled by market value at the beginning of the fiscal year (MV_0) (see chapter 3 for details on dirty surplus flows). Averages are computed for company i over the available years in the period 1994 to 2001. The term α_0 is the regression intercept. The term β_0 is the regression coefficient of $APYA_i$. The term β_1 is the regression coefficient of AGW_i. The term β_2 is the regression coefficient of AGM_i. The term β_3 is the regression coefficient of AAR_i. The term β_4 is the regression coefficient of $AOTH_i$. The term ε_i is an error term. Observations that fall in the most extreme 2% of the distribution for are eliminated.

b. t-statistics within ( ) and probability values within [ ] are given beneath the regression coefficients. These are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). In the case of β_0, β_1, β_2, β_3 and β_4 the t-statistics are in respect of a two-sided test of the null hypothesis that the regression coefficient is zero. t-statistics and probability values marked as bold indicates that one can reject at the 5% level the null hypothesis that the coefficient β_0, β_1, β_2, β_3 and β_4 is zero. In the case of α_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the intercept coefficient is zero.

Table 5.19 - Regression tests of the relationship between yearly company valuation errors and company-average total dirty surplus flows for the small sample

Country Year	*Number of observations*	*Signed valuation errors*			*Absolute valuation errors*		
		Intercept α_0	*ATDSF$_i$* β_0	R^2	*Intercept* α_0	*ATDSF$_i$* β_0	R^2
All							
1994	62	-0.327 *(-6.067)* *[<0.001]*	1.148 *(0.330)* *[0.743]*	0.001	0.477 *(11.191)* *[<0.001]*	-1.954 *(-0.920)* *[0.361]*	0.015
1995	69	-0.385 *(-8.333)* *[<0.001]*	-3.069 *(-1.133)* *[0.261]*	0.035	0.470 *(13.162)* *[<0.001]*	-0.903 *(-0.656)* *[0.514]*	0.008
1996	93	-0.375 *(-11.107)* *[<0.001]*	-0.724 *(-0.360)* *[0.720]*	0.002	0.424 *(13.496)* *[<0.001]*	-0.472 *(-0.359)* *[0.721]*	0.002
1997	113	-0.362 *(-8.829)* *[<0.001]*	-4.293 *(-1.491)* *[0.139]*	0.045	0.482 *(16.410)* *[<0.001]*	0.547 *(0.364)* *[0.717]*	0.002
1998	115	0.565 *(2.430)* *[0.017]*	-5.908 *(-0.386)* *[0.701]*	0.003	0.989 *(4.400)* *[<0.001]*	11.930 *(0.951)* *[0.344]*	0.016
1999	105	0.268 *(1.922)* *[0.057]*	-2.415 *(-0.369)* *[0.713]*	0.002	0.814 *(7.070)* *[<0.001]*	3.780 *(0.893)* *[0.374]*	0.008
2000	82	0.418 *(2.406)* *[0.018]*	-12.493 *(-1.445)* *[0.152]*	0.044	0.778 *(5.409)* *[<0.001]*	14.635 ***(2.068)*** ***[0.042]***	0.090
2001	85	0.411 *(2.396)* *[0.019]*	-8.332 *(-1.215)* *[0.228]*	0.016	0.850 *(4.910)* *[<0.001]*	4.682 *(0.822)* *[0.413]*	0.007

Notes to table 5.19:

a. The table reports the regression coefficients, t-statistics, probability values and R^2 for the regression tests for a small sample of French, German, U.K. and U.S. companies for the following model: $VE_i = \alpha_0 + \beta_0 ATDSF_i + \varepsilon_i$, obtained for each individual year during the period 1994 to 2001. VE_i is the company-year valuation error. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. $ATDSF_i$ is the company-average, over the available years in the period 1994 to 2001, of total dirty surplus flows (*TDSF*) obtained from published financial reports scaled by market value at the beginning of the fiscal year (MV_0) (see chapter 3 for details on computing *TDSF*). The term α_0 is the regression intercept. The term β_0 is the regression coefficient of $ATDSF_i$. The term ε_i is an error term. Observations that fall in the most extreme 2% of the distribution are eliminated for each year.

b. t-statistics within ( ) and probability values within [ ] are given beneath the regression coefficients. These are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). In the case of β_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the regression coefficient is zero. t-statistics and probability values marked as bold indicates that one can reject at the 5% level the null hypothesis that the coefficients β_0 is zero. In the case of α_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the intercept coefficient is zero.

Table 5.20 - **Regression tests of the relationship between company-average valuation errors and company-average total dirty surplus flows by industry for the small sample**

Industry	*Number of company-averages*	*Signed valuation errors*			*Absolute valuation errors*		
		Intercept α_0	*ATDSF$_t$* β_0	R^2	*Intercept* α_0	*ATDSF$_t$* β_0	R^2
Panel A: Regression tests by industry for the pooled sample							
Basic	94	-0.052	-1.408	0.003	0.696	-2.269	0.013
		(-0.583)	*(-1.008)*		*(9.813)*	***(-2.156)***	
		[0.561]	*[0.316]*		*[<0.001]*	***[0.034]***	
Goods	28	0.360	13.818	0.079	0.910	-8.896	0.113
		(2.560)	***(2.604)***		*(7.990)*	***(-2.181)***	
		[0.017]	***[0.015]***		*[<0.001]*	***[0.038]***	
Services	24	-0.351	2.955	0.027	0.639	-0.513	0.005
		(-2.884)	*(1.367)*		*(13.096)*	*(-0.586)*	
		[0.009]	*[0.185]*		*[<0.001]*	*[0.564]*	
Financials	44	0.248	-0.156	0.000	0.676	3.479	0.050
		(1.557)	*(-0.037)*		*(6.522)*	*(0.814)*	
		[0.127]	*[0.971]*		*[<0.001]*	*[0.420]*	

Panel B: Tests of cross-industry differences for the pooled sample

Industry	*Signed valuation errors*			*Absolute valuation errors*		
	Goods	*Services*	*Financials*	*Goods*	*Services*	*Financials*
Basic	**0.006**	0.090	0.778	0.116	0.200	0.192
Goods		0.058	**0.039**		**0.045**	**0.036**
Services			0.511			0.360

Notes to table 5.20:

a. The table reports the regression coefficients, t-statistics, probability values, R^2 and tests for a small sample of French, German, U.K. and U.S. companies for the following model: $AVE_i = \alpha_0 + \beta_0 ATDSF_i + \varepsilon_i$. AVE_i is the company-average valuation error over the available years in the period 1994 to 2001. Valuation error is defined as $(V_0 - P_0)/P_0$, where V_0 is the value estimate obtained from the valuation model and P_0 is the observed price per share at the valuation time 0. Negative value estimates are set to zero. $ATDSF_i$ is the company-average, over the available years in the period 1994 to 2001, of total dirty surplus flows (*TDSF*) scaled by market value at the beginning of the fiscal year (MV_0) (see chapter 3 for details on computing *TDSF*). The term α_0 is the regression intercept. The term β_0 is the regression coefficient of $ATDSF_i$. The term ε_i is an error term.

b. Panel A reports regression results for the pooled sample. t-statistics within ( ) and probability values within [ ] are given beneath the regression coefficients. These are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). In the case of β_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the regression coefficient is zero. t-statistics and probability values marked as bold indicates that one can reject at the 5% level the null hypothesis that the coefficients β_0 is zero. In the case of α_0 the t-statistics are in respect of a two-sided test of the null hypothesis that the intercept coefficient is zero.

c. Panel B reports probability values based on a t-test of the null hypothesis of equality of coefficients of $ATDSF_i$ across pairs of industries for the pooled sample. This is obtained by performing tests on the regression coefficients of the model below. Probability values of 0.05 (5%) or less are printed in bold type. Probability values are calculated using the heteroskedasticity-consistent covariance matrix estimator as proposed by White (1980). The regression model is as follows:

$$AVE_i = \alpha_0 + \alpha_1 Basic + \alpha_2 Goods + \alpha_3 Services + \beta_0 ATDSF_i + \beta_1 Basic.ATDSF_i + \beta_2 Goods.ATDSF_i + \beta_3 Services.ATDSF_i + \varepsilon_i$$

The terms α_1, α_2 and α_3 are the regression coefficients of *Basic*, *Goods* and *Services*. *Basic*, *Goods* and *Services* are dummy variables that assume a value of one if the company belongs to industry group basic (resources, basic and general industries and utilities), industry group goods (consumer goods), industry group services (services, information and technology), respectively, or a value of zero otherwise. for industry group financials. The terms β_1, β_2 and β_3 are the regression coefficients of $ATDSF_i$ interacted with the dummy variables.

d. Regression models are applied to the data reported in table 5.14, panel A.

Appendix 5.1 - Equivalence between intrinsic value estimates from the RIVM and AEGM for the U.K. company *AEA Tecnology Plc* for the year 1997

		Periods				
			Explicit earnings forecasts		*Implicit earnings forecasts*	
		0	1	2	3	4
roe	0.1302					
r	0.1150					
dp	0.5390					
$g = roe(1-dp)$	0.0600					
$bvps_0$		0.9311				
$bvps_{t(t>0)} = bvps_{t-1} + xps_t - dps_t$			15.6623	32.6433	34.6026	36.6796
xps_1 *and* xps_2			31.9548	36.8352		
$xps_{t(t>2)} = roe \times bvps_{t-1}$					4.2502	4.5053
$dps_t = \delta xps_t$			17.2236	19.8541	2.2908	2.4283
RIVM intrinsic value estimate:						
xps^a			31.8477	35.0340	0.4962	0.5260
Present value xps^a			28.5630	28.1799		
TV					7.2594	
vps_0^{RIVM}		**64.9334**				
AEGM intrinsic value estimate:						
xps_1 / r		277.8677				
zt (b)			27.7068	-300.3288	0.2590	-41.2531
Present value zt (b)			24.8492	-241.5724		
TV					3.7889	
vps_0^{AEGM}		**64.9334**				

Notes:

a. Variables are defined as in section 5.4.1 of the text. For easy of notation values are rounded to four decimal places.

b. $zt = \dfrac{(xps_{t+1} - xps_t) - r(xps_{t+1} - dps_t)}{r}$.

Appendix 5.2 - Dirty surplus flows obtained from the algorithm and from the financial statements for U.K. company *Alliance & Leicester Plc* for the year 2000

(in million Euros)

	Prior year adjustments	*Goodwill*	*Asset revaluations*	*Currency translation differences*	*Total dirty surplus flows*
	PYA	*GW*	*AR*	*CUR*	*= TDSF*
Panel A: Algorithm $TDSF = PYA - GW + AR + CUR$					
Data from Extel	0	0	0	0	0
Panel B: Financial statements					
Data from the financial statements	-10.720[a]				-10.720

Notes:

a. According to the notes to the financial statements this movement refers to restatement of previous years accounts as a result of changes in the accounting policy for software and consultancy costs.

Appendix 5.3 - Dirty surplus flows obtained from the algorithm and from the financial statements for U.S. company *Louisiana-Pacific Corporation* for the year 1997

(in million Euros)

	Currency translation differences	*Adjustments for marketable securities*	*Pension adjustments*	*Other comprehensive income[a]*	*Total dirty surplus flows*
	CUR	*MSEC*	*PEN*	*OTH*	*= TDSF*
Panel A: Algorithm *TDSF = CUR + MSEC + PEN*					
Data from Compustat	0	0	-11.651	0	-11.651
Panel B: Financial statements					
Data from the financial statements	-13.078[a]	0	-7.150[b]	0.872[a]	-19.356

Notes:

a. Item not captured by the database but reported in the company financial statements as part of comprehensive income.

b. Item incorrectly reported by the database.

Chapter 6

Conclusion

6.1 Summary

Given the paramount importance of accounting earnings as an indicator of performance and value-creation, any issue regarding the definition and disclosure of earnings is likely to cause concerns among regulators, scholars, investors, managers and other users of accounting information. Measurement and disclosure of earnings is the core issue in the current International Accounting Standards Board (IASB) project on Reporting Financial Performance, which is now a joint project with the Financial Accounting Standards Board (FASB). According to Cauwenberge and De Beelde (2005), the IASB decision on measurement and recognition of income will have significant consequences for financial analysis, financial performance measurement, and company valuation. However, income definition is not a recent topic in accounting. As far back as the 1930s regulators and researchers were intensively debating what transactions should be included in or excluded from accounting earnings (Paton, 1922; Littleton, 1940; Black, 1993; Linsmeier, *et al.*, 1997; Johnson, *et al.*, 1995; FASB, 1997 – *Statement of Financial Accounting Standards (SFAS) 130: Reporting Comprehensive Income*). The centre of the debate is an accounting practice that records certain gains and losses directly in the balance sheet. This is referred to as 'dirty surplus accounting'. Examples of such practice include goodwill write-offs, asset revaluations, foreign currency translation differences and consolidation adjustments, which are directly recorded as part of shareholders' funds. The transactions responsible for dirty surplus accounting are know as 'dirty surplus flows'. The question of whether to include or exclude dirty surplus flows from income might have important implications in accounting-based measures of value and performance, particularly if such flows are of large magnitude and persist over periods of time (Stark, 1997). Further, because dirty surplus accounting varies across accounting regimes, the performance measurement and valuation implications may vary accordingly (Frankel and Lee, 1999; Chen, *et al.*, 2004). Often, the arguments in favour of excluding dirty surplus flows from income are based on the usefulness of earnings for valuation. For example, Black (1993) argues that abnormal items such as dirty surplus flows reduce the predictive ability of earnings for future flows. Black defends a definition of earnings based on recurring items. A divergent position is advocated by Johnson, *et al.* (1995), who argue that income should include all items so that all information is provided to the users of financial information. This definition is known as the all-inclusive concept of income, or comprehensive income. Under comprehensive income, earnings are defined in accordance with the clean surplus relationship (CSR) meaning that all transactions except capital transactions are included in net income. In other words, if CSR holds there is no room for dirty surplus accounting practices. Over the years, standard-setters have favoured one or other concept. Nowadays, there seems to be a preference for the comprehensive income perspective expressed in some accounting standards (*FASB - SFAS 130*; IASB - *Reporting Financial Performance Project*), but in practice a hybrid solution is adopted in most countries.

I use the context of internationally permitted variation in CSR violations to analyse the level of dirty surplus accounting practices and its implications for performance measurement and equity valuation. My first study focuses on documenting the characteristics of dirty surplus flows in four countries: France, Germany, the U.K and the U.S. during the period 1993 to 2001. These four countries are economically important and provide a scenario with substantial variation in dirty surplus accounting. The first problem encountered in the study is access to reliable data on dirty surplus flows. Previous studies have applied simplified algorithms to machine-readable data from commercial databases like Compustat, Datastream and Global Vantage (Hand and Landsman, 1998; Dhaliwal, *et al.*, 1999; Wang, 2003). I test the reliability of algorithm-based measures of dirty surplus flows by comparing them with the companies' financial statements and conclude that, in many cases, algorithm measures contain large errors. The failure of such ready-to-use measures is often the result of incorrect classification or non-availability of dirty surplus items in the databases. A typical example is the database items relating to capital movements in shareholders' funds, which include both capital transactions and dirty surplus flows. The databases failure to provide accurate information is, in many cases, a consequence of opaque financial reporting on dirty surplus movements by the companies. This is particularly true in the case of French and German companies where clear accounting regulation on the disclosure of these items is virtually non-existent. Therefore, the data on dirty surplus flows used in the greater part of this thesis are hand-collected from companies' published financial reports. This procedure ensures high data quality but reduces the feasible number of companies used in the analysis. The sample used comprises eighty companies from each of the four countries representing sixteen broad industry-size groupings.

Based on the unique set of data gathered from extensive analysis of the companies' financial reports, I provide evidence that the distribution of various categories of dirty surplus flows is often not centred on zero. Dirty surplus flows are negative on average across the four countries and there is significant cross-country variation in such flows. Goodwill-related items are the most important source of dirty surplus accounting, although such items are being eliminated in some accounting regimes.

My next analysis considers the implications of dirty surplus flows and cross-country variation therein for performance measurement. Specifically, I aim to provide evidence on the impact of omitting dirty surplus flows from earnings numbers used to measure multi-period abnormal performance. I assess the potential implications based on a measure of abnormal performance developed in O'Hanlon and Peasnell (2002) and denoted Excess Value Created (EVC). EVC is an *ex-post* measure of performance equal to cumulative residual income, adjusted by opening and closing market-to-book premium. Because the link between EVC and residual income formulation relies on CSR, it provides a framework for observing the effect of using earnings numbers that disregard dirty surplus flows to measure abnormal performance. It is worthwhile mentioning that this framework is similar to using a residual-income type valuation model except that this later approach adopts an *ex-ante* perspective based on future flows. Using data obtained from the companies' financial reports, I analyse the EVC error resulting from omission of dirty surplus flows, both in terms of bias (signed error) and inaccuracy (absolute error). Regarding bias, results indicate that the effect of omitting dirty surplus flows on the accounting-based measure of abnormal measurement is largely limited to goodwill-related flows. Regarding inaccuracy, results show that all categories of dirty surplus flows have some significant impact on EVC and there is cross-country variation in that effect. Hence, omission of dirty surplus flows in accounting-based measures of economic performance might result in inaccurate measures of performance. This is particularly relevant if such measures are used in the context of performance evaluation and contracting, as the measures may be inaccurate.

I continue the analysis of the implications of dirty surplus accounting by assessing the effect of omitting such flows on accounting-based valuation models.

Specifically, I investigate the relationship between violations of CSR and valuation errors in the residual income valuation model (RIVM) and abnormal earnings growth model (AEGM). I start by demonstrating analytically that the RIVM and AEGM can be derived from a model that expresses company equity value as the present value of expected future dividends (PVED). I show that if there is consistency in projections of accounting numbers used in implementations of the RIVM and AEGM and CSR holds, the models yield identical intrinsic value estimates. Accordingly, the omission of expected future dirty surplus flows from the projections of accounting numbers should result in identical valuation error in both models. I derive an analytical expression of the valuation error in terms of omitted projected dividends. I then explore empirically the relationship between the valuation errors in the RIVM and AEGM and total dirty surplus flows, both in terms of bias (signed valuation errors) and inaccuracy (absolute valuation errors). I conduct the empirical analysis using two sets of data: a large sample of U.K. and U.S. companies, where dirty surplus flows can be measured with relative reliability using algorithms applied to computer-readable data, and a small sample of French, German, U.K. and U.S. companies, where dirty surplus flows are directly obtained from the companies' financial statements. The last sample is the same as that used in previous chapters of this thesis. For the large sample during the period 1994 to 2003, results indicate some evidence of a relationship but only in the case of the U.S. and in terms of inaccuracy. For the U.S, results also reveal significant cross-industry differences between financial companies and other industry groups. Results for the small sample during the period 1994 to 2001 provide some supportive evidence of a relationship for the U.S. sample, both in terms of bias and inaccuracy. There is also evidence of significant differences in the relationship between U.S. and non-U.S. companies. Overall, the findings suggest that omission of dirty surplus flows from expected future flows might cause problems, particularly as regards accuracy, in the accounting-based estimates of equity value, but only for U.S. companies. Hence, using the models' value estimates for comparisons between financial and non-financial companies within the U.S., and between U.S. and non-U.S. companies may lead to incorrect inferences. I find no systematic evidence of interferences with the models' value estimates in other situations.

6.2 Contribution and limitations

The measurement and recognition of income is an important issue in financial reporting. Whether or not to include certain components of earnings in income is therefore a pertinent question, which has been occupying regulators and financial statement users for decades. One way to assess the implications of excluding or including dirty surplus flows is to investigate the effects of such items on measures of business performance and equity value. I believe that the studies presented in this thesis contribute to that objective. By providing evidence on the impact of omitting dirty surplus flows from net income in accounting-based measures of economic performance and equity value, this thesis sheds light on issues that preoccupy users of financial information, such as: What definition of income to adopt? Where to report the different components of income? How to report financial performance?

The results of this thesis are subject to a caveat regarding the particular period and the sample-country-companies used in the analysis. For a different time period, with markedly different economic circumstances, companies might perform differently and thus yield different realisations of accounting flows. Likewise, for a different sample of companies from the same countries or from different countries the analysis might produce different results.

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