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IFRS and European Commercial Banks: Value Relevance and Economic Consequences

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Abstract

2005 was a landmark year in the European Union's (EU) financial reporting history as all EU listed firms were required to switch from national accounting standards to IFRS. Using a sample of European commercial banks, this study explores two research questions within the framework of equity valuation theory: (i) whether the disclosed fair value estimates of loans and advances; held-to-maturity investments; deposits; and other debt, as well as the recognition of derivatives at fair value, are value relevant, (ii) whether the adoption of IFRS led to a reduction in European banks' cost of equity capital.

The results show that the fair value of loans and advances and other debt are value relevant as is the recognition of derivatives at fair value. Further analysis revealed that the relevance of fair value of loans and derivatives is contingent on banks' financial health and earnings variability, respectively, as well as on the ability of countries to enforce IFRS. The findings also indicate that the cost of equity capital of European commercial banks decreased after the adoption of IFRS. However, banks domiciled in countries with continental accounting standards and weak enforcement rules experienced a greater reduction in their cost of equity capital.

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Abbreviations

AG	Application Guidance
BIS	Bank for International Settlements
BSM	Balance Sheet Model
CAPM	Capital Asset Pricing Model
CE	Cost of Equity Capital
CSR	Clean Surplus Relation
DDM	Dividend Discount Model
EBF	European Banking Federation
EC	European Commission
ECB	European Central Bank
EFRAG	European Financial Reporting Advisory Group
EGM	Earnings Growth Model
EU	European Union
FDIC	Federal Deposit Insurance Corporation
IAS	International Accounting Standards
IASB	International Accounting Standards Board
IFRS	International Financial Reporting Standards
FASB	Financial Accounting Standards Board
RIVM	Residual Income Valuation Model

Chapter 1: Introduction

1.1 Introduction

This thesis deals with the application of the International Financial Reporting Standards (hereafter IFRS) by a single industry, the European commercial banking. The study relates to two major streams of accounting literature, i) the value relevance of fair value accounting, and ii) the economic consequences from the mandatory adoption of IFRS.

Value relevance research deals with the statistical relationship between the accounting numbers and measures of market value, such as share prices or returns (Barth, 2000). A major strand of value relevance studies examines the significance of fair value estimates in explaining share prices (Landsman, 2007). These studies provide evidence on whether fair values are useful in making investment decisions. Fair value accounting has been proposed as an alternative measurement system to historical cost accounting and has been adopted by the International Accounting Standards Board (hereafter, IASB) and the US standard setting body, the Financial Accounting Standards Board (hereafter, FASB), in several of their standards. For example, fair values have been used extensively in measuring financial instruments, such as investment securities and derivative financial instruments (trading and hedging). The usefulness of fair values over and above other measurement attributes (e.g. historical costs), in explaining market values, is another major question of the value relevance research. (Barth, 2006b)

The IASB deals with financial instruments in the accounting standards: International Accounting Standard (hereafter, IAS) 39, IAS 32, IFRS 7 and IFRS 9. IAS 39 is concerned with the recognition and the measurement of financial instruments, and IAS 32 and IFRS 7 with their presentation and disclosure, respectively. IFRS 9 is a new standard on financial instruments with which the IASB intents to replace completely IAS 39. The term fair value is defined in IAS 39 as: 'the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction' (see, IAS 39, 2003b).

Proponents of fair value accounting argue that fair values provide more relevant and up-to-date information to investors than historical cost accounting, and thus whenever it is possible assets and liabilities should be measured at fair value (Penman, 2007, p. 33). However, there are concerns with respect to the reliability of fair value estimates as sometimes they are based on subjective assumptions.

The other stream of accounting research that this thesis deals with relates to the economic consequences of the mandatory adoption of IFRS. IFRS are regarded as a set of high quality accounting standards as compared to national accounting standards. For example, Barth et al. (2008) examined the accounting quality of the IFRS in 21 countries and found less earnings management, more timely loss recognition, and more value relevance as compared to a control group of firms following non-US national accounting standards. Moreover, the adoption of IFRS is a commitment to increased disclosure by many countries, such as the risk related information of all financial instruments (e.g., IFRS 7 requires the disclosure of credit risk, liquidity risk, and market risk). In theory, high quality accounting standards and increased disclosure are related to less uncertainty for investors and thus, a reduction in the information asymmetry between managers and shareholders (Diamond & Verrecchia, 1991). This leads to a reduction in the cost of equity capital (hereafter CE). The adoption of IFRS can also reduce the CE through the information comparability across the financial statements of firms as investors (and analyst) do not have to adjust financial accounts to overcome the differences between national accounting standards.

1.2 Research objectives

Previous studies support the view that fair values of financial instruments are relevant and reliable enough to be reflected in share prices (Barth, 1994; Barth et al., 1996; Venkatachalam, 1996; Ahmed et al., 2006). However, most of these studies deal with US GAAP and US commercial banks. To date there is not a single study that tests the value relevance of fair values of European banks that report under the new adopted IFRS. Moreover, there are reasons to believe that the value relevance of fair values may differ in other jurisdictions outside the US, such as in Europe. For example, the US market is regarded as a highly efficient market whereas many European markets, such as the Portuguese and Polish may be less efficient or even inefficient. Motivated by the argument above the first research objective of the thesis is defined as follows:

(1) To examine whether fair value estimates under IFRS for the financial instruments of European commercial banks are value relevant incrementally to their book values.

This study provides evidence for the value relevance of disclosed fair values of Loans and Advances, Held-to-Maturity Investments, Deposit Liabilities, and Other Debt. According to IAS 39, banks recognise these financial instruments at amortised cost. However, IAS 32 requires the disclosure of their fair values in the notes of the financial statements. The availability of two values (fair values and amortised costs) for these financial instruments makes feasible the examination of the value relevance of fair values incrementally to book values.

In addition, evidence is also provided for derivatives' fair value recognition. Prior to the adoption of IFRS, under national accounting standards, banks were treating derivatives as off-balance sheet instruments or even ignoring them. Under IFRS, however, most European commercial banks recognise for the first time derivatives at their fair value (IAS 39). Hence, this thesis also tests the valuation implications of the recognition of derivatives at fair value.

Further evidence is provided on whether the relevance and reliability of fair value estimates of loans and derivatives vary with the financial health of banks and their earnings variability respectively. In particular, Barth et al. (1996) find that fair value estimates of loans are less relevant for banks with low capital adequacy ratios. This is because banks with low capital adequacy ratios have more incentives to manipulate fair values estimates of loans in order to increase this ratio. With respect to the relationship between earnings variability and derivatives, Barton (2001) found that firms use derivatives to smooth earnings. Thus, investors should also value less the fair value estimates of derivatives for banks with high earnings volatility.

Even though most of European countries were required to apply a uniform set of accounting standards from 2005 onwards (i.e. the IFRS), the application of IFRS may have differed from country to country. Some countries could have applied IFRS in more detail, due to stricter enforcement rules, and some other in a more relaxed way. This is likely to affect the reliability of fair value measurements given the fact that investors take into account institutional differences between countries when making economic decisions. Some studies in the literature found that the value relevance of accounting numbers (e.g. earnings, book value of equity) varies with country-specific institutional differences (Ali & Hwang, 2000). Ruland et al. (2007, p. 101) also discuss the importance of controlling in international accounting studies for the institutional differences between countries. Hence, given the cross-country sample of this thesis, the study controls for the institutional differences between the sample European countries using the country-specific scores provided by Kaufmann et al. (2009). It is argued that the market will regard as less relevant fair value estimates of banks domiciled in countries with weak enforcement rules than of banks domiciled in countries with strong enforcement rules. This later statement is based on the notion that banks domiciled in weak enforcement rule countries have more freedom to manipulate fair value estimates.

With respect to the economic consequences of IFRS, there is some early evidence in the literature regarding the impact of the mandatory adoption of IFRS on firms' CE (Daske et al., 2008; Lee et al., 2008; Li, 2010). However, these studies either examine all industries in aggregate (including financial institutions) or exclude financial institutions from the analysis. Therefore, there is a need to examine financial institutions separately in order to avoid the industry-effect. Thus, the second research objective is as follows:

(2) To examine whether the mandatory adoption of IFRS had an impact on the CE of European banks.

Banking industry is an important sector in each economy: commercial banks act as intermediaries between savers and investors by allocating funds to productive activities of the economy. Thus, an increase or a decrease in banks' CE, could also affect the cost with which they charge the funds they lend (e.g. the interest rates).

It is not clear whether the adoption of IFRS results in lower CE (Armstrong et al., 2010, p. 39-40). This will depend on a trade-off between the potential benefits and costs. IFRS provide high quality financial information to investors and thus reduces information asymmetries between managers and shareholders. On the other hand, firms' commitment to increased disclosure, as a result of adopting IFRS, may incur compliance costs to the new standards, especially for smaller firms.

This study also provides evidence on whether the impact on CE differs between sub-groups of the sample banks. In particular, the study examines whether the CE is lower for banks with low analyst following as compared to banks with high analyst following. Usually, firms with high analyst following provide a substantial amount of financial information to investors independent to the requirements of accounting standards (Botosan, 1997). This thesis also examines whether the decrease in the CE is higher for banks domiciled in countries with Continental accounting systems and in Strong enforcement rule countries. Continental accounting systems (e.g. German GAAP) have greater differences with IFRS than Anglo-Saxon accounting systems (e.g. the U.K. GAAP) (Nobes, 2008). Moreover, Strong enforcement rule countries (as measured by country-specific scores provided by Kaufmann et al., 2009) are more likely to force firms domiciled in their jurisdictions to apply IFRS in detail than Weak enforcement rule countries.

1.3 Overview of methodology

1.3.1 Theoretical framework

The theoretical framework of the thesis is the equity valuation theory. Value relevance studies base the development of their empirical models on equity valuation models that provide the theoretical foundation of their results (Barth, 2006b). A number of equity valuation models have been used by empirical studies to address value relevance questions. For example, Barth et al. (1996) used the Balance Sheet Model to examine whether fair value disclosures are value relevant. In another empirical study, Wang et al. (2005) used the Ohlson (1995) model to examine the value relevance of derivatives' fair value disclosures.

Equity valuation theory also serves as the theoretical framework for the purpose of estimating the CE for the economic consequence tests. CE is defined in the literature as the '…rate of return investors require on an equity investment in a firm' (Damodaran, 2002). Given that the CE is unobservable, researchers need to calculate it. Early studies in the literature used an asset pricing model, such as the Capital Asset Pricing Model (hereafter, CAPM), to derive the CE. However, a major criticism of CAPM is that it involves realized returns (i.e. historical data) (Fama & French, 2004). Therefore, later studies base the estimation of CE on equity valuation models that use forward-looking data, such as analysts' forecasted earnings per share. These models are the Residual Income Valuation Model and the Earnings Growth Model (i.e. Ohlson & Juettner, 2005).

1.3.2 Research Methodology

The value relevance of fair value accounting is tested using econometric techniques which are standard research approaches in accounting literature. In particular, in order to test the value relevance of fair value disclosures over and above book values the Balance Sheet Model is implemented (Landsman, 1986; Barth, 1991). Hence, changes between market values and book values of equity are regressed on changes between fair values and book values of the financial assets and liabilities. Financial assets include *Loans and Advances* and *Held-to-Maturity Investments* and financial liabilities include *Deposit Liabilities* and *Other Debt.* These are the primary variables of interest. The model also controls for a number of variables that are found in the literature to explain significantly share prices. These variables are a proxy variable for: interest rate risk, default risk, core deposit intangible, the notional amounts of derivatives, the credit-related off-balance sheet instruments, and the non-IAS 39 assets and liabilities. The findings are tested under alternative specification models for robustness.

With respect to the value relevance of derivatives' fair value recognition, the empirical model is based on the valuation model of Ohlson (1995) (see also, Wang et al., 2005). This model regresses the market value of equity on the book value of equity, two earnings variables (operating income and securities income), the fair values of net hedging and net trading derivatives and a set of control variables. The control variables are the same as the ones used in the previous empirical model, the value relevance of fair value disclosures (see previous paragraph). Again findings are also provided by using alternative specification models for robustness, including among others a changes model and a Balance Sheet Model.

The methodology of the economic consequences test is separated into two steps. In the first step the CE for each commercial bank is calculated for a period of three years before the mandatory adoption of IFRS (2002, 2003, and 2004) and three years after the mandatory adoption of IFRS (2005, 2006, and 2007). Four methods are used to calculate the CE. Two methods are based on the Residual Income Valuation Model as implemented by Gebhardt et al. (2001) and by Claus &

Thomas (2001); and two other methods are based on Earnings Growth Model (i.e. Ohlson & Juettner, 2005) as implemented by Gode & Mohanram (2003) and by Easton (2004).

In the second step the calculated CE is regressed on a dummy variable that takes the value of one for periods after the mandatory adoption of IFRS and zero otherwise. The empirical model controls for a number of variables such as the capital adequacy ratio, loans-to-deposits ratio, market beta, variability in earnings, the book-to-market ratio, size, financial leverage, risk-free rate, and US listing. A significant and negative coefficient for the dummy variable indicates that the CE has been decreased after the mandatory adoption of IFRS.

Furthermore, in order to test whether the impact on the CE differs with respect to specific factors, such as analyst following, the classification of national accounting standards, and countries enforcement rules, a series of additional models developed. Under these models three indicator variables are developed, one for each of the factors above: an indicator variable for low vs. high analyst following, an indicator variable for Continental vs. Anglo-Saxon accounting systems, and an indicator variable for Strong vs. Weak enforcement rule countries. Finally, these indicator variables are interacted with the dummy variable that indicates whether an observation is before or after the mandatory adoption of IFRS.

1.4 Contribution to the literature

The first objective of the research is directly related to the value relevance literature, and specifically to studies that examine the relevance and the reliability of fair value estimates. Most of the previous studies focus on US GAAP and provide evidence on whether fair value estimates for specific assets and liabilities are relevant and reliable enough to be reflected in share prices. Regarding financial instruments, most of the evidence supports the view that fair values are relevant to investors. For example, Barth (1994), Bernard et al. (1995), Petroni & Wahlen (1995), and Carroll et al. (2003) found the fair values of investment securities value relevant. Barth et al. (1996) also found that fair values of loans and core deposits significantly explain market prices. Venkatachalam (1996) and Ahmed et al. (2006) provide evidence on derivatives' fair values.

Most of the studies cited above test the value relevance of fair values in the context of US GAAP and the US banking sector. However, there is no evidence to date on the value relevance of fair value estimates of European banks in the context of IFRS. Although fair values are relevant in the US market this may not be the case in other jurisdictions, such as the European market. Institutional differences between jurisdictions may lead to finding different results. For example, the US market is regarded as highly efficient. In contrast, most of European markets are less efficient or even inefficient (an exception can be the UK market which is an equity-based market). Thus, this thesis contributes to the literature by providing further evidence on the argument regarding the relevance and reliability of fair value accounting using a unique cross-country sample of European commercial banks that apply IFRS in a possibly inefficient environment.

The second objective of the thesis, which is examined under the economic consequences test, is directly related to studies that investigate the impact of increased disclosure on CE. In general, there is evidence in the literature that supports the view that increased disclosure reduces the CE (e.g., Dhaliwal, 1979; Botosan, 1997). Studies which dealt with this issue in the context of the

IFRS adoption can be separated into two groups. The first group of studies investigate the economic consequences of IFRS adoption for periods prior to their mandatory adoption date (2005); these studies examine the impact of the IFRS adoption on the CE using a sample of early adopter firms (Cuijpers & Buijink, 2005; Daske, 2006; Leuz & Verrecchia, 2000). These studies provide mixed results. The second group of studies, which are more relevant to this thesis, examine periods including the mandatory adoption period after 2005 (Daske et al., 2008; Lee et al., 2008; Li, 2010). These studies provide some evidence that the CE has reduced after the mandatory adoption of IFRS. However, all of these studies examine many industries in aggregate or exclude financial institutions from the analysis (see, Lee et al, 2008). This approach, although it gives a general indication on whether IFRS decreased CE, it does not take explicitly into account industry-specific characteristics that may have affected the CE. Moreover, commercial banking sector is important for the economy as a whole as it provides the funds which are necessary for other firms to finance their operations and grow. A reduction in commercial banks' CE results in a reduction of the interest rates which banks charge on the funds they lend. Thus, lower CE for banks benefits the economy as a whole. This fact dictates the separate examination of commercial banking sector. Thus, the second test of the thesis contributes to the literature by investigating the impact of the mandatory adoption of IFRS on European banks' CE.

1.5 Structure of the thesis

The thesis is organized as follows: Chapter 2 discusses regulations that apply to European commercial banks, such as accounting standards and capital adequacy rules. European listed banks were required to adopt the IFRS from 2005 onwards ((EC) No. 1606/2002). Accounting for financial instruments is discussed in three standards: the IAS 39, IAS 32, and IFRS 7. A discussion is also provided regarding the new project of IASB to replace IAS 39 (i.e. IFRS 9). US GAAP on financial instruments are also presented. Apart from accounting rules, banks also follow capital regulatory rules based on the Capital Accord which includes the regulation on banks' capital requirements developed by the Bank for International Settlements (BIS).

Chapter 3 presents the theoretical framework of the thesis. Equity valuation theory provides the theoretical framework for both the value relevance and the economic consequences tests. The Chapter also discusses methodological approaches to calculate the CE, which is the dependent variable of the economic consequences test. Moreover, it is analyzed how CE relates to accounting standards. Finally, a critical view of the value relevance research is presented.

Chapters 4 and 5 are the literature review Chapters of the thesis. Chapter 4 reviews the literature of the first objective of the thesis, which is to examine the value relevance of fair value accounting under IFRS, whilst Chapter 5 reviews the literature of the second objective of the thesis which is to investigate the economic consequences of the mandatory adoption of IFRS on the CE.

Chapter 6 is dedicated to the research methodology of the value relevance tests, and Chapter 7 to the research methodology of the economic consequences test. Chapters 8 and 9 report the findings of the tests, respectively. Finally, Chapter 10 provides a synopsis of the thesis and concludes.

1.6 Conclusion

This thesis deals with the application of IFRS by European commercial banks. It focuses on two major streams of accounting research: i) the value relevance of fair value accounting, and ii) the economic consequences of the mandatory adoption of IFRS. This Chapter presents the research motivation and the research objectives of the thesis. Furthermore, it discusses the theoretical framework of the thesis, which is the equity valuation theory, and outlines the research methodology. Finally, it explains the relationship and the contribution of the thesis to the literature.

Chapter 2: Regulations for European Commercial Banks

2.1 Introduction

This chapter discusses the regulatory framework within which European commercial banks operate. It is separated into two parts. The first part discusses the accounting rules, and specifically the IFRS which became mandatory in 2005 for all listed European firms. The accounting standards that were expected to have profound effects on the financial statements of banks are those related to financial instruments. Thus, the analysis focuses on IAS 39, IAS 32, and IFRS 7 that provide measurement, disclosure and presentation rules for financial instruments. IFRS 9 is also briefly explained given that it will replace IAS 39 from 2013 onwards. Although the discussion focuses on commercial banks, accounting rules for financial instruments are also applicable to non-financial firms. The second part discusses banks' capital requirements as have been developed by the Basel Committee and have been adopted by the EU for all EU's banks.

The chapter is organised as follows: Section 2.2 discusses the accounting for financial instruments, such as classification requirements, measurement and reporting issues and hedge accounting. It also analyzes the endorsement procedure of IAS 39 within the EU, the current project of the IASB to replace IAS 39 (i.e. IFRS 9), and US rules for financial instruments. Section 2.3 discusses the capital adequacy rules as have been developed by the Basel committee, and finally, Section 2.4 draws a conclusion.

2.2 Accounting for financial instruments

Accounting for commercial banks is directly related to accounting for financial instruments as banks' balance sheets are dominated by financial assets and liabilities. IAS 32 defines *financial instrument* as,

"...any contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another entity" (IAS 32, para 11).

A financial instrument is a contractual right to receive cash or other financial assets from another entity or to deliver cash or other financial assets to another entity (IAS 32, para 11). Fair value accounting is at the centre of the discussion on financial instruments as it is a major measurement basis for recognising and disclosing financial assets and liabilities (see, IAS 39). However, there are still concerns on whether fair values are the ideal measurement basis for all financial instruments and thus, other measurement bases are proposed by standard-setters such as the amortized cost.

The IASB deals with accounting for financial instruments mainly in three accounting standards. The IAS 39 *"Financial instruments: Recognition and Measurement"* (IASB, 2003b), IAS 32 *"Financial instruments: Presentation"* (IASB, 2003a), and IFRS 7 *"Financial instruments: Disclosures"* (IASB, 2005). IAS 39 deals with recognition and measurement issues, IAS 32 deals with presentation issues, and IFRS 7 deals with disclosure issues[1]. IAS 39 is regarded as one of the most complicated and controversial accounting standard as it requires the measurement of many financial instruments at fair value. Banks hold a substantial amount of

1 IFRS 7 was issued at the 18th of August 2005 and was effective for annual periods beginning on or after the 1st of January 2007. However, early adoption was encouraged by the IASB. IFRS 7 supersedes IAS 30 "*Disclosures in Financial Statements of Banks and Similar Financial Institutions*" and the disclosure requirements of IAS 32. It should be noted that before IFRS 7 becomes effective, IAS 32 was dealing with both presentation and disclosure issues.

financial instruments and thus the measurement requirements, imposed by IAS 39, change radically the way banks value and present the financial instruments in their balance sheets.

2.2.1 Classification of financial instruments

IAS 39 defines four general categories of financial instruments namely: *i) Financial assets or Financial liabilities at fair value through profit or loss, ii) Held-to-maturity investments, iii) Loans and receivables, and iv) available-for-sale* instruments (IAS 39, para 9). For all other financial liabilities (e.g. deposit liabilities, long-term debt), although IAS 39 does not classify them in a separate category, it gives general instructions regarding their measurement.

A financial instrument should be classified at fair value through profit or loss if either of the two following conditions are met: i) it is classified as held for trading or ii) it is designated upon initial recognition at fair value through profit or loss, usually, referred as the *fair value option* (IAS 39, para 9). The first condition is satisfied if a financial instrument is held for short-term profit-taking or if it is a derivative contract, other than a contract designated as an effective hedging derivative. The second condition, the fair values option, allows banks to designate a financial instrument, upon initial recognition, at fair value through profit or loss either because it eliminates significant inconsistencies arising by measuring the financial assets and liabilities under different methods, or because a group of financial instruments are managed or evaluated for risk management purposes at fair value[2].

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2 The *fair value option* was one of the two main disagreements between the IASB and the EC in EU's endorsement process. The other disagreement is the *macro-hedging accounting.* Regarding the fair value option, the IASB and the EC came into an agreement. Macro-hedging accounting is still pending. A complete discussion on the endorsement procedure of the EC regarding the IAS 39 is included in a later section of this chapter (Section 2.2.4).

Held-to-maturity investments are defined as non-derivative financial assets with fixed or determined payments and fixed maturities (IAS 39, para 9). A bank can classify a financial asset as held-to-maturity investment if it has the ability and intention to hold it to the maturity. Usually, debt instruments qualify for this category. Equity instruments are not eligible to be classified as held-to-maturity investments as they have indefinite life or their related expected cash flows can not be specified with precision at the inception (AG17, IAS 39).

Under loans and receivables, banks classify the financial instruments with fixed or determinable payments that are not quoted in an active market. Thus, financial assets that are quoted to active markets can not be classified as loans and receivables, but they may qualify as held-to-maturity investments (AG26, IAS 39).

Available-for-sale instruments include financial assets that are designated as available-for-sale by banks or financial assets that are not classified in one of the previous three categories. Finally, for all other financial liabilities, such as deposit liabilities and long-term debt (i.e. financial liabilities other than at fair value through profit or loss) IAS 39 do not gives specific definitions. With respect to commercial banks, deposits are the most important liability that represents more than the fifty percent of banks' total liabilities.

2.2.2 Measurement and presentation issues

IAS 39 requires different measurement bases for the categories of financial assets and liabilities described above. This means that banks' balance sheets are a mixture of different measurement bases, in particular a mixture of fair values and amortized costs.

According to IAS 39, all financial instruments should be measured at fair value upon initial recognition (IAS 39, para 43). However, the subsequent measurement of financial instruments depends on the category to which they belong. Specifically, the financial assets and liabilities at fair value through profit or loss and the available for sale assets should be recognised at fair value. Changes in the fair value of the financial instruments at fair value through profit or loss should be recognised in the income statement, whilst changes in the fair values of the available for sales securities should be recognised in equity. Held-to-maturity investments and loans and receivables should be recognised at amortized cost using the effective interest rate method. For all other financial liabilities, such as the deposits and the long-term debt, banks should recognise them at amortized cost using the effective interest rate method. However, each bank at the balance sheet date should examine whether its financial assets and liabilities, carried at amortized cost and the available-for-sales financial assets, are impaired. See table 2.1 for a summary on the measurement bases of financial instruments under IAS 39.

Although IAS 39 requires specific categories of financial instruments to be recognised at amortised cost, IAS 32 (and later IFRS 7) requires the disclosure of their fair values in the notes to the financial statements for comparison. Thus, banks provide two values for the Loans and Advances, Held to Maturity investments, Deposit Liabilities, Debt Securities, and Subordinated Debt: the amortised cost which is recognised in the financial statements (required under IAS 39) and the fair value which is disclosed in the notes to the financial statements (required under IAS32/IFRS 7).

Table 2.1
Measurement basis of financial instruments
Under the IAS 39

	Initial Measurement	**Subsequence measurement**	**Changes in values**
Loans and Advances	Fair value	Amortised cost	Subject to impairments (profit or loss)
Financial assets at fair value through profit or loss	Fair value	Fair value	Profit or Loss
Available for Sale	Fair value	Fair value	Equity or when subject to impairment profit or loss
Held-to-Maturity investments	Fair value	Amortised cost	Subject to impairments
Deposit Liabilities	Fair value	Amortised cost	Subject to impairments (profit or loss)
Financial liabilities at fair value through profit or loss	Fair value	Fair value	Profit or Loss
Other liabilities (e.g. Long-term debt)	Fair value	Amortised cost	Subject to impairments (profit or loss)
Hedging Derivatives	Fair value	Fair value	Profit or Loss / Equity

In order to clarify the concept of fair value, IAS 39 provides guidance in paragraphs AG69-AG82. This guidance aims to alleviate some of the concerns regarding the reliability of fair values and to ensure greater verifiability. The guidance imposes a measurement hierarchy for fair values, starting from the most reliable and objective estimates to the least verifiable and subjective estimates. Thus, the IASB makes clear that the best estimate of fair value derives from listed financial instrument in active markets. In that case the fair value is the quoted market price or equally speaking the market value of the instrument. On the other hand, the absence of active markets leads banks to use valuation techniques that market participants commonly implement to estimate fair values, such as discounted cash flow models and option pricing models. To assure greater reliability in estimating fair values using valuation techniques, the IASB requires firms to base their estimates more on market inputs and less on entity-specific inputs (IAS 39, para. AG75).

Thus, the fact that the fair value is not always a market value (mark-to-market), but also an estimated amount (mark-to-model) makes the term "fair value" a broader concept than the term "market value" even if sometimes these two values coincide (Khurana and Kim, 2003).

When banks calculate the fair value of a financial instrument should consider a number of observable market factors that can affect its fair value. IAS 39 provides factors such as *the time value of money, credit risk, foreign currency exchange prices, commodity prices, equity prices, volatility, prepayment risk and surrender risk, and servicing costs* (IAS 39, para. AG82). For example, a bank should account for interest rate changes when estimating the fair value of a loan by discounting the loan's expected cash flows with the prevailing interest rate.

Regarding deposit liabilities, which represent a major liability for banks, IAS 39 states that the fair value of a financial liability with a demand feature, such as a demand deposit, can not be less than the amount payable on demand (IAS 39, para 49). Hence, banks assume that the fair value of demand deposits equals the carrying amount and no difference arises between the amortised cost and the fair value. For all other deposits (i.e. term deposits) banks use discounted cash flow models to estimate their fair values[3].

3 Indicative extracts from the Annual Report 2006 of Lloyds TSB Group (p. 117) illustrate how banks estimate the fair values of loans and deposits in practice. A) For loans: *"…For commercial and personal customers, fair value is*

The other measurement basis required by IAS 39 is the amortized cost. This concept, applies to the vast majority of banks' financial instruments, which consists of Loans and advances, Held-to-maturity investments, and financial liabilities other than those classified at fair value through profit or loss (e.g. deposits and long-term debt). The amortised cost is calculated using the effective interest rate method which is the interest rate that exactly discounts the expected cash flows of a financial instrument, throughout its expected life, to the net carrying amount of the financial instrument. IAS 39 allows banks, when estimating the expected cash flows, to consider every contractual term of the instrument, such as prepayments, calls and similar options. However, future credit losses, such as the possibility that a related counterparty will be defaulted, should not be taken into account. The effective interest rate is also used to recognised gains or losses in the income statement.

2.2.3 Hedge accounting

As discussed above, IAS 39 requires some financial instruments to be measured at fair value and some others at amortised cost. Butler (2009, p. 68) observes that,

'this inconsistent treatment causes the artificial volatility and is a major headache for entities like banks'.

Specifically, this mixed measurement approach results in higher earnings variability because it diminishes the physical hedging between the losses of a financial instrument with the gains of

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principally estimated by discounting anticipated cash flows (including interest at contractual rates) at market rates for similar loans offered by the Group and other financial institutions. The fair value for corporate loans is estimated by discounting anticipated cash flows at a rate which reflects the effects of interest rate changes, adjusted for changes in credit risk. Certain loans secured on residential properties are made at a fixed rate for a limited period, typically two to five years, after which the loans revert to the relevant variable rate. The fair value of such loans is estimated by reference to the market rates for similar loans of maturity equal to the remaining fixed interest rate period". B) For deposits: *"The fair value of deposits repayable on demand is considered to be equal to their carrying value. The fair value for all other deposits and customer accounts is estimated using discounted cash flows applying either market rates, where applicable, or current rates for deposits of similar remaining maturities".*

another financial instrument when they are all measured at fair values. Thus, the purpose of hedge accounting is to provide an artificial match between gains and losses in order to reduce risk.

According to IAS 39 (IAS 39, para 86), the hedging relationships can be of three types, namely: a *fair value hedge*, a *cash flow hedge*, and a *hedge of the net investment in a foreign operation.* As the term indicates, a fair value hedge aims to hedge banks' exposure to changes in fair values of recognised assets and liabilities and of unrecognised commitments. Similarly, the cash flow hedge aims to hedge banks' exposure against the variability of financial instruments' cash flows. Finally, a net investment hedge is a hedge of an entity's interest in the net assets of that operation against a foreign currency exposure.

The accounting treatment of the hedging activity depends on the type of the hedging discussed above. If a hedging relationship is a fair value hedge then the gains and losses of both the hedging instrument and the hedged item are recognised in the profit or loss for the year statement. If a hedging relationship is a cash flow hedge or a hedge of net investment in a foreign operation then the effective portion of the gains and losses on the hedging instrument is recognised in equity, whilst the ineffective portion is recognised in the profit or loss statement.

IAS 39 imposes some restrictions as to which types of financial instruments can qualify for hedge accounting. For example, it precludes the use of held-to-maturity investments as hedged instruments, regarding the interest rate risk. Held-to-maturity investments are usually held to maturity and thus changes in values are irrelevant. Furthermore, IAS 39 precludes the use of fair value hedge accounting for demand deposits that are managed in a portfolio with other financial assets and liabilities. This is the macro hedging activity of banks that it was also a core disagreement between the EC and the IASB; this issue is discussed in the next section.

2.2.4 EU on the adoption of IFRS

With Regulation (EC) No 1606/2002 of the European Parliament and of the Council of 19 July 2002, European Union made mandatory the adoption of IFRS for all European listed firms from 2005 onwards. The objective of this adoption is to ensure,

‘a high degree of transparency and comparability of financial statements and hence an efficient functioning of the Community capital market and of the Internal Market’ (Article 1).

However, in order the EU to adopt IFRS and their related interpretations an endorsement process has been adopted by the European Commission (EC). This endorsement process requires the technical assessment of each accounting standard by the European Financial Reporting Advisory Group (EFRAG) and the submission of its comments to the EC. The EFRAG comprises preparers, professional accountants, users and academics and it is a private sector body which role is to advice the EC in the endorsement process of the IFRS. After the EC receives the comments of the EFRAG proposes the endorsement of the accounting standard to the European Parliament and to the Accounting Regulatory Committee (ARC), a committee comprises representatives of EU Member States. The EU Member States discuss and comment on the proposed standard and vote for its endorsement.

However, the endorsement process of the EC was not favourable for all of the IASB standards. For example, the intention of the EU to adopt the IFRS in 2005 caused some concerns, especially in relation to standards dealing with financial instruments (IAS 32 and 39). The two most important concerns were the *fair value option* and the *macro hedging* (BIS, 2004a; EBF, 2003). These concerns led the EU to endorse the IAS 32 and 39 with two major 'carve-outs' until the IASB reconsiders the issues. Thus, the paragraphs, relating to the fair value option and the macro hedging, have not been included in the version of IAS 39 that was adopted by the EU. All other standards were endorsed by the EU as published by the IASB.

The fair value option permitted firms to measure upon initial recognition all financial assets and liabilities at fair value without any restriction (IAS 39). This statement caused the reaction of the European Central Bank (hereafter, ECB) and of prudential supervisors represented in the Basel Committee who argued that the fair value option could be used inappropriately by firms, especially for their liabilities (BIS, 2004a). These concerns caused the IASB on 16 June 2005 to issue amendments to the fair value option in IAS 39. The amendments restricted the use of the fair value option to specific circumstances. For example, when it eliminates or reduces accounting mismatches, when a group of financial assets and liabilities is managed and evaluated at fair value due to risk management purposes, and when an instrument contains an embedded derivative.

The macro hedging has been raised by European banks through their representative body, the European Banking Federation (EBF, 2003). European banks argued that IAS 39 restricts the application of hedge accounting for demand deposits by not permitting the use of fair value hedge accounting for such instruments. This is because the IAS 39 requires that the fair value of a demand liability is not less than the amount payable on demand (IAS 39, para 49). This rule became an obstacle for banks to apply the fair value hedging to a portfolio of financial assets and liabilities that includes demand deposits. Banks were concerned that this prohibition will force them to change their asset-liability management and to incur addition costs to their accounting systems. Banks classify their financial instruments in portfolios based on their expected maturities to manage risk. The argument of banks is that the expected maturities of demand deposits in aggregate (i.e. core deposits) usually differ significantly from their contractual maturities (on demand). Based on historical statistical observations, the expected maturities of demand deposits are longer than on demand. Thus, using discounted cash flow models, the fair value of demand deposits in aggregate is usually a smaller amount than the amount payable on demand. However, as stated above, the IAS 39 in paragraph 49 does not allow the fair value of a liability to be less than the amount payable on demand. This restricted banks to follow their asset-liability management for their macro hedging activity.

The amendment of the fair value option by the IASB on 16 June 2005 has been endorsed by the EC on 15 November 2005, and finally the IASB and the EC came into an agreement. On the other hand, no agreement has yet been achieved regarding the macro hedging, and thus the EC has adopted a version of the IAS 39 that excludes the provisions for the macro hedging restrictions.

The other important involvement of the EU in accounting standard setting was in 2008 when the credit crunch forced many banks to write-down huge amount of losses in financial assets, such as subprime loans. Arguably, the measurement of financial instruments at fair value became a difficult procedure in inactive markets; hence fair value is not the ideal measurement method for recognising assets in a forced liquidation or a distressed sale. Furthermore, accounting rules have been criticised for causing market volatility. This led many European politicians, including the French President Nicola Sarkozy, to ask the IASB to suspend mark-to-market accounting and change the rules on fair values. Finally, in 13 October 2008, the IASB succumbed to pressures and permitted the reclassification of financial assets (other than derivatives) out of the fair value through profit or loss category.

2.2.5 A new standard on financial instruments (IFRS 9)

IAS 39 has been criticized for its complexity by preparers of financial statements, auditors, and users (IASB, 2008). Since its publication in 1999 the IASB received numerous comments and suggestions to improve accounting for financial instruments and to simplify the rules. The pressure for a change was intensified during the financial crisis of 2008 when accounting standards, and specifically IAS 39, were blamed for amplifying volatility due to the huge write-downs of losses relating to the fair values of banks' financial instruments.

This criticism led the IASB to re-examine accounting rules and gradually to replace completely IAS 39. Towards this aim, the IASB issued in November 2009 a new standard, the IFRS 9 *"Financial instruments"* which consists of the first phase of a project to replace IAS 39. This version of IFRS 9 discusses only the classification and measurement of financial assets. It was re-issued in October 2010; this version includes the requirements on accounting for financial liabilities. The effective date of mandatory adoption is 1 January 2013, with early adoption permitted for the year-end 2009.

The aim of the IASB with IFRS 9 is to reduce complexity, improve comparability, and aid investors to understand better accounting for financial instruments. The differences between the old standard, IAS 39, and the new standard, IFRS 9, are remarkable. IFRS 9 eliminates two broad categories of financial instruments, those of available-for-sale assets and held-to-maturity investments. Financial assets are now classified according to their measurement basis, namely: as at fair values or at amortized cost. IFRS 9 adopts a new approach to classify financial assets based on two criteria: the objective of the entity's *business model* and the *contractual cash flows* of the financial asset. Each entity first considers its business model regarding its purpose to hold financial assets to collect contractual cash flows, as opposed to holding financial assets to realise short-term returns. The business model test is not necessarily performed separately for each asset, but can be applied to aggregated assets. On the other hand, the contractual cash flow characteristic test should be applied on an asset and only for assets that are measured at amortized cost because of the business model criterion. According to the contractual cash flow characteristic, the contractual terms of a financial asset should give rise at specific dates to cash flows that are solely payments of principal and interest on the principal outstanding.

The debt instruments are measured at amortized cost if both the business model test and the cash flow characteristic test are met. All other debt instruments should be recognised at fair value. Equity instruments that are held for speculation should be measured at fair value with changes recognised in the income statement. A new category of financial assets is the equity investments with no trading objective. These financial instruments should be also measured at fair value but their changes are recorded to other comprehensive income instead of the income statement.

However, IFRS 9 makes clear that any dividends arising from these instruments should be recognised in the income statement.

Another important change between the provisions of IAS 39 and IFRS 9 is the different treatment of equity instruments and derivatives that do not have quoted market prices and their fair value cannot be estimated reliably. Whilst IAS 39 required their recognition at cost, IFRS 9 requires their measurement at fair value. Finally, all derivatives should be measured at fair value through profit or loss. However, IFRS 9 gives the option to firms to continue treat hedging derivatives as required under IAS 39 (see, Section 2.2.3).

The fair value option, which was also present in IAS 39, is permitted by IFRS 9. This rule applies to all financial assets and allows a firm to designate a financial asset upon initial recognition at fair value through profit or loss given that this treatment eliminates accounting mismatches. Finally, reclassifications from the amortized cost category to the fair value category and vice versa are not prohibited, but they need to be based on changes of the entity's business model which are usually rare.

2.2.6 US GAAP on financial instruments

Up to now the accounting for financial instruments is examined within the context of IFRS. However, a brief mention should be made to the US GAAP for two reasons. First, most of the value relevance studies on financial instruments are within the context of US accounting standards, and second both the IASB and the FASB collaborate to produce common rules regarding financial instruments or to eliminate the differences (see, Memorandum of Understanding between the FASB and the IASB, 2006).

US GAAP addresses accounting for financial instruments in a number of standards. The first standard that included disclosure requirements for financial instruments was SFAS No. 105 "*Disclosure of Information about Financial Instruments with Off-Balance-Sheet Risk and Financial Instruments with Concentrations of Credit Ris*k" (FASB, 1990). Specifically, it required the disclosure of notional principal amounts, the term of the instruments, and possible losses arise from contracts with off-balance sheet risk (this standard was superseded by SFAS No. 133 (FASB, 1998)).

An important US standard on this issue was SFAS No. 107 *"Disclosures about fair value of financial instruments"* (FASB, 1991). It was the first US standard that required the disclosure of the fair values of all financial assets and liabilities, either recognised or not in the financial statements. Although some US firms were disclosing voluntarily the fair values of some financial instruments, SFAS No. 107 made this disclosure mandatory for both on and off-balance sheet instruments.

Similar to IAS 39 classification, SFAS No. 115 *"Accounting for certain investments in debt and equity securities"* (FASB, 1993) addressed the accounting and reporting for investments in equity securities (that have readily determinable fair values) and for investments in debt securities. This standard classifies debt and equity securities in three categories: i) *Held-to-maturity securities* (debt instruments where the entity have the ability and intend to hold to maturity), ii) *trading securities* (debt and equity securities that are bought for short-term profit realisation), and iii) *available-for-sale securities*, (all other debt and equity securities that are not classified in one of the other two categories).

Derivative instruments were examined under separate standards, SFAS No. 119 and SFAS No. 133. The aim of SFAS No. 119 "*Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments"* (FASB, 1994) was to amend existing requirements of the SFAS No. 107 and No. 105. For example, it required the distinction between financial instruments held for trading and other than trading purposes, and required the disaggregation of reported information about derivatives. Later, SFAS No. 119 was superseded by SFAS No. 133 "*Accounting for Derivative Instruments and Hedging Activities"* (FASB, 1998). This last standard made mandatory the recognition of all derivatives at fair value either as a financial asset or as a financial liability. Hedge accounting is also the topic of this standard and its treatment is similar to that of IAS 39. Specifically, SFAS No. 133 requires three categories of hedging: i) a fair value hedge ii) a cash flow hedge, and iii) a hedge of the foreign currency exposure of the net investments in foreign operations.

Concerns from users of financial statements (e.g. investors) regarding the reliability of fair value estimates led the FASB to issue a separate standard to addresses issues related to fair value measurements. Hence, SFAS No. 157 *"fair value measurements"* (FASB, 2006) gives the definition of fair value and establishes a framework for measuring fair value. This standard do not supersedes previous standards on financial instruments but provides guidance on how to measure fair values. Finally, the fair value option, which is present in IAS 39, is also permitted by the FASB under certain conditions (see, SFAS No. 159 *"The Fair Value Option for Financial Assets and Financial Liabilities"* (FASB, 2007)).

2.3 Capital regulations for commercial banks

2.3.1 The need for regulation

Commercial banks perform a vital role in an economy. They act as financial intermediaries between borrowers and savers as they transfer money from people and organizations that have surplus of funds to those that have deficit of funds (Casu et al., 2006). In other words, they collect money from the public via deposits and allocate them to productive activities in the economy by giving loans. This operation of banks contributes significantly to the economic growth of a country. This sensitive role of banks makes necessary their regulation by imposing restrictions on minimum capital requirements. In theory, regulation promotes public confidence and alleviates concerns that a bank will go bust.

2.3.2 The 1988 Capital Accord (Basel I)

Traditionally, the regulation of commercial banks was performed by central banks. Specifically, for the euro zone, this role is undertaken by the ECB with the cooperation of the independent central banks based around the EU countries. Central banks also have their own "bank", the Bank for International Settlements (BIS), which is an international organization with members the majority of the central banks of the developed and developing countries. BIS states that the objective of the organization is to 'foster international monetary and financial cooperation, and to serve as a bank for central banks' (Available from: www.bis.org/ [Accessed 1 September 2009]).

In order to achieve its objective, BIS operates a number of committees that discuss on a regular basis monetary and financial matters. Such a committee is the Basel Committee on Banking Supervision (hereafter Basel Committee) which aims to improve banking supervision by developing capital adequacy rules for commercial banks. The Basel Committee published in 1988 the "Capital Accord" which was the first attempt to provide details on how banks shall measure capital adequacy and minimum capital requirements. Under the Capital Accord the capital adequacy of a bank is determined using the Capital Adequacy Ratio (CAR) as presented below:

$$\text{CAR} = \frac{\text{Tier 1} + \text{Tier 2}}{\text{On and off-balance sheet assets (weighted by credit risk)}}$$

The numerator of this ratio consists of a bank's capital. According to the Basel Committee, this capital is separated between two elements, the *core capital*, widely known as the Tier 1 and the *supplemental capital*, widely known as the Tier 2. Tier 1 capital consists of the i) banks' equity capital, and ii) the published reserves from post-tax retained earnings. Tier 2 capital comprises of i) Undisclosed reserves, ii) Asset revaluation reserves, iii) General provisions/general loan loss reserves, iv) Hybrid debt capital instruments, and v) Subordinated term debt[4].

The denominator of the ratio is the on and off-balance sheet assets of a bank, weighted by credit risk. The rationale behind this ratio is that banks should keep a minimum amount of capital relative to their credit risk that can cover future potential losses. Therefore, assets in the denominator are classified based on their credit risk by specifying risk weights for each bank's

4 Certain deductions should be made from Tier 1 and Tier 2 capital. Specifically, goodwill needs to be deducted from the Tier 1 capital and investments and subsidiaries from the total capital base (Tier 1 + Tier2).

asset. Specifically, it assigns no risk (0%) to cash and claims on central governments and central banks, low risk (20%) to claims on banks incorporated in the OECD and to short-term claims with maturities a year or less, moderate risk (50%) to mortgages, and high risk (100%) to claims to the private sector, such as commercial loans. In addition, the Capital Accord assigns to all off-balance sheet items equivalent weights based on their credit risk.

The ratio above indicates that banks with more low credit risk assets have higher capital adequacy ratios, and thus lower possibility to be in trouble due to customer defaults. According to the Basel Committee, each commercial bank needs to maintain a CAR above 8%. In addition the Tier 1 capital to weighted assets (i.e. Tier 1/weighted assets) should be above 4%. It also requires that the Tier 1 capital should be at least 50% of the total bank's capital base (Tier 1 and Tier 2).

2.3.3 Basel Amendments (1996) to incorporate market risk

The Capital Accord focused only on credit risk, ignoring other important types of risk, such as market risk[5]. This led to criticism of the Basel Accord's approach of measuring capital adequacy and urged Basel Committee to re-examine rules on capital in order to incorporate market risk. The assets of banks that are most vulnerable to market risk are those in their trading book which consist primarily of short-term positions usually held for speculation.

In order to improve the 1988 Basel Accord, the Basel Committee issued in 1996 specific amendments to incorporate the market risk in measuring capital requirements. Specifically, it

[5] Market risk arises from the fluctuation in values of banks' assets caused by changes in market prices of equities, interest rates, exchange rates, the commodities' prices and any other changes in market values.

introduced a third type of capital in the numerator of CAR, the Tier 3 capital. This capital consists of short-term subordinated debt and can be used *solely* to support the market risk. This means that the Tier 1 and Tier 2 capital will continue to cover the credit risk including the credit counterparty risk with respect to derivatives in both the trading and the banking books. Tier 3 capital is limited to up to 250% of the Tier 1 capital.

In order for both the credit risk and the market risk to be incorporated consistently into the calculations of the CAR, the measure of market risk should be multiplied by 12.5 (which is the reciprocal of the minimum CAR of 8%) and then added to the risk-weighted assets relating to the credit risk. Thus the CAR under these calculations represents the capital that is available to cover both types of risk, the credit and the market risk.

2.3.4 Basel II – The Three Pillar Approach

The amendments introduced in 1996 to overcome the criticisms of the Capital Accord proved insufficient. Further discussions between the Basel Committee on Banking Supervision and other constituents, such as bankers, resulted in the publication of a new document in 2004 titled, *"International Convergence of Capital Measurement and Capital Standards: a Revised Framework"* (BIS, 2004b). This document proposes a new framework to measure banks' credit risk and introduces three pillars that aim to provide a holistic approach in measuring banks' capital adequacy.

The first pillar aims to quantify banks' risk and to set minimum capital requirements to support the risk undertaken by financial institutions. It allows banks to adopt new measures of credit risk by examining the creditworthiness of their counterparties in detail and not by applying the "one size fits all" approach which was used by Capital Accord. Banks can use both internal risk ratings and external credit risk assessments in order to evaluate the credit risk. Furthermore, Basel II introduces a new type of risk, the operational risk defined as 'the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events'. The rules regarding the measurement of market risk have not changed since the amendments in 1996. Thus, under Basel II the CAR is expanded to include three types of risk in the denominator, namely: the unchanged measures of market risk (the amendments of the Capital Accord in 1996); new measures of credit risk (as discussed above); and the operational risk. Tier 1 and Tier 2 capital in the numerator are kept unchanged as well as the minimum capital adequacy ratio of 8% for the total CAR (Tier 1 and 2) and the 4% requirement for the ratio of Tier 1 capital to weighted assets.

The second pillar is referred to as the supervisory review process. Under this pillar supervisors should closely monitor banks' activities and risks and provide guidance on the minimum amount of capital that should be kept separately by each bank in order to support the undertaken risk. Furthermore, supervisors should encourage banks to develop their own risk management systems and to improve their risk measurement techniques regarding their financial instruments. Moreover, supervisors have the right to require banks to hold more capital than the minimum requirements (i.e. 8%) if they believe that some banks undertake excessive risk.

Finally, the third pillar is a supportive function of the first two pillars. It requires banks to disclose a substantial amount of information to the financial community (e.g. analyst and investors in general) relating to the capital requirement of banks. In particular, banks need to disclose information such as the risk exposure, the methods they use to calculate capital adequacy, and details of their risk management techniques.

Following the financial crisis of 2008, Basel Committee moved again to improve banks capital regulations by introducing stricter rules. This movement is called the 'Basel III' and intends to strengthen banks' capital and improve liquidity rules. For example, it gradually increases the minimum capital for the Tier 1 ratio from 4% to 6% until the 1st of January 2015. The total capital requirement is retained at 8%.

2.3.5 EU on Capital Adequacy Requirements

The EU promoted the adoption of a single set of rules on capital adequacy requirements that aim to strengthen the credibility of financial institutions while at the same time it hoped that they would boost the functioning of an integrated European economy. The Codification of Banking Directive (2000/12/EC), which was a consolidation of two Directives of the EC (the Directive of solvency ratio (89/647/EEC) and the Directive of own funds (89/299/EEC)), together with the Directive of the capital adequacy of investment firms and credit institutions (93/6/EEC) constitute the EU legislation framework that incorporates the requirements of the Basel Accord. These laws apply to all credit institutions and investment firms in the EU.

The issue of new capital rules (the Basel II) by the Basel Committee in 2004 led the EU to commence all the necessary procedures in order to incorporate the new capital adequacy requirements into its own legislation. The outcome of the discussions resulted in the Capital

Requirements Directive (CRD) that consists of the Directive 2006/49/EC on the capital adequacy of investment firms and credit institutions and the Directive 2006/48/EC which relates to the taking up and pursuit of the business of credit institutions. These two Directives form an equivalent agreement to the provisions of the Basel II framework. The new EU law came into force on the 1st of January 2007 and was fully adopted by the 1st of January 2008.

2.4 Conclusion

This Chapter explored the regulations within which European commercial banks operate by analysing the accounting and capital adequacy rules that apply to these institutions. Accounting for financial instruments was the focus of the analysis as they dominate banks' financial statements. All European listed firms were required to follow the IFRS from 2005, and thus the discussion is performed within the IFRS context, covering accounting standards on financial instruments, such as the IAS 32, IAS 39, and the IFRS 7. However, the US GAAP was also discussed for two reasons: i) there is a tendency during the last few years between the IASB and the FASB to develop a common set of accounting standards, and specifically, to achieve converge on financial instrument rules (see, IASB and FASB's "Norwalk Agreement")[6], ii) for comparison, as most value relevance studies on financial instruments use US GAAP. Finally, the Chapter discussed the capital adequacy rules, such as the Capital Accord requirements and the Basel II provisions to which Banks are subjected. This was necessary given the fact that a number of variables in this thesis are based on banks' capital adequacy ratios.

[6] Available from: http://www.fasb.org/news/memorandum.pdf, [Accessed 17 March 2009].

Chapter 3: Theoretical Framework

3.1 Introduction

This chapter discusses the theoretical framework of the thesis which is the equity valuation theory. Both value relevance research and cost of equity research, which this thesis deals with, are based on this framework. The chapter also explains the relationship between CE and accounting standards which provides the argument regarding why one should expect that the adoption of IFRS will reduce the CE. Finally, a critical view of the value relevance research is discussed.

Barth (2006b) defines value relevance as 'the relation between share prices, or returns, and accounting information'. Equity valuation theory provides models that link accounting numbers to market values, and not surprisingly these models have been used extensively in the value relevance research (Barth et al., 1996; Eccher et al., 1996; Nelson, 1996; Wang et al., 2005).

Equity valuation theory also provides the theoretical framework for the second part of the thesis which examines the effects that the mandatory adoption of IFRS has on banks' cost of equity (See, the second research objective in Chapter 1). CE, however, is not observable and needs to be estimated. Equity valuation models provide us with the equity value of a firm given its CE. Most of the inputs of equity valuation models can be found from published figures, such as share prices and firms' expected earnings, and therefore, it is possible to infer the CE under certain assumptions. Although, this is not the only approach for obtaining the CE (e.g. early studies used the CAPM that uses historical observations to derive the require rate of return (i.e. the CE)) it is now the most popular in the accounting literature (Gebhardt et al., 2001).

The chapter is organised as follows: Section 3.2 discusses the equity valuation theory. This includes the discussion of the following equity valuation models: the dividend discount model (hereafter DDM); the residual income valuation model (RIVM); the Ohlson's (1995) model, the Feltham-Ohlson (1995) model; the Ohlson & Juettner (2005) model; and the balance sheet model (BSM) which is a standard research model in the value relevance literature and is adopted by this thesis. This section also discusses the approaches used in the literature to determine the CE. Section 3.3 discusses the relationship between CE and accounting standards, and Section 3.4 provides a critical view of the value relevance research. Finally, Section 3.5 concludes.

3.2 Equity valuation theory

This section is separated into two sections. The first section makes an in-depth analysis of the equity valuation models (Section 3.2.1) and the second section discusses the CE which constitutes an important input to equity valuation models (Section 3.2.2).

3.2.1 Equity valuation models

3.2.1.1 The Dividend Discount Model (DDM)

At least in theory, DDM is probably the only valuation model that is regarded as non-controversial in the accounting and finance literature. It is common in equity valuation to assume that the price of a firm at a specific point in time equals the present value of the expected future dividend distributions to its shareholders discounted at the cost of equity capital of that firm (Barker, 2001). The above fundamental statement of valuation can be applied equally to any security and is not limited only to equity valuation. In its general form the DDM can be expressed as below:

$$P_t = \sum_{\tau=1}^{\infty} R^{-\tau} E_t\left[d_{t+\tau}\right] \qquad (3.1)$$

Where,

P_t =	the market value per share at date t, (i.e. share price)
R =	the cost of equity (r) plus 1
$E[d_{t+\tau}]$ =	the expected dividend per share at date $t+\tau$

Equation (3.1) implies that in order to derive the market value of equity, first, the expected future dividends should be estimated for each year after year t, and second, these dividends should be discounted at firm's cost of equity capital. The DDM is known in the financial economics literature at least since 1938 and can be traced in the work of Williams (1938). Although the model has limited empirical implications, it helped both practitioners and academics to understand how assets are priced and it is the fundamental model upon which the equity valuation theory was built. As Barker (p. 18, 2001) states in his analysis of the DDM,

'any theoretical valuation model must be reconcilable with the DDM, or else it is conceptually flawed'.

The link between the DDM and the valuation models is crucial as it provides the necessary theoretical underpinning to any empirical research relating to equity valuation.

Other versions of the DDM can be obtained by making small modifications to equation (3.1). For example, substituting the term "expected dividends" with the more general term "expected cash flows" the model can also be used in assessing investment projects and the prices of assets other than equities. An interesting modification of the DDM is the Gordon Growth Model (see Barker, 2001; Damodaran, 2002) which makes the assumption that future dividends grow at a constant rate in perpetuity. The Gordon growth model can be easily derived by simple mathematical transformations of Equation (3.1):

$$P_t = \frac{d_{t+1}}{r - g} \tag{3.2}$$

The constant term *g* in equation (3.2) denotes growth in dividends. Assuming that dividends grow at a constant percentage, the model requires only the estimation of three parameters, namely: next period's dividends d_{t+1}, the cost of equity capital *r,* and the growth in dividends *g*. Equation (3.2) demands *r* to be greater than *g* otherwise the value of the asset would be negative.

3.2.1.2 The Residual Income Valuation Model (RIVM)

As analysed above the market value of equity in the context of DDM is based only on expected dividends (i.e. cash flows to equity), given the cost of equity capital. However, other valuation models, such as the RIVM, use solely accounting information inputs. As Rees (1995) and Lee (1999) observe RIVM is not new in the accounting literature, but can be traced in the works of Preinreich (1938), Edwards & Bell (1961), Edey (1962) and Peasnell (1982). Under this model, the market value of equity is the outcome of two accounting constructs i) the book value of equity, and ii) the present value of abnormal earnings. Mathematically this relationship can be expressed as follows:

$$P_t = bv_t + \sum_{\tau=1}^{\infty} R^{-\tau} E_t\left[x_{t+\tau}^{\alpha}\right] \tag{3.3}$$

Where:
bv_t = book value of equity at time *t*
$E_t\left[x_{t+\tau}^{\alpha}\right]$ = expected abnormal earnings at date $t+\tau$

Ohlson (1995, p. 667) defines abnormal earnings as the excessive amount of earnings over "normal" earnings. "Normal" earnings are the anticipated return on the beginning of the period book value of equity (the return that investors expect to earn). This anticipated return can be expressed as the product of the beginning of the period book value of equity at date *t*-1 and the cost of equity capital (*r*). Thus using symbols abnormal earnings are defined as follows:

$$x_t^{\alpha} = x_t - r \times bv_{t-1} \tag{3.4}$$

Where x_t is actual earnings for the period (*t*). RIVM (Equation 3.3.) assumes that the book value of equity (*bv*) underestimates the market value of equity, due to conservative accounting, and thus an additional construct is necessary to capture the difference between the book value and the market value of equity. This additional construct is the present value of all future abnormal earnings which alternatively can be viewed as a firm's goodwill. It is reasonable to assume that under an accounting system where all assets and liabilities are measured at market value, the book value of equity (*bv*) equals the market value (*P*) and thus the present value of abnormal earnings in equation (3.3) is zero ($\sum_{\tau=1}^{\infty} R^{-\tau} E_t\left[x_{t+\tau}^{\alpha}\right] = 0$). In all other circumstances $P \neq bv$ and thus the term $\sum_{\tau=1}^{\infty} R^{-\tau} E_t\left[x_{t+\tau}^{\alpha}\right] \neq 0$. Usually in practice $bv < P$ due to conservative accounting and as a consequence the present value of abnormal earnings is a positive number.

Substituting equation (3.4) into equation (3.3) and making some simple transformations we can have a different interpretation of RIVM using the relationship (3.5).

$$P_t = bv_t + \sum_{\tau=1}^{\infty} R^{-\tau} E_t\left[\left(ROE_{t+\tau} - r\right) bv_{t+\tau-1}\right] \tag{3.5}$$

Equation (3.5) implies that $P_t = bv_t$ if and only if future *ROE* equals firm's cost of equity capital (r). ROE_t denotes the return on equity at date t and is defined as the ratio of earnings at date t divided by the book value of equity at the beginning of the period *t-1*. In a highly competitive business environment *ROE* equals cost of equity capital (r) as firms do not have significant competitive advantages to support excessive earnings. In a different situation, firms possessing some forms of competitive advantages have a *ROE* that is greater than r and as a consequence their P is greater than bv. However, even in a competitive business environment *ROE* may differ from r due to conservative accounting (Frankel & Lee, 1998).

Returning back to the statement of Barker (2001) that every valuation model must be reconciled to the DDM in order to be theoretical consistent it will be an omission not to present the link between the DDM and the RIVM. Clean Surplus Relation (CSR) provides this link. The term Clean Surplus Relation means that all gains and losses pass through the income statement in a way that the difference between the book value of equity at the end of the period t and at the beginning of the period *t-1* equals earnings at date t minus dividends at date t.

$$\mathrm{bv}_t - \mathrm{bv}_{t-1} = \mathrm{x}_t - \mathrm{d}_t \qquad \text{or}$$

$$\mathrm{x}_t = \mathrm{bv}_t - \mathrm{bv}_{t-1} + \mathrm{d}_t \tag{3.6}$$

Substituting Equation (3.6) into (3.4) and making some arrangements we can express dividends (d_t) as follows:

$$\mathrm{d}_t = \mathrm{R} \times \mathrm{bv}_{t-1} + \mathrm{x}_t^{\alpha} - \mathrm{bv}_t \ , \qquad \text{where } R=r+1 \tag{3.7}$$

Substituting Equation (3.7) into Equation (3.1) (the DDM formulae), we obtain the RIVM, see Equation (3.3). Thus, the link between the DDM and the RIVM is justified by assuming that the accounting system follows the Clean Surplus Relation. The empirical failure of the RIVM to capture market value of equity can be interpreted as a rejection of the DDM, which is the fundamental valuation model. However, Lo & Lys (2000) argue that this is a naive conclusion given that RIVM requires prediction of future expected earnings which are usually vulnerable to measurement errors. Thus, failure of the RIVM to estimate share prices can be attributed to the noise arising from the input data and not from the misspecification of the model. Lo & Lys (2000) conclude that the RIVM is '…neither implementable nor testable' and that the contribution of Ohlson (1995) in the valuation theory is the transformation of the RIVM to an empirically testable valuation model using Information Dynamics (ID).

3.2.1.3 The Ohlson (1995) model

Ohlson (1995) developed a parsimonious valuation model which links market values to contemporaneous accounting data. The formulation of the model is based on three straightforward assumptions. The first one is that the model builds on the neoclassical approach to equity valuation that of the DDM. The second assumption relates to a Clean Surplus Relation accounting system where the book value of equity at the end of the year equals the book value of equity at the beginning of the year plus year's earnings minus dividends. One can easily observe that the first two assumptions are the ones that are also used to derive the RIVM. However, the contribution of Ohlson to equity valuation theory relates to his third assumption, the Information Dynamics (ID), which impose that the abnormal earnings follow an autoregressive process of AR(1).

RIVM demands the prediction of abnormal earnings. In order to estimate these predictions, Ohlson (1995) assumes a linear relationship for abnormal earnings as follows:

$$x^{\alpha}_{t+1} = \omega x^{\alpha}_{t} + v_t + \varepsilon_{1t+1} \tag{ID1}$$

$$v_{t+1} = \gamma v_t + \varepsilon_{2t+1} \tag{ID2}$$

Where, ε_{1t} and ε_{2t} are zero mean disturbance terms. Equation (ID1) imposes abnormal earnings to follow a time-series process in a way that abnormal earnings at year *t+1* is a linear function of two components: a) of abnormal earnings of the previous year, year *t* and b) of a scalar variable representing "other information" (v_t) not yet incorporated into accounting data. "Other information" v_t is assumed to follow an AR(1) process (see, Equation ID2) and it affects abnormal earnings with a lag of exactly one period. Because of its abstract nature, "other information" was excluded by many testable empirical implementations of Ohlson (1995) model assuming that $v_t = 0$ (see Frankel & Lee, 1998). This assumption imposes abnormal earnings to follow an AR(1) process which makes the model more convenient in its application, but less accurate as it excludes a possibly value relevant variable. "Other information" can be viewed as all the value relevant events not yet incorporated in current and past abnormal earnings but they will affect future abnormal earnings. Rees (1995) explains "other information" as the set of information affecting future earnings that analysts struggle to acquire. According to Rees "other information" may include,

'…macroeconomics activities and their relationship to the company's activities, breakdowns of the company's activities by industrial and geographical segment, knowledge of the company's relative strength in the markets in which it operates, knowledge of patent protections and so on. Some of this information will be available in notes to the financial statements but some will not'.

The model imposes specific restrictions for the parameters *ω* and *γ* which are limited to be non-negative and less than one (0≤*ω*<1 and 0≤*γ*<1). These restrictions imply that both abnormal earnings and "other information" converge toward zero as *t* grows to infinity. The rationale behind these restrictions is in conformity with a competitive business environment. If a firm possesses a competitive advantage generating positive abnormal earnings this will attract other firms to enter into the same market in order to benefit from the excessive profits that the market generates. In the long-run competition will diminish every competitive advantage that firms have and thus abnormal earnings will converge toward zero.

Parameters ω and γ can also be interpreted as being the persistence parameters of x_t^a and v_t. The closer these parameters are to unity the longer the competitive advantages will last for firms and the slower the abnormal earnings and "other information" will converge to zero. It is worthwhile to state that in the long-run both x_t^a and v_t asymptotically converge to zero.

Based on the three assumptions above, namely: the DDM, the Clean Surplus Relation and the Information Dynamics, Ohlson (1995) derives a linear equity valuation model that expresses the equity value of a firm as a linear function of i) current book value of equity, ii) current abnormal earnings, and iii) "other information".

$$P_t = bv_t + \alpha_1 x_t^\alpha + \alpha_2 v_t \tag{3.8}$$

Where,

$$\alpha_1 = \omega/(R-\omega) \geq 0$$

$$\alpha_2 = R/(R-\omega)(R-\gamma) > 0$$

The advantage of the Ohlson (1995) model over the RIVM is that it uses contemporaneous numbers to derive firm's market value of equity, whilst RIVM relies on the prediction of future abnormal earnings. However the modelling of Ohlson's (1995) "other information" is still a controversial issue in the literature.

Ohlson's (1995) approach to valuation implies "perfect" accounting (i.e. unbiased accounting). Unbiased accounting occurs when on average the market value of equity equals the book value of equity. This can be seen equivalent to Ohlson (1995) model (Equation 3.8) where the market value of equity is a weighted average of book value of equity, an earnings construct, and a zero mean "other information" variable. Assuming an unbiased accounting is not realistic in accounting practice. Feltham & Ohlson (1995) developed a valuation model which builds on Ohlson (1995) model with the difference that accounts for conservative accounting.

3.2.1.4 The Feltham & Ohlson (1995) model

Ohlson (1995) model implies unbiased accounting. In contrast, Feltham & Ohlson (1995) incorporate conservative accounting in their analysis. They separate firm's activities into financial (fa) and operating activities (oa). They argue that the book value of financial assets and liabilities equals their market value and thus no goodwill arises from financial activities. On the other hand, operating assets and liabilities do no have observable market values. This results in accrual accounting for measuring operating income and net assets, and thus book value differs from market value (i.e. unrecognised goodwill arises).

The fact that financial activities follow "perfect" accounting made Feltham & Ohlson (1995) to model investors' expectations about future abnormal earnings using solely operating earnings (earnings from operating activities). They developed a Linear Information Model (LIM) as follows:

$$\mathrm{o}\overline{\mathrm{x}}^{\alpha}_{\mathrm{t+1}} = \omega_{11} ox^{a}_{t} + \omega_{12} oa_{t} + v_{1t} + \overline{\varepsilon}_{1t+1} \quad \text{(LIM1)}$$

$$\mathrm{o}\overline{\alpha}^{\alpha}_{\mathrm{t+1}} = \omega_{22} oa_{t} + v_{2t} + \overline{\varepsilon}_{2t+1} \quad \text{(LIM2)}$$

$$\overline{v}_{1t+1} = \gamma_1 v_{1t} + \overline{\varepsilon}_{3t+1} \tag{LIM3}$$

$$\overline{v}_{2t+1} = \gamma_2 v_{2t} + \overline{\varepsilon}_{4t+1} \tag{LIM4}$$

Where, $\overline{\varepsilon}_{jt+\tau}, j = 1,...,4$, are zero mean disturbance terms.

ox_t^α = abnormal operating earnings for the period end of *t*

$o\alpha_t$ = net operating asset at *t*

And v_t = other information at *t*

Equation (LIM1) imposes that one year ahead abnormal operating earnings (ox_{t+1}^α) are a linear function of i) current abnormal operating earnings, ox_t^α, ii) current operating assets, $o\alpha_t$, and iii) other information, v_t. The parameters of "other information", γ_1 and γ_2, are restricted to be less than one or else $|\gamma_h| < 1, h = 1,2$. This condition dictates "other information" not to have any effect on future "other information" as *t* grows to infinity.

The parameter, ω_{11} can be seen as the *persistence* of abnormal operating earnings taking the values between zero and one, $0 \leq \omega_{11} < 1$. The restriction of ω_{11} to be less than the unity imposes abnormal operating earnings in the long-run to converge to zero.

Growth in operating assets is determined by parameter ω_{22}, which is set to be $1 \leq \omega_{22} < R_F$. The lower bound for ω_{22} is one indicating a zero growth for a firm. In case where $\omega_{22} > 1$, growth is positive. The upper bound for growth is limited to that of R_F (i.e. one plus cost of equity capital). This upper bound eliminates extraordinary growths.

The final parameter, ω_{12}, is related to unbiased versus conservative accounting. As discussed above (see, Ohlson (1995) model), Feltham & Ohlson (1995) incorporated conservative accounting in their model. Thus, a positive ω_{12} indicates conservative accounting whilst a zero ω_{12} relates to unbiased accounting. Setting $\omega_{12} = 0$, LIM1 becomes similar to Equation (ID1) of Ohlson (1995) model which is built on "perfect accounting". Hence, the restriction for the parameter ω_{12} is $\omega_{12} \geq 0$. Based on the analysis above, Feltham & Ohlson (1995) derive a linear valuation function as follows:

$$P_t = bv_t + \alpha_1 ox_t^a + \alpha_2 oa_t + \beta v_t \tag{3.9}$$

Where, $bv_t = fa_t + oa_t$

$$\alpha_1 = \frac{\omega_{11}}{R_F - \omega_{11}}$$

$$a_2 = \frac{\omega_{12} R_F}{(R_F - \omega_{22})(R_F - \omega_{11})}$$

$$\beta = (\beta_1, \beta_2) = \left[\frac{R_F}{(R_F - \omega_{11})(R_F - \gamma_1)}, \frac{\alpha_2}{(R_F - \gamma_2)}\right]$$

Comparing Ohlson (1995) model, Equation (3.8), and Feltham & Ohlson (1995) model, Equation (3.9), they differ as of the oa_t variable. A positive parameter for oa_t, $(\alpha_2 > 0)$, is the correction for the understatement of book value of equity due to conservative accounting. When $\alpha_2 = 0$, Equation (3.9) becomes identical to Ohlson (1995) model (see, Equation (3.8)), indicating unbiased accounting.

3.2.1.5 The Earnings Growth Model (EGM) - Ohlson & Juettner (2005) Model

The model of Ohlson & Juettner (2005) is a parsimonious Earnings Growth Model (EGM) that relates firm's market value of equity to expected earnings per share of next year, short-term and long-term growth in earnings per share, and the CE. An important difference between the Ohlson & Juettner (2005) model and the other valuation models, such as the RIVM, the Ohlson (1995) model, and the Feltham & Ohlson (1995) model, is that it does not involves the book value of equity in the valuation process.

Ohlson & Juettner (2005) argue that valuation process starts from next-period expected earnings per share capitalized: $P_0 = \frac{eps_1}{r}$. However, this simplified model needs also to be adjusted for a premium, which according to Ohlson & Juettner (2005) should be related to growth of expected earnings per share beyond next-period.

$$P_0 = \frac{eps_1}{r} + \sum_{t=1}^{\infty} R^{-1} z_t \tag{3.10}$$

Where, $z_t = \frac{1}{r}\left[eps_{t+1} + rdps_t - R * eps_t\right]$ *t=1,2,K*

and, R = 1+r

The term z_t shows that growth in earnings per share (*eps*) relies on earnings retention ($rdps_t$): cost of equity capital (*r*) multiplied by dividend per share (*dps*). Under the extreme scenario of zero earnings retention (*eps = dps*), premium is zero (i.e. $z_t = 0$) when the growth in expected earnings per share (*eps*) is zero or equally speaking when $eps_{t+1} = eps_t$. On the other hand of full earnings retention (*dps = 0*), premium is zero (i.e., $z_t = 0$) when growth in expected earnings per share equals r ($\frac{eps_{t+1} - eps_t}{eps_t} = r$). The case of zero premium ($z_t = 0$) in Equation (3.10) leads to normal earnings performance, with $P_0 = \frac{eps_1}{r}$. However, in case of $z_t>0$, the model implies superior earnings performance. Ohlson & Juettner (2005) impose z_t to follow an AR (1) process as shown below:

$$z_{t+1} = \gamma * z_t \quad , \qquad t=1, 2, K \tag{3.11}$$

Where, $\qquad 1 \le \gamma < R \qquad$ and $\qquad z_1 > 0$

The growth rate γ is restricted to be equal or greater than the unity. Ohlson & Juettner (2005) argue that a growth rate of less than one is implausible given conservative accounting. Note that when $\gamma < 1$ expected earnings per share (*eps*) performances become normal as t grows to infinity. Assuming a fixed growth rate for z , equation (3.10) is restated as:

$$P_0 = \frac{eps_1}{r} + \frac{z_1}{R - \gamma} \tag{3.12}$$

Where, $\qquad z_1 = r^{-1}\left[eps_2 + rdps_1 - R * eps_1\right]$

Equation (3.12) can be seen as a generalization of the Gordon Growth Model (see, Section 3.2.1.1). Introducing a measure of short-term growth in equation (3.12) such as $\hat{g}_2 \equiv \left[\frac{eps_2 - eps_1}{eps_1} + r\frac{dps_1}{eps_1}\right] - r \equiv g_2 - r$, Ohlson & Juettner (2005) derive their valuation formula as follows:

$$\frac{P_0}{eps_1} = \frac{1}{r}\left[1 + \frac{\hat{g}_2}{R - \gamma}\right] = \frac{1}{r} * \frac{g_2 - (\gamma - 1)}{r - (\gamma - 1)} \tag{3.13}$$

Solved as for the cost of equity capital, *r*:

$$r = A + \sqrt{A^2 + \frac{eps_1}{P_0} * \left(\frac{eps_2 - eps_1}{eps_1} - (\gamma - 1) \right)} \tag{3.14}$$

Where, $A \equiv \frac{1}{2}\left(\gamma - 1 + \frac{dps_1}{P_0} \right)$

Equation (3.14) is an important equity valuation model in accounting literature that provides an estimate for the cost of equity capital. Ohlson & Juettner (2005) model and RIVM provide the two theoretical valuation models that this thesis uses in order to calculate the cost of equity capital. For the application of these models in estimating the cost of equity capital see analysis in Chapter 7, Section 7.3.1.

3.2.1.6 The Balance Sheet Model (BSM)

The BSM is based on the basic accounting identity which defines equity as the difference between total assets and total liabilities. Under historical cost accounting the basic accounting identity is defined using historical values as follows:

$$BVE = BVA - BVL \tag{3.15}$$

Where, BVE denotes Book Value of Equity, BVA denotes Book Value of Total Assets, and BVL denotes Book Value of Total Liabilities. In perfect and complete markets, where all assets and liabilities are publicly traded and have observable market values, the basic accounting identity can be expressed using market values instead of historical values.

$$MVE = MVA - MVL \tag{3.15a}$$

Or assuming that a firm has J assets and K liabilities, Beaver (1998) presents the BSM as follows:

$$\mathrm{MVE} = \sum_{j=1}^{J} \mathrm{MVA}_j - \sum_{k=1}^{K} \mathrm{MVL}_k \tag{3.15b}$$

Where, MVE, MVA, and MVL denote Market Value of Equity, Market Value of Assets, and Market Value of Liabilities, respectively. Equation (3.15a) holds only in theory and cannot be tested empirically as the market values of some assets and liabilities are not observable. Going one step further to more realistic settings (i.e. incomplete and imperfect markets), an accounting system that bases on fair value accounting tries to mimic the settings of perfect and complete markets by using valuation models to determine the values of non-publicly traded assets and liabilities. Under uncertainty and in a full fair value accounting system, equation (3.15a) can be expressed using fair values instead of market values plus an error term.

$$MVE = FVA - FVL + \varepsilon \tag{3.15c}$$

The error term ε was added in equation (3.15c) to correct for potential measurement errors in estimating fair values, management biases, and omitted variables, such as unrecognised goodwill.

The BSM can be found at different versions in value relevance studies according to the demands of the research. For example, if the purpose of the research is to examine the value relevance of a disclosed fair value amount, the BSM model can be used as expressed in equation (3.15c). For example, Venkatachalam (1996) regresses directly the market value of equity on the fair values of assets and liabilities and the fair values of disclosed derivatives. However, if the purpose of the research is to examine the value relevance of the fair value of an asset or liability over its historical cost then the BSM can be expressed as the equation that links the differences between the market value and the book value of equity to the differences in fair values and book values of assets and liabilities. Adding and subtracting BVE in equation (3.15c) and using the definition of BVE as presented in equation (3.15) an alternative version of the BSM is shown in Equation (3.16).

$$MVE - BVE = (FVA - BVA) - (FVL - BVL) + \varepsilon \tag{3.16}$$

Equation (3.16) is a widely used theoretical model in the value relevance literature (e.g., Barth et al., 1996; Eccher et al., 1996; Nelson, 1996; Park et al., 1999; Petroni & Wahlen, 1995). It examines the extent to which the differences between fair values and book values of assets and liabilities explain cross-sectionally the discrepancy between the market value and the book value of equity. The rationale of this model (Equation 3.16) is that as long as the fair values of assets and liabilities are measures of current values then any material difference between fair values and historical costs should explain the excess of market value of equity over the book value of equity.

As discussed in Section 3.2.1.1, Barker (2001) suggests that each valuation model should be reconciled with the fundamental valuation model, the DDM, in order to be theoretically consistent. Barth (p. 12, 2000) suggests that the,

'asset and liability values are the present value of the expected dividends, or cash flows, associated with the underlying rights and obligations'

This statement implies a direct link between the two models, the DDM and the BSM. The following two equations demonstrate this link as they show that the fair values of assets (Equation 3.17) and liabilities (Equation 3.18) can be alternatively viewed as the discounted future claims and obligations, respectively.

$$FVA = \sum_{i=1}^{i} \sum_{t=1}^{\infty} \frac{E_t[CF(A_i)]}{(1+k)^n} \tag{3.17}$$

$$FVL = \sum_{J=1}^{J} \sum_{t=1}^{\infty} \frac{E_t[CF(L_J)]}{(1+k)^n} \tag{3.18}$$

Where, $E_t[CF(A_i)]$ and $E_t[CF(L_J)]$ refer to the Expected Cash Flows of an Asset i and Expected Cash Flows of a Liability J, respectively and k is the prevailing interest rate.

3.2.2 Cost of equity capital

The discussion above demonstrated the importance of the CE in the equity valuation theory. This section discusses the standard approaches in the literature to calculate the CE. The CE is an unobservable measure that investors require as a return when they invest on a firm. The fact that it is unobservable requires its estimation. Two streams can be found in the literature to estimate the CE. The first stream uses asset pricing models, such as the CAPM, and the second stream uses equity valuation models, such as the RIVM.

Since the development of the CAPM in the 1960s, finance literature recommended the use of an asset pricing model (e.g. the CAPM or the three-factor model of Fama & French, 1993, 1995, 1996) in estimating the equity risk premium (i.e. the CE)[7]. Asset pricing models have their origin to the seminal work of Markowitz (1959) suggesting that individuals base their investment decisions on two statistical measures, the mean, and the variance. Under the mean-variance analysis, as it is alternatively known in the finance literature, rational investors seek to select investment portfolios that maximize their expected returns while at the same time minimize the variance of returns.

Building on the mean-variance analysis, Sharpe (1964) and Lintner (1965) developed the CAPM which provided the first theoretical approach on how to quantify the risk and return of capital assets. Based on two assumptions that all investors have homogenous expectations about the distribution of assets' expected returns, and the existence of borrowing and lending at a risk-free rate of interest, CAPM defines the expected return of an asset as a function of the risk-free

[7] The equity risk premium is defined as the excess required rate of return over the risk-free rate usually the interest rate of the 10-years government US bonds.

interest rate, R_f plus a risk premium, the covariance of asset's return, $E(R_i)$, with the return of the market portfolio, $E(R_M)$,

$$E(R_i) = R_f + b_{iM}[E(R_M) - R_f]$$

Where, $$b_{iM} = \frac{Cov(R_i, R_M)}{s^2(R_M)}$$

Fama & French (1993, 1995) provided empirical evidence that size and book-to-market equity (the ratio of book value of equity to market value of equity) can further explain the cross-section variations of expected returns incrementally to the market risk. The three-factor model has been used by both empirical research and practitioners as an alternative to the CAPM in order to provide estimates of the CE. A forth factor usually added to the three-factor model is the 'momentum effect' which means that stocks that performed well relative to the market, tend to continue to outperform in the future and vice versa, stocks that underperformed in the near past tend to underperform in the future (Carhart, 1997; Jegadeesh & Titman, 1993).

However, later empirical evidence suggests that using the CAPM, or the Fama & French model, is a flawed way of estimating the equity risk premium (Claus & Thomas, 2001; Fama & French, 2004). A major criticism is that they are based on historical data (i.e. realised returns). Thus, later studies turned to a more dynamic approach in estimating the CE using forward looking data, such as forecasted analysts' earnings per share (Claus & Thomas, 2001; Easton et al., 2002; Gebhardt et al., 2001; Gode & Mohanram, 2003; Ohlson & Juettner, 2005). These studies are based on equity valuation theory and specifically on the RIVM and the EGM, discussed in Sections 3.2.1.2 and 3.2.1.5, respectively.

Under the RIVM, the CE is the model-implied required rate of return which can be seen alternatively as the internal rate of return (IRR) that equates the current share price of a firm, to the current book value per share and the discounted expected abnormal earnings.

The EGM, as developed by Ohlson-Juettner (2005), is a parsimonious valuation model that relates share price to the one-year ahead and two-year ahead earnings per share, the forthcoming dividend per share, a perpetual growth rate (γ), and a short-term growth that is assumed to decay asymptotically to the perpetual growth rate (γ). Contrary to the RIVM, the Ohlson-Juettner (2005) model needs no estimates of the forecasted book values per share and does not requires data for the forecasted earnings per share beyond the second year ahead.

Hence, given the limitations of the CAPM, this thesis focuses on the second stream of research to estimate the CE, which uses forecasted data instead of historical data. In total, four models are used to estimate the CE. The first two models are based on the RIVM and are the Gebhardt et al. (2001) model and the Claus & Thomas (2001) model. The other two models are based on the EGM and are the Gode & Mohanram (2003) model and the Easton (2004) model. These models are discussed extensively in the methodology chapter of the cost of equity capital (see, Chapter 7). The fact that all of the four models above are based on subjective assumptions (e.g. expected growth in earnings) makes the calculation of the CE sensitive to different inputs. Thus, given that none of these four models is proved in practice to be superior relative to the others, the average CE is also used in the empirical analysis. The next section shows the link between CE and accounting standards.

3.3 CE and accounting standards

The purpose of this section is to explain the relationship between CE and accounting standards. The section is separated into two sections. The first section explores how increased disclosure relates to the CE. Most of theoretical discussion predicts that increased disclosure and more quality in financial reporting results in lower CE. The second section provides some views that one set of accounting standards, such as the IFRS, may result in lower CE. Diverse accounting standards result in more adjustment costs when investors compare financial statements prepared under different accounting rules.

3.3.1 Increased disclosure and CE

The notion that high quality accounting standards and increased disclosure decrease CE and hence increase share prices, *ceteris paribus*, is a dominant theme in the accounting literature (Ball, 2006; Levitt, 1998). As early as 1950s, Horngren (1957, p. 598) suggested that:

'It is probable that the analyst would be better able to make intelligent decisions concerning securities if he should receive corporate information in bigger and better quantities and qualities'.

He also added that,

'Analysts generally will be more interested in firms that disclose as opposed to those which do not'. Horngren (1957, p. 600).

The argument of Horngren (1957) above implies that increased disclosure constitutes a positive signal for analysts in particular, and investors in general. Well-informed investors experience less uncertainty in their investment decision process and as a consequence, apply a relatively lower CE to those firms that disclose more. A relatively lower CE is translated into a relatively higher share price for firms with increased disclosure. Two streams of research exist in the literature that attempt to explain how increased disclosure relates to lower CE (Botosan, 2006, p. 33).

The first stream of research argues that increased disclosure reduces the estimation risk of firms' expected returns. Choi (1973) presents the association between increased disclosure and the CE, mathematically. Building on the theoretical notion that a firm's value is driven by the expected dividend streams and the dispersion of these streams, he expresses the value that an individual assigns to a firm as the utility function f:

$$V_i = f\left(\overline{D}, \sigma_D, \overline{v'}, \sigma_{v'}, w\right) \tag{3.19}$$

Where,

V_i	= Perceived value of a firm by an individual
D	= Expected dividend streams for the firm (the bar over the variables refers to expected values)
v'	= the value of all other alternative assets in the market
σ	= The dispersion (measured as the standard deviation) of the probability distributions of D and v'
w	= individual's wealth constraints

A firm's attitude toward disclosure affects only variable D (dividend streams) which is depended on firm's expected income (Y). An individual assigns probabilities to the different levels of expected dividends (this forms its probability function). As long as the ability of a firm to distribute dividends is related to a number of accounting measures (e.g. income, cash flows, debt to equity ratios) the level of a firm's disclosure affects indirectly individual's expectations about future dividend streams. However, given the relationship between dividends and income, the dispersion of the expected value of dividends is related to the dispersion of firm's income expectations. Based on the above argument two more functions derive:

$$\overline{D} = g\left(\overline{Y}\right) \tag{3.20}$$

$$\sigma_D = h\left(\sigma_Y\right) \tag{3.21}$$

Individuals form their expectations about a firm's income, Y, based on a set of information, such as past data and future expectations regarding a firm (e.g. accounting data), data on the related industry, and macroeconomic factors. Thus, the income distribution function of an individual *j* for a firm *i* in an industry *N* is conditional on the available information to this individual and can be expressed mathematically as, $\overline{Y} = t\left({}_{j}I_{iN}\right)$. Choi (1973) makes the assumption that the higher the level of information ${}_{j}I_{iN}$, the better the firm and the industry performs in total[8]. He also argues that although the expectations of each individual separately for a firm's accounting variables are poor estimates of 'true' value, taking the expectations of individuals in total, they are quite unbiased estimates of the long-term 'true' value. Equations (3.19) to (3.21) together with equation $\overline{Y} = t\left({}_{j}I_{iN}\right)$ are aggregated in a single equation (3.22). Taking the differential calculus of equation (5.22) with respect to $\bar{I}$ and σ_I, equations (3.23) and (3.24) derive respectively.

$$V_i = f\left\{\ g\left[\ t(\bar{I})\ \right]\right\} \tag{3.22}$$

$$dV_i = \left(\frac{\partial V_i}{\partial \overline{D}}\right)\left(\frac{\partial \overline{D}}{\partial \overline{Y}}\right)\left(\frac{\partial \overline{Y}}{\partial \bar{I}}\right) d\bar{I} \tag{3.23}$$

$$dV_i = \left(\frac{\partial V_i}{\partial \sigma_D}\right)\left(\frac{\partial \sigma_D}{\partial \sigma_Y}\right)\left(\frac{\partial \sigma_Y}{\partial \sigma_I}\right) d\sigma_I \tag{3.24}$$

Interpreting equations (3.23) and (3.24), Choi (1973) argues that increased disclosure affect a firm's value not by changing the mean expectations of the individuals, which assumed to be unbiased estimates of the true values and thus $\Delta \mathrm{I}_i = 0$, but through the reduction in the

8 Choi (1973) explains that an increase in earnings or/and a decrease in debt to equity ratio are signals of good performance resulting in both cases in an increase of the level of ${}_{j}I_{iN}$. This is based on the assumption that firms that perform well are more likely to disclose more, in order to communicate the good 'news' to the market.

dispersion, σ_I, regarding these expectations. Thus, individuals become *less uncertain* about the future expectations of accounting variables. Given the fact that: i) any firm's value at any point in time incorporates the mean expectations of all investors, and ii) increased disclosure reduces the dispersion of these expectations and hence uncertainty, and as a consequence CE is reduced and share price increases.

In another study, Barry & Brown (1985) provide an example of two securities (A and B) in order to explain that increased disclosure matters when investors choose between competing investments. They first assume that the two securities, A and B, have identical estimates of expected returns and variances, but estimates of security A are based on twenty quarterly observations, whilst estimates of B are based on only four quarterly observations. Barry & Brown (1985) argue that in a Bayesian framework the dispersion in the distribution of future returns will be higher for security B and lower for security A. Thus, investors would prefer to invest in firm A with the lower estimation risk. Coles et al. (1995) support also the view that increased disclosure reduces the estimation risk that investors face when estimate payoff distributions. They argue that investors have more information for some firms which results in lower beta (i.e. CE) and higher share price.

The second stream of research argues that increased disclosure decreases information asymmetries between managers and shareholders, which increases securities' liquidity, which in return reduces the CE. Amihud & Mendelson (1986) argue that higher bid-ask spreads result in higher transaction costs for investors who require higher returns. This fact increases firms' CE. Amihud & Mendelson (1986) also argue that firms with high bid-ask spreads have incentives to increase the liquidity of the issued securities through information disclosure. In another study, Diamond & Verrecchia (1991) provide evidence that the CE decreases when the liquidity of share prices increases due to higher levels of disclosure. They explain that improvement in liquidity attracts large traders who increase demand for firm's securities and thus increase share price and reduce CE. Finally, Easley & O'hara (2004) argued that investors demand higher return for firms with greater private information than public information. They suggest that:

'firms can influence their cost of capital by affecting the precision and quantity of information available to investors. This can be accomplished by a firm's selection of its accounting standards, as well as through its corporate disclosure policies' Easley & O'hara (2004, p. 1578).

Uninformed investors face higher uncertainty and thus demand higher return for firms with higher private information. However, if a firm starts to disclose more information to the market this will increase demand for its shares, which in return will increase liquidity. Finally, more public information is related to lower information asymmetries which decrease firm's CE.

However, increased disclosures may not always result in lower CE for all firms. It is likely that disclosing more information to the financial markets will cause more variability in share prices, especially when the disclosed information reveals additional risk for these firms. A recent example was the financial crisis of 2008, where a number of banks that were disclosing the negative changes in the fair values of their financial instruments resulted in high share price variability around the date of the disclosures. Hence, even that the theory suggests that increased disclosure is better than poor disclosure this is may not always be the case under certain conditions (e.g. financial crises).

3.3.2 Uniformity of accounting standards and CE

The adoption of one set of accounting standards by a number of countries that previously applied diverse accounting standards may reduce CE. Investors when they have to select between two equity investments usually compare (among other things) the financial statements of these firms. If the firms follow different accounting standards, investors need to make adjustments in order to make the results comparable. This procedure demands an in-depth knowledge of the different accounting rules which incurs additional costs for investors, such as to educate themselves in order to interpret financial statements prepared under different accounting standards.

There are views in accounting practice and academic literature that one set of accounting standards may lead to a lower CE. For example, Sir David Tweedie, the then Chairman of IASB, argued in 2004 in his speech, before the Committee on Banking, Housing and Urban Affairs of the United States Senate that:

> 'A single set of international standards will enhance comparability of financial information and should make the allocation of capital across borders more efficient The development and acceptance of international standards should also reduce compliance costs for corporations and improve consistency in audit quality.'[9]

This view is shared by Ball (2006, p. 11) who suggests that investors will be benefitted if many countries adopt the IFRS as this will reduce the adjustment costs for making financial statements comparable. Several other academic studies support this proposition. For example, Armstrong et al. (2010, p. 32) argued that,

> 'Investors also might have believed that application of a common set of standards would have convergence benefits, such as lowering the costs of comparing firms' financial position and performance across countries…'.

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[9] Available from: http://www.iasplus.com/resource/040909tweedietestimony.pdf [Accessed 19 January 2011].

Moreover, Hail et al. (2010, p. 358) argued that comparability also increases liquidity as investors can distinguish between less and more profitable firms. As explained above, this increased liquidity results in lower information asymmetries and as a consequence lower CE. Ray (2010) also examined the costs and benefits of uniform accounting standards based on a neoclassical approach. He argues that regulators (e.g. IASB) aim to provide accounting standards that maximize social welfare. Uniform accounting standards improve social welfare if variation between firms is low. Firms with small differences (e.g. in size) have lower compliance costs as standard-setters produce accounting standards that fit better to the 'average' firm. On the other hand, if differences between firms are large, then multiple accounting standards serve better the needs of firms as they reduce compliance costs, and as a consequence promote social welfare. Ray (2010) also explains that when differences between investors are large then uniform accounting standards are those that increase social welfare because they draw more investors in capital markets providing more liquidity. Investors experience costs of interpreting diverse accounting standards and making the necessary adjustments. Uniform accounting standards aid investors to compare investment opportunities in an economy and to allocate capital efficiently. Efficient capital allocation reduces the CE. Hence, Ray (2010) concludes that standard-setters need to trade-off the costs and benefits of applying uniform accounting standards as opposed to diverse accounting standards.

However, despite the benefits of one set of accounting standards (under certain assumptions, see, Ray, 2010), Zeff (2007) argues that genuine comparability is still difficult to be achieved (under the IFRS) due to cultural differences between countries. Such differences are related to i) business and financial culture, ii) accounting culture, iii) auditing culture, and iv) regulatory culture. Thus, whether the adoption of IFRS lead to higher comparability between the financial statements of firms, which prepare their accounts under different accounting standards, is an empirical question.

3.4 A critical view of value relevance research

Value relevance research uses empirical models to examine the relevance and reliability of any accounting number published in financial statements. Beaver (2002, p. 462) explains that,

> 'the theoretical foundation of value relevance studies is a combination of a valuation theory plus contextual accounting arguments that allow researchers to predict how accounting variables relate to the market value of equity'.

Thus, Beaver (2002) suggests that value relevance research is based on two elements: valuation theory (described above in Section 3.2) and contextual accounting arguments which set the accounting questions that researchers want to explore. For example, a contextual accounting argument of this thesis is the first research question presented in Section 1.2 that examines whether fair value estimates under IFRS for the financial instruments of European commercial banks are value relevant incrementally to their book values.

Proponents of value relevance argue that the results of value relevance research can inform standard setting as it is a way to operationalize the qualitative characteristics of accounting information, the relevance and reliability (Barth et al., 2001). Barth (2007, p. 8) observes that,

> 'when applying the Framework to measurement questions, the IASB focuses on determining which measurement basis best meets the objective of financial reporting, the elements definitions, and the qualitative characteristics of accounting information'.

Thus, Barth (2007, p. 13) argues that value relevance studies can inform standard setters on the extent various measurement bases comply with the qualitative characteristics of relevance and reliability (i.e. faithful representation), as stated in the IASB's Conceptual Framework (IASB, 2010).

However, other studies take an opposite view. For example, Holthausen & Watts (2001, p. 4) argue that without an underlying descriptive theory of accounting and standard setting, value relevance research has limited implications for standard setting. They also suggest that the associations between accounting numbers and market values, that value relevance studies report, are of little interest to standard setters. Another criticism of value relevance research is that it focuses only on one group of users of financial statements; the investors, who use accounting information in their investment decision making process. However, accounting information is also be used for contracting purposes (Watts & Zimmerman, 1986) and this is ignored by value relevance research. However, Barth et al. (2001) suggest that,

'Although financial statements have a variety of applications beyond equity investment, e.g., management compensation and debt contracts, the possible contracting uses of financial statements in no way diminish the importance of value relevance research, which focuses on equity investment'.

Thus, based on the argument above, financial reporting serves different objectives and users of financial statements. The fact that value relevance research focuses only on a single group of users, the investors, it does not mean that financial reporting can not serve other purposes such as contracting purposes (i.e. debt covenants). The methodology of this thesis adopts the investor point of view as the objective of financial reporting. This decision does not diminish the importance of financial statements for contracting purposes which is also another core objective of financial reporting.

3.5 Conclusion

This chapter discussed the equity valuation theory which provides the theoretical framework for the empirical part of the thesis, i.e., value relevance and the economic consequence tests. Value relevance studies underpin the development of their empirical models on equity valuation theory as otherwise these models would have been regarded as ad hoc constructs. Equity valuation theory also provides the theoretical models for estimating the cost of equity capital which is prerequisite for the economic consequence part.

The valuation models presented are: i) the DDM which is the neoclassical approach to valuation, ii) the RIVM that uses accounting numbers to derive equity's value, iii) the Ohlson (1995) model which builds on the RIVM by incorporating linear information dynamics, iv) the Feltham & Ohlson (1995) model that extends Ohlson (1995) model to incorporate conservative accounting, v) the Ohlson & Juettner (2005) model which is a an abnormal earnings growth valuation model, and vi) the BSM that relates equity value to the difference between assets and liabilities' values (i.e. the basic accounting identity).

As stated in the introduction, the interest of this thesis is to examine whether fair value estimates of banks' assets and liabilities are value relevant incrementally to their book values. Thus, for the value relevance tests of this thesis, the model that provides the link between accounting numbers and market values is the BSM. The advantage of the BSM model over the other valuation models (e.g. RIVM) is that it provides a direct link between the values of assets and liabilities and the market value of equity.

Equity valuation theory also provides the theoretical background for estimating the CE, a vital measure for the economic consequence test. In particular, this thesis uses four methods of estimating the CE, which are the most common in accounting literature (Daske et al., 2008). Two of the models are based on the RIVM and are the Gebhardt et al. (2001) method and the Claus & Thomas (2001) method. The other two models are based on the EGM and are the Gode & Mohanram (2003) method and the Easton (2004) method[10]. The advantage of these models over other models, such as the CAPM is that they use forward looking data (e.g. expected earnings) instead of historical data.

The chapter also analyzed the relationship between CE and accounting standards. In summary, theoretical studies conclude that increased disclosure reduces CE. Choi (1973) has shown mathematically that the CE reduces when the dispersion of the expectations on firms accounting variables decreases. Amihud & Mendelson (1986) and Diamond & Verrecchia (1991) found that the CE is reduced when increasing the liquidity of share prices and Easley & O'hara (2004) argue that firms can reduce CE if they choose to provide more public information than private information. Moreover, the adoption of IFRS (which for most countries is a commitment to increased disclosure and to more quality in financial reporting) can reduce CE through better comparability of financial statements across countries. This is mainly because investors will eliminate the necessary adjustments in order to make firms' accounts comparable (Ball, 2006; Armstrong et al., 2010). The benefits of uniform accounting standards will be higher the lower is the variation between firms (Ray, 2010).

[10] These four models are discusses in details in Chapter 7, the methodology chapter for the cost of equity test.

Finally, the chapter presented a critical view of the value relevance research. Advocates of the value relevance research argue that this type of research can provide valuable inputs to standard setters, given that it is a way to operationalize relevance and reliability (i.e. faithful representation), two qualitative characteristics stated in IASB's and FASB's conceptual frameworks (Barth et al., 2001). On the other hand, other researchers believe that value relevance cannot inform standard setters in the absence of an underlying descriptive theory of accounting and standard setting Holthausen & Watts (2001).

Having analysed extensively the equity valuation theory which underpins both the value relevance and the economic consequence tests, the next two chapters review the empirical studies of the value relevance literature (Chapter 4) and the empirical studies relating to the economic consequence part (Chapter 5).

Chapter 4: Review of Value Relevance Empirical Studies

4.1 Introduction

So far this thesis has explored the theoretical framework of the study, the equity valuation theory (see, Chapter 3). Several value relevance studies have used this framework to empirically test the relevance and reliability of accounting numbers either recognised in the financial statements or disclosed in the notes. In particular, the value relevance literature attempts to operationalize the standard setters' qualitative characteristics of relevance and reliability by using empirical models underpinned by the equity valuation theory (Barth et al., 2001).

The purpose of this chapter is to analyse the empirical findings of the value relevance literature. Value relevance studies adopt the view that investors are the core users of financial statements and, therefore, they use econometric techniques to provide evidence on the relationship between accounting numbers and share prices. Barth (2000, p. 16) defines value relevance as the extent to which '…the accounting amount is associated with some measure of value e.g. share prices'. In another study of Eccher et al. (p. 80, 1996), value relevance is defined '…in terms of the association of supplementary fair value disclosures with share prices'. Although value relevance studies test several accounting numbers in the financial statements (e.g. net income), this thesis is particularly focused on the value relevance of fair value measures. Value relevance studies conclude that the measurement method (e.g. fair value or amortized cost) that correlates the most with share prices is the most relevant to investors (AAA FASC, 1998).

Due to the fact that this study deals with banks, the review of empirical studies is categorised into two groups: banking and non-banking. Section 4.2 presents the empirical studies on banks.

The analysis distinguishes further between US and non-US studies. This distinction is made because US studies dominated the value relevance literature, whilst non-US studies and in particular, studies on IFRS are not in a plethora. All of the studies, however, both US and non-US relate to financial instruments. Section 4.3 discusses the non-banking literature, which covers industries such as industrial firms, mutual funds, property-liability insurers, software firms, investment property firms. The analysis is again presented separately for US and non-US studies. The literature on non-banks involves not only financial instruments, but also intangible and tangible assets. Finally, Section 4.4 concludes.

4.2 Empirical Studies on Banks

The value relevance literature on banks is mainly related to financial instruments. This is not surprising given that financial instruments constitute the majority of bank's assets and liabilities.

4.2.1 The US literature

As discussed in Chapter 2, Section 2.2.6, SFAS 107 was the first US standard which required the disclosure of the fair values of all financial instruments in the notes of the financial statements. Therefore, studies before SFAS No. 107 examined fair values in a period where banks were disclosing voluntarily fair values in the notes of financial statements. The discussion of these studies is in Section 4.2.1.1. Section 4.2.1.2 provides the findings under SFAS No. 107 and under the derivative standards, SFAS Nos. 109 and 133. SFAS No. 115 required the classification of equity and debt securities in three categories, namely: held-to-maturity, trading assets, and available-for-sale securities. These studies are analysed in Section 4.2.1.3. Finally, Section 4.2.1.4 discusses recent studies that relate to the requirements of SFAS No. 157.

4.2.1.1 Evidence before SFAS No. 107

Two early studies of Barth (1994) and Ahmed & Takeda (1995) provide some first evidence on the fair values of investment securities. The samples of these studies cover periods before 1992, the year when SFAS No. 107 became effective. Before this standard, US banks voluntarily disclosed the fair values of investment securities.

Barth (1994) provides evidence on the value relevance of investment securities' fair values and their related gains and losses. Using data from 1971 – 1990 for US banks she sheds some light on the argument surrounding the merits of fair value accounting over historical cost accounting. Specifically, Barth examines two research questions, namely: i) whether investment securities' fair values are associated with share prices incrementally to historical costs, and ii) whether fair value gains and losses, resulted by changes in investment securities' fair values, are associated more with changes in share prices (returns) than historical costs. Her methodology for the value relevance of investment securities' fair values is based on the BSM described in Chapter 3. Including in a single model the two values of investment securities (the recognised historical values and disclosed fair values) and the book value of equity before investment securities, she reports a higher coefficient for investment securities' fair values, indicating incremental explanatory power to historical costs. On the other hand, using an earnings capitalisation model no evidence is provided for the fair values' gains and losses of investment securities.

One should expect that as long as investment securities' fair values have incremental explanatory power, then fair values' gains and losses (which are the changes in investment securities' fair values) should also have incremental explanatory power. Barth (1994) provides two interpretations. i) Estimation errors in investment securities' fair values are relative small when considered separately for each year. However, taking together two years to calculate securities' gains and losses this makes the aggregated estimation errors larger, affecting the results for the gains and losses. ii) Correlated omitted gains and losses from assets and liabilities that are not taking into account by the model (e.g. non-investment securities), could have hedged the investment securities' fair value gains and losses making them insignificant.

Contrary to Barth (1994) who gives support to the first interpretation, Ahmed & Takeda (1995) provide evidence for the second interpretation. Specifically, they found that failing to control in the model for net assets' gains and losses of non-investment securities (due to interest rate changes), can bias the coefficient of the changes in unrealised gains and losses of investment securities.

Another study before SFAS No. 107 is that of Riffe (1997). This study provides evidence on the valuation implication of the notional amounts of derivatives in a period where the US GAAP did not require the disclosure of fair values of derivatives. Banks were disclosing from 1986 the notional amounts of all off-balance sheet instruments in the Y-9 reports as required by Federal Reserve. Later on, SFAS No. 105 also required banks to disclosure the notional amounts of off-balance sheet instruments for fiscal years ending after June 15, 1990. Riffe (1997) separates between market-related and credit-related off-balance sheet instruments. The evidence is based on two pooled across banks and time valuation models, the BSM and the Ohlson (1995) model (see, Chapter 3). The sample of the research consists of 242 bank holding companies using quarterly data from September 1986 through December 1989. The results support the value relevance of the notional amounts for both groups of off-balance instruments. Their signs are found to be positives, indicating that investors find hidden values in the notional amounts which they incorporate in share prices.

4.2.1.2 Evidence under SFAS No. 107, 109, and 133

Three concurrent studies of Barth et al. (1996), Eccher et al. (1996), and Nelson (1996) test the value relevance of disclosed fair values for a sample of US banks. The purpose of their studies is to examine the value relevance of SFAS No. 107 for the first two years of its adoption, 1992 and 1993. Evidence is provided separately for investment securities, loans, deposits, long-term debt and off-balance sheet items. Their primary model is based on the BSM which regresses the differences between the market value and book value of equity (Barth et al., 1996; Nelson, 1996) or the market-to-book value ratios (Eccher et al., 1996) on the differences between fair value disclosures under SFAS No. 107 and their related book values (see, Equation 3.16 in Chapter 3).

The findings of the three aforementioned studies support the view that investment securities' fair values provide incremental explanatory power beyond that provided by the related book values, and thus their fair values are relevant in equity valuation. However, findings regarding the other financial instruments (loans, deposits, long-term debt and off-balance sheet instruments) are not in consensus.

In particular, Nelson (1996) finds that the fair values of loans, deposits, long-term debt and off-balance sheet instruments do not have incremental explanatory power relatively to book values. Examining the market-to-book value ratios, in 1992 and 1993, she finds that they are greater than one, even if the book values are adjusted for the fair values of SFAS No. 107 disclosures. The greater than one market-to-book value ratio indicates that part of market value of equity remains unexplained by the book values and the SFAS No. 107 disclosures. Thus, Nelson (1996) adds two more variables in the primary model to control for future growth opportunities of banks. The aim is to capture the unexplained value of market value of equity. These variables are the historical growth in the book value of equity and the return on equity (ROE)[11]. Under this model, even though the explanatory power has been increased, the fair values of investment securities are not any more significant. Nelson (1996) attributes the change in significance of investment securities to high collinearity between the fair values of investment securities and the ROE.

Contrary to Nelson (1996), Eccher et al. (1996) find the fair values of net loans significant in 1992 with the expected positive sign. The fair values of long-term debt, even though they find to be significant in 1992, they have the opposite sign. With respect to deposits and off-balance sheet fair values there are no evidence to suggest that they are value relevant. Results in 1993 support the view that only investment securities' fair values have incremental explanatory power, but relatively weaker than in 1992. Loans' fair values in 1993 are marginally significant in only one of model specifications.

11 According to Bernard (1994) the growth in book value of equity and the ROE are found to play a significant role in explaining the market-to-book value ratio.

Eccher et al. (1996) also test the incremental value relevance of fair values over and above historical costs. They argue that historical cost variables, such as profitability, loan quality, capital adequacy, and liquidity can capture part of goodwill over the fair values. Thus, they first developed a benchmark model that included the historical cost data discussed above. Then they expanded this model to include the fair values of SFAS No. 107. The results reveal that fair value disclosures have incremental explanatory power over and above historical cost. The R-squared increased in 1992 from 44% for the benchmark model (the model that included only historical data) to 63% when the fair values were incorporated in the model. Findings in 1993 are not so robust. Overall, Eccher et al. (1996) conclude that investors are better-off by having available both values: historical costs and fair values, with historical costs contributing significantly in the value relevance of reported information.

Contrary to Eccher et al. (1996), the results of Barth et al. (1996) indicate that the fair values of loans are statistically significant in both years, 1992 and 1993 with the expected positive sign. Similar to the other two studies (Eccher et al., 1996; Nelson, 1996), no evidence suggests that deposits and off-balance sheet instruments explain the difference between market and book value of equity. Regarding long-term debt fair values are found to be significant only in 1993. Barth et al. (1996) attributed the insignificant results for the fair values of deposits to the requirements of SFAS No. 107 to state the fair values of deposits, with no defined maturities, equal to their book values (on demand values). Furthermore, they attribute the insignificant results for off-balance sheet instruments to measurement issues and ambiguities in deriving their fair values.

A major difference between Barth et al. (1996) and the studies of Eccher et al. (1996) and Nelson (1996) is the way the former study controls for omitted variables. Barth et al. (1996) include in the primary regression model, apart from the SFAS No. 107 variables, two other sets of variables that according to the literature are found to contribute significantly in explaining the variation in banks' market values. The first set of variables includes the fair values of pension assets, as disclosed under SFAS No. 87 (see Barth, 1991; Landsman, 1986), the book values of non-financial assets and liabilities (i.e. non – SFAS No. 107 assets and liabilities) and a proxy variable for core deposits. Omitting these variables can bias the coefficients of the under investigation variables. Core deposits are an important intangible asset for banks where according to US GAAP are permitted but not required to be disclosed in the financial statements. The second set of variables is competitor to SFAS No. 107 variables and includes nonperforming loans (Beaver et al., 1989), and interest-sensitive assets and liabilities (see Beaver et al., 1989; Flannery & James, 1984a, 1984b). The value of a loan portfolio is affected by the financial health of borrowers (default risk) and by macroeconomics factors such as the change in interest rates (interest rate risk). Thus, Barth et al. (1996) included the variables of non-performing loans and the interest-sensitive assets and liabilities to control for the default risk and the interest rate risk, respectively[12].

Barth et al. (1996) find concurrently significant the coefficients of the fair values of loans and the coefficients of nonperforming loans and the interest-sensitive assets and liabilities. They argue that although fair values of loans are value relevant, they do not capture all the value related information of the default risk and the interest rate risk. Findings for the fair values of loans are

12 Interest-sensitive assets are defined as total assets less non-financial assets and interest earning assets reprised within a year. Interest-sensitive liabilities are the total deposits and long-term debt less their values reprised within a year.

robust under alternative model specification (e.g. using December share prices and controlling for growth opportunities).

Overall, the results of the studies of Barth et al. (1996), Eccher et al. (1996), and Nelson (1996) support the findings of early studies (e.g. Barth 1994) that investment securities' fair values are value relevant. In contrast, fair values of deposits and off-balance sheet instruments do not have any incremental explanatory power relative to their book values. Fair values of long-term debt are found statistically significant with the expected sign only in Barth et al. (1996), and only in 1993. Loans' fair values are significant in Barth el al. (1996), for both years, and in Eccher et al. (1996) in 1992 (see Table 4.1 below).

Table 4.1
Summary of the value relevance disclosures under SFAS No. 107

	Barth et al. (1996)	*Eccher et al. (1996)*	*Nelson (1996)*
Investment Securities	Value-relevant	Value-relevant	Value-relevant*
Loans	Value-relevant	Value-relevant*	No evidence
Deposits	No evidence	No evidence	No evidence
Long-term debt	Value-relevant*	No evidence	No evidence
Off balance sheet	No evidence	No evidence	No evidence

* Value-relevant only in some model specifications or in one of the two years examined, 1992 or 1993 (see the analysis for further information).

All the three studies, did not find significant the fair values of off-balance sheet instruments. An explanation for this finding is the ambiguities in SFAS No. 107 regarding derivatives and other off-balance sheet disclosures. For example, under this standard, banks although they disclose the fair value of off-balance sheet instruments, they do not disclose whether this fair value represents a net receivable position (i.e. asset) or a net payable position (i.e. liability). Furthermore, SFAS No. 107 does not distinguish between trading and other than trading derivatives. These ambiguities have been amended by SFAS No. 119, which consists the subject of Venkatachalam (1996).

Venkatachalam (1996) uses the BSM, described in Chapter 3, to test whether fair values of derivatives, used in asset-liability management, and the fair values of other off-balance sheet items (e.g. loan commitments, letters of credit, and guarantees) are significant in explaining cross-sectional variations in share prices. Venkatachalam (1996) includes also additional variables in the model to incorporate the values of on-balance sheet items, such as the fair values of the financial instruments required under SFAS No. 107 (fair values of loans, deposits, investment securities, long-term debt) and a variable for the remaining net book value. Furthermore, two other variables are used to control for correlated omitted variables, namely: net pension and post-retirement benefit obligations, and the book value of nonperforming loans.

The results show that derivative fair values are positively and significantly related to market values, suggesting that they are value relevant. Similar results are presented for SFAS No. 107 variables and the net pension costs. On the other hand, the fair values of other off-balance sheet items are insignificant. These results are robust to other model specification (e.g. a changes model). Fair values of derivatives are also found to be value relevant over and above their contractual amounts (the notional amounts) indicating that fair values convey additional information to investors.

SFAS No. 119 requires also the disaggregation of the notional amounts of derivatives. Venkatachalam (1996) performs two tests. The first test examines the usefulness of separating the notional amounts of off-balance sheet instruments in notional amounts of derivatives and notional amounts of other off-balance sheet items. The second test investigates whether the disaggregation of the notional amounts of derivatives in derivatives used for trading and for risk-management purposes are useful to investors. Both tests reveal that investors are better-off by having the disaggregated amounts in the financial statements.

Seow & Tam (2002) used a different model to empirically test the value relevance of disclosed values of derivatives. Specifically, they developed an ad hoc empirical model regressing share returns on earnings and market beta and on a series of derivative variables, such as the notional amounts of derivatives, credit derivatives exposure, and gains and losses on trading and non-trading derivatives. The results support the view that disclosures on derivatives, required under SFAS No. 105, 107, and 119, explain significantly the returns, with the only exception the notional amounts of derivatives.

A more recent study on derivative disclosures under SFAS No. 119 and SFAS No. 133 is that of Wang et al. (2005). Using a different methodological approach than that of Venkatachalam (1996), they provide evidence on the information content of the notional amounts of derivatives for a sample of US commercial banks. Based on the suggestions of Ohlson (1995) that the market value of equity is a linear function of book value of equity and earnings (See, Chapter 3, Section 3.2.1.3), Wang et al. (2005) find the notional amounts of derivatives value relevant[13]. Although they find significant the notional amounts of derivatives, further tests do not support the view that derivatives' fair values are also value relevant. The opposite results for the fair

13 Wang et al. (2005) based on Ohlson (1995) include in their model the book value of equity, net earnings, and a third variable that proxies for 'other information'. 'Other information' is proxied by the growth in sales in the last three years.

values of derivatives between this study (Wang et al., 2005) and previous studies (Venkatachalam, 1996) can be attributed to methodological issues (e.g. different approaches to the valuation model, explanatory variables, correlated omitted variables).

The studies on derivatives above examine disclosed amounts of fair values. SFAS No. 133 required the recognition of all derivatives in fair values. Ahmed et al. (2006) test the value relevance of both the disclosed and the recognised fair values of derivatives using a sample of US banks. They investigate two samples. A sample before the effective date of SFAS No. 133, where banks held simultaneously disclosed and recognised fair values of derivatives, and a sample of banks that used to disclose derivatives' fair value before SFAS No. 133 and after SFAS No. 133 recognised them in the balance sheet. Ahmed et al. (2006) operate a similar enough model to the one used by Venkatachalam (1996) (the BSM analysed in Chapter 3). In particular, the market value of equity is regressed on the disclosed and recognised fair values of derivatives, on the balance sheet values of the remaining assets and liabilities, and on a number of control variables, such as the nonperforming loans and the core deposits. Evidence from both samples indicates that recognised fair values have significant explanatory power in contrast to disclosed amounts where they found to be insignificant. Thus, investors perceive the recognised amounts as being more relevant in decision making than disclosed amounts.

4.2.1.3 Evidence under SFAS No. 115

Park et al. (1999) test whether the difference between the fair values and the historical costs of available-for-sale assets and held-to-maturity investments explain the differences between banks' market value and book value of equity or the returns (raw returns and abnormal returns)[14]. They use a model based on the BSM similar to Nelson (1996). Findings indicate that fair values of available-for-sale assets and held-to-maturity investments are significant in determining market values (either in level or in changes form). The results from the model that uses raw and abnormal returns, as a dependent variable, are significant for the available-for-sales assets, whilst for held-to-maturity investments the results are only significant under the raw returns model. Held-to-maturity investments have lower marketability than available-for-sale assets as they are usually debt securities that the management have the intention and ability to hold them to maturity. In contrast, available-for-sale assets are equity securities which are more liquid. This resulted in finding the fair values of available-for-sale assets significant with higher explanatory power than the held-to-maturity investments.

Given that share prices reflect a portion of future expected earnings, Park et al. (1999) examine whether available-for-sale assets are related to future earnings more than held-to-maturity investments. Using as the dependent variable next year's ROE, Park et al. (1999) find that only the coefficient of available-for-sale assets is significant in explaining future earnings, whilst the coefficient of held-to-maturity investments is not. This last finding strengthens the view that available-for-sale assets are more relevant in estimating future earnings and thus equity market values.

14 Park et al. (1999) do not examine trading securities as the difference between fair values and book values of these instruments is zero.

4.2.1.4 Evidence under SFAS No. 157

Three recent studies of Song et al. (2010), Goh et al. (2009), and Kolev (2008) examine the value relevance of fair value hierarchy (i.e. three levels of fair value measurements) required under SFAS No. 157. The aim of these studies is to test whether the market perceives the fair value measurements of Level 1 as being more reliable estimates than Level 2, and Level 2 estimates as being more reliable than Level 3.

The sample of these studies is the banking industry covering data from the first three quarters of 2008 (Kolev (2008) examines only the first and the second quarter). Using similar models, they regress share prices on the three hierarchical levels of fair values (i.e. Level 1, 2, and 3). The results support the view that fair value estimates based on observable market prices (Level 1) are more value relevant than the fair value estimates based on indirect observable data (Level 2), and the fair value estimates based on subjective assumptions made by banks (Level 3).

In addition, Song et al. (2010) found that the reliability of fair value estimates increases for all Levels as the strength of firm's corporate governance increases. Specifically, Song et al. (2010) report for low corporate governance firms a close to zero coefficient for Level 3 variable and lower, although still significant, coefficients for Level 1 and 2 variables. This finding suggests that strong corporate governance can mitigate information asymmetries and estimation errors which are more obvious in Level 3.

Apart from corporate governance, which is tested by Song et al. (2010), capital adequacy ratios and big four auditors are likely to affect the market pricing of fair values. Goh et al. (2009)

provide evidence on these two issues. Banks with capital adequacy ratios over the sample's median have significantly higher coefficients for fair value estimates of Level 3 than banks with capital adequacy ratios below the sample's median. Interpreting this result, researchers argue that investors assign higher liquidity risk to banks with low capital adequacy ratios as it is more likely to sell their illiquid assets in unfavourable prices in case of disorder markets. Regarding the big four auditors, Goh et al. (2009) find that the presence of 'high quality auditors' increases the reliability of mark-to-model fair value estimates (Level 2, and particularly Level 3) and thus the value relevance. Similar to Song et al (2010) and Goh et al. (2009), Kolev (2008) documents higher reliability for mark-to-model estimates of banks with higher equity capital.

Studies on SFAS No. 157 also provide some first evidence on whether the reliability of fair value estimates decreased as the economic crisis worsened in 2008. Song et al. (2010) fail to provide evidence that the reliability of fair value estimates decreased during the period of their study (from the first quarter to the third quarter of 2008). Goh et al. (2009) find that the reliability of fair values decreased only for mark-to-model levels (Level 2 and 3), but not for mark-to-market model estimates (Level 1). Further evidence of Goh et al. (2009) suggest that investors assigned higher liquidity risk to mark-to-model fair value estimates as the economic crisis worsened in 2008, which is indicated by a reduction in the coefficient of Level 3 financial instruments.

4.2.2 The non-US literature

Value relevance literature, analysed above, is dominated by US studies. On the other hand, research based on non-US data is rare. Moreover, research on banks that examine the value relevance of the financial instruments' fair values as required under IFRS does not exist.

Some first non-US evidence on the empirical valuation of mark-to-market accounting is provided by Bernard et al. (1995) using a sample of Danish banks and thrifts. Their research objective was to provide evidence on the reliability of fair values that will aid US standard-setters to decide whether to require fair values under US GAAP. Bernard et al. (1995) investigate two major mark-to-market adjustments, namely: price adjustments on investments and off-balance sheet items, and the loan loss provisions. Results indicate that Danish banks do not manipulate price adjustments as they depend on observable market prices. In contrast, with respect to the loan loss allowance there is some evidence of manipulation.

Bernard et al. (1995) also compare the market-to-book ratios between Danish and US banks. Although the average ratios are much higher than the unity for both Danish and US banks, the dispersion in ratios is higher for the US banks. Researches observe that the higher volatility in US ratios is attributed i) either to the fact that the volatility of the unrecorded goodwill of US banks is higher than that of Danish banks, or/and ii) the discrepancy between market value and book value of equity for the US sample is substantially higher than that of the Danish sample. Due to data availability on goodwill, the first interpretation can not be tested. Regarding the second interpretation, Bernard et al. (1995) argue that mark-to-market accounting, that Denmark banks follow, provides more relevant information for valuing their assets than historical cost accounting that US banks follow.

Having analysed extensively the value relevance literature, regarding the fair values of banks' financial instruments, the findings can be summarised as follows. Overall, the results support the view that financial instruments' fair values are value relevant to investors. However, it is obvious that some fair value estimates are associated more with share prices, whilst some others have weaker associations. Investment securities' fair values are found unanimously value relevant by all studies. For all other fair value estimates, even though results are not uniform, they seem to be quite relevant and reliable to be reflected in share prices. Table 4.2 below summarises the empirical studies on the banking literature and facilitates the comparison of the studies. There is some evidence to support that fair values of loans can explain significantly share prices, even though their estimates involve subjective assumptions (Barth et al, 1996). Fair value of deposits proved not to be value relevant. A plausible explanation is the requirement of the FASB for all banks to state the fair values of demand deposits at face values. A plethora of studies examine the fair values of derivatives (see Venkatachalam, 1996; Ahmed et al., 2006; Seow & Tam, 2002). The results support the view that the fair values of derivatives, either disclosed or recognised in the financial statements, are value relevant. Moreover, evidence on the notional amounts of derivatives show that they provide relevant information to investors incrementally to their fair values (Venkatachalam, 1996; Riffe, 1997; Wang et al., 2005). Finally, recent studies on SFAS No. 157, which classifies fair value estimates on three Levels based on the reliability criterion (i.e. direct observable market values, indirect observable market values, and mark-to-model estimates) indicate that this classification is value relevant. Furthermore, the findings show that fair value estimates based on observable market prices (Level 1) have greater explanatory power than the estimates under Level 2 and 3, which are based on indirect values and subjective assumptions.

Table 4.2
Summary of the empirical evidence on Banks

Studies	Market – Sample	Investment securities	Loans	Deposits	Long-Term Debt	Derivatives – Off balance sheet items	Level 1, 2, 3 – SFAS No. 157
Barth (1994)	US	Value relevant	N/A	N/A	N/A	N/A	N/A
Ahmed & Takeda (1995)	US	Value relevant	N/A	N/A	N/A	N/A	N/A
Riffe (1997)	US	N/A	N/A	N/A	N/A	Value relevant	N/A
Barth et al. (1996)	US	Value relevant	Value relevant	No evidence	Value relevant	No evidence	N/A
Eccher et al. (1996)	US	Value relevant	Value relevant	No evidence	No evidence	No evidence	N/A
Nelson (1996)	US	Value relevant	No evidence	No evidence	No evidence	No evidence	N/A
Venkatachalam (1996)	US	N/A	N/A	N/A	N/A	Value relevant	N/A
Seow & Tam (2002)	US	N/A	N/A	N/A	N/A	Value relevant	N/A
Wang et al. (2005)	US	N/A	N/A	N/A	N/A	Value relevant	N/A
Ahmed et al. (2006)	US	N/A	N/A	N/A	N/A	Value relevant	N/A
Park et al. (1999)	US	Value relevant	N/A	N/A	N/A	N/A	N/A
Song et al. (2010)	US	N/A	N/A	N/A	N/A	N/A	Value relevant
Goh et al. (2009)	US	N/A	N/A	N/A	N/A	N/A	Value relevant
Kolev (2008)	US	N/A	N/A	N/A	N/A	N/A	Value relevant
Bernard et al. (1995)	Danish	Value relevant	N/A	N/A	N/A	N/A	N/A

Notes to Table 4.2:
1. 'Value relevant' indicates that the values of financial instruments (e.g. fair values, notional amounts) are value relevant at least in some model specifications. 2. 'No evidence' indicates that the study fails to provide value relevant results. 3. 'N/A' indicates that the financial instrument is not examined under this study.

4.3 Empirical studies on Non-Banks

The non-banking literature includes samples of industrial firms, manufacturing firms, mining firms, mutual funds, investment property firms, software firms, property-liability insurers. The findings involve any kind of asset and liability measured at fair value, such as tangible and intangible assets. The studies are separated into US and non-US studies.

4.3.1 US – Empirical Studies

The US studies are separated further into financial instruments and non-financial instruments.

4.3.1.1 Financial instruments

A major argument surrounding fair value accounting is whether fair value estimates, regarding non-tradable securities, are reliable enough to be value relevant. Carroll et al. (2003) and Petroni & Wahlen (1995) address this issue by examining the value relevance of different types of securities for a sample of closed-end mutual funds and property-liability insurers, respectively.

In particular, Carroll et al. (2003) use a sample of 143 closed-end mutual funds to examine the reliability of investment securities. They separate between six general categories of investment securities based on their reliability. The six groups (stated with the most reliable first) are: investments in publicly held equity securities from G7 countries, private and public equities from developing countries, US government and municipal securities, investments in corporate bonds, a group of other investments, such us mortgage backed securities, convertible securities, preferred stocks, and options and warrants, and a last group of other securities not classified in one of the above categories.

Using a level and a return model, similar to the ones used by Barth (1994), Carroll et al. (2003) test for the association of fair values of each of the six categories above with share prices and returns. They observe that the fair values of all six groups are highly related to market values. Despite the concerns, this finding indicates that even the fair value estimates of investment securities trading in thin markets are reliable enough to be reflected in share prices. Contrary to previous studies (Barth, 1994; Petroni & Wahlen, 1995), Carroll et al. (2003) argue that their findings support the reliability of investment securities' fair value. They explain that such significant results are mainly related to the full fair value accounting which is applied by closed-end mutual funds. Specifically, closed-end mutual funds hold solely investment securities' assets which are measured in fair values. In contrast, empirical studies that test other industries that partly apply fair value accounting suffer from correlated omitted variables, and thus special consideration is needed in designing the research methodology[15.]

Although Carroll et al. (2003) find the fair value estimates of different types of investments value relevant, Petroni & Wahlen (1995) provide opposite results. Using a sample of 56 property-liability insurers they observe that only the fair values of equity investments and US Treasury investments are associated to share prices. Other

15 Carroll et al. (2003) suggest that *"...the difference in investment securities fair value gains and losses results between Barth (1994) and this study is most likely attributable to the elimination of correlated omitted variable problems in the closed-end setting, suggesting that the incremental informativeness of fair value information may improve when a comprehensive fair value system is employed".*

types of securities, such as municipal and corporate bonds and other debt instruments proved to be insignificant. Hence, fair value estimates based on securities traded in active and more liquid markets are considered more reliable, and thus value relevant to investors, whilst fair values of non-traded securities are found unreliable.

In another study, Simko (1999) examines the value relevance of net cumulative holding gains of financial assets, financial liabilities, and derivative contracts for a sample of nonfinancial firms. The net cumulative holding gains are measured as the difference between fair values (as disclosed under SFAS No. 107) and their related book values. Simko (1999) implements a model based on Feltham & Ohlson (1995) (see Chapter 3, Section 3.2.1.4). In his primary specification model (Simko, 1999, p. 253) he regresses the market value of equity on the three primary variables of interest, namely: the holding gains of financial assets, financial liabilities, and derivative contracts. He also controls for a number of additional variables imposed by the theoretical model of Feltham & Ohlson (1995). These variables are the net book value of financial assets, the net book value of nonfinancial assets, the abnormal earnings of the current period, and the abnormal earnings of the next period. Findings support only the value relevance of the cumulative holding gains of financial liabilities and only in years 1993 and 1995, where the differences between the fair values and book values are more substantial. Contrary to previous studies on banks (e.g. Barth et al., 1996; Eccher et al. 1996; Venkatachalam, 1996) fair values of financial assets and derivatives are found insignificant. Simko (1999) argues that the lower explanatory power for the financial instruments of nonfinancial firms is attributed to accounting rules that do not recognise the changes (gains or losses) in values of nonfinancial assets. Recognised gains and losses of financial instruments are negatively correlated to a proxy of gains and losses of nonfinancial assets, making the fair values of financial instruments insignificant.

Evidence on investment securities presented above relates to trading assets excluding equity investments that accounted under the equity method (equity investment over 20 percent). However, large blocks of shares are not treated necessarily as trading securities in valuation. For example, due to high transaction costs when selling a large block of shares results in receiving a net amount which is much lower than the quoted market price. Furthermore, the expected cash flows to blockholders usually exceed the expected cash flows to trading investors due to synergies between investors (blockholders) and investees. Based on the argument above, Graham et al. (2003) test empirically whether fair value disclosures under the equity method are reflected in share prices. Using the model of Ohlson (1995), they find fair value disclosures significant under the equity method. However, their findings are limited only to publicly traded securities and cannot be extended to other types of instruments.

4.3.1.2 Non-financial instruments

US GAAP do not allow upward revaluations of tangible assets. Thus, this section analyses only intangible asset revaluations. Intangible assets, such us goodwill, patents, computer software, trademarks, copyrights, and R&D are important elements in the financial statements of some firms (e.g. software development firms, internet-based firms, pharmaceutical firms). For most of these firms, intangible assets are the most valuable asset for profit making.

Motivated by FASB's concerns regarding the capitalisation of R&D expenditures, Lev and Sougiannis (1996) examine the value relevance of R&D using both a returns and a level specification model. The capitalisation of R&D expenses was unavailable and thus researchers estimated it. They first calculated the amortisation rate of R&D capital, as the coefficient of a regression of current earnings on the R&D expenditures of the previous year and a series of other control variables. Then they used the amortisation rates to adjust reported earnings and book values as of the R&D capitalisation.

Findings suggest that R&D adjustments are highly correlated with contemporaneous share prices suggesting that R&D capitalisations are relevant in explaining market values. Additional tests reveal that R&D capitalisation is only partial related to contemporaneous returns. R&D capitalisation is also found to be related to subsequent year's returns, suggesting that a substantial amount of value is not fully reflected in current prices. Researchers attributed this observation, without testing it, either to market inefficiency (i.e. investors underreact to R&D information) or to an additional market risk associated with the R&D capital.

Contrary to the full expensing rule of R&D costs (SFAS No. 2), software development costs are allowed to be capitalised when the software product reaches the stage of technological feasibility (SFAS No. 86). Using a sample of 163 software firms for the period 1987-1995, Aboody and Lev (1998) provide results that software capitalisation costs are value relevant, as both their annual amounts and their cumulative values are significantly related to returns and share prices, respectively. Further results indicate that software capitalisation values, which represent costs after the technological feasibility point, are reliable estimates and provide valuable information to investors that can aid them in predicting future earnings.

4.3.2 Non-US – Empirical Studies

The non-banking, non-US empirical studies are presented under this section. Evidence on tangible assets relates to three jurisdictions, the U.K., Germany, and Australia. The U.K. and Australia allowed upward and downward revaluations of the tangible assets. Germany allowed only the use of historical cost accounting for tangible assets.

Easton et al. (1993) examine a sample of 100 Australian firms from 1981-1990 to conclude whether tangible assets' revaluations are associated to share prices and returns. Their model builds on the notion that value is captured by two accounting measures that of book value of equity and earnings. The findings support the view that the asset revaluation reserve and the increment to the asset revaluation reserve have significant explanation power over the earnings variables, suggesting that asset revaluations capture real changes of the values of tangible assets.

Another interesting study using Australian data is that of Barth & Clinch (1998). This study provides evidence on the relevance, reliability and timeliness of financial, tangible, and intangible assets' revaluations for a sample of 350 publicly traded Australian firms. The sample represents approximately the 81% of the total market capitalisation of the ASX (Australian Securities Exchange). Barth & Clinch (1998) use a model where equity value is captured by two accounting constructs, namely: the book value of equity and the net income (Ohlson, 1995). They use two measures of equity as the dependent variable, namely: the market value of equity and estimates of equity values based on analysts forecasted earnings per share. Given that earnings drive value, the later measure of equity provides a direct link between asset revaluations and expected future earnings.

The sample of Barth & Clinch (1998) is separated in three general industries, namely: non-financial, mining, and financial firms. Assets' revaluations of *investments* are disaggregated into investment in associates and other investments (listed investments); *Property, Plant, and Equipment*, into property (land and buildings), and plant and equipment; and *intangible assets* into goodwill and other intangibles.

Evidence on the revaluation of asset classes is mixed and not the same for the three industries in the sample. The only revaluations that are found significant in explaining share prices, across all the three industries, are the listed investments and the intangible assets other than goodwill. Investments in associates are value relevant only for the mining industry. With respect to tangible assets, revaluations of property are only significant for non-financial firms, whist plant and equipment revaluations are significantly related to prices merely for the mining industry.

Australian GAAP do not require firms to revalue assets every year. Thus, asset revaluations are related not only to current year revaluations but also to previous years. Barth & Clinch (1998) investigate also the timeliness of assets' revaluations separating the total amount of assets in current year, before two years, and over than three years' revaluations. Results are as follows: investments are value relevant more for current years; intangible assets are significantly related to share prices under all years; tangible assets are value relevant for mining firms (for the current and over than three years' revaluations) and for financial firms (for two years before revaluations). Non-financial firms' revaluations are found not to be significantly related to share prices for all years. The results, using as a dependent variable analysts' implied equity values are consistent with market values model.

Given that asset values are determined by discounting expected cash flows and that fair values of assets are a good approximation of 'real' value, then a positive correlation should be observed between fair values and future performance. Using a sample of UK firms, Aboody et al. (1999) investigate whether upward revaluations of fixed assets are reflected to changes in future performance over the three subsequent years of the revaluation date. Future performance is measured as 1) operating income, before depreciation, amortisation, and gains on asset disposals and 2) operating cash flows. In addition to the results on the direct relation between fixed asset revaluations and future performance, they also provide evidence on the relation between asset revaluations and share prices and returns.

Findings indicate that current year revaluations of fixed assets are positively and significantly related to three years ahead operating income and cash flows, suggesting that upward revaluations of fixed assets are a good approximation of their 'real' values. However, due to the long-term nature of fixed assets, upward revaluations are only partially reflected to the short period of future performance (only three years ahead). Findings on share prices and returns are consistent with the results of future performance.

Aboody et al. (1999) perform also a number of robustness tests. In particular, they control for the acquisition activity of firms that may resulted in finding positive associations between upward revaluations of fixed assets and future performance. The results reveal that the acquisition activity does not affect the primary findings. Finally, Aboody et al. (1999) provide evidence that firms with higher debt-to-equity ratios tend to have weaker associations between upward revaluations of fixed assets and future performance, suggesting that these firms use revaluations to manipulate debt-to-equity ratios and not to present true and fair financial statements.

Another study that examines long-lived assets is that of Dietrich et al. (2001). They test the reliability of fair value estimates for a sample of 76 UK investment property firms from 1988-1996. Taking for benchmark the realised selling prices of investment properties, Dietrich et al. (2001) provide evidence on the accuracy of fair value estimates as compared to historical costs. They find that fair value estimates understate realised selling prices by six percent and that they are less biased and more accurate measures of the realised selling prices than historical costs.

So & Smith (2009) also analysed investment property for a sample of firms from Hong Kong. Their aim is to study the change in reporting the unrecognised changes of the fair values of investments properties from the revaluation reserve (SSAP 13) to the income statement (HKAS 40). Hong Kong has adopted HKAS 40 as a part of a project to converge national accounting standards to IFRS from 2005. HKAS 40 is a word-for-word equivalent standard to IAS 40 *"Investment Property"*. So & Smith (2009) following an event study methodology, they implement two empirical models. One is based on short-window and the other on long-window abnormal returns. In particular, each model regresses the buy-and-hold abnormal returns on a dummy variable that takes the value of one if HKAS 40 applies for the first time and zero otherwise. Furthermore, the models control for earnings before gains and losses, changes in earnings, gains and losses in fair values of investment properties, three interaction terms between the dummy variable and the earnings, changes in earnings, and gains and losses variables, firm size, and leverage. Findings of So & Smith (2009) indicate that the market has a higher respond when changes in fair values of investment property recognised in income statement (required by HKAS 40) than in revaluation reserve (required by SSAP 13). These findings are opposite to the results provided by Owusu & Yeoh (2006) for a sample of New Zealand firms. The results do not support the view that recognising unrealised gains in income statement have greater explanatory power than recognising them in a revaluation reserve.

In another recent study, Danbolt & Rees (2008) examine the market valuation of historical cost accounting as compared to fair value accounting for a sample of UK real estate firms and investment fund firms. The period of their study is from 1993-2002. Their model follows the RIVM described in Chapter 3. It regresses price changes on net income per share, changes in net income per share, changes in equity per share, and changes in the revaluation component of equity. Their results, under a model controlling only for earnings, indicate that fair value earnings have higher explanatory power than historical cost earnings. However, expanding the model to include the changes in the equity of fair value accounting, they do not find any significant difference in the explanatory power between the fair value and the historical cost income measures. This finding is consistent with the statement of Barth

& Landsman (1995) that in a full fair value accounting system, which is the case with investment fund firms,

'… (2) a fair value-based balance sheet reflects all value relevant information; (3) a fair value-based income statement is redundant to valuation'.

Finally, Christensen & Nikolaev (2009) provide evidence about why firms choose to use fair value accounting instead of historical cost accounting, and vice versa, for a number of non-financial assets, when accounting standards permit either of these two measurement methods. They focus on i) investment property, ii) property, plant and equipment, and iii) intangible assets. Their sample includes firms from two major European economies, the UK and the German economy, that were required to swap from national accounting standards to the IFRS in 2005. They found that only just 3% of sample firms use fair values for owner-occupied property and 47% for investment property. They explain that the initiative of a firm to use fair value accounting is related to contracting: firms that choose fair values rely more on debt financing than equity. Christensen & Nikolaev (2009) argue that the use of fair values by these firms is a demand of their creditors and not of the investors. Contrary to previous studies (e.g. Barth & Clinch, 1998), Christensen & Nikolaev (2009) support the contracting view of using fair values as compared to the valuation view. Their findings resemble most the findings of Aboody et al. (1999) who they found that firms with higher debt-to-equity ratios use fixed asset revaluations to manipulate this ratio.

4.4 Conclusion

The aim of the chapter was to review the value relevance empirical studies on fair value estimates. Value relevance studies were separated between banking and non-banking empirical studies. This distinction was made because the focus of this thesis is commercial banks and thus empirical findings on banks are of particular interest. The value relevance literature on banks focuses solely on financial instruments. The literature on non-banks covers a variety of financial statement elements, such as such fair value estimates of tangible and intangible assets. The literature is separated further between US and non-US studies.

Overall, the empirical findings on banks support the view that fair value estimates of most financial instruments are value relevant. In particular, investment securities' fair values are found significant in explaining share prices in most of the studies (Barth, 1994; Ahmed & Takeda, 1995; Barth et al., 1996; Eccher et al., 1996; Nelson, 1996). Evidence on the fair values of derivatives indicates that they are relevant in equity valuation (see, Venkatachalam, 1996; Seow & Tam, 2002). Ahmed et al. (2006) also find that recognised fair values of derivatives are significantly related to share prices, whilst derivatives' disclosures are not. This result suggests that market participants do not perceive fair value disclosures as being substitutes for fair value recognitions. Barth et al. (1996), Eccher et al. (1996), and Nelson (1996) find the fair values of off-balance sheet instruments (including derivatives) insignificant. They explain that their results are biased by ambiguities in banks' financial statements due to SFAS No. 107. These ambiguities have been considered by SFAS No. 119 and No. 133. Apart from fair values, banks report in the notes the notional amounts of derivatives which provide further information on banks' risk. Studies by Venkatachalam (1996), Riffe (1997), and Wang et al. (2005) provide evidence that notional amounts of derivatives are important in determining share prices.

Fair value estimates of loans are regarded as being more subjective than the fair values of investment securities. However, Barth et al. (1996) found significant the fair values of loans under all model specifications. In contrast, Eccher et al. (1996) and Nelson (1996) do not provide similar results. The different results can be attributed to methodological approaches and to the research design that each study follows. For example, Barth et al. (1996, p. 517) explain these differences as follows:

'...Because the sample banks and time periods are similar across the three studies, the difference in findings is likely attributable to research design. As discussed more fully in Section III, the primary difference between this study's research design and those in ERT (1996) and Nelson (1996) relates to the explanatory variables in the estimating equation in addition to the SFAS No. 107 variables.'

With respect to other financial instruments, such as deposits and long-term debt, fair value accounting does not seem to provide relevant information to investors. A plausible explanation for deposits is that SFAS No. 107 requires that the fair values of all deposits with no stated maturities equal their amounts payable on demand.

Recent studies of Song et al. (2010), Goh et al. (2009), and Kolev (2008) provide evidence that SFAS No. 157's classification of fair value estimates in three Levels is value relevant. In addition, they found that fair value estimates based on direct observable market inputs (Level 1) are more value relevant than indirect observable inputs of comparable items (Level 2) and mark-to-model estimates (Level 3).

Although there is plenty of evidence for the value relevance of financial instruments of US banks, such evidence for non-US samples is rare. An exception is the study of Bernard et al. (1995) who reported that price adjustments to investment securities represented reliable estimates.

There is also considerable evidence concerning the value relevance of financial instruments of firms other than banks. Carroll et al. (2003) provide evidence for mutual funds; they report that all types of investment securities' fair values are reliable enough to be reflected in share prices. On the other hand, Petroni & Wahlen (1995) find that for property-liability insurers only investment securities traded in active and liquid markets, such as equity and US Treasury investments, are significantly related to market values, whilst other types of securities, such as municipal and corporate bonds are not value relevant. Findings on a sample of nonfinancial firms (Simko, 1999) indicate that only the fair values of financial liabilities are significant.

Apart from financial instruments, researchers test the value relevance of intangible and tangible assets. Lev & Sougiannis (1996) and Aboody & Lev (1998), respectively, found significant the R&D capitalisations and the software capitalisation costs. Regarding tangible assets, Easton et al. (1993) and Aboody et al. (1999) provide evidence that tangible asset revaluations for a sample of Australian and UK firms, respectively, are value relevant. In another study using Australian data, Barth & Clinch (1998) found that revaluations of property were only significant for non-financial firms, whilst plant and equipment revaluations were significantly related to share prices merely for the mining industry.

Studies on UK investment properties, such as Dietrich et al. (2001), support the view that fair values are more accurate estimates of the realised selling prices than historical cost estimates. The results of Danbolt & Rees (2008) on UK real estate firms and investment fund firms indicate that fair value earnings are value relevant, whilst historical cost earnings are not. Finally, findings from a Hong Kong sample reveal that recognising in income statement the unrealised profit and losses of investment properties (required under HKAS 40) are relate more to abnormal returns than recognising unrealised profit and losses in a revaluation reserve (So & Smith, 2009). However, this later finding is not supported by Owusu & Yeoh (2006) for a sample of New Zealand firms.

Contrary to all studies above, that take the valuation point of view to explain the use of fair values, Christensen & Nikolaev (2009) adopted the contracting point of view. Specifically, they provide evidence that the UK and German firms, that choose to use fair values for their property, are debt financing firms that intend to signal the current values of their property more to their creditors and less to the investors.

Overall, most of value relevance studies on fair values relate to US GAAP. However, studies on the IFRS and specifically, on the value relevance of banks' financial instruments' fair values do not exist. Taking advantage of this gap in the literature, the aim of this thesis is to provide further evidence on the relevance and reliability of fair value accounting under IAS 39 and IAS 32. The sample of the thesis is a number of European commercial banks from the 27 EU member-states including two more large European economies, Switzerland and Norway.

Chapter 5: Review of the Cost of Equity Empirical Studies

5.1 Introduction

The second empirical part of this thesis examines the impact of the mandatory adoption of IFRS on banks' CE. The purpose of this chapter is to review the empirical literature on the relationship between increased disclosure and the CE. Increased disclosure could be either the result of an initiative by some firms to communicate more information to the financial markets or an imposition by a law as it is the case with the adoption of IFRS by all European listed firms from 2005 onwards. The level of disclosure has been a constant issue in accounting standard-setters' agenda as the benefits of providing financial information to the investment community is closely related to the fundamental economic problem of the optimum wealth allocation; firms that perform better than their peers should receive more of the available funds of the society (Healy & Palepu, 2001).

As discussed in Chapter 3 (Section 3.2.2), CE is an important input in equity valuation procedure as it is used extensively in equity valuation formulae to discount firms' expected future cash flows (Pastor & Stambaugh, 1999). Two of the valuation models explored in Chapter 3, namely, the RIVM and the Ohlson & Juettner (2005) models have been used extensively by the accounting literature to estimate the CE. Hence, most of the empirical studies analysed in this chapter use these two models to derive estimates for the CE.

The chapter is organized as follows: Section 5.2 analyzes the empirical studies on the relationship between the level and quality of financial disclosures and the CE.

Empirical studies are separated between the non-IFRS and the IFRS literature. Finally, Section 5.3 concludes.

5.2 Review of the empirical studies

This section examines the empirical literature pertaining to the relationship between firms' disclosure level and the CE. The studies are separated between the non-IFRS and the IFRS literature. This distinction was necessary given the fact that this thesis deals with the IFRS and the CE.

5.2.1 The Non-IFRS literature

The empirical studies analysed below represent the most important studies on the relationship between increased disclosure and the CE. Early studies in the literature examined the impact of increased disclosure on firms' CE using proxies for the CE. These studies used asset pricing theory (e.g. CAPM) to derive measures for the CE. For example, Dhaliwal (1979) provides evidence on whether the requirement of the SEC for multi-product firms to disclose revenues and profits in further analysis, i.e., by line-of-business, had an impact on the CE (which was based on proxies derived from the CAPM, such as the dispersion of the returns of a firm *i*, $\sigma(\widetilde{R}_i)$).

The sample of Dhaliwal (1979) was based on two groups of firms. 25 firms that constituted the experimental group (firms that were affected by the new regulation by having to report additional information) and 26 firms that constituted the control group (firms that were not affected). Dhaliwal (1979) developed an empirical model that regresses the proxies for the CE on a number of control variables and a dummy variable that takes the value of one if a firm belongs to the experimental group, and the value of zero if a firm belongs to the control group[16]. The results indicate that firms in the experimental group (that reported additional information) had lower CE than firms in the control group.

A complementary study to Dhaliwal (1979) is that of Dhaliwal et al. (1979) who also examined the requirement of the SEC for disclosing revenue and profits by the type of product (segmental disclosure). Their results support again the findings of Dhaliwal (1979) that the CE is decreased for those firms that extended the disclosure of revenue and profits by type of product.

Later empirical studies, instead of proxing for the CE, they estimated it using equity valuation models, such as the RIVM and the Ohlson & Juettner (2005) model (see, Chapter 3, Sections 3.2.1.2 and 3.2.1.5). These models derive the CE as the implied required rate of return that equates share price to the discounted expectations of future earnings.

Both RIVM and Ohlson & Juettner (2005) model are theoretical models and one needs to make specific assumptions in order to apply them. Thus, Gebhardt et al. (2001) and Claus & Thomas (2001) provide an empirical implementation of the RIVM, and Gode & Mohanram (2003) and Easton (2004) provide an empirical implementation of the Ohlson & Juettner (2005) model (for the detailed discussion of these methods see, Chapter 7). These implementations of the two theoretical models above have been used extensively by most of the empirical studies discussed below.

16 The control variables are the payout ratio, a growth variable, the leverage ratio, the current liquidity ratio, a size variable (total assets), and the earnings variability (measured as the standard deviation of the E/P ratio).

Using a sample of 122 US manufacturing firms, Botosan (1997) examines whether firms' with increased disclosure experience lower CE. She approximated the CE using a derivation of the RIVM based on analysts' forecasted earnings per share. She also developed an index to measure the level of disclosure that each firm provides through its annual report based on five attributes of financial reporting, such as the background information, summary of historical results, key non-financial statistics, projected information, and management discussion and analysis.

Botosan's (1997) primary results indicate that for the full sample although the coefficient of the disclosure index is found negative as predicted, it is insignificant which means that increased disclosure is not related to lower CE. Further analysis reveals that there is a significant inverse relationship between the level of disclosure and the CE, however, only for firms with low analyst following but not for firms with high analyst following. Usually, firms with high analyst following keep financial community well informed by disclosing a substantial amount of financial information. On the other hand, the benefits of increased disclosure are more profound to firms with low analyst following.

Similar results with that of Botosan (1997) are also provided by Richardson & Welker (2001). Their study examines a sample of 87 Canadian firms for 225 firm-year observations (The period of the study was 1990 – 1992). They used the Gebhardt et al. (2001) method to estimate the CE which is the implied required rate of return. Richardson & Welker (2001) document a negative association between higher levels of disclosure and CE for their full sample model. They also found that analyst following play an important role in the magnitude of the reduction in the CE, with firms with low analyst following to experience lower CE. However, although these results hold for the financial disclosures of firms, they do not also hold for the social disclosures.

Two other studies that found a negative relationship between the level of disclosure and the CE are those of Botosan & Plumlee (2002) and Hail (2002). Contrary to Botosan (1997), who developed her own measure of disclosure level, Botosan & Plumlee (2002) used a disclosure level index found in a report of the Association for Investment Management and Research (AIMR) and Hail (2002) relied on a study conducted by the Swiss Banking Institute (SBI).

The focus of Botosan & Plumlee (2002) is a sample of 668 US firms from a wide range of industries for the period 1986 – 1996. Contrary to previous studies that used the RIVM (e.g. Richardson & Welker, 2001), Botosan & Plumlee (2002) implemented a DDM to estimate the CE which is regressed on four measures of disclosure level under four separate models. The four measures of disclosure level are: i) the total disclosure level, ii) the annual report score, iii) other publication score, and iv) investor relations score (where, the last three measures of disclosure are the disaggregation of the total disclosure measure). Furthermore, in a fifth model they also included all the last three disclosure measures.

Controlling for market beta and firm size, Botosan & Plumlee (2002) fail to find significant results for the coefficient of the total disclosure level measure. However, examining the disclosure level by type, they find significant negative relationship for the ‘annual report score’, indicating that firms which voluntarily disclose more in annual reports tend to have lower CE. Contrary to the expectations, the 'other publication score' is found to have a significant positive impact on the CE. Botosan & Plumlee (2002) attribute this positive association to managers' concerns that greater disclosure in quarterly reports (a major component of 'other publication score') could increase the CE through greater share price volatility. Finally, the results for the 'investor relations score' are insignificant suggesting that greater investor relations services do not have any impact on the CE.

Another study supporting the view that increased disclosure decreases CE is that of Hail (2002). The findings are based on 73 non-financial firms listed on the Swiss Exchange. Hail (2002) estimated the CE using a derivation of the RIVM provided by Gebhardt et al. (2001). Similar to other studies (Botosan, 1997; Botosan & Plumlee, 2002), Hail (2002) regressed the CE estimates on the primary variable of interest, namely: the proxy variable for the disclosure level, and a number of control variables, such as market beta, leverage, and a variable to control for firm size (the natural logarithm of market value). As it is predicted the coefficient of the primary variable of interest is found to be negative supporting the view that higher level of disclosure results in lower CE.

A later study on the relationship between voluntary disclosure and the CE is that of Francis et al. (2008) who examined a sample of 677 US firms. Similar to Botosan (1997) the researchers proxy for firms' voluntary disclosure by developing a self-constructed index using information from annual reports and K-10 filings[17]. Francis et

17 Francis et al. (2008) index on voluntary disclosure is an equally weighted index of the scores of four separate categories of corporate information found on annual reports and K-10 filings, namely: summary of historical results, other financial measures, non-financial measures, and projected information.

al. (2008) used a number of different ways to calculate the CE. Their primary way is a model that imposes dividends to be reinvested at firm's CE. They also used several other measures of the CE in their sensitivity analysis tests. In particular, they calculated the CE as: i) the realized portfolio returns, ii) the realized firm-specific returns, iii) other implied cost of debt, and iv) the implied cost of equity (i.e. Easton, 2004).

The primary results of Francis et al. (2008) indicate that there is a significant inverse relationship between increased disclosure and the measures of CE. However, this significance disappeared when they controlled for earnings quality (e.g., accruals quality and earnings variability). They show that firms with high earnings quality select to disclosure more information to the financial community in order to communicate the good news to the market. This means that the lower CE that has been observed is related more to higher earnings quality and less to the increased disclosure per se.

All of the studies discussed above relate to non-financial firms. In contrast, Poshakwale & Coutris (2005) performed an empirical test to examine the impact of voluntary disclosures of 135 world-wide banks on their CE[18]. The estimates of the CE were based on a transformation of the dividend growth model (see, Chapter 3, Section 3.2.1.1). They also constructed an index to proxy for banks' voluntary disclosures based on 29 key financial and non-financial performance measures that relate to the banking industry. Controlling for a number of risk-related factors, such as beta, bank-

18 Poshakwale & Coutris (2005) sample consisted of 135 banks, 73 European banks and 62 non-European banks from the US, Canada, and Australia. The period of this study was the 1995 – 1999.

size, Price-to-Book ratio, and the P/E ratio, Poshakwale & Coutris (2005) found significant lower CE for banks with increased disclosure. Further evidence indicates that disclosures with respect to risk management activities, contribute the most to the reduction of banks' CE. Finally, European banks with high levels of disclosure experienced lower CE than their peers in non-European countries.

In summary, the non-IFRS literature supports the view that increased disclosure results in a lower CE (see, Table 5.1). This conclusion holds irrespective of which proxy or method is used to approximate the CE (e.g., Dhaliwal, 1979; Botosan, 1997; Hail, 2002; Poshakwale & Coutris, 2005).

Table 5.1
Summary of the non-IFRS literature

Study	**Sample**	**CE Estimate**	**Impact on CE Decrease (D) / Increase (I)**[1]
Dhaliwal (1979)	US firms	Proxies derived from CAPM	D
Dhaliwal et al. (1979)	US firms	Proxies derived from CAPM	D
Botosan (1997)	US firms	RIVM	D[2]
Richardson & Welker (2001)	Canadian firms	Gebhardt et al. (2001)	D
Botosan & Plumlee (2002)	US firms	DDM	D/I[3]
Hail (2002)	Swiss firms	Gebhardt et al. (2001)	D
Poshakwale & Coutris (2005)	European, US, Canadian, Australian banks	DDM	D
Francis et al. (2008)	US firms	• A model that imposes dividends to be reinvested at firm's CE. • Realized portfolio returns. • Realized firm-specific returns. • Implied cost of debt. • Easton (2004).	D[4]

Notes:.

1. The last column indicates the impact of increased disclosure on the CE. (D) for Decreased and (I) for Increased.
2. Although the study found a reduction in CE, this holds only for firms with low analyst following.
3. With respect to disclosure in annual reports the CE has decreased. For quarterly disclosures the CE has increased and for disclosures relating to investor relations there is no impact on the CE.
4. The negative relationship between increased disclosure and CE disappears conditional on earnings quality.

5.2.2 The IFRS Literature

This section discusses the empirical studies that relate to the IFRS literature. The transition of an increasing number of countries from national accounting standards to the IFRS is an ideal context to examine whether increased disclosure and comparability affect the CE. In general, IFRS require firms to disclose a substantial amount of information in annual reports usually much more than the national accounting standards (Ashbaugh & Pincus, 2001). Moreover, IFRS are regarded as a set of high quality accounting standards providing more timely financial information while at the same time diminish earnings management (Barth et al., 2008). Comparability, through the adoption of one set of accounting standards, such as the IFRS, eliminates adjustments in making financial accounts, prepared under different accounting standards, comparable.

Accounting literature, long before the mandatory adoption of IFRS provided some first evidence on the impact of IFRS on the CE using samples of early-adopter firms (see Section 5.2.2.1). Evidence is also provided by later studies, after the mandatory adoption of IFRS (see Section 5.2.2.2).

5.2.2.1 Voluntary disclosures of IFRS

Leuz & Verrecchia (2000) examine whether increased disclosure decreases the information asymmetry between insiders and investors, and as a consequence decreases the CE. They developed proxies for the information asymmetry component of the CE using the bid-ask spreads; trading volumes of share prices; and share price volatility.

Consistent with their expectations, Leuz & Verrecchia (2000) found significant lower bid-ask spreads and higher trading volumes for a sample of German firms that switched from German GAAP to international reporting standards (IFRS or US GAAP) as compared to a sample of German firms that continued to report under the German GAAP (their full sample consists of 102 German firms). These findings support the argument that increased disclosure benefits firms by decreasing the information asymmetry component of the CE. However, results with respect to share price volatility indicate none economic benefit for firms. Finally, the differences in economic benefits between firms that report under IFRS and firms that report under US GAAP are found to be small and insignificant. This last finding is consistent with the study of Leuz (2003) which examined the differences in economic consequences between adopting the IFRS or the US GAAP for a sample of firms in the German New Market.

Cuijpers & Buijink (2005) examined 114 non-financial EU firms that voluntarily adopted IFRS or the US GAAP. They implemented only one estimate of the CE that derived from Easton et al. (2002). Their analysis indicates that firms following IFRS/US GAAP exhibit higher CE than a comparable sample of firms that reported under national GAAP. The comparable sample was selected on a firm-by-firm basis in order to match the risk characteristics and the country origination of the IFRS/US GAAP firms. Thus, Cuijpers & Buijink (2005) using a matched sample design control for country origination and for specific risk characteristics, such as beta, size (measured as the natural logarithm of market capitalisation), and the likelihood of a firm to have adopted the IFRS/US GAAP. Cuijpers & Buijink (2005) provided two explanations for the higher CE of the IFRS/US GAAP firms: i) either that firms need time to familiarize themselves with the IFRS/US GAAP, or ii) investors need time to understand better and interpret correctly the financial results. They tested the later statement by separating the sample into two groups of 'early' and 'late' adopters. Again the results do not support a lower CE for IFRS/US GAAP firms. However, the differences in the CE between the IFRS/US GAAP firms and the national GAAP firms for 'early' adopters were smaller.

The findings of Cuijpers & Buijink (2005) are in conformity with those of Daske (2006). Using a sample of 735 German firms, Daske (2006) examines whether the voluntary adoption of globally recognised accounting standards, such as the IFRS and the US GAAP, is related to a decrease in CE for the period 1993-2002. His full sample consists of 24,359 monthly observations of German firms that use IFRS (4,567 observations), US GAAP (3,542 observations), and German GAAP (16,250 observations).

Daske (2006), in order to derive estimates for the CE, used the Gebhardt et al. (2001) model and the Gode & Mohanram (2003) model which are an implementation of the RIVM and the Ohlson & Juettner (2005) model, respectively. These two models require subjective assumptions regarding the long-term growth of earnings that may add bias to CE estimations (see, Chapter 7, Section 7.3.1). Thus, Daske (2006) also calculated the CE by simultaneously estimating the CE and the growth of earnings using Easton et al. (2002) and Easton (2004) models. However, the simultaneous estimation of the CE can be applied only at a portfolio level and not at an individual firm level.

The descriptive statistics of Daske (2006) indicate that the CE is higher for firms that report under IFRS and the US GAAP than for firms that report under German GAAP. These results apply for the full sample (24,359 observations) as well as for firms that switched from German GAAP to IFRS/US GAAP within the sample's period. Similarly, the results from the multivariate regression models indicate that firms reporting under IFRS (or the US GAAP) hold on average higher CE than firms reporting under German GAAP. This is evidenced by the positive coefficient of a dummy variable that takes the value of one for firms that follow IFRS (or the US GAAP) and the value of zero otherwise (i.e. firms that follow German GAAP). However, this dummy variable is not found to be significant under all model specifications (e.g. using the Gode & Mohanram (2003) model to estimate CE).

Finally, Daske (2006) performed a time-series test. Under this test he examined the CE for a maximum period of three years before and three after German firms have switched from German GAAP to IFRS/US GAAP. He found again that the CE has increased when German firms switched from national accounting standards to globally accepted accounting standards (e.g., IFRS and US GAAP).

Another study on the voluntary adoption of IFRS (and the US GAAP) is that of Dargenidou et al. (2006). They examined the economic consequences on the CE for a sample of firms from 16 European countries (EU countries and Switzerland and Norway) that switched from national accounting standards to either IFRS or US GAAP. Dargenidou et al. (2006) estimated the CE using one equity valuation model, the Ohlson & Juettner (2005) model for the period 1995 to 2004. Their results indicate that the CE has increased for firms that switched from national accounting standards to the IFRS/US GAAP. This result is in conformity with the findings of Daske (2006) above that also reported an increased CE for a sample of German firms that were reporting under globally accepted accounting standards (i.e. IFRS and US GAAP). However, Dargenidou et al. (2006) found that the increase in the CE is smaller for larger firms with already increased disclosure.

Daske et al. (2007) used a large sample from 24 countries around the world (e.g., Hungary, Switzerland, Italy, Germany, China) to examine the economic consequences of the adoption of IFRS by firms that voluntarily adopted the standards in 1988-2004. The valuation models used to estimate the CE are the Claus & Thomas (2001) model, Gebhardt et al. (2001) model, Ohlson & Juettner (2005) model, and the Easton (2004) model. Overall, they find little evidence that the adoption of IFRS reduce CE or increase liquidity. In additional tests, they split the sample into ‘serious’ adopters (i.e., firms that voluntarily adopted IFRS as a commitment to greater transparency) and ‘label’ adopters (i.e., firms that voluntarily adopted IFRS as a label without making serious changes to their reporting policies). Under this analysis, their results indicate that the CE and the liquidity for ‘serious’ adopter firms have been decreased and increased, respectively. In contrast, they do not provide any evidence for the 'label' adopters.

Finally, Christensen et al. (2007) examined the economic consequences of the likely adoption of IFRS by a sample of UK firms before they become mandatory in 2005. UK legislation precluded the use of IFRS before the mandatory adoption date. Thus, Christensen et al. (2007) based on the German experience, where some firms had adopted voluntarily the IFRS before they became mandatory, they constructed a counter-factual proxy for the probability that the UK firms would have adopted IFRS voluntarily if they had been permitted to do so.

Christensen et al. (2007) tested the economic consequences in two ways: First, they implemented an 'event-study' based on announcements (i.e. events) that were in favour (or not in favour) of mandating IFRS in the UK. Second, they examined the long-term changes in UK firms' CE between a period where the mandatory adoption of IFRS was not certain (January 1996 – December 1998, the pre-announcement period) and a period where the mandatory adoption of IFRS was certain (September 2001 – October 2004, the post announcement period). With respect to the 'event study', findings reveal that the counter-factual proxy for UK firms (i.e. firms that were more likely to have voluntarily adopted the IFRS) is positively (negatively) related to the reactions of share prices to favourable (unfavourable) events of mandating IFRS. Regarding the second test, results indicate that the CE has increased from the pre-announcement period to the post announcement period. However, Christensen et al. (2007) found that the counter-factual proxy is inversely related to changes in CE. This last finding indicates that UK firms that were more likely to have adopted the IFRS, if they were permitted, experienced lower increases in the CE which is translated in greater benefits for these firms. Christensen et al. (2007) estimated the CE using the Gode & Mohanram (2003) and the Easton (2004) model (see, Chapter 7).

5.2.2.2 Mandatory disclosures of IFRS

This section analyses recent studies that examine the economic consequences of the mandatory adoption of IFRS. As a rule, these studies implement empirical models which regress the CE estimates on a dummy variable which takes the value of one for periods after the mandatory adoption of IFRS and zero for periods prior to the mandatory adoption of IFRS.

The first study under this category is that of Lee et al. (2008) that used a maximum sample of 18,900 non-financial firm-year observations from 17 European countries. They estimate an implied CE using the Ohlson & Juettner (2005) model and the Easton (2004) model in unadjusted and adjusted forms. The unadjusted CE is derived directly from the valuation formulae of the Ohlson & Juettner (2005) model and the Easton (2004) model. The adjusted CE is the residuals from the regression of the unadjusted CE on company-specific characteristics that are found in the literature to be correlated with the CE[19]. Therefore, the adjusted CE includes only the portion of the unadjusted CE that it is not affected by the changes in the company-specific characteristics.

19 The company-specific characteristic used in the regression to derive the adjusted CE are: the log of market value, the book-to-market ratio, the debt-to-equity ratio, sales growth, R&D expenses, % of closely held shares of the company, and years dummy variables.

The authors control for the institutional environment of the different countries after considering two competing theories which relate to the benefits of mandatory adoption of high quality accounting standards, such as IFRS. The first 'school of thought' suggests that accounting standards determine accounting quality. Consequently the benefits relating to the adoption of high quality accounting standards, such as IFRS, will be greater for countries with previously low quality national accounting standards, such as Portugal. This school of thought is referred to as the pro-standard school. The second 'school of thought' suggests that as long as IFRS are developed as equity-based standards and not as debt-oriented standards, the benefits from their adoption should be more obvious in equity-based economies, such as the UK and Ireland than in debt-based economies such as Germany. Moreover, preparers' incentives to use discretion techniques when applying IFRS will be lower for equity-based economies, since the benefits of compliance will be higher for these firms. Hence, the second 'school of thought' suggests that both the institutional context and preparer's incentives determine the accounting quality. They refer to this 'school of thought' as the pro-incentive school.

On the basis of the above arguments Lee et al. (2008) classify the European countries into high financial reporting incentive and low financial reporting incentive countries. They base their classification on Leuz et al (2003). They use five institutional characteristics to each of which they give a score of one: outsider rights (based on La Porta et al., 1998), the importance of the equity market (La Porta et al., 1997), ownership concentration (La Porta et al., 1998), disclosure quality (based on, La Porta et al., 1998), and earnings management (Leuz et al., 2003). Thus, countries that have a score of five (only the UK falls into this category) are regarded as the countries with the highest financial reporting incentives, and those with a score of zero (such as Austria, Belgium, Germany, Greece, Italy, and the Netherlands) as the ones with the lowest incentives.

In addition, they control for a number of variables which are considered as explanatory of a firm's CE, (i.e., market value, book-to-market ratio, debt-to-equity ratio, sales growth, R&D expenses, % of closely held shares of the company, and years dummy variables).

Lee et al. (2008) report that their results provide support to the pro-incentive 'school of thought' that firms in high financial reporting incentive countries (i.e. the U.K.) experience lower CE after the mandatory adoption of IFRS than firms in countries with low financial reporting incentives. The lower CE for UK firms is surprising given the fact that UK GAAP and IFRS could be seen as equivalent in terms of quality. Further analysis of Lee et al. (2008) revealed that only the UK firms with greater demand for foreign capital (as measured by the annual growth in foreign to total revenue) experienced the lower CE. This finding implies that the combination of equity-based economies (such as the UK), higher disclosure incentives and greater demand for foreign capital leads to a reduction in CE due to cross-border comparability following the adoption of IFRS. Such observation does not hold for the other European countries.

The second study, Daske et al. (2008), examined the economic consequences of the mandatory adoption of IFRS using a world-wide sample of firms from 26 countries. The study covered the period 2001 – 2005. However, a shorter period is used in the univariate analysis (2004 – 2005, see below). Their objective was to test whether the adoption of IFRS results in economic benefits for firms, in the form of:

i) increased liquidity; proxied by zero returns, price impact, total trading costs, and bid-ask spreads.

ii) lower CE; calculated using the average of four CE methods derived by Claus & Thomas (2001), Gebhardt et al., (2001), Ohlson & Juettner (2005), and Easton (2004).

iii) increased market valuation; measured by Tobin's q which is defined as (Total Assets – Book Value of Equity + Market Value of Equity)/Total Assets.

Daske's et al. (2008) analysis involved a univariate comparison of the CE, liquidity, and the market valuation between a sample of firms that required to adopt IFRS in 2005 (the mandatory group) and a sample of firms that were not reporting under IFRS (the benchmark group) during the period 2004 – 2005. The number of observations differs as to which dependent variable is used. For example, the number of observations for the CE is 688 observations for the mandatory group and 599 observations for the benchmark group. Thus, comparing the changes in the liquidity, the CE, and the market valuation between 2004 and 2005 (a year before the mandatory adoption of IFRS and a year after) they found that liquidity increased more for the mandatory group (IFRS adopters) than the benchmark group (non-IFRS adopters) which indicates that the adoption of IFRS results in more economic benefits. In contrast, results on CE indicate that the mandatory group experienced a greater increase in the CE than the benchmark group. This finding does not support the argument that increased disclosure resulted by the IFRS, decreases information asymmetries and as a consequence the CE. Results on market valuation reveal that the benchmark group had more economic benefits (i.e. market valuation increased) than the mandatory group.

Daske et al. (2008) also test three separate regression models, one for each of the economic benefits presented above: CE, liquidity, and market valuation. These three economic benefits constitute the dependent variables. The independent variables include a series of dummy variables (i.e. binary variables) such mandatory adopters: firms that mandatory adopted IFRS, and voluntary adopters (early and late voluntary): firms that voluntarily adopted IFRS. Daske et al. (2008) also included the interaction terms between these dummy variables. Apart from dummy variables, they controlled also for industry-year-fixed effects, US cross-listing, US GAAP reporting, being a member of a major stock index, firm size, financial leverage, the risk-free rate, return variability, and forecast bias. The results of the regression tests indicate that the market liquidity increased for all firms reporting under IFRS. In particular, firms that mandatory adopted IFRS experienced the smallest increase in liquidity as compared to firms that voluntarily adopted the IFRS where they experienced greater increase. Results with respect to the CE are in conformity with the findings in the difference-in-difference analysis, the univariate analysis (see previous paragraph). The CE increased for firms that mandatory adopted the IFRS. Daske et al. (2008) attributed this increase to the anticipation effect: investors given the assumption that IFRS reduce CE, they might have assigned a lower CE to discount the expected earnings, quite before the date where the IFRS became mandatory in 2005. Hence, they specified the regression model in order to account for the anticipation effect. In particular, Daske et al. (2008) excluded the observations immediately before the IFRS adoption date (observations of 2004) and in a separate model they assumed as the mandatory date the year before the official mandatory adoption (i.e. 2004 instead of 2005). Under these two models, the CE of the mandatory adopters decreased. With respect to voluntary adopters, findings are found to be similar but stronger than the findings of the mandatory adopters above. Findings regarding market valuation indicate that mandatory firms do not experience economic benefits: market valuation decreased for firms that reported under IFRS. Similar to the CE, when researchers controlled for the anticipation effect the market valuation is found to be increased.

Given the cross-country sample of Daske et al. (2008), it is likely that institutional differences between countries have affected the magnitude of the economic consequences of the mandatory adoption of IFRS. Thus, they further include dummy variables to capture the effect of institutional differences. They found that the liquidity increases only for firms domiciled in countries with strong enforcement rules as well as for firms domiciled in EU countries where governments forced additional rules, simultaneously with the IFRS rules, such as corporate governance enforcement and auditors oversight. Moreover, liquidity increases for firms that domiciled in countries that the national accounting standards differ significantly from the IFRS. However, Daske et al. (2008) discuss (without reporting the results) that findings for market valuation are consistent with the liquidity results (e.g. firms domiciled in strong enforcement countries experienced greater increase in market valuation). Finally, results with respect to the CE are weak. Thus, Daske et al. (2008) only found the CE to be decreased when they control for the anticipation effect. In all other circumstances the CE increased for mandatory adopters.

The third study relating to the mandatory adoption of IFRS is that of Li (2010). The objective of this study is to examine whether there is a significant reduction in CE after the mandatory adoption of IFRS in 2005. Her research includes 1,084 firms from 18 EU countries and covers the period from 1995 – 2006. Similar to Daske et al. (2008), she measures the CE by using the average of four CE methods: the Claus & Thomas (2001), the Gebhardt et al. (2001), the Ohlson & Juettner (2005), and the Easton (2004) method. This average of the CE constitutes the dependent variable of her study. The independent variables of primary interest were two dummy variables; the first controlled for voluntary adopters and the second for pre-IFRS and the post-IFRS period. The other independent variables were control variables that are commonly used in the CE literature, e.g., U.S. cross-listing, country-specific inflation rates, firm size, return variability, financial leverage, and dummy variables for industry and country fixed-effects.

Li's (2010) findings indicate that the CE has decreased significantly for mandatory adopters after the mandatory adoption of IFRS in 2005 by 47 basis points. Contrary to Daske et al. (2008), she failed to find a significant decrease in the CE for the voluntary adopters after 2005. The CE was significantly higher for mandatory adopters than for voluntary adopters prior to 2005. But, this difference disappeared after the mandatory adoption of IFRS in 2005. This finding is consistent with the argument that the adoption of IFRS will induce convergence of financial reporting between firms in the EU.

The view that economic benefits for firms are higher in countries with strong enforcement rules is also supported by Li (2010). Similar to Daske et al. (2008), she run an additional model which included an interaction dummy variable that takes the value of one if a firm is domiciled in strong enforcement rule countries and the value of zero if a firm is domiciled in weak enforcement rule countries. The findings reveal that the reduction in the CE for mandatory adopters is only significant for firms domiciled in countries with strong enforcement rules. In contrast, firms domiciled in weak enforcement rule countries did not experience a significant change in their CE. Li (2010) also provides evidence on whether increased disclosure and information comparability were responsible for the reduction in the CE. She operationalised increased disclosure by the number of additional disclosures the IFRS require (compared to national accounting standards), identified by Nobes (2001). She also used as a proxy for increased disclosure the number of analysts multiplied by firm size in 2004, the year before the mandatory adoption of IFRS. Information comparability is measured by the number of inconsistencies between the IFRS and the national accounting standards (Nobes, 2001). Her findings indicate that increased disclosure and increased comparability are two important attributes of the reduction in the CE due to the adoption of IFRS.

Finally, Li (2010) implemented a number of additional tests. Similar to Leuz & Verrecchia (2000), her first test examines whether the information asymmetry (measured by the bid-ask spread) reduced after the adoption of IFRS. For this purposed, she regressed the natural logarithm of the bid-ask spread to the mandatory dummy variable (mandatory vs. voluntary disclosers), the post-adoption dummy variable, and their interaction. Her model also controlled for the U.S. cross-listing, the natural logarithm of market value, return variability, share turnover, and industry and country fixed effects. The results indicate that they are only significant in the 10%

significance level which provides weak support that the information asymmetry decreased. Her second model excluded countries with no voluntary adopters. Under this model, findings support the primary findings that the CE decreased. Her third and final model controlled for the self-selection bias. She argues that the differences in the results between the voluntary and mandatory adopters could be attributed to heterogeneities between the two groups. To test this argument, Li (2010) implemented a two-stage regression procedure. In the first stage she estimated a probit model which regressed an indicator variable that takes the value of one for voluntary adopters and the value of zero for mandatory adopters on a number of factors that increase the likelihood for a firm to have adopted the IFRS before the mandatory adoption. These factors are firm size, U.S. cross-listing, earnings growth, return-on-assets (ROA), country's legal origin, and industry and year fixed effect. In the second stage, Li (2010) included the inverse Mills Ratio from the first stage as an additional variable in her primary model. The primary results remain unchanged, i.e., the CE decreased. However, Li (2010) argues that the method that controls for the self-selection bias using an instrumental variable is problematic (Larcker & Rusticus, 2010).

Overall, the results from the mandatory IFRS literature indicate that the adoption of IFRS benefits firms either by increasing liquidity (Daske et al., 2008) or by decreasing the CE (Lee et al., 2008, and Li, 2010) (see, Table 5.2). However, the early studies, undertaken prior to the mandatory adoption of IFRS and used samples of firms that voluntarily adopted IFRS, reported conflicting results. Some reported that the CE of such firms has increased significantly (see, Daske, 2006; Cuijpers & Buijink, 2005; and, Dargenidou et al., 2006), whilst others reported that they experienced a reduction in their CE (see, Daske et al., 2007; and, Leuz & Verrecchia, 2000). Table 5.2 summarises the IFRS literature discussed above. The four most common methods in the literature to estimate CE are the Gebhardt et al. (2001); the Claus & Thomas (2001); the Gode & Mohanram (2003) (which is the Ohlson & Juenttner, 2005 model); and the Easton (2004). Hence, these four studies are also implemented by this thesis to derive estimates for the CE (see, Chapter 7).

Table 5.2
Summary of the IFRS literature

Studies	**Sample**	**Method used for CE**	**Impact on CE Decrease (D) / Increase (I)**[1]
Voluntary studies			
Leuz & Verrecchia (2000)	German firms	They used proxies such as bid-ask spreads, trading volumes, and share price volatility.	D
Cuijpers & Buijink (2005)	Non-financial EU firms	• Easton et al. (2002)	I
Daske (2006)	German firms	• Gebhardt et al. (2001) • Gode & Mohanram (2003) • Easton et al. (2002) • Easton (2004)	I
Dargenidou et al. (2006)	European firms	• Ohlson & Juettner (2005)	I
Daske et al. (2007)	World-wide firms	Average of: • Gebhardt et al. (2001) • Claus & Thomas (2001) • Ohlson & Juettner (2005) • Easton (2004)	D
Christensen et al. (2007)	UK firms	• Gode & Mohanram (2003) • Easton (2004)	D
Mandatory studies			
Lee et al. (2008)	European firms	• Ohlson & Juettner (2005) • Easton (2004)	D
Daske et al. (2008)	World-wide firms	Average of: • Claus & Thomas (2001) • Gebhardt et al. (2001) • Ohlson & Juettner (2005) • Easton (2004)	D (when controlling for the anticipation effect)
Li (2010)	EU firms	Average of: • Claus & Thomas (2001) • Gebhardt et al. (2001) • Ohlson & Juettner (2005) • Easton (2004)	D

Notes:

1. This column indicates whether the study found a Decreased (D) or Increased (I) CE after the adoption of IFRS. However, due to the fact that some of the studies found mixed results, this column presents the outcomes of the primary findings. For more information see the analysis in the main text of the thesis.

5.3 Conclusion

The purpose of this Chapter is to review the empirical literature on the relationship between disclosure and CE. Given that one of the main objectives of this thesis is to examine whether the mandatory adoption of IFRS had an impact on the CE of European banks, the emphasis is on studies which test the relationship between the adoption of IFRS (either voluntarily or mandatory) and CE.

The non-IFRS studies examine whether increased disclosure results in lower CE. Early evidence finds a negative correlation between CE proxies, such as CAPM's beta, and increased disclosure (see, Dhaliwal, 1979; and, Dhaliwal et al., 1979). Later studies provide direct evidence by approximating the CE using equity valuation models (Botosan, 1997; Richardson & Welker, 2001; and, Botosan & Plumlee, 2002). Botosan (1997) calculated the CE as the model-implied required rate of return derived by the RIVM. She found that the CE is lower for a sample of US firms that disclose more. However, this finding holds only for firms with low analyst following. Similar results are provided by Richardson & Welker (2001) using a sample of Canadian firms. Botosan & Plumlee (2002) tested the type of disclosures. Their findings suggest that only increased annual report disclosures reduce CE, whilst other disclosures, such as quarterly disclosures, increase the CE through greater share price volatility. Hail (2002) found that the CE is lower for a sample of Swiss firms with increased levels of disclosure and Francis et al. (2008) highlighted the importance of controlling for earnings quality when examining the relationship between increased disclosure and CE. Finally, Poshakwale & Coutris (2005), using a sample of world-wide banks, found that the CE is lower for banks with increased disclosure.

The second part of the review relates to the IFRS literature, and therefore, is directly related to the empirical part of this thesis. Leuz & Verrecchia (2000) examined the impact of the voluntary adoption of IFRS or US GAAP by a sample of German firms on the information asymmetry component of CE. They found that these firms experienced lower bid-ask spreads and higher trading volumes which implies greater economic benefits for these firms. Other studies did not provide support for the proposition that firms which voluntarily adopted IFRS experience a reduction in their CE (see, Cuijpers & Buijink, 2005; Daske, 2006; and, Dargenidou et al., 2006). They found instead that the CE has increased. However, Dargenidou et al. (2006) found that this result is more prominent for smaller firms, with already lower disclosures, than for larger firms. This implies that smaller firms face higher adoption costs to comply with increased disclosure required by IFRS. In another study, Daske et al. (2007) found that only 'serious' voluntary adopters experience more economic benefits (i.e. higher volatility and lower CE) than 'label' voluntary adopters.

Finally, recent evidence from the mandatory adoption of IFRS supports the notion that high quality accounting standards reduce uncertainty and as a consequence the CE. Lee et al. (2008) found that firms from high financial incentive countries (e.g. the UK) experience greater reduction in their CE than firms from low financial incentive countries, (e.g. Austria, Greece, and Italy). This evidence is surprising given the fact that the UK GAAP is perceived as similar to the IFRS. In another study, taking account the anticipation effect, Daske et al. (2008) report significant economic benefits for firms that mandatorily have adopted the IFRS, namely: higher liquidity, lower CE, and higher valuation. Contrary to Lee et al. (2008), Daske et al. (2008) report more economic benefits for firms that are domiciled in countries where the differences between national accounting standards and the IFRS are significant. Furthermore, they document more economic benefits for firms that are domiciled in countries with strong enforcement rules than in countries with weak enforcement rules. This last finding is also supported by Li (2010), who used a large sample of EU firms. In addition, Li (2010) reported a decrease of 47 basis points for the CE of mandatory adopters after the adoption of IFRS in 2005. In contrast, she did not provide evidence that the CE also decreased for the voluntary adopters after 2005.

Up to now, the value relevance and the CE literature have been reviewed in Chapter 4 and 5, respectively. The next two chapters present the methodology of this thesis on the value relevance of fair value accounting and the economic consequences from the mandatory adoption of IFRS.

Chapter 6: Research Methodology on the Value Relevance

6.1 Introduction

This chapter develops the research methodology of the value relevance tests. The analysis distinguishes between the value relevance of fair value disclosures and the value relevance of derivatives' fair value recognitions.

The first research objective of the thesis is to provide further evidence on the relevance and reliability of fair value accounting using a cross-country sample (see, Chapter 1, Section 1.2). Prior studies provide evidence for the value relevance of fair value disclosures using US GAAP (Barth, 1994; Barth et al., 1996; Vankatachalam, 1996). This thesis extends this literature by providing evidence from a sample of European commercial banks that report under IFRS. Moreover, given the cross-country sample, the study also investigates whether institutional differences between countries affect the reliability of fair value estimates. In particular, it is examined whether the level of countries' enforcement rule (strong vs. weak enforcement) gives the latitude to banks to manipulate fair value estimates. However, the need of each firm to manipulate fair values depends on some incentives. This study explores banks' financial health as the incentive to manipulate fair value of loans (Barth et al., 1996) and banks' earnings variability as the incentive to manipulate fair value of derivatives (Barton, 2001). Countries' enforcement rule is combined with these incentives to develop interaction terms in the empirical models.

Value relevance research is based on valuation models that link accounting numbers to market values (Barth, 2000). For the purposes of this study, the value relevance of fair value disclosures is examined using the BSM analyzed in Chapter 3 (Section

3.2.1.6). This is consistent with previous studies (Barth et al., 1996). In contrast, the value relevance of derivatives' fair value recognition is examined using the Ohlson (1995) model, similar to Wang et al. (2005). Other studies on derivatives used the BSM for their analysis (Venkatachalam, 1996; Ahmed et al., 2006). The decision to use the Ohlson (1995) model instead of the BSM as the primary model specification was based on high collinearity (over 99%) between two variables in the BSM, the aggregated fair values of financial assets and liabilities. However, results are also provided by a BSM for completeness.

The Chapter is organised as follows: Section 6.2 discusses the hypotheses. Section 6.3 develops the empirical models. Sample selection and data issues are presented in Section 6.4, and finally, Section 6.5 concludes.

6.2 Development of Hypotheses

6.2.1 Fair value disclosures

Fair value accounting has been proposed as an alternative measurement system to historical cost accounting and has been used extensively by the IASB and the FASB in their accounting standards. For example, the IASB requires the use of fair values in measuring financial instruments (IAS 39), post-employment benefits (IAS 19), and tangible assets' revaluations (IAS 16). However, the use of fair values in financial reporting did not found unanimous support in the financial and the academic community. Fair value estimates have been criticised that provide unreliable numbers, especially, when assets and liabilities are unique and their measurement is based on subjective assumptions. Thus, there is an argument in the accounting literature and practice regarding the merits and limitations of fair value accounting.

Advocates of fair value accounting argue that fair values are relevant as they provide more up-to-date information to users of financial statements than historical cost. They observe that the historical cost value of an asset becomes irrelevant sometimes even immediately after the first date of its recognition and thus is of little importance to investors. Ball (2006, p. 12) argues that,

"the fundamental case in favour of fair value accounting seems obvious to most economists: fair value incorporates more information into the financial statements."

Other benefits of fair values are timeliness and comparability. Timeliness because changes in the economic conditions of assets and liabilities are reflected in the financial statements when they occur and comparability because fair value estimates are based on specific characteristics of an asset (or liability) and not on unique characteristics of an entity (Barth, 2006a; Barth, 2007; Penman, 2007). The criticism of fair values is summarized by Barth (2007, p. 11) as follows:

'lack of a clear definition of fair value, lack of verifiability, the ability for management to affect fair value estimates, and the potential circularity of reflecting fair values in financial statements when the objective is to provide financial statement users with information to make economic decisions that include assessing the value of the equity'.

Motivated by the argument above, this thesis aims to provide further evidence on the relevance and reliability of fair values incrementally to historical costs (or in the context of IAS 39, the amortized costs). The study uses a sample of European commercial banks for the first two years of the mandatory adoption of IFRS, the 2005 and 2006.

US studies support the view that fair value disclosures, for specific types of financial instruments, are quite relevant and reliable enough to be reflected in share prices incrementally to their historical costs. For example, Barth et al. (1996) examine the value relevance of SFAS No. 107 and provide evidence for the relevance of fair value disclosures of loans. However, up to date, we do not have any evidence with respect to the value relevance of IAS 32 disclosures required by the IASB.

Hence, the first research objective is directly related to the value relevance literature that examines the relevance and reliability of fair value measures. For the purposes of this thesis, value relevance is defined as to what extent fair value estimates are related to a measure of market value, such as the market value of equity or the differences between the market value and the book value of equity. The first research objective of this thesis is examined under Hypothesis H_1 stated in the null form:

H_1: The IAS 32 fair value disclosures for financial instruments are not incrementally value relevant over and above their recognised amortised costs.

The null hypothesis H_1 is examined against the alternative hypothesis that IAS 32 fair value disclosures are value relevant incrementally to amortised costs. In order to test H_1 two values of banks' assets and liabilities are required, namely: the fair values and the amortized costs. IAS 39 requires the recognition of loans and advances, held-to-maturity investments, deposit liabilities, and other debt to amortised cost, whilst IAS 32 requires the disclosure of their fair values. Thus, for those four categories of financial instruments two values are available through the annual reports, the recognised amortized values (required under IAS 39) and the disclosed fair values (required under IAS 32).

The explanatory power of the fair values of a bank's financial instruments is likely to be related to the bank's financial condition. Barth et al. (1996) report a higher coefficient for the fair value of loans of banks that have relatively higher capital adequacy ratios. This may be due to the greater incentives that less healthy banks have to manipulate fair value estimates. Irrespective of these incentives, however, such banks' ability to manipulate estimates depends to a great extent on the regulatory environment in which they operate. In general, firms in countries where the mechanisms for enforcing accounting standards are weak are more likely to abuse the discretion afforded by accounting rules and engage in earnings manipulation (Burgstahler et al., 2006). Therefore, banks domiciled in countries with weak legal enforcement of accounting rules will be more able to influence fair value estimates than banks domiciled in countries with strong legal enforcement. This argument leads to the second hypothesis:

H_2: The IAS 32 fair value disclosures of banks with low capital adequacy ratios in countries with weak enforcement of accounting rules are less value relevant than the disclosures of banks with high capital ratios in countries with strong enforcement of accounting rules.

Given, the fact that loans are the most important asset in terms of book value (consist more than 50% of the total assets) and that the difference between the fair values and the book values of loans is the highest of all the differences between the fair values and the book values of the other financial instruments, H_2 is examined only for the fair value estimates of loans (see also, Barth et al., 1996).

6.2.2 Recognition of derivatives' fair values

Most European national accounting standards do not require the recognition or even the disclosure of derivative financial instruments. Thus, the values of derivatives under most national GAAP are hidden from the financial statements. On the other hand, the IFRS and specifically IAS 39 requires the recognition of all derivatives in fair values either as an asset if the derivative has a positive value or as a liability if the derivative has a negative value. Furthermore, IAS 39 separates between trading derivatives and hedging derivatives.

Under historical cost accounting, which is the standard measurement method of most national GAAP, derivatives had negligible or even zero cost upon initial recognition (Whittington, 2005, p. 139). In contrast, under fair value accounting, that both the IASB and the FASB have adopted, an estimate can be provided for the value of the contract which can either be recognised or disclosed in the financial statements.

The Triennial Central Bank Survey (BIS, 2007) reveals that the OTC derivatives market was expanded to $516 trillion in notional amounts, an increase of 135% to the previous survey in 2004 (see Table 1 in Appendix E)[20]. The rapid development of derivatives market and the increasing use of derivatives by commercial banks make interesting the examination of the value relevance of derivatives' fair values and notional amounts.

The US literature on derivatives found relevant the disclosures of derivatives' fair values in explaining share prices (Venkatachalam, 1996). In a later study, Ahmed et al. (2006) provide evidence that derivatives' fair value recognition are value relevant, whilst derivatives' disclosures are not. Although there is evidence in the US literature that supports the value relevance of derivatives' fair values, evidence under the IFRS is not existed. Thus, the second test of value relevance deals with the examination of the relevance and reliability of recognised fair values of derivatives under the IFRS.

20 The Triennial Central Bank Survey is conducted by 54 central banks and monetary authorities and coordinated by the Bank for International Settlements (BIS).

Commercial banks disclose also the notional amounts of derivatives (i.e. contractual amounts) which represent the reference amounts to calculate the cash flows of a derivative contract. These amounts are not being exchanged between the related parties and usually are much higher in value than the fair values. Ryan (2007) suggests that,

‘although the notional amounts of derivatives usually far exceed their fair values, these amounts generally do indicate the risk transferred by derivatives’.

Furthermore, the FASB argues in its SFAS No. 105 that the,

‘notional principal amount of financial instruments… provides a useful basis for assessing the extent to which an entity has open or outstanding contracts’.

Given that the two values of derivatives (the fair values and the notional amounts) may convey different kind of information to the market this study also examines the information content of fair values of derivatives incrementally to their notional amounts. Thus, two more hypotheses are examined in null form:

H_3 = The IAS 39 fair value recognitions of derivatives are not value relevant.

H_4 = The IAS 39 fair value recognitions of derivatives are not incrementally value relevant over and above their notional amounts.

Hypothesis H_3 tests whether the recognition of derivatives in fair values (required under IAS 39) is reflected in share prices and hypothesis H_4 examines the value relevance of derivatives’ fair value recognitions incrementally to their notional amounts.

Similar to fair values of loans (discussed in the previous section), it is likely that managers may also have incentives to manipulate the fair values of derivatives. For example, Barton (2001) provides evidence that firms use derivatives to smooth earnings. If this is also the case for the sample of this thesis then it is expected that derivatives' fair values of banks with greater earnings volatility will be less value relevant than derivatives' fair values of banks with lower earnings volatility. However, the ability of banks to manipulate fair values of derivatives is restricted by countries enforcement rules (weak versus strong enforcement rule countries). Hence, a fifth hypothesis is examined:

H_5 = Fair values of derivatives' recognition of banks with high earnings volatility in countries with weak enforcement rules are less value relevant than the fair values of derivatives' recognition of banks with low earnings volatility in countries with strong enforcement rules.

The next section discusses the primary model specifications and a number of alternative model specifications for robustness.

6.3 Empirical Methodology

This section is separated into two parts. The first part (Section 6.3.1) develops the empirical models that test the value relevance of fair value disclosures (e.g. banks' disclosures on loans and advances, held-to-maturity investments, deposit liabilities, and other debt). The second part (Section 6.3.2) presents the empirical models that test the value relevance of derivatives' fair value recognition.

6.3.1 Fair value disclosures

6.3.1.1 Primary model specification

The methodology described below is based on the BSM which has been discussed extensively in Chapter 3. Value relevance studies usually develop a primary specification model, which is expressed in price level, and alternative specification models, including a changes model. The same procedure is also followed by this thesis.

As discussed in Chapter 3 (Section 3.2.1.6), the BSM can be found in many versions depending on the purpose of the research. This study aims to examine the value relevance of fair value disclosures over and above their book values. Thus, Equation (3.16) is used to test Hypotheses H_1 and H_2. In particular, the differences between the fair values and book values of assets and liabilities in Equation (3.16) are substituted by the specific differences between the fair values and book values of: loans and advances (LNS); held-to-maturity investments (HTM); deposit liabilities (DEP); and other debt (DT). This model specification tests whether the disclosed fair values are value relevant incrementally to the amortized costs, and as a consequence are useful in determining market values.

For all other financial instruments that IAS 39 requires recognition in fair values, namely: 'financial assets and liabilities at fair value through profit or loss', 'available-for-sale assets', and 'hedging derivatives' the empirical model (6.1) below implicitly assumes that the differences between their fair values and book values are zero. The fact that banks recognise these financial instruments at fair value in the balance sheet, results in fair values coincide with book values.

Apart from financial instruments, banks also have other assets and liabilities that are recognised at historical cost, such as property, plant and equipment, and deferred taxes. The definition of the BSM model in Chapter 3 requires the inclusion of all assets and liabilities in the model. Failing to incorporate these elements in the model can bias the estimated coefficients of the primary variables of interest. Thus, the book value of these assets and liabilities are aggregated into two separate variables, the NON39AS and the NON39LI. The primary model specification is defined as follows:

$$MB_{it} = a_0 + a_1 LNS_{it} + a_2 HTM_{it} + a_3 DEP_{it} + a_4 DT_{it} + \\ + \; a_5 NON39AS_{it} + a_6 NON39LI_{it} + \varepsilon_{it} \qquad (6.1)$$

Where, i and t refer to a specific commercial bank at a specific point in time, respectively. According to the literature, in perfect and complete markets the theoretical values of the coefficients in Equation (6.1) are 1 and -1 for assets and liabilities, respectively and the theoretical values for the intercept and the error term are zero (Landsman, 1986). In more realistic settings the estimated coefficients of assets and liabilities are likely to differ from their theoretical values. Therefore, the empirical model (Equation 6.1) provides evidence on whether the estimated coefficients of each asset and liability is statistically different from zero and have the expected signs, positive for assets and negative for liabilities. The results are from a two-tailed test when no sign is predicted for the coefficients of variables and from a one-tailed test when the sign is predicted.

Control variables

As it is, Equation (6.1) suffers from correlated omitted variables, unless it controls for factors that according to the literature can explain significantly the market values. These can be grouped into two categories. First, a group of potential competitors variables to the IAS 39 variables, such as the interest rate risk (denoted as GAP), the default risk (NPL), and the core deposit intangible (CORE). Second, a group of non-IAS 39 variables, such as the notional amounts of derivatives (NADER) and the credit-related off-balance sheet items (OFF). The detailed definition and justification of the control variables is discussed below.

Potential competitors to IAS 39

i) Interest rate risk

Interest rate risk is probably the most important risk of banks. However, it does not affects all banks in the same way as they hold different mixes of rate-sensitive assets and liabilities (Casu et al., 2006, p. 262).

Ryan (2007) separates between two interest rate risks, namely: variability in *value* and variability in *cash flows*. Variability in value arises when future cash flows of a financial instrument do not vary in perfect proportion with interest rate changes. Thus the values of fixed-rate assets are more vulnerable to interest rate changes than the values of floating-rate assets. In contrast, variability in cash flows implies that fixed-rate assets have zero interest rate risk as opposed to floating-rate assets. Hence, no matter how the interest rate risk is conceptualized, banks are vulnerable to the unexpected changes of interest rates, affecting both the values and the expected cash flows of their financial instruments.

Previous studies examined the relationship between interest rate changes and price returns (see Flannery & James, 1984a, 1984b). These studies provide evidence that banks' interest rate sensitivity of share prices is positively related to the nominal maturities of net assets, suggesting the importance of maturity mismatch of assets and liabilities in the valuation of banks. This thesis operationalizes the interest rate risk as the maturity gap of interest-sensitive assets and interest-sensitive liabilities

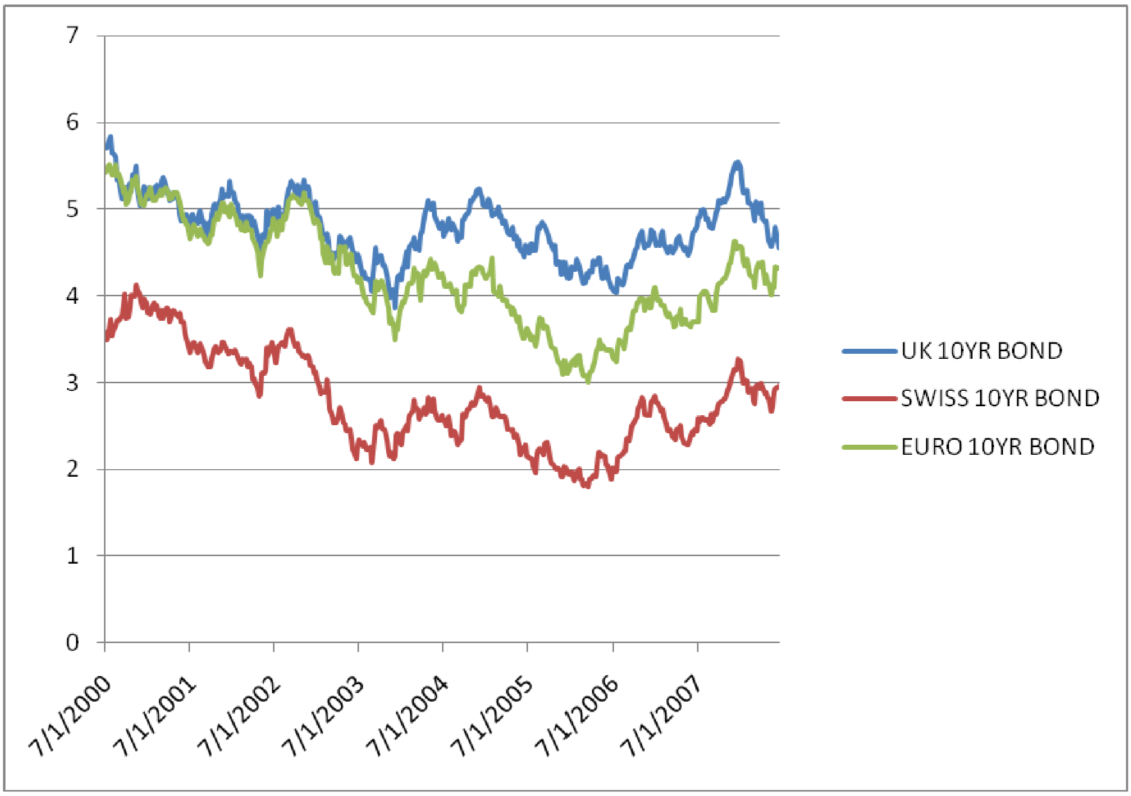
(GAP). Specifically, the variable of interest rate risk is defined as the difference between the interest-sensitive assets (ISAS) and the interest-sensitive liabilities (ISLI). Interest-sensitive assets are financial assets that mature or reprised in more than a year, and interest-sensitive liabilities are financial liabilities that mature or reprised in more than a year. Financial assets and liabilities with maturities over a year are regarded as the most sensitive to interest rate changes.

Contrary to this thesis, Barth et al. (1996) include two variables in order to control for the interest rate risk, the ISAS and ISLI. This thesis considers a single variable (GAP) for two reasons: i) banks manage their interest rate risk based on the maturity mismatch of interest-sensitive assets and liabilities over specific time-horizons. Casu et al. (2006) suggest that,

'Interest rate risk derives from mismatching the maturities of assets and liabilities, as part of a bank asset transformation function'.

ii) The interpretation of a single variable (GAP) is more straightforward than the interpretation of two separate variables (ISAS and ISLI). For the sample of this thesis European commercial banks have on average positive maturity gaps with interest-sensitive assets exceeding interest-sensitive liabilities (i.e. ISAS – ISLI > 0). Thus, European commercial banks for the period of the thesis (2005 and 2006) are 'asset sensitive'. Adopting the variability in *value* concept of interest rate risk (Ryan, 2007, p. 64-66), an increase in interest rates should have a inverse impact on the value of banks' assets. During the period of the study, interest rates were in upward trend (see, Figure 6.1). Figure 6.1 presents the bond yields of three key European 10-years government bonds that have positive correlations with interest rate changes. The positive maturity gap of European commercial banks and the upward trend in interest rates results in expecting a negative sign for the proxy variable of interest rate risk (GAP).

Figure 6.1
Bond yields of key European 10-years government bonds



ii) Default risk

Default risk is the other important risk of banks. It arises when a counterparty of a bank defaults and thus it can not fulfil its obligations. A measure of default risk is the non-performing loans of banks which are loans that do not perform according to their contractual terms (Beaver et al., 1989). This, however, does not constitute these loans necessarily impaired (Casu et al., 2006).

A substantial number of banks in the sample disclose the amount of non-performing loans, and thus this variable is used to control for banks' default risk. Beaver et al. (1989) argue that non-performing loans provide incremental information content to that of loan loss allowance, and thus investors are better-off having this information in the notes of the financial statements. They conclude that non-performing loans capture the default risk of financial institutions and predict a negative effect on their market values. Thus, similar to other studies (Barth et al., 1996; Venkatachalam, 1996) the variable of non-performing loans (NPL) is also added to Equation (6.1) to control for the default risk. Based on the discussion above a negative sign is predicted for the NPL.

iii) Core deposit intangibles

Core deposits are an important intangible asset of banks. Demand deposits and saving accounts even though they are payable on demand, they tend to be stable over time, usually over many years, as deposit withdrawals are replaced by new deposits. Core deposits constitute an intangible asset for banks because they represent customers' loyalty. Flannery & James (1984b) provide evidence that the effective maturities of the liabilities with a demand feature or a short notice (e.g., demand deposits, saving accounts, and small denomination time deposits) are comparable to those of long-term items, suggesting a core deposit behavior for these liabilities. Banks usually pay zero or a negligible interest rate on these deposits that constitutes a cheap finance for banks usually available to them for many years.

Ryan (2007, p. 61) argues that depositors are willing to preserve their funds in deposits if they believe that the economy will continue to be steady and if their desirability to invest in riskier alternative investments is low. Deposit insurance schemes are also another important reason for depositors to continue keeping their funds in deposits. The US was the first country to establish such a scheme through an independent body the Federal Deposit Insurance Corporation (FDIC) created in 1934 after the massive bank failures of 1930-1933. The FDIC insures an amount of up to $100,000 per depositor per insured bank which constitutes the basic insurance amount[21]. EU does not have a single deposit insurance body to guarantee deposits. Directive 94/19/EEC of European Commission requires each EU member state to establish its own deposit insurance scheme in order to protect depositors from bank failures. This Directive requires a minimum guarantee level of €20,000. On average, the 27 EU member states (excluding Bulgaria and Romania) guarantee a minimum of €27,036 as of in 2004[22].

Core deposits are unobservable to researchers and thus a proxy variable is needed. Barth et al. (1996) based on the study of Flannery & James (1984b) define core deposits as domestic deposits minus time deposits in excess of $100,000. Barth et al. argue that foreign deposits are not insured by the FDIC and thus were excluded from core deposits' calculations. They also use an alternative proxy defined as domestic deposits minus time deposits, without affecting the results.

This study proxies core deposits as deposits with no stated maturities (CORE) (e.g., demand deposits, current accounts, savings accounts, and generally deposits with a demand feature). Due to data availability for European banks on account sizes breakdown it was not possible to exclude time deposits over a specific amount, as it is the case of Barth et al. (1996). Furthermore, the fact that EU member-states do not have consistent deposit insurance schemes and that every member-state excludes

21 Information regarding the FDIC is retrieved via its website, Available from http://www.fdic.gov/ [Accessed 24 October 2008].

22 Data regarding minimum deposit guarantees in the EU are retrieved from the *"Report on the minimum guarantee level of Deposit Guarantee Schemes Directive 94/19/EC"*. Available from http://ec.europa.eu/internal_market/bank/docs/guarantee/report_en.pdf [Accessed 24 October 2008].

different depositors from the deposit insurance scheme, foreign deposits are not excluded from the calculations of core deposits. For example under the French deposit insurance scheme foreign deposits are covered (Demirguc-Kunt et al., 2005). The discussion above indicates a positive sign for the core deposit variable (CORE).

Non-IAS 39 variables

iv) Notional amounts of derivatives

A number of previous studies found that the notional amounts of derivatives explain significantly market values. In particular, Riffe (1997) reports a positive relation between the notional amounts of market-related instruments and market value of equity, whilst Venkatachalam (1996) and Eccher et al. (1996) report a negative relation. These opposite results can be attributed to the way investors interpret notional amounts. In Riffe's (1997) study, investors perceive notional amounts as an indicator of future benefits (net expected claims of derivative contracts). In Venkatachalam (1996) study, investors value more the risk related to the magnitude of the involvement of banks in derivative contracts. The fact that investors do not interpret consistently the notional amounts of derivatives, the sing of this variable (NADER) is not predicted.

v) Credit-related off-balance sheet instruments

Banks apart from engaging in derivative contracts, they also involve in credit-related instruments, such as commitment to extent credits, guarantees, and other contingent liabilities. With loan commitments banks agree to lend funds to their customers and receive a commitment fee on undrawn amounts (see Fabozzi, 2002). Other credit-related instruments are standbys and commercial letters where banks guarantee to pay the underlying amount in behalf of their costumers in case of a default. Thus, banks expect to have a cash inflow from credit-related instruments which is the interest earned on the contractual notional amount, and a cash outflow in case one or more of their customers default. The sign of the coefficient of credit-related instruments will depend on whether the present value of the expected cash inflows is greater than the present value of the potential cash outflows (Riffe, 1997). Previous studies found that the credit-related instruments are positively related to share prices (Riffe, 1997). The same results are also provided by Eccher et al. (1996).

Loan Commitments and other contingent liabilities are excluded from IAS 39 but are covered under IAS 37 *"Provisions, Contingent Liabilities and Contingent Assets"* (IASB, 1998)[23]. Thus, banks are required to disclose in the notes the notional amounts of these instruments[24]. Following Riffe (1997) and Eccher et al. (1996), the notional amounts of credit-related off-balance sheet items are also included in the model (OFF).

[23] An exception is loan commitments that are described in para 4 of IAS 39.

[24] An example on how banks disclose information of off-balance sheet items is extracted from the annual report of Fortis in 2005. The text follows is taken out of Note 50. *"Credit-related financial instruments include acceptances, commitments to extend credit, letters of credit and financial guarantees. Fortis's exposure to credit loss in the event of non-performance by the counterparty is represented by the contractual notional amounts of those instruments. Fees received from these credit-related instruments are recorded in the income statement when the service is delivered"… "The following is a summary of the notional amounts (principal sums) of Fortis's credit-related financial instruments with off-balance-sheet risk at 31 December.*

	2005	*2004*
Guarantees and standby letters of credit	*15,141.7*	*5,886.6*
Commercial letters of credit	*581.0*	*7,183.5*
Documentary credits	*7,048.9*	*4,168.1*
Commitments to extend credit	*156,932.7*	*84,628.9*
Total	*179,704.3*	*101,867.1*

Of these commitments some EUR 17,617.8 million have a maturity of more than one year (2004: EUR 8,477.8 million)".

Including in Equation (6.1) the control variables described above and the interaction term of loans that tests H_2, the primary model arises:

$$MB_{it} = a_0 + a_1 LNS_{it} + a_2 LNS_{it}*WEAK*LOWC + a_3 HTM_{it} + a_4 DEP_{it}$$
$$+ a_5 DT_{it} + a_6 NON39AS_{it} + a_7 NON39LI_{it} + a_8 NADER_{it} + a_9 NPL_{it} + a_{10} GAP_{it} \tag{6.2}$$
$$+ a_{11} CORE_{it} + a_{12} OFF_{it} + \varepsilon_{it}$$

Where,

MB	= the differences between market value (MVE) and book value of equity (BVE) at the end of each year. Market values are as of the last trading date of December.
LNS	= the difference between the fair value disclosed and the book value recognised for net loans and advances.
WEAK	a dummy variable that takes the value of one if a bank is domiciled in a country with a rule of law score below or equal the sample median, and zero otherwise.
LOWC	a dummy variable that takes the value of one if the capital adequacy ratio of a bank is below the sample median, and zero otherwise.
HTM	= the difference between the fair value disclosed and the book value recognised for ‘held-to-maturity investments’.
DEP	= the difference between fair value disclosed and book value recognised for ‘deposit liabilities’.
DT	= the difference between the fair value disclosed and the book value recognised for ‘other debt’, other than deposits.
NON39AS	= Non-IAS 39 assets: total assets less IAS 39 financial assets.
NON39LI	= Non-IAS 39 liabilities: total liabilities less IAS 39 financial liabilities.
NADER	= The notional amounts of derivative financial instruments.
NPL	= The Non-performing loans.
GAP	= The gap between financial assets and financial liabilities with maturities over a year.
CORE	= A proxy variable for the core deposit intangible, defined as deposits with no stated maturities, i.e. demand deposits.
OFF	= The Credit-related off-balance sheet instruments.
ε	= The residual term

Equation (6.2) is used to test both Hypotheses H_1 and H_2 and it is in undeflated form similar to Barth et al. (1996). According to Barth & Kallapur (1996) deflating the model by a variable (e.g., book value of equity) can increase coefficient bias and often does not reduce heteroscedasticity.

The codification of the WEAK dummy variable is performed based on countries' rule of law scores provided by Kaufmann et al. (2009). According to this study the Rule of Law measures the,

'perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence'.

Although the definition above does not refer explicitly to accounting rules, however, it gives the general attitude in each country towards every rule within its jurisdiction. Other studies in the literature used the classification provided by La Porta et al. (1997;1998) (see Daske et al., 2008; Hail & Leuz, 2006; Lee et al., 2008; Li, 2010). However, the classification of La Porta et al. (1997;1998) does not apply to this thesis as it does not provide information for the rule of law of all countries in the sample. Moreover, La Porta's scores may be considered outdated as countries' institutional characteristics change over time. Table 6.1 below presents the codification of WEAK. Countries with scores below or equal to the sample median are classified as weak enforcements (one values) and those with scores above the sample median are classified as strong enforcements (zero values).

Table 6.1
Classification of countries according to Kaufmann et al. (2009) Rule of Law Score

Country	Score 2006	WEAK variable Classification	Score 2005	WEAK variable Classification
Austria	1.85	0	1.81	0
Belgium	1.39	1	1.39	1
Cyprus	0.92	1	0.84	1
Czech Republic	0.75	1	0.76	1
Denmark	1.95	0	1.97	0
Finland	1.96	0	1.94	0
France	1.38	1	1.37	1
Germany	1.73	0	1.68	0
Greece	0.74	1	0.70	1
Hungary	0.80	1	0.75	1
Ireland	1.65	0	1.56	0
Italy	0.34	1	0.50	1
Lithuania	0.45	1	0.48	1
Luxemburg	1.81	0	1.90	0
Malta	1.46	0	1.39	1
Netherlands	1.72	0	1.70	0
Norway	2.00	0	1.92	0
Poland	0.28	1	0.36	1
Portugal	0.94	1	1.09	1
Slovakia	0.41	1	0.44	1
Spain	1.04	1	1.07	1
Sweden	1.88	0	1.81	0
Switzerland	1.91	0	1.93	0
UK	1.70	0	1.56	0
Mean	**1.29**		**1.29**	
Median	**1.43**		**1.39**	
Std Dev	**0.59**		**0.56**	

The interaction term LNS*WEAK*LOWC is included in Equation (6.2) to test whether the reliability of fair value estimates differs with respect to banks' financial health and countries' ability to enforce their rules. Barth et al. (1996) find that the market assigns a lower coefficient of fair values of loans to those banks with low capital adequacy ratios. As the authors explain, less healthy banks may have more incentives to overstate unrealised gains or to understate unrealised losses. However, in a cross-country study as this one, it is likely that manager's efficacy to manipulate fair value estimates is a function of countries' ability to enforce their rules. Banks domiciled in weak enforcement rule countries have more latitude to manipulate fair value estimates than banks domiciled in strong enforcement rule countries.

Combining financial health and countries enforcement rules, banks can be separated into four groups, namely: banks with low capital adequacy ratios domiciled in weak enforcement rule countries (group A), banks with high capital adequacy ratios domiciled in weak enforcement rule countries (group B), banks with low capital adequacy ratios domiciled in strong enforcement rule countries (group C), and banks with high capital adequacy ratios domiciled in strong enforcement rule countries (group D).

From the four groups, it is expected that the market will assign the *lowest* coefficient of fair value of loans to banks in group A. Banks in group A not only have the incentives to manipulate fair value estimates, due to the low capital adequacy ratio, but also have the latitude to do it as they domiciled in weak enforcement countries. For all other groups, group B, C, and D, there is at least one reason to expect higher coefficients. For example, banks in group B have high capital adequacy ratios and thus less incentive to manipulate fair value estimates. Banks in group C, although have low capital adequacy ratios, do not have flexibility to manipulate fair values as they domiciled in strong enforcement rule countries. Finally, banks in group D are expected to have the highest coefficient as they have high capital adequacy ratios and their ability to manipulate fair values is restricted due to strong enforcement rules (Table 6.2 below presents a summary of the expected levels of coefficients for each group).

Equation (6.2) tests whether the market assigns a lower coefficient to group A than to groups B, C, and D in aggregate. Thus, the model implicitly assumes that groups B, C, and D have the same loans' coefficient which equal to a_1 (one at least of the dummy variables of *LOWC* and *WEAK* is zero). Coefficient of group A (the case where both *LOWC* and *WEAK* are ones) equals to $a_1 + a_2$. Finding a significant negative coefficient for the interaction term *LNS*WEAK*LOWC* is an indication that the market perceives that banks in group A are more likely to manipulate fair value estimates of loans than banks in groups B, C, and D.

Table 6.2
Expected levels of coefficients for the four Groups of banks

	Weak Enforcement	Strong Enforcement
Low CAR[1]	Group A: is expected to hold the lowest coefficient	Group C: is expected to hold high coefficient
High CAR	Group B: is expected to hold high coefficient	Group D: is expected to hold the highest coefficient

1. CAR = Capital Adequacy Ratio.

6.3.1.2 Alternative model specification

This section develops alternative model specifications in order to test the robustness of the primary findings. The following alternative models are developed.

i) A first-difference model or changes model. Equation (6.2) is stated in price levels: it regresses prices (e.g. equity values) on prices (e.g. the values of assets and liabilities). In contrast, a changes model regresses returns or price changes of equity values on returns or changes of the values of assets and liabilities (see Christie, 1987; Landsman & Magliolo, 1988). A changes model mitigates the problem of correlated omitted variables given that the omitted variables remain constant over time. Skinner (1996) argues that,

   ‘of particular interest is whether the results are robust to estimating the regression in 'changes' form, since this reduces the likelihood of correlated omitted variable problems’.

The notion behind using a first-difference model is quite straight-forward. Unobserved factors can be separated into two types, those that have a fixed effect on the dependent variable which are constant over time, and those that vary over time (see Wooldridge, 2006, p. 461). Hence, the changes model of this thesis takes the differences in values of the variables in Equation (6.2) between 2006 and 2005 (See, equation below). The Greek letter Δ denotes the difference.

$$\Delta MB_{it} = a_0 + a_1 \Delta LNS_{it} + a_2 \Delta LNS_{it}*WEAK*LOWC + a_3 \Delta HTM_{it} + a_4 \Delta DEP_{it}$$
$$+ a_5 \Delta DT_{it} + a_6 \Delta NON39AS_{it} + a_7 \Delta NON39LI_{it} + a_8 \Delta NADER_{it} + a_9 \Delta NPL_{it}$$
$$+ a_{10} \Delta GAP_{it} + a_{11} \Delta CORE_{it} + a_{12} \Delta OFF_{it} + \varepsilon_{it}$$

ii) Following Barth et al. (1996), Eccher et al. (1996) and Nelson (1996), the second alternative specification model is a model which includes the BVE as a separate independent variable instead of incorporating it in the formulation of the dependent variable. Thus, this model regresses the MVE on the BVE and the primary variables of interest, LNS, HTM, DEP, and DT (control variables are included).

iii) A model that uses March market values instead of December market values in the dependent variable (values are as of the last trading dates of March). Semi-strong efficient markets incorporate almost instantaneously the published information from financial statements in share prices. However, given that the financial statements are available to the public a few months after the year end (until the end of March), and not immediately at the date of the financial statements (31st of December) this model tests for the possibility that the market reacts belatedly.

iv) Similar to Barth et al. (1996) a model which includes a growth variable. This variable is operationalised using the changes in the book values of net loans for the last 5-years before 2005 and 2006.

v) A small number of banks, 14 in total, adopted the IFRS before they became mandatory. These banks are likely more familiar with the standards and the fair value measures than banks that did not have adopted the IFRS until 2005. Furthermore, investors may value differently the early adopters assigning greater market values. Hence, a dummy variable (EARLY) is also included in Equation (6.2) to control for early adopters. The dummy variable EARLY takes the value of one for those banks that have adopted the IFRS before they became mandatory in 2005 and the value of zero otherwise.

vi) A model that controls for banks' pension fund status. Pension plans are separated between defined contribution schemes and defined benefit schemes. Moreover, they separated between funded plans, where a firm establishes an independent entity (a pension fund) with separate assets and liabilities and an independent management (trustees), and unfunded plans where a firm operates internally the pension plan. Defined contribution plans are by definition funded. The firm makes regular contributions to the pension fund and bears no risk on the level of the pensions to be paid in the future. Defined benefit plans can be either funded or unfunded. Contrary to defined contribution plans, firm's liability is not limited only to regular contributions, but also extends to employees' benefits. Thus, if the assets of a plan cannot cover its pension liability then the firm needs to make additional payments to the scheme. US studies support the view that the fair value of pension assets and the present value of pension liability are priced by the market and thus are reflected to share prices (Barth, 1991; Landsman, 1986). Most European banks in this thesis operate defined benefit plans. Other banks operate more than one type of pension scheme, such as a defined contribution plan, a funded defined benefit plan, and an unfunded defined benefit plan. The different types of pension plans operated by European commercial banks precluded the use of a consistent variable for the pension obligation. Thus, similar to other studies (Barth et al., 1996) the pension variable (PENS) is defined as the 'fair values of plan assets less the present value of pension obligation'. For banks that do not have a funded schemes this variable is set to be zero.

6.3.2 Recognition of derivatives' fair values

6.3.2.1 Primary model specification

Value relevance studies on derivatives used the BSM as the primary specification model. For example, Ahmed et al. (2006) regressed the market value of equity on the fair values of the aggregated financial assets, the fair values of the aggregated financial liabilities, the non-financial assets and liabilities, the fair values of derivatives and a number of other control variables. However, due to high collinearity in this thesis (more than 0.99) between the aggregated fair values of financial assets and financial liabilities, the primary specification model on derivatives is based on Ohlson (1995) model (See, Wang et al., 2005). For completeness, in an alternative specification test results are also provided by a BSM model.

Equation (6.3) tests the value relevance of derivatives' fair value recognition. Consisted with Wang et al. (2005) the estimation model is based on Ohlson (1995) (see, Chapter 3, Section 3.2.1.3).

$$MVE_{it} = \beta_0 + \beta_1 BV_{it} + \beta_2 NOI_{it} + \beta_3 NSI_{it} + \beta_4 NTDER_{it} + \beta_5 NTDER_{it} * WEAK * VARIN + \\ + \beta_6 NHDER_{it} + \beta_7 NHDER_{it} * WEAK * VARIN + \beta_8 NADER_{it} + \beta_9 NPL_{it} + \beta_{10} GAP_{it} \\ + \beta_{11} CORE_{it} + \beta_{12} OFF_{it} + \varepsilon_{it} \tag{6.3}$$

Where:

MVE	= Market value of equity as of the last trading date of December of 2005 and 2006.
BV	= Book value of equity before net trading derivatives and net hedging derivatives.
NOI	= Net operating Income: Interest Income (from loans) less Interest expense (from deposits).
NSI	= Net Securities Income: Net Gains (Losses) on Trading and Derivatives, Net Gains (Losses) on Other Securities, and Net Gains (Losses) on Assets at FV through Income Statement.
NTDER	= Net trading derivatives defined as fair values of trading derivative assets less fair values of trading derivative liabilities.
NHDER	= Net hedging derivatives defined as fair values of hedging derivative assets less fair values of hedging derivative liabilities.
VARIN	= Variability in earnings, defined as the natural logarithm of the coefficient of variation of net income in the last five years. (For 2005 the period was 2001-2005 and for 2006 the period was 2002-2006). When data was not available for the full five year period, the variable is calculated with the available data.

All other variables: NADER, NPL, GAP, CORE and OFF, are defined as above (see, under Equation (6.2)).

Ohlson (1995), apart from book value of equity and the earnings variable, includes in his model a third variable, the 'other information' *(v)*, which captures information not yet incorporated in current and past abnormal earnings but it will affect future abnormal earnings. This study assumes other information to equal zero ($v = 0$). Barth (2006b) argues that,

'…if all assets, including intangible assets, were recognised at fair value, NI [Net Income] is simply gains and losses and ν = 0 ...because, in this setting, the persistence of abnormal earnings equals zero'.

Commercial banks recognise a substantial amount of assets and liabilities at fair value, and thus this provides support to the operationalization of v as equal to zero.

Coefficients β_4 and β_6 test hypothesis H_3. Positive and significant values for these coefficients reject H_3 against the alternative hypothesis that fair values of derivatives are value relevant (Ahmed et al., 2006).

Hypothesis H_4 aims to test whether fair values of derivatives are value relevant over and above the notional amounts of derivatives. This hypothesis is tested by examining the significance of β_4 and β_6 coefficients incrementally to the coefficient of notional amounts of derivatives, the β_8.

Finally, coefficients β_5 and β_7 test Hypothesis H_5: whether banks domiciled in weak enforcements rule countries with higher earnings variability have lower derivatives' coefficients than banks domiciled in strong enforcement countries with lower earnings variability. A significant and negative coefficient for β_5 and β_7 supports H_5.

6.3.2.2 Alternative model specification

Similar to the value relevance of fair value disclosures (Section 6.3.1.2), robustness tests are also carried out for the value relevance of derivatives' fair value recognition.

The alternative model specification includes: i) a changes model. Similar to Ahmed et al. (2006), the model has been deflated by the beginning market value of equity, ii) a March model, iii) a growth model, iv) an early adopters model, v) a model that controls for banks' pension fund status, vi) a model that disaggregates the NADER in notional amounts of trading derivatives (NATDER) and notional amounts of hedging derivatives (NAHDER), and vii) a model based on the BSM that regresses the market value of equity on the aggregated fair values of financial assets and liabilities, the non-financial assets and liabilities, the fair values of net trading and hedging derivatives, their interaction terms and a number of control variables, as in Equation (6.3).

6.4 Sample Selection

The objective of the study is to assess the value relevance of fair value estimates over the first two years of the mandatory adoption of IFRS, i.e., 2005 and 2006, for the European banking sector. Banking sector is an ideal context to examine the value relevance of fair value accounting as the majority of banks' assets and liabilities are financial instruments, such as loans, investment securities, deposits, and derivatives, all measured at fair values. The tests are performed cross-sectionally.

The concurrent adoption of the IFRS by a large number of firms across Europe provides a unique sample to test the value relevance of fair value accounting. For the first time in financial reporting history more than 100 countries have adopted one set of accounting standards, the IFRS, which have substituted the national accounting standards (at least for the listed firms).

The population of the study was drawn from BankScope as at 6th September 2007 and consisted of banks which met all of the following three criteria: (i) they were classified as Commercial Banks, Cooperative Banks, Savings Banks, Bank Holding and Holding Companies, or Real Estate and Mortgage Banks (ii) they were domiciled in one of the 27 EU member-states, or in Switzerland or Norway; (iii) they were listed on a stock exchange in one of the 27 EU member-states, or in Switzerland or Norway[25]. 196 firms met the above criteria.

For 2005 (and 2006), 20 (21) banks were excluded due to the unavailability of their annual report. A further 55 (53) banks were excluded due to lack of, or very poor, information in relation to a number of variables of interest (e.g., the fair values of financial instruments, non-performing loans). For both years a further three banks were excluded because they did not grant loans or collect deposits. In addition, for 2005 (2006) three (one) banks were excluded because they were not listed in that year. Finally, eight banks were excluded (for both years) because their financial year ended on a date other than 31 December. This resulted in a sample of 107 banks for 2005 and 110 for 2006 (see, Table 6.3). The large missing values in the population result in some countries not being represented in the final sample by any bank, such as Bulgaria.

[25] Although Norway is not an EU member, it is a member of the European Economic Area (EEA) and as such Regulation (EC) No. 1606/2002 of the European Parliament and of the Council of 19 July 2002 applies equally to the EEA members. Thus, Norwegian listed firms, similar to the EU listed firms, were required to adopt the IFRS from 2005. Switzerland belongs neither to EU nor to EEA. However, the standard setting body in Switzerland, the Swiss Foundation for Accounting and Reporting, required all listed firms to report their accounts by 2005 either in IFRS or in US GAAP, but not in Swiss GAAP. (Available from: http:// www.iasplus.com / country / norway.htm and http:// www.iasplus.com / country / switzerl.htm [Accessed 12 January 2008]).

Table 6.3
Sample selection

	2005	2006
Population	196	196
The annual reports weren't available on-line and even if they were asked from banks' investor relations departments, via e-mail, there was no reply	-20	-21
Poor information in the annual report regarding some variables in the models	-55	-53
The institution even though is classified as a bank holding company does not grant loans and collect deposits	-3	-3
The bank wasn't listed in the related year	-3	-1
The bank has as a year end a date other than the 31st of December	-8	-8
Total Sample	**107**	**110**

The market capitalisation of the sample represents more than 90% of the total market capitalisation of all listed banks in the 27 EU member-states and Switzerland and Norway. The fact that the number of the sample banks represents less than 60% of all listed banks (107 and 110 out of 196 banks) means that the sample consists of the largest European commercial banks. Caution, should therefore be exercised in generalising the study's results to all European banks.

A variety of sources were used to collect the data. In particular, on-balance sheet items were hand-collected by annual reports. The majority of banks provide sufficient and detailed information regarding the classification of financial assets and liabilities, according to IAS 39. Non-performing loans, off-balance sheet items, and capital adequacy ratios were taken directly from BankScope (however when these variables were not available at BankScope they retrieved from annual reports). Other data, such as the maturities of financial assets and liabilities, notional amounts of derivatives, demand deposits, and pension fund information were hand-collected by the annual reports. Similar, the disclosed fair values of loans, held-to-maturity investments, deposits, and other debt, were hand-collected by the annual reports. Finally, information related to market-based data, such as share prices and number of shares outstanding were collected from BankScope and when not available from DataStream (for more information on data collection, see Table 6.4).

All the amounts in the sample are in million of Euros. Bank accounts that were reported in a different currency were translated into Euros using the exchange rates provided by the ECB on the last available date of each year. Data on exchange rates are retrieved from DataStream (See, Appendix E, Table 2, for the exchange rates).

Table 6.4
Data Availability and Data Sources for key variables

Data description	**Variables**	**Source**
On-balance sheet items	AFS, BHTM, FAFVPL, BLNS, NON39AS, FLFVPL, BDEP, BDT, NON39LI, BVE	Banks' Annual Reports or BankScope
Non-performing loans	NPL	BankScope
Interest-sensitive assets and liabilities	ISAS, ISLI, GAP	Banks' Annual Reports
Fair values of derivatives	NTDER, NHDER	Banks' Annual Reports
Notional amounts of derivatives	NADER	Banks' Annual Reports
Fair values of on-balance sheet items	FLNS, FHTM, FDEP, FDT	Banks' Annual Reports
Core deposit intangible proxy	CORE	Banks' Annual Reports
Capital adequacy ratios	CAR	BankScope
Pension fund status	PENS	Banks' Annual Reports
Off-balance sheet items	OFF	BankScope
Market-based data	MVE, MB	BankScope or DataStream

6.5 Conclusion

This chapter analysed the methodology to test the value relevance of fair value disclosures and the value relevance of derivatives' fair value recognition. The objective is to provide further evidence on the relevance and reliability of fair value estimates using a sample of European commercial banks that report in IFRS. The analysis is performed cross-sectionally for the first two years of the mandatory adoption of the IFRS, i.e., 2005 and 2006.

Previous studies provide evidence that fair value disclosures are value relevant (Barth et al., 1996; Eccher et al., 1996; Nelson, 1996). Other studies find derivatives' fair value recognitions significant in explaining market values (Ahmed et al., 2006). However, these results are based on US GAAP, such as the SFAS Nos. 107, 109, and 133. Up to now there is no evidence for the value relevance of banks' fair value disclosures under IFRS (e.g. IAS 32) and derivatives' fair value recognition (e.g. IAS 39). Thus, the purpose of this thesis is to fill this gap.

The thesis also aims to shed some light on whether banks' financial health and earnings variability affect the reliability of fair value estimates of loans and derivatives, respectively. Banks with low capital adequacy ratios have more incentives to manipulate fair value estimates of loans (Barth et al., 1996). Moreover, banks with high earnings volatility have more incentives to manipulate fair value estimates of derivatives in order to smooth earnings (Barton, 2001). However, the latitude of banks to manipulate fair value estimates is likely to depend on institutional differences between the sample countries, and specifically on their efficacy to enforce their rules. The rule of law scores, provided by Kaufmann et al. (2009) are used to classify the sample countries in strong enforcement rules and weak enforcement rules. The dummy variables of capital adequacy ratio and earnings variability were interacted in the empirical models (see, Equations 6.2 and 6.3) with the variables of loans and derivatives, respectively, and with a dummy variable that indicates whether a bank is domiciled in a weak enforcement rule country or in a strong enforcement rule country.

The empirical model of the fair value disclosures test is based on the BSM, which has been a standard valuation model in the value relevance research (see, Landsman, 1986; Eccher et al., 1996; Venkatachalam, 1996; Ahmed et al., 2006). The model controls for a series of variables that have been found significant in the literature in explaining the market values of equity of banks. These variables include non-performing loans (Beaver et al., 1989), the maturity gap between interest-sensitive assets and liabilities, core deposits (Barth et al., 1996), notional amounts of derivatives (Riffe, 1997), and credit-related off balance sheet instruments (Eccher et al., 1996). Apart from the primary model specifications, results are also provided using alternative models for robustness (e.g. changes model).

Similar to Wang et al. (2005), the empirical model of the derivatives test follows the Ohlson (1995) model. The reason for not using again as the primary specification model the BSM is that two of the variables in the model (i.e. BSM) were highly correlated with each other (more than 99% correlations in both years). However, the BSM model is run as a robustness test for completeness.

The next chapter develops the methodology of the second empirical part of this thesis, the economic consequence test (i.e. cost of equity test). The findings of the value relevance part and the economic consequence part are presented in chapters 8 and 9, respectively.

Chapter 7: Research Methodology on the Cost of Equity Capital

7.1 Introduction

This chapter discusses the research methodology relating to the second main research objective of this thesis which is to examine whether the mandatory adoption of IFRS had an impact on the CE of European banks (see, Chapter 1, Section 1.2). As discussed in Chapter 3 (Section 3.3), transparent accounting standards and increased disclosure reduce information asymmetries between managers and shareholders, reduce uncertainty, and as a consequence they lower the CE. Moreover, the adoption of uniform accounting standards across countries reduce firms' CE through the reduction in adjustment costs that usually arise when comparing financial statements prepared under different accounting standards (IASCF, 2002).

As discussed in Chapter 5, which reviewed the empirical evidence on this issue, early studies documented the existence of an inverse relationship between increased disclosure and the CE (Botosan, 1997; Dhaliwal et al., 1979; Diamond & Verrecchia, 1991). Studies using samples of IFRS early adopters (firms that adopted the IFRS before they became mandatory) report mixed results (Cuijpers & Buijink, 2005; Daske, 2006; Leuz & Verrecchia, 2000). However, empirical studies relating to the mandatory adoption of IFRS found that this adoption led to a reduction in the CE under some model specifications (Daske et al., 2008) and for some groups of IFRS adopters, such as the mandatory adopters (e.g. Li, 2010).

This thesis uses empirical tests to investigate the impact of mandatory adoption of IFRS on European commercial banks' CE. Banks are highly affected by the adoption of IFRS through the accounting standards IAS 32 and IAS 39 as most of their assets and liabilities are financial instruments. Under these two standards, banks are required to disclose a substantial amount of information regarding the risk of their financial instruments. Important requirements that relate to banks' risk are: i) either the recognition or disclosure of fair values of all financial instruments, ii) the recognition of previously off-balance sheet items, such as derivatives, iii) the use of hedge accounting, and iv) relevant disclosures relating to the risk of financial instruments (i.e. market risk, credit risk and liquidity risk) (See, Chapter 2 for more analysis of the requirements of IAS 32 and IAS 39).

The chapter is structured as follows. Section 7.2 develops the hypotheses. Based on the theoretical framework developed in Chapter 3 (Section 3.3), it is expected that the adoption of IFRS will reduce banks' CE. However, this statement needs to be tested empirically under certain hypotheses. Section 7.3 discusses the methods used by this thesis to estimate the CE and develops the empirical models. Four methods are used to estimate the CE based on the theoretical models of RIVM (Gebhardt et al., 2001; Claus & Thomas, 2001) and the EGM (Gode & Mohanram, 2003; Easton, 2004). Section 7.4 presents the sample procedures and the data collection process. Finally, Section 7.5 concludes.

7.2 Development of Hypotheses

Literature on the mandatory adoption IFRS provided some first results on whether the CE has decreased after the adoption of IFRS in 2005. For example, Li (2010) found lower CE for mandatory adopter firms. Daske et al. (2008) also reported lower CE for firms but only when they control for the anticipation effect. In another study, Lee et al. (2008) found greater reduction in the CE of firms domiciled in high financial incentive countries (e.g. the UK) than firms domiciled in low financial incentive countries, (e.g. Austria, Greece, and Italy). However, these studies analyze either many industries in aggregate including banks (Daske et al., 2008) or they exclude financial firms from the analysis because they are highly regulated and their balance sheets are structured differently from the balance sheets of the industrial firms (Lee et al., 2008). Thus, there is a need to examine financial institutions separately under a homogenous sample in order to avoid the industry-effect in the model. Hence, the sample of this thesis is a set of European commercial banks that were required to adopt the IFRS from 2005 onward. Based on the discussion above, the first hypothesis of the CE part is stated in its null form as follows:

H_6: The mandatory adoption of IFRS did not have any material impact on banks' CE.

As it is stated in the introduction of this Chapter, banks are mostly affected by two IASB standards, the IAS 32 and IAS 39. Hence, this test can also be regarded with caution as an *indirect* test of the relevance of these two standards in assessing banks' risk.

Complementary to Hypothesis H_6, three other hypotheses are examined to test whether the effects on the CE vary with specific characteristics of banks. Specifically, it is examined whether the level of analyst following, the classification of national accounting standards, and countries' enforcement rules have a particular effect in determining the impact of IFRS on the CE.

Previous research has shown that the reduction in CE differs with the number of analysts following a firm (Botosan, 1997; Richardson & Welker, 2001). Low analyst following is associated with higher reduction in the CE. On the other hand, firms with high analyst following tend to have less reduction in their CE, as analysts used to have access to more information, before the mandatory adoption of IFRS. Hence, the second hypothesis of the CE in its alternative form:

H_7: Banks with low analyst following experienced a higher reduction in their CE than banks with high analyst following.

The study's sample consists of banks from all EU countries and Norway and Switzerland. Nobes (2008) classified these countries into those that fall within the Anglo-Saxon accounting system (Cyprus, Denmark, Ireland, Malta, Netherlands, Norway, and the UK) and the Continental accounting system (Austria, Belgium, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxemburg, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland). Furthermore, Nobes (2008) argues that IFRS, as a reporting system, is more closely related to the Anglo-Saxon one. Therefore, it is reasonable to suggest that banks domiciled in countries which have an Anglo-Saxon accounting system are less likely to be affected by the adoption of IFRS, because they are already using accounting standards which are similar to the IFRS. The effects, however, on banks domiciled in Continental countries are likely to be more pronounced because for them IFRS represents a very different reporting system. Hence the third hypothesis of the CE in its alternative form:

H_8: Banks domiciled in 'Continental' countries experienced a higher reduction in their CE than banks domiciled in 'Anglo-Saxon' countries.

The final hypothesis relates to the effect of countries' enforcement rules on the CE. There is evidence in the literature supporting the view that countries with strong enforcement rules are likely to experience a higher reduction in the CE (Daske et al., 2008; Li, 2010) due to significant less earnings management undertaking by the firms in such countries (Burgstahler et al., 2006). This observations leads to the forth hypothesis:

H_9: Banks domiciled in 'strong enforcement rule' countries experienced a higher reduction in their CE than banks domiciled in 'weak enforcement rule' countries.

The next section discusses the methods used by this thesis in the estimation of the CE (the dependent variable of the empirical models) (Section 7.3.1). It also discusses the development of the empirical models based on which hypotheses H_6 – H_9 are tested (Sections 7.3.2 and 7.3.3).

7.3 Empirical Analysis

7.3.1 Estimation of cost of equity

Following the discussion in Chapter 3 (Section 3.2.2) four methods are used to estimate banks' CE. Two of these methods are based on an implementation of the RIVM as provided by Gebhardt et al. (2001) and Claus & Thomas (2001) and two are based on the Ohlson & Juettner (2005) model as implemented by Gode & Mohanram (2003) and Easton (2004).

7.3.1.1 The Gebhardt et al. (2001) method

The Gebhardt et al. (2001) method is an implementation of the RIVM. Due to the fact that the RIVM involves infinite horizon periods, Gebhardt et al. (2001) made assumptions regarding the growth of earnings in the long-term (i.e. beyond the period of the explicit estimation of earnings). The GLS method is defined as follows:

$$P_t = BVE_t + \frac{FROE_{t+1} - r_{GLS}}{(1 + r_{GLS})} BVE_t + \frac{FROE_{t+2} - r_{GLS}}{(1 + r_{GLS})^2} BVE_{t+1} + TV \qquad (7.1)$$

Where,

P_t = Market value per share, i.e. share price at time t

BVE_t = Book value of equity per share at time t

$FROE_{t+i}$ = Forecasted Return on Equity (*ROE)* for period $t+i$. Calculated using the forecasted *EPS* (*FEPS*) for year $t+i$, acquired from the I/B/E/S database, divided by the book value per share for year $t+i-1$, BVE_{t+i-1}.

BVE_{t+i} = $BVE_{t+i-1} + FEPS_{t+i} - FDPS_{t+i}$, where $FDPS_{t+i}$ denotes forecasted dividends per share for year $t+i$, estimated by multiplying the current dividend payout ratio (k) at time t with the $FEPS_{t+i}$.

TV = The Terminal Value after year $t+2$, was calculated by assuming that the *FROE* at period $t+3$ reverted to the industry specific median *ROE*.

r_{GLS} = The implied cost of equity capital derived from the GLS method.

The terminal value (*TV*) in equation (7.1) is calculated using the formulae below:

$$TV = \sum_{i=3}^{T-1} \frac{FROE_{t+1} - r_{GLS}}{\left(1 + r_{GLS}\right)^{i}} BVE_{t+i-1} + \frac{FROE_{t+T} - r_{GLS}}{r_{GLS}\left(1 + r_{GLS}\right)^{T-1}} BVE_{t+T-1} \tag{7.2}$$

The GLS method uses explicitly the forecasted analysts' earnings per share for the first three years, while for the periods beyond the third year and up to twelfth year (T=12) the model assumes that the forecasted Return on Equity (*ROE)* of the third year reverts to the industry median *ROE* through simple linear interpolation. The industry median *ROE* is a moving median of the historic *ROEs* of banks in the population. For the calculation of the industry median *ROE* a maximum of ten years are used. The industry median is used because in the long run and in a competitive environment the *ROE* of firms in the same industry tends to be closer to the *ROE* of their peers. The value beyond the twelfth year (T=12) is approximated by computing the present value of abnormal earnings at period T as a perpetuity.

7.3.1.2 The Claus & Thomas (2001) method

Claus & Thomas (2001) method, hereafter the CT method, follows a different approach to operationalise RIVM than Gebhardt et al. (2001). Instead of assuming that in the long-run firms' *ROE* reverts to the industry's median, they explicitly calculate earnings per share for the first five years, using forecasted analysts' estimates, and beyond year five they impose abnormal earnings to grow at a steady percentage, the expected inflation rate (g_{ae}). This steady percentage is the 10-year risk free rate of US Treasury bonds less the real risk-free rate, which is assumed to be 3 percent.

Given the fact that this thesis deals with a non-US sample (European banks), the approach to estimate expected inflation rates needs to be different. Thus, the expected inflation rate (g_{ae}) is approximated by using the median of country-specific annualized one year ahead monthly inflation rates as in Daske et al. (2008). The index used is the Harmonized Index of Consumer Prices (HICPs) which 'gives comparable measures of inflation in the euro-zone, the EU, the European Economic Area and for other countries including accession and candidate countries'[26]. Hence, the second method to estimate the CE is the CT method:

$$P_t = BVE_t + \sum_{i=1}^{5} \frac{AE_{t+i}}{(1+r_{CT})^i} + \frac{AE_{t+5}(1+g_{ae})}{(r_{CT}-g_{ae})(1+r_{CT})^5} \tag{7.3}$$

Where, *AE* denotes the Abnormal Earnings calculated using the formula of abnormal earnings as: $AE_{t+i} = FEPS_{t+i} - r_{CT} * BVE_{t+i-1}$. Again $FEPS_{t+i}$ is the forecasted analysts' earnings per share, BVE_{t+i-1} is the forecasted book value per share

[26] Available from: http://epp.eurostat.ec.europa.eu/portal/page/portal/hicp/introduction [Accessed 23 August 2008].

calculated using the clean surplus relation as $BVE_{t+i} = BVE_{t+i-1} + FEPS_{t+i} - FDPS_{t+i}$, and r_{CT} is the implied CE as derived under the CT method. Similar to the GLS method, the $FDPS_{t+i}$ is calculated by applying the current dividend payout ratio on the forecasted earnings per share for the period $t+i$ ($FEPS_{t+i}$).

7.3.1.3 The Gode & Mohanram (2003) method

Apart from the RIVM, some other studies use also an Earnings Growth Model to derive the CE (see, Daske et al., 2008; Dhaliwal et al., 2007). Gode & Mohanram (2003) provide an empirical implementation of the Ohlson & Juettner (2005) model which defines market value per share in terms of next-period's expected earnings per share; next-period's expected dividends per share; short-term growth in earnings; long-term perpetual growth in earnings (γ); and the CE. The model builds on the Gordon growth model (see, Chapter 3, Section 3.2.1.1) which is based on a dividend measure of value and the assumption of a constant dividend growth in perpetuity. The model of Ohlson & Juettner (2005) is a parsimonious equity valuation model that does not require the consideration of expected book values and the expected earnings per share beyond the second year. Formula (7.4) below is the Gode & Mohanram (2003) model which is based on Ohlson & Juettner (2005) model solved as for r_{OJ}.

$$r_{OJ} = A + \sqrt{A^2 + \frac{FEPS_1}{P_0}\left(g_2 - (\gamma - 1)\right)} \tag{7.4}$$

Where, $A = \frac{1}{2}\left((\gamma - 1) + \frac{FDPS_1}{P_0}\right)$ and $g_2 = \frac{FEPS_2 - FEPS_1}{FEPS_1}$

The inputs used to estimate the r_{OJ} are the following: The forecasted analysts' earnings per share for the following and the next year, $FEPS_1$ and $FEPS_2$, respectively; the one year ahead forecasted dividend per share calculated as in the previous two methods ($FEPS_1*k$); the current share price (P_0) the short-term growth on earnings (g_2) calculated as the average of the percentage change in forecasted analysts' earnings per share ($FEPS_2/FEPS_1$-1) and the five years growth in earnings per share provided by analysts; and the long-term perpetual growth (γ-1) which is set to be equal to the expected inflation rate which is the median of country-specific annualized one year ahead monthly inflation rate (similar to the CT method).

7.3.1.4 The Easton (2004) method

Easton (2004) presents a modified price-earnings growth model (PEG) which is a special case of the Ohlson & Juettner (2005) model analysed above (see also Chapter 3, Section 3.2.1.5). The model imposes next year's dividend per share to be equal to zero *($FDPS_1=0$)* and the long-term perpetual growth in earnings to be equal to one *($\gamma=1$)*. Under these assumptions the model requires only three parameters, namely: two years ahead earnings per share (the next year's earnings per share and the year's following), as provided by analysts' forecasts, and the current share price. The $FEPS_1$ and $FEPS_2$ are restricted to be positive and the $FEPS_2$ to be greater or equal to $FEPS_1$. The Easton (2004) model is defined as follows and denoted as r_{PEG}:

$$r_{PEG} = \sqrt{(FEPS_2 - FEPS_1)/P_0} \tag{7.5}$$

The different theoretical approaches and assumptions, underpinning the four CE methods explained above, result in providing different estimates for the CE. Each method is competitive to the other methods. Thus, the empirical analysis below provides the findings under each of the four CE methods. In addition, the average CE values of these methods are also calculated. The average CE is denoted using the notation r_{AVG}.

7.3.2 Primary analysis

The impact of the mandatory adoption of IFRS on banks' CE is examined under a univariate analysis, by observing the change of the CE through time, and under a multivariate analysis using a multiple regression model similar to the one used by Lee et al. (2008), Li (2010) and by Dhaliwal et al. (2007)[27].

The period of the study covers six financial years from 2002 to 2007. Given the fact that the official adoption of the IFRS by European firms is the year 2005, the CE estimates in years 2002, 2003, and 2004 are regarded as the pre-IFRS period, and the CE estimates in years 2005, 2006, and 2007 are regarded as the post-IFRS period.

The results provided under the univariate analysis should be interpreted with caution as they do not take into account other factors, apart from the IFRS adoption, that may have affected the CE around that time. Thus, a more complete way to test the impact of the IFRS is to control in a regression model for other observable factors that according to the literature are found to explain significantly the expected returns. The primary empirical model is defined as follows:

$$CE_{it} = \gamma_0 + \gamma_1 POST_{it} + \gamma_2 MAND_{it} + \gamma_3 POST{*}MAND_{it} + \gamma_4 CAR_{it} + \gamma_5 LD_{it} + \gamma_6 BETA_{it} + \gamma_7 VARERN_{it} + \gamma_8 BM_{it} + \gamma_9 LOG(ASSET)_{it} + \gamma_{10} LEV + \gamma_{11} RF_{it} + \gamma_{12} USLIST_{it} + \sum_{k}^{18} \delta_k COUNTRY_{ki} + \omega_{it} \qquad (7.6)$$

Where,

CE	= the implied cost of equity capital from the GLS method, the CT method, the OJ method, the PEG method, and the average of all the aforementioned methods (AVG).
POST	= a dummy variable that takes the value of one for post-IFRS periods (on and after 2005) and the value of zero for pre-IFRS periods (before 2005).

[27] However, Dhaliwal et al. (2007) examine the expectation that the 2003 Tax Act reduced the cost of equity capital after the new tax law came into effect in May 2003.

MAND	= a dummy variable that takes the value of one if a commercial bank did not adopt IFRS until 2005, and zero otherwise.
POST*MAND	= the interaction term between POST and MAND.
CAR	= capital adequacy ratio.
LD	= net Loans to Deposits ratio.
BETA	= market beta, derived by regressing commercial banks' weekly returns for the past five years on the weekly returns of the pan-European index, DJ STOXX 600.
VARERN	= variability in earnings, defined as the standard deviations in earnings over the past five year divided the mean earnings over the same period.
BM	= Book to Market ratio.
LOG(ASSET)	= a control for banks' size, defined as the natural logarithm of the total assets.
LEV	= financial leverage, defined as the long-term debt to the book value of equity ratio.
RF	= country specific risk-free rate of return.
USLIST	= a dummy variables that takes the value of one when a bank is listed in the US market and zero otherwise.
COUNTRY	= dummy variables to control for the country-effect.

The coefficient of POST (γ_1) is the coefficient of interest in examining the impact of IFRS on the CE. A significant positive coefficient indicates that the IFRS reveal additional risk for banks that previously (before 2005) was unknown to investors. Risk overcomes the benefits provided by increased disclosure. On the other hand, a negative coefficient supports the view that high quality in financial information and increased disclosure, as it is the case with IFRS, decrease the CE. Finding the γ_1 coefficient significant rejects hypothesis H_6 that the mandatory adoption of IFRS did not have any material impact on banks' CE.

The interaction term POST*MAND tests whether there is any difference between banks that have adopted IFRS only when they became mandatory (in 2005) and early adopters, banks that voluntarily adopted IFRS prior to 2005. Coefficient γ_3 aims to capture this difference.

The remaining variables are included in equation (7.6) to control for other factors that were found in the literature to explain significantly the variations in the CE.

Control variables

i) This study uses two industry specific control variables, the capital adequacy ratio (CAR) and the Loans to Deposits ratio (LD). An extensive discussion of the CAR is provided in Chapter 2, Section 2.3. According to Basel Committee, banks should keep this ratio above the 8% in order to have adequate funds to cover unexpected losses. Thus, whenever this ratio falls below the 8%, supervisors demand from banks to increase capital or to liquidate some risky assets. The higher this variable is, the lower are the regulatory costs and hence the lower the risk for a bank[28]. The sign for this variable is expected to be negative (Karels et al., 1989). The other industry specific variable, is the loans to deposit ratio (LD), which is the control variable for banks' liquidity and credit risk (Mansur et al., 1993). Commercial banks use public deposits to finance their loan activity which are regarded (the deposits) as a cheap source of finance. A high ratio of Loans to Deposits, usually well above the unity, increases the liquidity risk of banks in the unexpected event of significant deposit withdrawals. Moreover, high levels of loans, as compared to deposits, increase credit risk if an important number of banks' clients default. Hence, based on the argument above, the sign for the coefficient of LD is predicted to be positive.

28 Regulatory costs arise when the capital adequacy ratio of a bank falls below the minimum capital requirement which is set to be 8% for the Total Adequacy Ratio (Tier 1 and Tier 2).

ii) The BETA is the market beta derived by regressing banks' weekly returns over the past five years on the weekly returns of the pan-European index, DJ STOXX 600. Following the CAPM a positive relationship is expected between the market beta and the CE. Market beta is widely used in the CE literature to control for market volatility, e.g., Hail (2002), Botosan & Plumlee (2002), Daske (2006), and Poshakwale & Courtis (2005). Other studies use other measures for market volatility, such as last year's return variability (Daske et al., 2008). For completeness in a separate robustness test the return variability variable is used instead of the market beta (see Section, 7.3.4 below).

iii) Earnings variability (VARERN) is cited in the literature as an important source of risk in equity valuation (Beaver et al., 1970; Collins & Kothari, 1989; Easton & Zmijewski, 1989). Thus, a variable that controls for earnings variability is included in the empirical model. Following Gebhardt et al. (2001) the VARERN is defined as the standard deviation of annual net earnings for the past five years divided by the mean over the same period. In a robustness test this variable is also operationalized with analysts' earnings coefficient (see Section, 7.3.4).

iv) Apart from market beta, Fama and French (1993) introduced two other types of risk, the firm size and the book-to-market ratio. Thus, the BM variable in equation (7.6) stands for the ratio of the book value to the market value of equity. Firm size is proxied by the LOG(ASSET) which is the natural logarithm of total assets. The BM and the LOG(ASSET) have been used extensively as control variables in the CE literature (see, Daske, 2006; Francis et al., 2008). Given the fact that there is more than a single way to measure size, an alternative measure is used in a robustness test, namely: the natural logarithm of the market value of equity (see Section 7.3.4).

v) LEV denotes the financial leverage. According to Modigliani & Miller (1958), financial leverage is inversely related to the required rate of return (i.e. the CE). Similar to other studies (e.g. Daske et al., 2008; Lee et al., 2008; and Li, 2010), this variable is defined as the long-term debt to the book value of equity of banks.

vi) The RF is the risk-free rate of return. Similar to Hail & Leuz (2006) and Daske et al. (2008), Equation (7.6) controls for the time-series variation in country-specific risk-free interest rates. RF aims to capture the differences in the level of interest rates between countries which are a reflection of local savings rates and the quality of institutional structures. High interest rates in a country should be related to higher CE for the banks in this country. The RF variable is constructed using country-specific local yields of short-term treasury bills, central bank papers, or interbank loans.

vii) The USLIST is a dummy variable taking the value of one if a commercial bank has securities listed in the New York Stock Exchange and zero otherwise. The rationale for including this variable is that banks, which file registration statements with the SEC, disclose a substantial amount of financial information. Therefore, the disclosure requirement of IFRS would not affect them as much as the banks which do not have a US listing.

viii) Finally, a set of dummy variables are included in the empirical model to control for the country-effect.

7.3.3 Additional analysis

The empirical models in this section test hypotheses H_7, H_8, and H_9 of the CE test. Each of these models includes three dummy variables: the POST, the MAND, and a dummy variable that relates to each of the hypotheses above. They also include the interaction terms between these dummies and the same set of control variables as in Equation (7.6). Hence, the theoretical model for H_7 is as follows:

$$
\begin{aligned}
CE_{it} = {} & \gamma_0 + \gamma_1 POST_{it} + \gamma_2 MAND_{it} + \gamma_3 LOWF_{it} \\
& + \gamma_4 POST_{it} * MAND_{it} + \gamma_5 POST_{it} * LOWF_{it} + \gamma_6 MAND_{it} * LOWF_{it} \\
& + \gamma_7 POST_{it} * MAND_{it} * LOWF_{it} + \sum_{l}^{9} \omega_l CTRL_{lit} + \sum_{k}^{18} \delta_k COUNTRY_{ki} + \omega_{it}
\end{aligned}
\tag{7.7}
$$

Where, LOWF is a dummy variable indicating the level of analyst following (low vs. high analyst following). The codification of the LOWF variable in low and high analyst following is performed by taking for each bank the average number of analyst of the three years before the mandatory adoption of IFRS (i.e. 2002 – 2004). Based on these estimates, the LOWF takes the value of one for banks with analyst following below the sample's median (low analyst following) and the value of zero otherwise (high analyst following).

$\sum_{l}^{9} \omega_l CTRL_{lit}$ is the set of control variables as in Equation (7.6). The interaction term POST*LOWF in equation (7.7) tests hypothesis H_7. A significant negative coefficient

($\gamma 5<0$) indicates that banks with low analyst following have a higher reduction in the CE than banks with high analyst following.

Hypotheses H_8 and H_9 are examined under two separate empirical models. The theoretical model for H_8 is Equation (7.8):

$$\begin{aligned} CE_{it} = {} & \gamma_0 + \gamma_1 POST_{it} + \gamma_2 MAND_{it} + \gamma_3 CONT_{it} \\ & + \gamma_4 POST_{it}{*}\,MAND_{it} + \gamma_5 POST_{it}{*}\,CONT_{it} + \gamma_6 MAND_{it}{*}\,CONT_{it} \\ & + \gamma_7 POST_{it}{*}\,MAND_{it}{*}CONT_{it} + \sum_{l}^{9} \omega_l CTRL_{lit} + \sum_{k}^{18} \delta_k COUNTRY_{ki} + \omega_{it} \end{aligned} \tag{7.8}$$

Where, CONT is a dummy variable taking the value of one for banks domiciled in countries classified as Continental and the value of zero for banks domiciled in countries classified as Anglo-Saxon (see, earlier discussion in the development of Hypothesis H_8).

The theoretical model for H_9 is Equation (7.9)

$$\begin{aligned} CE_{it} = {} & \gamma_0 + \gamma_1 POST_{it} + \gamma_2 MAND_{it} + \gamma_3 STRNG_{it} \\ & + \gamma_4 POST_{it}{*}\,MAND_{it} + \gamma_5 POST_{it}{*}STRNG_{it} + \gamma_6 MAND_{it}{*}\,STRNG_{it} \\ & + \gamma_7 POST_{it}{*}\,MAND_{it}{*}STRNG_{it} + \sum_{l}^{9} \omega_l CTRL_{lit} + \sum_{k}^{18} \delta_k COUNTRY_{ki} + \omega_{it} \end{aligned} \tag{7.9}$$

Where, STRNG is a dummy variable taking the value of one for banks domiciled in strong enforcement rule countries and zero for banks domiciled in weak enforcement rule countries.

Estimating equations (7.8) and (7.9) as it is, using the *Eviews* statistical package, gives an error message “near singular matrix”. Agung (2009, p. 105) explains that,

‘This error message indicates that the independent variables of the model have (almost) a perfect multicollinearity based on the data sets used. However, there might be nothing wrong with the model, since it could be an estimable model based on other data sets'.

Hence, given the small sample of this thesis (i.e. it involves only one industry) it is likely that the observations are not sufficient to estimate the full theoretical models (7.8) and (7.9). Agung (2009, p. 106) argues that the researcher, in order to solve this problem, can use a trial-and-error method to delete some of the independent variables that causing the problem. Thus, using the trial-and-error method, *Eviews* gives results under the two empirical models below, with lower interaction terms than those included in the theoretical models (7.8) and (7.9).

$$CE_{it} = \gamma_0 + \gamma_1 POST_{it} + \gamma_2 MAND_{it} + \gamma_3 POST_{it} * CONT_{it}$$
$$+ \gamma_4 POST_{it} * MAND_{it} * CONT_{it} + \sum_{l}^{9} \omega_l CTRL_{lit} + \sum_{k}^{18} \delta_k COUNTRY_{ki} + \omega_{it} \tag{7.10}$$

$$CE_{it} = \gamma_0 + \gamma_1 POST_{it} + \gamma_2 MAND_{it} + \gamma_3 POST_{it} * STRNG_{it}$$
$$+ \gamma_4 POST_{it} * MAND_{it} * STRNG_{it} + \sum_{l}^{9} \omega_l CTRL_{lit} + \sum_{k}^{18} \delta_k COUNTRY_{ki} + \omega_{it} \tag{7.11}$$

Model specifications with lower interaction terms than the full interaction terms between the dummy variables are also used by previous studies (Daske et al., 2008; Li, 2010). A significant negative coefficient for the interaction term POST*CONT in equation (7.10) indicates that banks domiciled in Continental countries experienced a greater reduction in their CE, after the mandatory adoption of IFRS, than banks domiciled in Anglo-Saxon countries. Similarly, a significant negative coefficient for the interaction term POST*STRNG in equation (7.11) is an evidence that banks domiciled in strong enforcement rule countries experienced a higher reduction in their CE than banks domiciled in weak enforcement rule countries.

Similar to the value relevance test (see, Chapter 6, Table 6.1), the classification of countries in strong and weak enforcement rule is performed using the scores provided by Kaufmann et al. (2009) and it is presented in Table 7.1[29]. This table provides the scores of the 'Rule of Law' index for the first three years following the mandatory adoption of IFRS. The last column in Table 7.1 provides the codification of the dummy variable STRNG which is common for all years[30]. Countries with scores above (or equal) to the median are classified as strong enforcement rule countries (value of one) and countries with scores below the median are classified as weak enforcement rule countries (value of zero).

Table 7.1
Codification of Countries according to the Rule of Law Score in Kaufmann et al. (2009)

Country	Score 2007	Score 2006	Score 2005	Dummy variable (STRNG) Codification
Austria	1.89	1.85	1.81	1
Belgium	1.48	1.39	1.39	0
Czech Republic	0.76	0.75	0.76	0
Denmark	2.04	1.95	1.97	1
Finland	1.89	1.96	1.94	1
France	1.35	1.38	1.37	0
Germany	1.74	1.73	1.68	1
Greece	0.69	0.74	0.70	0
Hungary	0.77	0.80	0.75	0
Ireland	1.75	1.65	1.56	1
Italy	0.41	0.34	0.50	0
Netherlands	1.74	1.72	1.70	1
Norway	1.98	2.00	1.92	1
Poland	0.31	0.28	0.36	0
Portugal	0.95	0.94	1.09	0
Spain	1.09	1.04	1.07	0
Sweden	1.93	1.88	1.81	1
Switzerland	1.98	1.91	1.93	1
UK	1.69	1.70	1.56	1
Mean	**1.39**	**1.37**	**1.36**	
Median	**1.69**	**1.65**	**1.56**	
Std Dev	**0.58**	**0.58**	**0.53**	

[29] Li (2010) using both the La Porta et al. (1998) codification and the Kaufmann codification provides qualitatively similar results.
[30] Results in Table 7.1 are different from the results in Table 6.1 because it includes different countries.

7.3.4 Robustness tests

A number of robustness tests are carried out in order to test the validity of the primary findings and the findings of the additional analysis, using alternative model specifications. Four robustness tests have been developed.

i) A number of control variables in Equation (7.6) are operationalised differently by using different proxies. In particular, instead of using BETA, as a proxy for market volatility, the model uses the annual return variability (RVAR) which is defined as the standard deviation of the monthly returns at year end (see, Gebhardt et al., 2001). VARERN is substituted by the coefficient of variation of all the FY1 analysts' earnings per share estimates, denoted as VARCOEF. Finally, banks' size is controlled by using the natural logarithm of the market value of equity, LOG(MVE), instead of the natural logarithm of the total assets, LOG(ASSET).

ii) A model that controls for outliers, by taking the natural logarithms of the continuous independent variables (Wooldridge, 2006, p. 330).

iii) A model that controls for the long-term growth potential of banks (LTG). This is proxied by the five-year consensus growth rate provided by equity analysts in the I/B/E/S. When the growth rate is not available it is calculated from analysts' forecasted earnings per share, using the formula (FY2/FY1-1). Gebhardt et al. (2001) explain that analysts tend to be over-optimistic for the high long-term growth firms which is translated to higher share prices and as a consequence to an abnormally lower CE.

iv) A model that uses the risk premium for the dependent variable instead of the implied CE (Hail & Leuz, 2006). Risk premium is calculated by subtracting from the implied CE the risk-free rate. This model aims to test whether the results are sensitive to other measures of the required rate of return. When the risk premium is used as the dependent variable, the risk-free interest rate variable (RF) is excluded from the right-hand side of the equation.

7.4 Sample procedure

The study's population consists of European listed banks in the 27 EU member-states and two major European economies, Switzerland and Norway. This is the same population used in the value relevance tests, i.e., 196 European listed commercial banks as provided by BankScope at 06/09/2007. However, due to the fact that analysts (in I/B/E/S) do not provide estimates of the expected earnings per share (EPS) and the growths for all banks in the population, the final sample was reduced to 88 commercial banks. For these 88 banks, data was sufficient to calculate the CE for every year in the sample (2002 – 2007) which gives a total of 528 bank-year observations for the CE. Excluding 108 banks from the population, some of the 29 European countries remain with zero banks and thus are not represented in the final sample (such countries are, Bulgaria, Cyprus, Estonia, Latvia, Lithuania, Luxemburg, Malta, Romania, Slovenia, and Slovakia).

Three major databases were used to collect the data for the calculation of the CE (DataStream, WorldScope and I/B/E/S). Analysts' forecasted EPS, the growth in EPS, the actual values of EPS, and the actual values of Dividend per Share (DPS) were taken from the I/B/E/S database. Book values per shares (BPS) and ROE ratios were retrieved from WorldScope, and data on share prices from the I/B/E/S. Finally, the information regarding country-specific inflation rates was downloaded from Eurostat's web site. Panel A in Table 7.2 provides a summary for the sources of the data used to calculate the dependent variable (CE).

Table 7.2
Data Sources

Panel A:		
Inputs in the CE estimates		**Source**
Earnings per Share forecasts		I/B/E/S
Earnings per Share growths		I/B/E/S
Actual Earnings per Share		I/B/E/S
Actual Dividend per Share		I/B/E/S
Actual Book value per Share		WorldScope
Return on Equity (ROE)		WorldScope
Share Prices (P)		I/B/E/S
Inflation rates		EuroStat
Panel B:		
Independent variables	**Description**	**Source**
ASSET	Total Assets	DataStream
MVE	Market value of Equity	DataStream
BETA	Market beta	Estimated
RVAR	Return Variability	Estimated
LD	Net Loans to Total Deposits ratio	Estimated
BM	Book to Market ratio	DataStream
VARERN	Earnings Variability	Estimated
VARCOEF	Coefficient of the Variation of FY1 EPS	I/B/E/S
CAR	Capital Adequacy Ratio	BankScope or Annual Reports
LTG	Long-Term Growth in earnings	I/B/E/S
LEV	Financial Leverage	Estimated
RF	Risk-Free Rate	DataStream
FOLLOW	Analysts' Follow	I/B/E/S

Panel B presents a summary of the sources for the independent variables. Data relating to some of the independent variables was not directly observable and therefore was estimated. Specifically, Market Values of Equity (MVE), Total Assets (ASSET), Book-to-Market ratios (BM), and Risk-Free rates (RF) are retrieved from DataStream. Capital adequacy ratios (CAR) are found on BankScope. When the CAR was not available on BankScope the ratio was hand-collected from banks' annual reports or from other sources found in banks' web sites.

The Loan to Deposit ratios (LD) are calculated using data from WorldScope on Banks Net Loans and Total Deposits. Similarly, the variable of financial leverage (LEV) is calculated using data from WorldScope dividing the Long-Term Debt with the Book Value of Equity. The BETA, the RVAR, and the VARERN were estimated using raw data from the DataStream, such as banks' share price returns, returns of the DJ STOXX 600 index, and net income data.

As with the value relevance empirical tests, all figures stated in other currencies are converted into Euros using the exchange rates provided by the DataStream as of the same date with the measurement date of the related variable (see, Appendix E).

7.5 Conclusion

This chapter provided the research methodology of the second empirical test of this thesis, the economic consequence test. The chapter develops four hypotheses. The first hypothesis tests whether the mandatory adoption of IFRS had any material impact on banks' CE. The other three hypotheses examine whether the decrease in the CE is higher for specific groups of banks. These groups are banks that experience *low analyst following*, domiciled in countries with *Continental accounting standards*, and domiciled in *Strong enforcement rule* countries.

The CE is not directly observable and therefore it needs to be estimated. Similar to Daske et al. (2008) and Li (2010), this thesis uses four methods to estimate the CE. Two of these methods are based on an implementation of the RIVM as provided by Gebhardt et al. (2001) and Claus & Thomas (2001) and two are based on the implementation of the EGM (the Ohlson & Juettner (2005) model) as developed by Gode & Mohanram (2003) and by Easton (2004).

The analysis involves a univariate test and a multivariate test. The univariate test simply examines the change of the CE from 2002 to 2007. The multivariate analysis provides a more powerful test by controlling for a number of factors that are likely to impact on CE, i.e., the capital adequacy ratio; the ratio of loans to deposits; the market beta; earnings variability; a size variable; the book-to-market ratio; the financial leverage; the risk-free rate; and the US listing.

For robustness, four alternative specification models are developed: i) a model that uses alternative variables to the variables of the primary model, ii) a model that controls for outliers by taking the natural logarithms of the continuous independent variables, iii) a model that controls for the growth expectations of banks by including a long-term growth variable in the primary model, and iv) a model that uses the risk premium as the dependent variable instead of the CE.

Chapter 8: Findings on the value relevance

8.1 Introduction

This chapter discusses the findings of the first empirical research, namely: the value relevance of fair value accounting under IFRS. The findings are presented into two separate sections. A section for the value relevance of fair value disclosures, such as loans and advances, held-to-maturity investments, deposits, and other debt, and a section for derivatives' fair value recognition (net trading and hedging derivatives).

In particular, this chapter is organized as follows: Section 8.2 presents the descriptive statistics for the dependent and the independent variables. Section 8.3 provides the results of the regression models that test the value relevance of fair value disclosures. The analysis begins with a discussion of the results of the primary specification model and follows with the alternative specification models. Section 8.4 discusses the findings on derivatives' fair value recognition under a primary specification model and under alternative specification models for robustness. Finally, Chapter 8.5 concludes.

8.2 Descriptive statistics

Table 8.1 reports the descriptive statistics for the variables in 2005 and 2006. On average the market value of equity (MVE) is almost double that of its book value (BVE). In particular, the market-to-book value ratio for 2005 is 1.73 (€13,103/7,557) and that for 2006 is 1.84 (€15,860/8,630). Therefore, the differences between MVE and BVE (i.e. MB), that this study attempts to explain, represent both in absolute and relative terms, very material amounts.

Table 8.1
Descriptive statistics for the variables

	Mean		Median		Max		Min		Std. Dev.	
	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006
Value of Equity										
MVE	13,103	15,860	3,889	5,120	154,183	159,025	10	28	23,347	25,797
BVE	7,557	8,630	2,165	2,527	83,263	87,265	46	54	13,292	14,675
MB	5,546	7,230	1,456	2,493	70,920	71,760	-2,148	-3,837	10,857	12,217
Book value of assets and liabilities										
BLNS	101,762	111,893	22,220	24,376	743,635	810,540	131	295	164,915	176,711
BHTM	1,640	1,437	29	14	19,769	18,007	0	0	3,567	3,431
AFS	17,685	17,881	1,621	1,983	179,020	188,378	0	0	36,446	39,183
FAFVPL	48,074	56,314	2,346	2,758	700,525	754,800	0	0	119,743	143,430
OAS	16,693	17,454	3,036	3,081	229,350	252,601	17	20	34,875	37,929
TA	185,854	204,979	30,158	33,248	1,348,836	1,491,388	250	401	327,714	363,542
BDEP	94,282	100,649	17,851	21,497	727,693	821,291	193	177	161,898	172,427
BDT	34,548	39,750	5,728	6,330	254,490	302,817	0	0	54,769	63,746
FLFVPL	31,577	36,396	469	536	610,681	653,328	0	0	91,302	103,321
OLI	17,890	19,554	1,829	1,676	230,389	251,727	4	10	37,390	42,697
Income statement variables										
NOI	2,194	2,279	620	618	26,692	26,443	5	10	3,839	4,020
NSI	702	862	39	61	13,571	10,489	-213	-184	1,902	2,122
Fair Value of assets and liabilities										
FLNS	102,467	112,228	22,247	24,762	743,372	807,604	131	295	165,696	176,944
FHTM	1,716	1,466	35	14	21,164	18,960	0	0	3,773	3,524
FDEP	94,331	100,363	17,851	21,481	727,693	821,291	193	177	161,913	172,146
FDT	34,762	39,802	5,767	6,347	258,107	303,185	0	0	55,146	63,855
Differences between Fair Values and Book Values										
LNS	705	334	66	12	15,099	7,734	-262	-2,936	1,817	1,179
HTM	76	29	0	0	1,395	953	-25	-148	239	137
DEP	49	-286	0	0	5,749	282	-5,177	-19,566	825	1,923
DT	214	52	2	0	3,617	1,985	-3,624	-2,176	805	465
Derivative values										
NTDER	-309	-584	0	-2	8,844	5,831	-15,839	-22,744	2,068	2,735
NHDER	-254	-230	0	0	2,570	1,718	-9,062	-7,140	1,521	1,147
NADER	1,494,698	1,920,331	41,090	56,651	26,097,245	31,246,745	0	0	4,284,178	5,567,135
NATDER	1,149,810	1,291,451	16,887	36,629	25,981,270	31,104,624	0	0	3,915,660	4,466,608
NAHDER	52,853	59,834	2,218	2,865	1,437,382	1,774,780	0	0	175,129	206,209
Other Control Variables										
NON39AS	15,864	16,731	2,932	2,852	229,106	246,682	-932	20	34,253	37,119
NON39LI	16,807	18,601	1,266	1,450	224,782	247,482	4	10	36,710	41,976
NPL	2,251	2,218	541	496	32,812	22,547	0	0	4,637	4,156
GAP	39,395	40,236	6,779	6,432	309,184	353,175	-8,166	-29,994	71,174	77,076
CORE	40,414	42,288	7,191	8,611	418,736	429,236	20	2	77,533	75,938
OFF	46,497	54,561	4,241	6,342	627,115	618,027	48	0	96,075	110,787
ISAS	76,572	81,627	13,161	15,270	670,497	757,450	5	17	128,994	142,611
ISLI	37,177	41,391	6,201	7,921	365,870	404,275	5	3	62,513	69,729
CAR	12.17	11.68	11.50	11.10	27.40	22.90	7.60	7.30	2.99	2.27

Notes to table 8.1:
1. All the amounts are in millions of euros.
2. The maximum number of observations are N=107 in 2005 and N=110 in 2006.
3. The observations for NATDER and NAHDER are 83 banks in 2005 and 89 banks in 2006 due to poor information regarding the disaggregated values of the notional amounts of derivatives, NADER.
4. MVE = market value of equity, BVE = Book value of equity, MB = MVE - BVE, BLNS = Loans and advances, BHTM = Held-to-maturity investments, AFS = Available for sales, FAFVPL = Financial assets at fair value through P/L, OAS = Other Assets, the remaining value of assets, TA = Total Assets, BDEP = Deposits, BDT = Short and Long-term debt, FLFVPL = Financial liabilities at fair value through P/L, OLI = Other liabilities, the remaining values of liabilities, NOI = Net operating income, NSI = Net securities income, FLNS = Fair values of Loans and advances, FHTM = Fair values of Held-to-Maturity investments, FDEP = Fair values of Deposits, FDT = Fair values of short and long-term debt, LNS = FLNS-BLNS, HTM = FHTM-BHTM, DEP = FDEP - BDEP, DT = FDT-BDT, NTDER = Net trading derivatives, NHDER = Net hedging derivatives, NADER = Notional amounts of derivatives, NATDER = notional amounts of trading derivatives, NAHDER = notional amounts of hedging derivatives, NON39AS = non-IAS 39 assets, NON39LI = non-IAS 39 liabilities, NPL = Non-performing loans, GAP = ISAS - ISLI, CORE = Deposits with no stated maturities, on demand deposits, OFF = Notional amounts of credit-related off-balance sheet items, ISAS = Interest-sensitive assets, ISLI = Interest-sensitive liabilities, and CAR = Capital adequacy ratio.

The market-to-book value ratio of more than one can be attributed to the partial use of fair values in the financial statements of banks: IAS 39 requires the recognition of loans and advances, held-to-maturity investments, deposits, and other debt in amortized cost instead of fair values. Adjusting the BVE for the fair value differences results in a market-to-book value ratio of 1.52 (13,103/8,601) for 2005 and 1.81 (15,860/8,759) for 2006[31]. These market-to-book ratios although are lower than the original ratios (1.73 for 2005 and 1.84 for 2006) there are still far away from unity. An explanation for this difference is the unrecorded goodwill of banks (e.g. core deposit intangibles).

Loans, in terms of their book value (BLNS), are by far the asset with the highest value and represent over 50% of total assets. On average, LNS, the difference between the fair value of loans (FLNS) and their book value (BLNS), was €705 million in 2005 and €334 million in 2006. These differences represent 9.3% of the book value of equity for 2005 and 3.9% for 2006. The difference between the fair value and the book value of loans is the highest of all of the differences between fair values and book values (for both 2005 and 2006), and this provides

[31] The adjusted BVE for the fair value differences have been calculated as the BVE from Table 8.1 plus the LNS, HTM, DEP, DT.

support for the operationalisation of the importance of capital adequacy ratio and weak enforcement environment using, LNS*WEAK*LOWC.

Financial assets at fair value through profit or loss (FAFVPL) are the asset with the second highest value, at 26% (27%) in 2005 (2006), followed by the available-for-sale assets (AFS), at 10% (9%). The assets with the lowest value are held-to-maturity investments. For example, for 2005 their book value (BHTM) and their fair value (FHTM) represent less than 1% of the total assets. Moreover, the difference between their fair values and book values is, relative to that relating to loans, small for both 2005 and 2006 (€76 million and €29 million, respectively).

With respect to the liability variables, book value of deposits (BDEP) are clearly the most important as they represent the 53% of all liabilities (51% for 2006). However, whilst the difference between their fair values and their book values (DEP) for 2005 is only 49 million, it is 286 million in 2006. Debt, in terms of its book value (BDT) represents only 19% (20%) of the total liabilities. However, in contrast to DEP, the difference between the fair value and the book value of debt (DT) is €214 million in 2005 and €52 million in 2006. The financial liabilities at fair value through profit or loss (FLFVPL) represent the 18% (19%) of total liabilities.

Income statement variables (NOI and NSI) indicate that the majority of banks' earnings relate to their core business, the loan – deposit activity. For example, for 2005 the average net operating earnings (NOI) were 2,194 million, whilst the average net securities earnings (NSI) were 702 million. Descriptive statistics regarding fair values of derivatives reveal that the net position of trading and hedging derivatives is negative with trading derivative liabilities and hedging derivative liabilities overcoming trading derivative assets and hedging derivative assets, respectively. In particular, the net trading derivatives are -309 (-584) million in 2005 (2006) and the net hedging derivatives are -254 (-230) million in 2005 (2006).

The descriptive statistics for control variables show that the notional amounts of derivatives (NADER) represent very substantial amounts - an average of €1,494,698 million for 2005. The notional amounts of derivatives are much higher than their fair values as they represent the contractual amounts based on which the cash flows of a derivative contract are calculated. The magnitude of notional amounts cannot be underestimated. For example, for Barclays plc in Annual Report 2005, whilst its total assets amounted to £924.36 billion, the notional amount of its derivatives was £17,884.44 billion. Descriptive statistics also show that, on average, the interest sensitivity assets (ISAS) are almost double the size of interest sensitivity liabilities (ISLI) for both years: e.g., for 2005, ISAS were €76,572 as opposed to €37,177 million for ISLI. GAP, which represents the difference between these two variables, is the excess amount of ISAS over ISLI. It is also noteworthy that off-balance sheet items (OFF) are relatively substantial: for both years, they exceed the fair value of debt.

The standard deviation for all variables is large, revealing a high dispersion in the sample. Therefore, although on average the differences between the fair value and book value of some of the variables of interest may not be particularly large, for many banks these differences represent very large amounts. For example, for 2005 the maximum difference between fair value and book value for debt (DT) is €3,617 million, whilst the average difference is only €214 million. The high dispersion in the sample may result in outliers which are a common dataset problem when estimating the model using the Ordinary Least Squares (OLS) method. Outliers can affect the results of the regression model because they minimize the sum of squared residuals (Wooldridge, 2006). Given the small population of this thesis and the fact that the sample consists of very large banks that usually domicile in developed countries, such as the U.K., and of very small banks that domicile in developing countries, such as Lithuania, outliers are also present in the dataset of this thesis. Dropping some of the outliers out of the model may decrease further the sample of the thesis and this will affect the estimated coefficients, given the smaller sample. Thus, the regression models below were run without taking any action for outliers.

8.3 Fair value disclosures

This section provides the findings regarding the value relevance of fair value disclosures. Evidence is provided for loans and advances, held-to-maturity investments, deposit liabilities, and other debt. Section 8.3.1 presents the results from the primary specification model and Section 8.3.2 discusses the results from the alternative specification models.

8.3.1 Results from the primary specification model

The correlation matrix for the regression variables indicates that some of the independent variables are highly correlated with each other (Table 8.2, Panel A). Although it is preferable for the correlations of the independent variables to be as low as possible, it is not clear when multicollinearity is a problem in the dataset (Wooldridge, 2006, p. 102-103). A standard solution is to drop one or more variables from the model: the variables that are highly correlated. However, excluding an important variable from the model results in model misspecification and as a consequence in bias (Greene, 2002; Wooldridge, 2006). Thus, many researchers run the model including all variables, ignoring multiciollinearity.

Table 8.2
Correlation matrixes for the regression variables

Panel A: Correlations for the variables included in the primary model specification, Equation (6.2).

	MVE	BVE	MB	LNS	LNS *WEAK *LOWC	HTM	DEP	DT	NON39AS	NON39LI	NADER	NPL	GAP	CORE	OFF
MVE	1	0.97	0.95	0.26	0.11*	0.20	-0.04*	0.28	0.79	0.63	0.69	0.59	0.82	0.88	0.87
BVE	0.96	1	0.86	0.31	0.15*	0.31	0.02*	0.31	0.76	0.70	0.73	0.69	0.85	0.92	0.91
MB	0.95	0.84	1	0.18*	0.05*	0.05*	-0.13*	0.23	0.76	0.49	0.59	0.42	0.71	0.78	0.75
LNS	0.17*	0.13*	0.20	1	0.82	0.17*	0.01*	0.03*	0.21	0.22	0.23	0.30	0.48	0.33	0.40
LNS*WEAK*LOWC	0.12*	0.12*	0.11*	0.52	1	0.08*	-0.16*	-0.45	0.13*	0.15*	0.12*	0.16*	0.29	0.11*	0.32
HTM	0.24	0.34	0.10*	-0.08*	-0.09*	1	0.09*	0.21	0.29	0.53	0.34	0.40	0.17*	0.28	0.34
DEP	-0.14*	-0.09*	-0.19	0.07*	-0.01*	-0.01*	1	0.43	0.01*	0.04*	0.08*	0.15*	-0.01*	0.07*	-0.04*
DT	0.35	0.35	0.32	-0.05*	-0.33	0.02*	-0.14*	1	0.30	0.35	0.30	0.35	0.33	0.44	0.15*
NON39AS	0.74	0.71	0.71	0.12*	0.13*	0.31	-0.04*	0.44	1	0.73	0.85	0.46	0.62	0.69	0.68
NON39LI	0.64	0.68	0.54	0.07*	0.05*	0.50	-0.25	0.34	0.75	1	0.68	0.60	0.71	0.75	0.67
NADER	0.71	0.76	0.60	-0.03*	-0.04*	0.31	-0.01*	0.32	0.68	0.64	1	0.50	0.63	0.70	0.74
NPL	0.66	0.73	0.51	0.26	0.39	0.31	-0.09*	0.10*	0.56	0.63	0.54	1	0.60	0.63	0.59
GAP	0.76	0.82	0.63	0.15*	0.22	0.20	-0.26	0.29	0.47	0.64	0.64	0.70	1	0.88	0.84
CORE	0.91	0.94	0.80	0.06*	0.12*	0.35	-0.28	0.31	0.63	0.76	0.71	0.71	0.89	1	0.85
OFF	0.81	0.88	0.66	0.06*	0.09*	0.43	-0.14*	0.11*	0.56	0.66	0.73	0.62	0.79	0.87	1

1. The numbers at the upper triangle in Panel A represent correlations between the variables for 2005, and at the lower triangle correlations between the variables for 2006.
2. The * indicates p-values > 0.05.

Panel B: Correlations for the variables in Equation (6.2) expressed in first-difference.

	ΔMVE	ΔBVE	ΔMB	ΔLNS	ΔLNS *WEAK *LOWC	ΔHTM	ΔDEP	ΔDT	ΔNON39AS	ΔNON39LI	ΔNADER	ΔNPL	ΔGAP	ΔCORE	ΔOFF
ΔMVE	1														
ΔBVE	0.81	1													
ΔMB	0.88	0.44	1												
ΔLNS	-0.06*	-0.21	0.06*	1											
LNS*WEAK*LOWC	-0.09*	-0.18*	0.01*	0.78	1										
ΔHTM	-0.47	-0.47	-0.35	0.09*	0.16*	1									
ΔDEP	-0.08*	-0.02*	-0.10*	0.19*	0.01*	0.01*	1								
ΔDT	-0.02*	0.03*	-0.06*	0.06*	-0.26	0.17*	0.13*	1							
ΔNON39AS	0.07*	0.11*	0.02*	-0.15*	-0.01*	-0.24	-0.03*	-0.05*	1						
ΔNON39LI	0.19*	0.19*	0.14*	-0.26	-0.03*	-0.29	-0.09*	-0.37	0.73	1					
ΔNADER	0.63	0.79	0.35	-0.28	-0.08*	-0.24	-0.04*	-0.17*	-0.05*	0.19	1				
ΔNPL	-0.04*	-0.06*	-0.01*	-0.09*	-0.07*	0.08*	0.01*	0.09*	-0.32	-0.34	0.08*	1			
ΔGAP	-0.04*	0.05*	-0.10*	-0.31	-0.01*	0.05*	-0.29	-0.25	-0.16*	-0.05*	0.13*	-0.13*	1		
ΔCORE	0.13*	-0.04*	0.25	-0.14*	-0.19*	-0.09*	-0.21	0.27	-0.07*	-0.02*	-0.22	0.03*	-0.05*	1	
ΔOFF	0.46	0.61	0.23	-0.51	-0.65	-0.39	0.01*	0.09*	0.01*	0.05*	0.46	-0.09*	0.04*	0.12*	1

1. The * indicates p-values > 0.05.

Multicollinearity is also present in previous value relevance studies (Barth et al., 1996). In this study, researchers examine (apart from the primary specification model that suffers from high collinearity) other model specifications, such as a first-difference specification model where the correlations between the explanatory variables are less prevalent. Similar, to Barth et al. (1996) the multicollinearity for the first-difference model of this study is much less of an issue (see, Table 8.2, Panel B).

Table 8.3 reports the results of the regression analysis based on the primary specification model, Equation (6.2). As indicated by the White (1980) chi-square test the null hypothesis of correct model specification and the homoskedasticity assumption is not rejected for either of the two years. White's chi-squares are 0.0825 and 0.0656, respectively. Failing to reject the null hypotheses of White's test (1980) is an indication that the primary specification model, Equation (6.2), is well specified. The model has high explanatory power: the adjusted R^2 shows that in total the independent variables explain 91% and 85% of the variation of the dependent variable in 2005 and 2006, respectively.

The results reject the null hypothesis H_1 against the alternative hypothesis that the fair values are value relevant over and above the amortized costs. This observation holds for the disclosures of the fair value of loans (LNS) and debt (DT). The loans variable (LNS), which represents the most important financial asset for banks, is significant at the 0.01 level with the expected positive sign in both years. There is also strong support for the value relevance of debt (DT) whose coefficient is significant and negative (as hypothesized) for both years under study. The significant positive coefficient of the loan variable (LNS) supports the findings of Barth et al. (1996) where they also found significant the coefficient of loans for a sample of US banks. In addition, Barth et al. (1996) found significant the proxy variables for the interest rate risk and the default risk, which they both act as competitive variables to the fair value of loans. Under this thesis, the variables of GAP and NPL, which control for the interest rate risk and the default risk, respectively are found significant only in 2006 with the expected signs.

Table 8.3
Primary regression results for the primary specification model, Equation (6.2)

		2005			2006		
Variables	Predict -ed sign	Coeff.	t-value	p-values[a]	Coeff.	t-values	p-values[a]
Intercept	?	266.689	0.69	0.4918	1078.653	2.02	0.0458
LNS	+	2.263	3.32	0.0007	2.276	4.86	0.0001
LNS*WEAK*LOWC	-	-4.392	-4.96	0.0001	-3.200	-2.98	0.0018
HTM	+	-4.405	-2.13	0.9822	-13.604	-3.19	0.9991
DEP	-	-0.596	-1.29	0.0993	-0.319	-1.18	0.1202
DT	-	-4.239	-3.92	0.0001	-4.140	-2.71	0.0040
NON39AS	+	0.307	14.77	0.0001	0.199	7.71	0.0001
NON39LI	-	-0.095	-4.43	0.0001	-0.129	-5.77	0.0001
NADER	?	-0.001	-8.55	0.0001	-0.001	-0.07	0.9418
NPL	-	0.045	0.46	0.6785	-0.397	-2.12	0.0182
GAP	-	0.015	1.14	0.8715	-0.031	-1.90	0.0297
CORE	+	0.052	4.36	0.0001	0.211	10.56	0.0001
OFF	?	0.051	5.21	0.0001	-0.023	-2.15	0.0340
Adj. R^2		0.91			0.85		
White's Chi-Square		0.0825			0.0656		
N		107			110		

[a] p-values are based on one-tailed t-tests when the coefficient sign is predicted, and two-tailed t-tests otherwise.

Consistent with previous studies (Barth et al., 1996; Eccher et al., 1996; and Nelson 1996), the deposit variable (DEP) is found to be insignificant. A plausible explanation for this result may lie in the estimates of the deposits' fair value by the sample banks. IAS 39, similarly to SFAS No. 107, requires that the fair value of deposit liabilities with a demand feature should not to be stated at less than the amount payable on demand (IAS 39, para. 49)[32]. Most European banks

32 Indicative extracts from two annual reports (2005) of sample banks follows: Lloyds TSB Group states that *"the fair value of deposits repayable on demand is considered to be equal to their carrying value. The fair value for all*

appear to state the fair value of deposits with no stated maturities at this minimum amount which is required by the standard, i.e., their carrying amount, which may not reflect their true fair value. Finally, held-to-maturity investments (HTM) are insignificant for both 2005 and 2006, but not in the hypothesised direction. The negative sign of the coefficient suggests that the market penalizes banks that classify financial assets as held-to-maturity. This may be due to the riskiness of these investments. Held-to-maturity investments do not qualify as hedged instruments in terms of interest rate risk (IAS 39, para. 79). Potential material variations in the value of these investments that are not hedged, coupled with the uncertainty surrounding management's intention and ability to hold these instruments until maturity, may lead the market to take a conservative stance on them, anticipating potential future losses. This is also consistent with the view of Ryan (1999) that the long maturity and low marketability of these investments may lead to 'greater incompleteness, noise, and discretion' relating to their disclosed fair values.

H_2 is also strongly supported: the interaction variable (LNS*WEAK*LOWC), which permits the fair value of loans coefficient to vary with the financial health of commercial banks and the strength of countries' enforcement rules, is significant for both years. The negative coefficient for this interaction term supports the hypothesis that the market assigns a lower coefficient to the fair value of loans of commercial banks that have a low capital adequacy ratio and domicile in countries with weak enforcement of accounting rules (banks in group A of Table 6.2).

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other deposits and customer accounts is estimated using discounted cash flows applying either market rates, where applicable, or current rates for deposits of similar remaining maturities". Bank Austria Creditanstalt AG states also that *"To the extent that market prices were available from exchanges or other efficient markets, these were stated as fair values. For the other financial instruments, internal valuation models were used, in particular the present value method (discounting future cash flows on the basis of current yield curves). For fixed-rate loans and advances to, and amounts owed to, banks and customers with a remaining maturity of, or regular interest rate adjustment within a period of, less than one year, amortised cost was stated as fair value"*.

The findings with respect to the control variables are broadly consistent with those of past studies. For both years the coefficients for both assets and liabilities other than those covered by IAS 39 (NON39AS and NON39LI) are statistically different from zero at $p<0.01$, with the predicted sign: positive for assets, and negative for liabilities. There is also support for the importance of the notional amounts for derivatives (NADER), which are found significant, with a negative sign, in 2005. This confirms the findings of past studies (e.g., Eccher et al., 1996 and Venkatachalam, 1996), that investors associate the notional amount of derivatives with an additional risk for banks. The results also strong support the importance of core deposits (CORE), which are found significant in both years. This reinforces the findings of Barth et al. (1996) that core deposits constitute an important unrecognized intangible asset which is reflected in the market value of banks. Also, similarly to previous studies (Eccher et al., 1996 and Riffe, 1997), the variable for credit-related off-balance sheet items (OFF) is found significant, with a positive sign in 2005 and a negative sign in 2006. This change in sing can be attributed to a number of factors, e.g., changes in the general financial outlook of banks might have led investors to take a more negative stance on off-balance sheet items. Default risk, proxied by non-performing loans (NPL), also has the predicted negative sign, supporting the view that investors interpret non-performing loans as having a negative effect on market values (Beaver et al., 1989); but it is only significant for 2006. Moreover, the results support the importance of interest rate risk, proxied by GAP (i.e., the difference between financial assets and financial liabilities with maturities over a year), which is significant for 2006. As predicted, because interest rates were in an upward trend from the second half of 2005 and on, this variable had a negative sign, indicating that the market had indeed taken a negative view on banks which were 'asset sensitive' (whose interest-sensitive assets exceeded their interest-sensitive liabilities).

8.3.2 Results from the alternative specification models

This section tests the robustness of the primary findings using a number of alternative models. Getting consistent findings under different model specifications strengthens the validity of the primary results and increases researcher's confidence for the relationship between the cause and the effect, in this case the relationship between the differences in assets and liabilities' values (i.e. fair values less book values) and the differences in equity values (i.e. market value less book value of equity).

i) Table 8.4 presents the results from the first-difference model that implicitly controls for correlated omitted variables to the extent the omitted variables are constant over time. According to White's test the model is well specified and do not suffer from heteroscedasticity (chi-square 0.2026). The model's explanatory power is lower than that of the primary model, but at 32% it is still substantial. The results with respect to the significance of the variables of interest are substantially the same. LNS and the interaction variable (LNS*WEAK*LOWC) are both significant at the 1% level, with the predicted sign: positive for LNS, and negative for LNS*WEAK*LOWC. DT also continues to be significant, with *p*-value of 0.0290. As in the primary model, deposits (DEP) and held-to-maturity investments (HTM) are not significant. There are, however, some differences concerning the significance of the control variables. CORE is still significant, as is NADER. In contrast, GAP and NPL, which were significant for 2006 in the primary model, are no longer significant. Finally, credit-related off-balance sheet items (OFF), and both assets and liabilities other than those covered by IAS 39 (NON39AS and NON39LI), which were significant for both 2005 and 2006, are no longer significant though their signs are in the hypothesized direction.

Table 8.4
Regression results from the first-difference specification model

Variables	Predict -ed sign	Coeff.	t-value	p-values[a]
Intercept	?	1272.257	4.68	0.0001
ΔLNS	+	1.296	3.37	0.0006
ΔLNS*WEAK*LOWC	-	-1.245	-2.41	0.0090
ΔHTM	+	-2.351	-1.01	0.8417
ΔDEP	-	-0.120	-0.93	0.1763
ΔDT	-	-1.256	-1.92	0.0290
ΔNON39AS	+	0.034	1.44	0.0771
ΔNON39LI	-	-0.016	-0.46	0.3227
ΔNADER	?	0.001	4.48	0.0001
ΔNPL	-	0.029	0.16	0.5636
ΔGAP	-	0.005	0.35	0.6375
ΔCORE	+	0.057	4.24	0.0001
ΔOFF	?	-0.012	-0.80	0.4270
Adj. R^2		0.32		
White's Chi-Square		0.2026		
N		100		

[a] p-values are based on one-tailed t-tests when the coefficient sign is predicted, and two-tailed t-tests otherwise.

ii) The results of the March market values model were markedly similar to those reported in Table 8.3 (See Appendix B, Section 1, Table A). The adjusted R^2 of this model was substantially the same (92% for 2005 and 85% for 2006), and both the variables of interest and the control variables retained their signs and significance, e.g., LNS, the interaction term (LNS*WEAK*LOWC), DT, NPL, GAP, CORE, and OFF continued to be significant.

iii) The results from the model treating BVE as an independent variable instead of incorporating in the dependent variable provides qualitative similar results to those reported in Table (8.3) (See Appendix B, Section 1, Table B). In particular, the coefficient of LNS in 2005 (2006) is found to be 1.444 (1.755) and its *p*-value 0.0216 (0.0001). DT and the interaction term (LNS*WEAK*LOWC) are also significant with the expected sings, e.g., for 2006, DT coefficient = -7.39 and *p*-value = 0.0001, and interaction term coefficient = -2.881 and *p*-value = 0.0020. One difference from the primary model results was that the deposits variable (DEP) was significant in the hypothesised direction for both years: for 2005, coefficient of -1.036 and *p*-value = 0.0139; and for 2006 co-efficient of -0.869 and *p*-value = 0.0010.

iv) With respect to the growth model, the growth variable (the five years change in net loans) is found marginally significant in 2005 with a coefficient of 0.014 and a *p*-value of 0.0575, and insignificant in 2006 (coefficient = 0.010, *p*-value = 0.2110). However, there was no variation in the results relating to the primary variables of interest (See Appendix B, Section 1, Table C).

v) A small number of banks (fourteen in 2005) have adopted the IFRS before the introduction of their mandatory use in 2005. The longer experience that the market had had in dealing with the fair value estimates of these banks could have resulted to different valuation between the early adopters and the mandatory adopters. The dummy variable of early adopters (EARLY) is found insignificant in both years and did not have any effect on either the signs or the significance of the other variables (See Appendix B, Section 1, Table D).

vi) Finally, the model that controls for banks' pension fund status supports again the view that the fair values of loans and the fair values of other debt are value relevant over and above their amortized cost (e.g., for 2005 the coefficient of LNS is 2.192 with a *p*-value of 0.0010 and the coefficient of DT is -4.223 with a *p*-value of 0.0001). The interaction term (LNS*WEAK*LOWC) continues to support Hypothesis H_2 (coefficient = -4.298 and *p*-value = 0.0001) and the results with respect to the control variables are consistent with those reported in Table 8.3 (See Appendix B, Section 1, Table E).

Overall, the results indicate that the LNS, its interaction term (LNS*WEAK*LOWC), and the DT are significant under all model specifications with the expected signs. Consistent to previous studies (Barth et al., 1996), fair values of loans are found value relevant. Fair values of banks' debt are also found significant with a negative sign. Moreover, the significant and negative coefficient for the interaction term of loans (LNS*WEAK*LOWC) indicates that the market assigns lower coefficient to those banks that hold low capital adequacy ratios and domicile in countries with weak enforcement rules. As explained in the methodology chapter (Chapter 6, Section 6.3.1.1), banks in group A have higher incentives to manipulate the fair values of loans due to low capital adequacy ratios. Moreover, they also have the latitude to do it as they domicile in weak enforcement rule countries.

8.4 Derivatives' fair value recognitions

This section reports the findings regarding the value relevance of derivatives' fair value recognition. Section 8.4.1 presents the results from the primary specification model and Section 8.4.2 the results from the alternative specification models.

8.4.1 Results from the primary specification model

Correlation matrixes for the derivatives' test indicate that the correlations between some of the independent variables are high in the primary model (Table 8.5, Panel A). For example, the correlation between the GAP and the NOI is 0.87 for 2005. However, the correlations are substantial lower in the changes model (Table 8.5, Panel B). For the same variables (GAP and NOI) the correlation fell to 0.34.

Table 8.6 reports the findings of the primary specification model, Equation (6.3). White's chi-square indicates that the model is well specified and does not suffer from heteroskedasticity (chi-square = 0.0940 in 2005 and 0.0653 in 2006). Similar to previous studies (Ahmed et al., 2006) the explanatory power of the model is high with an adjusted R-squared of 98% (97%) in 2005 (2006).

The fair values of net trading derivatives (NTDER) and net hedging derivatives (NHDER) are found to be value relevant. Specifically, in 2005 (2006) the coefficient of NHDER is 2.804 (1.045) and its p-value is 0.0001 (0.0359). NTDER is significant in 2005 (coefficient = 2.012, p-value = 0.0001). These findings reject the null hypothesis H_3 that the fair values of derivatives are not value relevant. Ahmed et al. (2006) provide similar results for the net fair values of recognised derivatives.

Table 8.5
Correlation matrixes for the regression variables:
Fair values of derivatives

Panel A: Correlations for the variables included in the primary specification Equation (6.3)

	MVE	BV	NOI	NSI	NTDER	NTDER *WEAK *VARIN	NHDER	NHDER *WEAK *VARIN	NADER	NPL	GAP	CORE	OFF
MVE	1	0.95	0.95	0.65	-0.29	0.20	0.15	-0.04	0.70	0.59	0.82	0.89	0.87
BV	0.95	1	0.93	0.64	-0.46	0.38	0.03	0.01	0.76	0.69	0.85	0.89	0.92
NOI	0.94	0.91	1	0.65	-0.25	0.21	0.13	-0.01	0.65	0.58	0.87	0.92	0.90
NSI	0.77	0.76	0.66	1	-0.29	0.26	0.06	-0.06	0.59	0.44	0.60	0.67	0.65
NTDER	-0.41	-0.54	-0.27	-0.50	1	-0.85	-0.14	0.18	-0.47	-0.26	-0.18	-0.17	-0.38
NTDER*WEAK*VARIN	0.31	0.47	0.21	0.42	-0.89	1	0.17	-0.21	0.45	0.24	0.17	0.14	0.36
NHDER	0.03*	-0.03*	-0.01*	0.11*	-0.12*	0.17*	1	-0.61	0.02	0.08	-0.03	0.13	0.01
NHDER*WEAK*VARIN	0.01*	0.03*	0.05*	-0.10*	0.22	-0.24	-0.57	1	-0.05	-0.09	0.13	0.01	0.16
NADER	0.66	0.76	0.70	0.57	-0.43	0.44	-0.17*	-0.07*	1	0.50	0.63	0.70	0.75
NPL	0.77	0.81	0.83	0.63	-0.25	0.23	-0.20	0.17*	0.70	1	0.61	0.64	0.59
GAP	0.72	0.79	0.63	0.77	-0.54	0.41	0.04*	-0.06*	0.54	0.64	1	0.88	0.85
CORE	0.82	0.88	0.82	0.72	-0.37	0.38	-0.10*	0.29	0.62	0.80	0.73	1	0.85
OFF	0.91	0.91	0.93	0.78	-0.29	0.24	-0.04*	0.08*	0.71	0.89	0.71	0.88	1

Table 8.5 (continued)

Panel B: Correlations for the variables in Equation (6.3) expressed in first-difference (changes model).

	ΔMVE	ΔBV	ΔNOI	ΔNSI	ΔNTDER	ΔNTDER *WEAK *VARIN	ΔNHDER	ΔNHDER *WEAK *VARIN	ΔNADER	ΔNPL	ΔGAP	ΔCORE	ΔOFF
ΔMVE	1												
ΔBV	0.54	1											
ΔNOI	0.11*	0.25	1										
ΔNSI	0.36	0.04*	-0.15*	1									
ΔNTDER	-0.04*	-0.32	-0.02*	0.02*	1								
ΔNTDER*WEAK*VARIN	0.26	0.42	-0.03*	0.03*	-0.50	1							
ΔNHDER	-0.05*	-0.20	-0.05*	-0.06*	-0.28	0.04*	1						
ΔNHDER*WEAK*VARIN	0.04*	-0.01*	0.08*	0.12*	0.11*	-0.16*	-0.27	1					
ΔNADER	0.28	0.51	0.01*	-0.12*	-0.39	0.68	0.04*	-0.21	1				
ΔNPL	-0.04*	-0.01*	0.09*	-0.19*	0.08*	0.04*	-0.02*	0.03*	0.04*	1			
ΔGAP	0.18*	0.25	0.34	0.18*	0.18*	-0.05*	-0.08*	0.07*	-0.06*	-0.18*	1		
ΔCORE	0.15*	0.41	0.10*	-0.19*	-0.36	0.57	0.02*	-0.15*	0.59	0.04*	-0.05*	1	
ΔOFF	0.16*	0.29	-0.02*	-0.07*	-0.15*	0.33	0.03*	-0.17*	0.51	0.17*	-0.12*	0.35	1

a. The numbers at the upper triangle in Panel A represent correlations between the variables for 2005, and at the lower triangle correlations between the variables for 2006.
b. The * indicates p-values > 0.05.

Table 8.6
Primary regression results for the primary specification model, Equation (6.3)

		2005			2006		
Variables	Predict -ed sign	Coeff.	t-value	p-values[a]	Coeff.	t-values	p-values[a]
C	?	385.342	0.88	0.3800	1050.158	1.95	0.0533
BV	+	2.155	15.24	0.0001	1.614	9.85	0.0001
NOI	+	0.809	1.84	0.0340	1.723	3.68	0.0002
NSI	+	1.284	4.59	0.0001	2.415	5.33	0.0001
NTDER	+	2.012	4.62	0.0001	0.153	0.30	0.3821
NTDER*WEAK*VARIN	-	-1.128	-3.66	0.0002	-1.036	-2.06	0.0209
NHDER	+	2.804	7.91	0.0001	1.045	1.82	0.0359
NHDER*WEAK*VARIN	-	0.373	0.99	0.8379	1.204	1.19	0.8832
NADER	?	0.000	1.41	0.1589	-0.001	-2.78	0.0064
NPL	-	-0.682	-5.52	0.0001	-0.782	-3.93	0.0001
GAP	-	0.002	0.18	0.5728	-0.021	-1.43	0.0771
CORE	+	-0.073	-4.45	0.9999	0.007	0.25	0.4009
OFF	?	-0.037	-2.77	0.0066	-0.047	-3.28	0.0014
Adjusted R-squared		0.98			0.97		
N		107			110		
White's chi-square		0.0940			0.0653		

[a] p-values are based on one-tailed t-tests when the coefficient sign is predicted, and two-tailed t-tests otherwise.

Null hypothesis H_4 tests the statement that derivatives' fair values are not incrementally value relevant over and above their notional amounts. The coefficient of the notional amounts of derivatives (NADER) is only significant in 2006 with a negative sign. This finding is consistent with previous studies (Venkatachalam, 1996) and the results presented in Table 8.3 of this thesis (the value relevance disclosures). The concurrent significance of the NADER with the NTDER and NHDER in 2006 indicates that the fair values of derivatives are value relevant over and above their notional amounts. This leads to a rejection of the null hypothesis, H_4. Investors regard fair values of derivatives, which represent the current values of derivative contracts, as providing additional information content to their notional (contractual) amounts. Fair values show whether derivative contracts are a value-added activity for banks (positive fair values of derivatives) or whether they decrease banks' market value of equity (negative fair values). In contrast, the notional amounts of derivatives only provide the magnitude of the involvement of a bank in derivative contracts without revealing whether the bank is better-off from this activity.

The interaction term of trading derivatives (NTDER*WEAK*VARIN) is found negative and significant in both years, e.g., for 2005 the coefficient = -1.128 and the *p*-value = 0.0002. This result supports Hypothesis H_5 that the market assigns a lower coefficient to the fair values of derivatives of banks with high earnings volatility, domiciled in weak enforcement rule countries. This finding is consistent with Barton (2001) that reports evidence that firms use derivatives to smooth earnings. Thus, investors are more concern with the fair value estimates of derivatives of banks that experience high earnings volatility. However, this result does not hold for hedging derivatives (e.g. for 2005 the *p*-value of the interaction term NHDER*WEAK*VARIN is 0.8379).

As predicted the book value of equity before trading and hedging derivatives (BV), the net operating income (NOI), and the net securities income (NSI) are all significant for both years with positive signs. These findings are consistent with those of Wang et al. (2005) who also found the book value of equity and the earnings variables significant with positive coefficients. Regarding the other control variables only non-performing loans (NPL) and off-balance sheet items (OFF) are found value relevant in both years. NPL also holds the expected negative coefficient. NADER is only found significant in 2006 with a negative sign. Contrary to the results from the value relevance disclosure test (see, Table 8.3) the CORE variable is insignificant.

8.4.2 Results from the alternative specification models

i) Table 8.7 reports the results from the changes model. The White's test can not be rejected as the chi-square equals 0.2051 which is higher than that of the primary model. The adjusted R-squared is lower but still substantial (Adjusted R^2 = 39%). The primary variables of interest, the fair values of trading and hedging derivatives, continue to be significant and positive as predicted. Specifically, the coefficient of NTDER is 2.615 with a *p*-value of 0.0064 and that of NHDER is 1.441 with a *p*-value of 0.0410. However, their interaction terms are no longer significant (e.g., *p*-value of NTDER*WEAK*VARIN equals 0.7425). Under the changes model, the notional amounts of derivatives (NADER) are found insignificant. The fact that the fair values of derivatives remain significant, whilst the notional amounts do not, indicates that investors regard fair values as providing more valuable information than their notional amounts. With the exception of the book value of equity (BV) and the net securities income (NSI), all other control variables are found insignificant.

Table 8.7
Regression results for the changes model

Variables	Predict-ed sign	Coeff.	t-value	p-values[a]
C	?	0.152	2.11	0.0376
ΔBV	+	1.222	5.40	0.0001
ΔNOI	+	0.392	0.77	0.2195
ΔNSI	+	4.585	4.11	0.0001
ΔNTDER	+	2.615	2.54	0.0064
ΔNTDER*WEAK*VARIN	-	0.531	0.65	0.7425
ΔNHDER	+	1.441	1.76	0.0410
ΔNHDER*WEAK*VARIN	-	0.594	0.57	0.7154
ΔNADER	?	0.001	0.93	0.3542
ΔNPL	-	-0.028	-0.06	0.4733
ΔGAP	-	-0.038	-0.89	0.1869
ΔCORE	+	-0.028	-0.44	0.6711
ΔOFF	?	-0.003	-0.25	0.8012
Adjusted R-squared		0.39		
N		100		
White's chi-square		0.2051		

ii) The results of the March model show that the fair values of trading (NTDER) and hedging (NHDER) derivatives are only significant in 2005 (See, Appendix B, Section 2, Table A). The interaction term of trading derivatives (NTDER*WEAK*VARIN) is significant and negative in both years supporting again the view that the market assigns a lower coefficient to the fair values of trading derivatives of banks with high earnings volatility, domiciled in weak enforcement rule countries. NADER is found concurrently significant with the fair values of derivatives. This rejects hypothesis H_4, which means that fair values of derivatives are value relevant incrementally to their notional amounts. Consistent with the results of the primary model (Table 8.6) the variables of BV, NOI, NSI, NPL, and OFF are significant.

iii) The results of the model which incorporates the growth variable (LNS_5YR_CH) show that this variable is found to be positive but insignificant in both years (e,g., for 2005 coefficient = 0.004, *p*-value = 3440). The inclusion of this variable in the primary model do not changes the results with respect to the other variables (See, Appendix B, Section 2, Table B).

iv) The early adopters' dummy variable is also found insignificant under the derivatives' model (See, Appendix B, Section 2, Table C). For 2005 its coefficient is 1,084.55 and *p*-value = 0.3450 and for 2006 coefficient = 945.72 and *p*-value = 0.5286. Fair values of hedging derivatives (NHDER) continue to be significant in both years and fair values of trading derivatives (NTDER) are only significant in 2005 (coefficient = 2.014 and *p*-value = 0.0001). Consistent with the findings of the primary model (Table 8.6) only the interaction term of trading derivatives is found significant, supporting again Hypothesis H_5.

NADER is concurrently significant with the fair values of derivatives in 2006, whilst the NPL and the OFF are found significant with a negative coefficient in both years.

v) The model that controls for the pension fund status of banks (PENS) indicates that investors do not regard the pension fund deficit or surplus of banks as an equity related figure (See Appendix B, Section 2, Table D). For example, the coefficient of PENS in 2005 is positive and amounts to 0.558 with a p-value = 0.1926. The findings with respect to the other variables are similar to that of the primary model specification.

vi) A model that disaggregates the notional amounts of derivatives (NADER) into notional amounts of trading (NATDER) and notional amounts of hedging derivatives (NAHDER) has also been tested (See Appendix B, Section 2, Table E)[33]. Similar to Venkatachalam (1996), this model supports the view that investors are better-off having available the disaggregated information for the notional amounts of derivatives. The adjusted R-squared has increased from 97% to more than 99%. Another important finding is that the White's chi-square is also found to be extremely high, 0.99 in 2005 and 0.98 in 2006. The fair value of trading derivatives (NTDER) and hedging derivatives (NHDER) are found value relevant in both years (e.g., for 2006 the coefficient of NTDER equals 1.725 and the p-value = 0.0001, and the coefficient of NHDER equals 1.507 and the p-value = 0.0027). The interaction term of trading derivatives (NTDER*WEAK*VARIN) for 2005 is significant and negative as in the previous model, whilst the interaction term of hedging derivatives (NHDER*WEAK*VARIN) is found insignificant in both years. With respect to the

[33] This model results in a substantial smaller sample (for 2005, N = 83, and for 2006, N = 88) due to lack of the disaggregated information regarding the notional amounts of total derivatives (NADER) in trading and hedging notional amounts.

disaggregated values of trading (NATDER) and hedging (NAHDER) derivatives, only the notional amounts of trading derivatives have a significant negative relationship to the market value of equity (p-value = 0.0078 in 2005, and p-value = 0.0001 in 2006). These results provide additional support to the findings of the previous models which show that the fair values of derivatives are incrementally value relevant over and above their notional amounts. Consistent with the results of the previous models the coefficient of NPL is negative and significant in both years. OFF is found insignificant, whilst core deposits (CORE) are value relevant only in 2006 with the expected sign (coefficient = 0.051 and p-value = 0.0083). Finally, as expected, the book value of equity before derivatives' fair values (BV) is significantly related to the market value of equity. Regarding the earnings variables, only the net securities income (NSI) is found significant and positive in 2005, whilst the net operating income (NOI) is no longer value relevant.

vii) Venkatachalam (1996) and Ahmed et al. (2006) used the BSM to provide results for derivatives' fair values. As discussed in Chapter 6 (Section 6.3.2.1), due to the fact that two variables in the BSM, the aggregated fair values of financial assets (FVFAS) and the aggregated fair values of financial liabilities (FVFLI) were highly correlated (more than 99% correlation in both years), a decision was taken not to use the BSM as the primary specification model. Instead, a model based on Ohlson (1995) model served as the study's primary model. However, for completeness a model based on the BSM is also tested (See, Appendix B, Section 2, Table F). Fair values of hedging derivatives (NHDER) continue to be significant in both years (for 2005 coefficient = 2.277 and p-value = 0.0001 and for 2006 coefficient = 2.897 and p-value = 0.0001). In contrast, fair values of trading derivatives (NTDER) are no longer significant. For both years, the coefficient of the notional amounts of derivatives (NADER) has a negative sign and it is significant. The other control variables have the expected signs. The non-performing loans (NPL) continue to be significant with a negative sing in both years. The maturity gap (GAP) is value relevant in 2006 with a coefficient of -0.038 and a *p*-value of 0.0019. Similar to previous studies (Barth et al., 1996), the core deposits (CORE) have a positive impact on market values. Finally, the aggregated fair values (FVFAS) of financial assets and financial liabilities (FVFLI) had the predicted signs, positive for assets and negative for liabilities. The same observation also holds for non-IAS 39 assets and liabilities.

Overall, the derivatives' tests indicate that the recognised fair values of trading and hedging derivatives are value relevant, which means that investors incorporate the new information provided by the fair values in their investment decisions. In addition, fair values of derivatives have incremental explanatory power over and above their notional amounts. Results also support the view that investors assign a lower coefficient to the fair values of trading derivatives for those banks with high earnings volatility that domiciled in weak enforcement rule countries. This finding provides support to the results of Barton (2001) that firms use derivatives to smooth earnings. However, this last result does not hold for hedging derivatives.

8.4.3 The use of hedging derivatives by European banks

As shown in the previous section, European banks do not use hedging derivatives to smooth earnings. In order to investigate further the role of hedging derivatives, this study examines whether banks use hedging derivatives solely for their primary purpose, which is to hedge their positions. Carter & Sinkey (1998) provide evidence that interest-rate derivatives of a sample of US banks are positively related to the maturity gap of financial assets and liabilities. This finding indicates that US banks use derivatives to reduce the interest rate risk related to the maturity gap of net financial assets. Hence, this thesis also examines whether European banks use hedging derivatives solely to hedge their maturity gap.

A multivariate regression model is operated to test whether banks use hedging derivatives to hedge the maturity gap between financial assets and liabilities, given earnings volatility. In particular, the model regresses the notional amounts of hedging derivatives (NAHDER) on the maturity gap between financial assets and liabilities (GAP), the credit related off-balance sheet items (OFF), the notional amounts of trading derivatives (NATDER), the natural logarithm of the coefficient of variation of earnings (VARIN), and a size variable, the market value of equity (MVE). The results of this model are provided in Table 8.8 below.

Findings in Table 8.8 reveal that the independent variables in the model explain more than the 70% of the variation of the notional amounts of hedging derivatives. The maturity mismatch of interest-rate sensitive financial assets and liabilities (GAP) is found to be significantly and positively correlated to the notional amounts of hedging derivatives (NAHDER). This result indicates that banks use hedging derivatives to hedge the maturity gap of interest-rate sensitive assets and liabilities (Carter & Sinkey, 1998). The same result can also be observed for off-balance sheet instruments (OFF). This is consistent with the IAS 39 statement that a fair value hedge relationship is,

'a hedge of the exposure to changes in fair value of a recognised asset or liability or an *unrecognised firm commitment, or an identified portion of such an asset, liability or firm* *commitment*, that is attributable to a particular risk and could affect profit or loss' (IAS 39, para. 86) (emphasis added).

Thus, banks use hedging derivatives not only to hedge the on-balance sheet positions, but also to hedge off-balance sheet activities, such as unrecognised banks commitments.

Table 8.8
The use of hedging derivatives by European banks

Variables	2005			2006		
	Coeff.	t-values	p-values	Coeff.	t-values	p-values
Intercept	-6,806.87	-0.46	0.6401	14,985.06	0.95	0.3415
GAP	2.55	7.83	0.0001	2.26	7.82	0.0001
OFF	3.11	9.58	0.0001	2.64	12.71	0.0001
NATDER	-0.03	-7.70	0.0001	-0.02	-7.78	0.0001
VARIN	-296.21	-2.40	0.0188	-41.46	-0.32	0.7431
MVE	-14.05	-10.10	0.0001	-10.19	-10.14	0.0001
N	83			88		
Adj. R-squared	0.72			0.77		

The control variable for the variability in earnings (VARIN) is only found significant in 2005 with a negative sign (coefficient = -296.21 and p-value = 0.0188). In 2006 this variable is highly insignificant (p-value = 0.7431). The negative sign of earnings variability is opposite to what expected. For example, Geczy et al. (1997) suggest that firms use currency hedging derivatives to reduce earnings variability. Finally, with respect to the notional amounts of trading derivatives (NATDER), the model indicates that there is an inverse relation between the hedging and the trading derivatives. This means that banks that make high use of hedging derivatives, in order to hedge the maturity mismatch between financial assets and liabilities and the off-balance sheet items, use less derivatives for speculation (e.g. trading derivatives). Thus, banks that use more trading derivatives are the 'risk lover' banks and those that use more hedging derivatives the 'risk averse' banks.

8.5 Conclusion

This chapter discussed the findings of the value relevance of fair value disclosures and fair value recognition of derivatives of European banks under IFRS. The first test examines fair value disclosures for a number of banks' financial assets and liabilities that according to IAS 39 are recognised in amortized costs. These items are loans and advances, held-to-maturity investments, deposit liabilities, and other debt. IAS 32 requires the disclosure of these items in fair values. The second test investigates the market valuation of derivatives' fair value recognition.

Overall, the results support the view that fair value of loans are value relevance incrementally to amortized costs. In all of the empirical models (primary and alternative specification models) the variable of loans is found significant with the expected positive sign. This finding is consisted with the results of previous studies that also found fair value of loans significant over and above their book values (Barth et al., 1996). Apart from loans, fair values of other debt (other than deposits) are also found significant in explaining market values. Their sign is estimated to be negative as predicted.

The coefficients of the other variables of interest: the fair value of held-to-maturity investments and the fair value of deposits are found to be insignificant. The coefficient of held-to-maturity investments was always negative and insignificant. The negative coefficient indicates that investors penalize banks that hold held-to-maturity investments as they do not qualify for the interest rate hedging relationship (IAS 39, para. 79) and due to the uncertainty surrounding management's intention and ability to hold these instruments to maturity. The variable of deposits is also found insignificant in most of the models, however with the expected negative sign. A plausible explanation is the restriction imposed by IAS 39 that the fair value of a liability with a demand feature can not be less than the amount payable on demand (IAS 39, para. 49). This restriction forced many banks to equal the fair value of demand deposits with their carrying amounts.

The chapter also provided evidence that investors assign lower coefficient to the fair value of loans of those banks that hold low capital adequacy ratios and domicile in Weak enforcement rule countries. Previous studies provide evidence that banks with low capital adequacy ratios have more incentives to manipulate fair value estimates of loans (Barth et al., 1996). This study extended this literature by relating banks' incentives to manipulate fair values to countries enforcement rules. In particular, it is argued that the latitude of banks to manipulate fair values depends on country-specific institutional factors, such as the ability of each country to enforce its rules. Thus, banks domiciled in Weak enforcement rule countries have more freedom to manipulate fair values than banks domiciled in Strong enforcement rule countries. Countries classified into Weak enforcement and Strong enforcement rule countries based on the rule of law scores provided by Kaufmann et al. (2009).

The control variables supported the findings of previous studies. Specifically, core deposit intangible (CORE) is found positive and significant (Barth et al., 1996). This result supports the view that investors consider core deposits as having a positive impact on banks market values. This is logical given the fact that core deposits proxy for the long-term relationship of banks with their customers. Non-performing loans (NPL) had a negative impact on the market value of equity (Beaver et al., 1989). Although non-performing loans do not necessarily indicate impairment of these loans, they do indicate the level of banks' default risk. The variable that controlled for interest rate risk: the maturity gap of interest-sensitive assets and liabilities (GAP) was found significant with the expected negative coefficient. European banks in the sample were 'asset sensitive' (i.e. interest-sensitive assets exceeded interest-sensitive liabilities). Given the fact that interest rates were in an upward trend during 2005 – 2006 (see, Figure 6.1), the value of net interest-sensitive assets decreased. Consistent with Venkatachalam (1996) and Eccher et al. (1996), the coefficient of notional amounts of derivatives (NADER) is estimated to be negative. This result indicates that the higher the involvement of a bank in derivative contracts the lower its marker value of equity.

Results regarding derivatives indicate that the fair values of derivatives' recognition (trading and hedging derivatives) are value relevant over and above their notional amounts in most of the empirical models. Investors consider fair value of derivatives as providing additional information content to the notional amounts of derivatives. Although notional amounts of derivatives provide the magnitude of derivative contracts, they do not provide the current values of these contracts, which is what fair values represent. Fair values can aid investors to conclude on whether derivatives are a value-added activity for banks or an activity that increases the overall risk of banks. These findings are consistent with the results reported by Venkatachalam (1996) who found the fair values of derivative disclosures value relevant incrementally to their notional amounts. Moreover, they are consistent with the results of Ahmed et al. (2006) that they found value relevant the recognised fair values of derivatives.

The chapter also provided evidence that the market assigns lower coefficient to derivatives' fair value estimates of banks with high earnings volatility. As predicted, banks with high earnings volatility have more incentives to manipulate the fair value estimates of derivatives in order to smooth earnings (Barton, 2001). However, the latitude of banks to manipulate fair value estimates will depend again on the ability of countries to enforce their rules. Hence, the market will assign lower coefficient to banks with high earnings volatility that also domicile in Weak enforcement rule countries. However, this result holds only for trading derivatives but not for hedging derivatives. Further analysis revealed that banks use hedging derivatives for their primary purpose that is to hedge the maturity gap of interest-sensitive assets and liabilities.

Chapter 9: Findings on the Cost of Equity Capital

9.1 Introduction

This chapter provides the empirical results of the impact of the mandatory adoption of IFRS on banks' CE. The univariate analysis involves comparisons between the level of CE for the three years before the official adoption of IFRS in 2005 and the level of CE for the first three years after their adoption. The results of the univariate analysis are provided for the full sample, and separately, i) for banks with low analyst following vs. high analyst following, ii) for banks domiciled in 'Anglo-Saxon' countries vs. 'Continental' countries, and iii) for banks domiciled in 'Strong Enforcement rule' countries vs. 'Weak Enforcement rule' countries.

Given the fact that the univariate analysis does not take into account other factors (apart from the IFRS adoption) that have affected the CE, results are also provided from a multivariate model that controls for a number of risk-related variables. The chapter also reports the findings from a number of additional tests in order to assess whether the effects on the CE vary with the level of analysts following (low following vs. high following), the countries' legal enforcement environment (Weak enforcement rule vs. strong enforcement rule countries), and the classification of the national accounting standards (Continental vs. Anglo-Saxon accounting standards). Finally, findings are also provided under alternative model specifications for robustness.

This chapter is organized as follows: Section 9.2 presents the descriptive statistics, Section 9.3 discusses the findings of the univariate analysis, Section 9.4 reports the findings of the primary multivariate models as well as the findings of the additional analysis which relates to the influence on the CE of: the level of analysts following; the countries' enforcement rules, and national accounting standards. Section 9.5 reports the findings of the robustness tests, and Section 9.6 concludes.

9.2 Descriptive statistics

The number of banks in the sample of the cost of equity tests differs substantially from that of the value relevance test due to the availability of some variables. For example, for the cost of equity test, analysts' forecasted earnings per share (provided via I/B/E/S) was a vital input in the calculations of the CE. The fact that analysts cover only a small fraction of the population of this thesis results in a smaller sample for the cost of equity test (88 banks) as compared to the sample of the value relevance test (110 banks in 2006).

Panel A in Table 9.1 reports the descriptive statistics for the independent continuous variables and Panel B for the dummy variables. The results indicate that the sample includes different types of bank sizes with the smallest bank having a value of total assets (market value of equity) of 317.00 million (29.42 million) and the biggest bank a value of 2.64 trillion (154.21 billion). The average ASSET is 208,710.80 million and the median 43,599.89 million, indicating that the series of ASSET is positively skewed. The same observation can be made for MVE with average and median values of 14,779.71 million and €5,290.09 million, respectively.

The average book value of net loans is higher than the average book value of deposits which gives an average LD ratio of 1.78. The LD ratio combined with the Long-term debt to Equity ratio (LEV), which is on average over 3, indicates that European commercial banks are highly leveraged. However, given the minimum capital requirements which are set to be 8% by the Basel Committee, European commercial banks are in a safe territory with an average CAR of 12%.

Table 9.1
Descriptive statistics for the Independent variables

Panel A: Continuous variables (for all years, 2002 – 2007)

	Mean	Median	Max	Min	Std. Dev.	Number of Observations
CAR	12%	11%	35%	8%	3%	444
LD	1.78	1.46	56.48	0.00	2.85	514
BETA	0.76	0.70	2.20	0.03	0.41	522
VARERN	1.16	0.39	113.51	0.02	5.75	522
BM	0.74	0.57	9.09	0.06	0.80	528
ASSET	208,710.80	43,599.89	2,640,839.00	317.00	349,551.00	522
LEV	3.11	2.53	20.63	0.00	3.00	521
RF	3.14%	2.85%	11.56%	0.10%	1.40%	528
RVAR	0.07	0.06	0.29	0.02	0.04	522
VARCOEF	11.52	7.20	215.13	0.00	19.96	500
MVE	14,779.71	5,290.09	154,205.80	29.42	23,075.28	517
LTG	0.15	0.10	14.00	-3.55	0.69	522
FOLLOW	11.39	9.00	37.00	0.00	8.18	522

Panel B: Dummy variables

	Number of banks (One)	Number of banks (Zero)	Total number of banks
MAND	76	12	88
USLIST	10	78	88
LOWF	43	45	88
STRNG	58	30	88
CONT	47	41	88

Notes:

1. Values are in million of Euros. The maximum number of observations is 528 bank-years, 88 banks for a 6 years period. The explanation of the continuous variables are as follows: CAR = capital adequacy ratio, LD = ratio of Total Net Loans to Total Deposits, BETA = market beta, VARERN = earnings variability, BM = ratio of Book-to-Market value, ASSET = Total Assets, LEV = financial leverage, RF = nominal local risk-free rate, RVAR = annual return variability, VARCOEF = coefficient of variation of all the FY1 analysts' earnings per share estimates, MVE = market value of equity, LTG = long-term growth, FOLLOW = number of analysts covering bank.
2. MAND takes the value of one for banks that have adopted the IFRS only when they became mandatory and the value of zero for banks that voluntarily have adopted the IFRS before the official adoption in 2005.
   USLIST takes the value of one for banks that are cross-listed in the US market and the value of zero for banks that do not have US listings.
   LOWF takes the value of one for banks that have low analyst following and the value of zero for banks that have high analyst following.

STRNG takes the value of one for banks that domicile in strong enforcement rule countries and zero for banks that domicile in weak enforcement rule countries.
CONT takes the value of one for banks that used to follow Continental accounting standards, before the mandatory adoption of IFRS, and zero for banks that used to follow Anglo-Saxon accounting standards.

The average BETA of the sample is 0.76. This number indicates that share prices of European commercial banks fluctuate less to the variations of the market index DJ STOXX 600. The alternative measure of market variability (RVAR) is found to be 0.07 (or 7%). The higher it is the higher the risk of a bank. The variables that control for earnings variability, the VARERN and the VARCOEF have a value of 1.16 and 11.52, respectively. Higher values for these variables indicate higher variability in banks' earnings. The below the unity BM variable reveals that commercial banks are priced quite above their book values with an average book-to-market ratio of 0.74. The average long-term growth (LTG) of earnings per share is approximately 15%, while on average each European commercial bank in the sample is covered by 11 analysts. Finally, the average risk-free rate (RF) is found 3.14% implying an average risk premium for commercial banks of 6.26% (calculated as the average CE, 9.40%, from Table 9.3 below, less the risk-free rate of 3.14%).

Panel B in Table 9.1 presents the descriptive statistics of the dummy variables which take the value of 'one' or 'zero'. MAND shows that only 12 out of 88 banks have voluntarily adopted the IFRS before they became mandatory and USLIST reveals that only 10 banks have US listing. STRNG indicates that most of the sample banks domicile in strong enforcement rule countries (58 banks); in contrast, CONT shows that there is no material difference between the number of banks from Continental countries (47) and the number of banks from Anglo-Saxon reporting countries (41). No material difference can also be observed between banks with low and high analyst following (e.g., 43 banks with low analyst following and 45 banks with high analyst following).

Table 9.2 presents the descriptive statistics of the independent variables by country. The UK is the country with the largest banks on average when the criterion of size is the market value of equity (MVE). The average MVE for UK commercial banks is approximately €41.63 billion. However, when the criterion of size is the variable of total assets (ASSET), French banks have an average of €661.13 billion, while the UK banks fell in the second position, with an average of 482.18 billion. The countries with the smallest banks are Norway and Poland (in terms of MVE).

Germany is the country with the most sensitive banks to market volatilities as indicated by the high values of BETA (1.30) and the RVAR (11%). It is also the country with the most leveraged banks as it holds an average of 3.60 loans-to-deposits ratio (LD) and an average of 7.61 long-term debt to equity ratio (LEV). The earnings volatility variables (VARERN and VARCOEF) indicate again that Germany is the country with the most earnings volatile banks.

All countries in the sample hold a capital adequacy ratio well above the minimum capital requirements of 8% imposed by the Basel Committee. Commercial banks in Switzerland experience the highest CAR of 20%. All the remaining countries have a CAR equal or below the 13%. Regarding, the LTG variable, Netherland, Poland, and Greece are the three countries with the highest future potential growths. Finally, the country with the lowest risk-free rates is Switzerland with 0.87% value. On the other hand the country with the highest risk-free rates is Hungary with 8.36% value.

Table 9.2
Descriptive statistics for the continuous independent variables – by Country

	Number of banks	CAR	LD	BETA	VARERN	BM	ASSET	LEV	RF	RVAR	VARCOEF	MVE	LTG	FOLLOW
Austria	1	11%	1.23	0.43	0.39	0.50	153,719.20	5.46	2.88%	0.05	7.26	9,556.93	0.19	12.66
Belgium	4	12%	1.05	1.04	0.56	0.76	352,809.20	2.66	2.81%	0.06	10.73	20,404.54	0.15	11.04
Czech Republic	1	13%	1.02	0.63	1.69	0.40	17,856.66	0.46	2.37%	0.07	7.77	3,656.28	0.07	8.50
Denmark	5	13%	1.50	0.33	3.12	0.69	69,806.72	2.34	2.91%	0.05	7.19	4,473.37	0.14	5.26
Finland	2	13%	2.69	0.60	0.43	0.68	26,468.17	2.88	2.70%	0.06	10.75	3,991.22	0.03	6.83
France	5	10%	1.19	0.84	0.42	0.78	661,133.10	1.55	2.76%	0.06	8.66	29,349.27	0.11	16.66
Germany	6	12%	3.60	1.30	4.01	0.91	177,856.20	7.61	2.70%	0.11	41.77	5,887.17	-0.04	11.33
Greece	5	12%	1.15	0.71	0.93	0.42	38,219.53	1.55	2.79%	0.08	11.76	5,571.83	0.24	11.23
Hungary	1	13%	0.99	0.69	0.41	0.34	20,411.80	1.11	8.36%	0.08	5.18	5,860.82	0.14	7.83
Ireland	4	11%	1.59	0.63	0.36	0.49	88,560.25	3.80	2.70%	0.06	3.97	9,310.28	0.10	11.54
Italy	10	12%	2.38	0.81	0.39	0.77	136,570.60	3.38	2.69%	0.06	13.37	11,810.50	0.15	11.64
Netherland	4	12%	1.13	1.05	0.91	0.58	409,465.10	2.18	2.76%	0.09	14.20	22,890.54	0.67	13.83
Norway	7	11%	1.73	0.38	0.47	2.18	21,587.67	3.85	3.81%	0.06	7.75	1,431.89	-0.02	4.19
Poland	4	14%	1.02	0.62	6.62	0.40	13,941.11	1.23	5.47%	0.09	10.31	3,444.35	0.51	5.62
Portugal	3	11%	1.69	0.43	0.24	0.50	51,844.12	5.33	2.76%	0.06	9.90	5,158.65	0.09	8.88
Spain	8	11%	1.70	0.63	0.25	0.43	147,398.80	3.00	2.68%	0.06	7.75	16,112.39	0.15	13.12
Sweden	4	10%	2.23	0.79	0.25	0.60	198,053.50	3.63	2.88%	0.05	6.24	13,292.33	0.05	17.41
Switzerland	4	20%	0.78	1.15	0.65	0.61	302,962.30	0.99	0.87%	0.08	15.56	22,130.77	0.12	10.54
UK	10	12%	2.33	0.82	0.35	0.51	482,184.20	3.00	4.49%	0.06	6.29	41,631.77	0.09	16.90
All	**88**	**12%**	**1.78**	**0.76**	**1.16**	**0.74**	**208,710.80**	**3.11**	**3.14%**	**0.07**	**11.52**	**14,779.71**	**0.15**	**11.39**

Notes:
Values of ASSET, and MVE are in million of Euros. CAR = capital adequacy ratio, LD = ratio of Total Net Loans to Total Deposits, BETA = market beta, VARERN = earnings variability, BM = ratio of Book-to-Market value, ASSET = Total Assets, LEV = financial leverage, RF = nominal local risk-free rate, RVAR = annual return variability, VARCOEF = coefficient of variation of all the FY1 analysts' earnings per share estimates, MVE = market value of equity, LTG = long-term growth, FOLLOW = number of analysts covering bank.

Table 9.3 presents the descriptive statistics by year and by country for the average CE. Panel A presents the classification of the average CE by year and Panel B by country. However, Appendix C also presents the results for each of the four CE methods (Gebhardt et al., 2001; Claus & Thomas, 2001; Gode & Mohanram, 2003; and Easton, 2004). The number of observations in Panel A represents the number of banks included in each year and the number of observations in Panel B represents the number of bank-years observations. The calculations of the CE are as of the last date of each year (31st December).

Table 9.3
Descriptive statistics for the Cost of Equity Capital

Panel A: By Year	Mean	Median	Max	Min	Std. Dev.	Number of Observations
2002	11.35%	10.45%	24.88%	6.08%	3.47%	88
2003	9.33%	9.17%	15.74%	1.11%	2.43%	88
2004	9.42%	9.05%	27.72%	5.70%	2.68%	88
2005	8.44%	8.47%	13.12%	5.01%	1.49%	88
2006	8.54%	8.63%	12.69%	4.94%	1.50%	88
2007	9.30%	9.42%	14.28%	5.64%	1.73%	88
All	**9.40%**	**9.15%**	**27.72%**	**1.11%**	**2.51%**	**528**

Panel B: By Country (for all years, 2002 – 2007)	Mean	Median	Max	Min	Std. Dev.	Number of Observations
Austria	10.25%	10.26%	11.49%	9.06%	0.77%	6
Belgium	8.94%	9.28%	11.56%	5.64%	1.39%	24
Czech Republic	7.78%	7.62%	11.48%	5.01%	2.09%	6
Denmark	9.30%	8.64%	24.88%	5.25%	3.63%	30
Finland	8.36%	7.87%	11.50%	6.17%	1.73%	12
France	9.70%	9.35%	14.98%	6.49%	1.82%	30
Germany	11.65%	9.95%	27.72%	5.91%	4.97%	36
Greece	10.94%	10.80%	13.99%	7.24%	1.38%	30
Hungary	10.10%	10.21%	11.05%	8.72%	0.92%	6
Ireland	9.50%	9.22%	12.66%	7.95%	1.22%	24
Italy	9.51%	9.42%	21.64%	1.11%	2.92%	60
Netherland	9.00%	8.81%	12.72%	5.98%	1.79%	24
Norway	9.83%	9.52%	15.74%	7.03%	1.78%	42
Poland	10.89%	10.37%	16.91%	6.32%	3.21%	24
Portugal	8.49%	8.30%	10.91%	6.32%	1.12%	18
Spain	8.70%	8.81%	11.56%	5.67%	1.36%	48
Sweden	7.80%	7.65%	10.39%	6.41%	1.02%	24
Switzerland	8.18%	7.92%	11.94%	5.89%	1.57%	24
UK	8.62%	8.58%	11.80%	5.90%	1.36%	60
All	**9.40%**	**9.15%**	**27.72%**	**1.11%**	**2.51%**	**528**

The descriptive statistics indicate that the average CE has decreased from 2002 to 2005. Specifically, the average CE is at the highest point at the first year of the sample in 2002 with a value of 11.35%, and takes the lowest value in 2005 where the IFRS became mandatory, 8.44%. After 2005 the CE started to increase again and in 2007 returned above nine percent at 9.30%, however quite below the highest value observed in 2002. Hence, the analysis indicates that the CE is lower for the post-IFRS period than the pre-IFRS period. The results for the medians are qualitative similar to the averages. Similar findings can also be observed for each of the four CE methods (see, Appendix C).

The banks with the five highest average CE are those domiciled in Germany, 11.65%, Greece, 10.94%, Poland 10.89%, Austria, 10.25%, and Hungary, 10.10%. On the other hand, the banks with the five lowest average CE are those domiciled in Czech Republic, 7.78%, Sweden, 7.80%, Switzerland, 8.18%, Finland, 8.36%, and Portugal, 8.49%. German banks are found to hold the highest average CE (11.65%) due to a number of extreme observations. The examination of the medians, which are not affected by extreme values, reveals that German banks fall to the fifth position with a median CE of 9.95%, quite below Greek banks with a median CE of 10.80%, Polish banks with a median of 10.37%, Austrian banks with 10.26%, and Hungarian banks with a median of 10.21%. The results of the medians for banks domicile in countries with the lowest CE do not change materially from the averages. Findings from each of the four CE methods (see, Appendix C) reveal that German banks hold the highest CE only under the Easton (2004) method (i.e. 14.04%). For all other methods, although German banks still hold high CE are not in the first position. Unexpectedly, banks domicile in Greece and Poland that are found to hold one of the highest CE under the average CE, under the GLS method they hold one of the lowest CE

(Appendix C, Table C1). With respect to the other CE methods (see, Appendix C, Tables C2-C4), both Greece and Poland hold high CE.

9.3 Univariate analysis

The univariate analysis involves the examination of the changes in the CE over the period, 2002 to 2007. Exhibit 9.1 lists all the hypotheses developed in section 7.2 relating to the cost of equity tests.

Exhibit 9.1
List of hypotheses of the cost of equity tests

H_6: The mandatory adoption of IFRS did not have any material impact on banks' CE.

H_7: Banks with low analyst following experienced a higher reduction in their CE than banks with high analyst following.

H_8: Banks domiciled in 'Continental' countries experienced a higher reduction in their CE than banks domicile in 'Anglo-Saxon' countries.

H_9: Banks domiciled in 'strong enforcement rule' countries experienced a higher reduction in their CE than banks domiciled in 'weak enforcement rule' countries.

Table 9.4 shows the level of CE for these six years using four different methods (see, Section 7.3.1.), as well as the average of these methods. Figure 9.1 presents these data graphically. The examination of the four CE methods (see columns GLS, CT, OJ, and PEG method in Table 9.4) indicates that the CE has decreased from the pre-IFRS period to the post-IFRS period under all methods. The GLS, the CT, and the PEG methods clearly reveal that the CE has slightly increased again during 2007, which is also reflected in the average CE (r_{AVG}). The only method under which the CE is decreasing for the whole sample period is the OJ method. This method gives the lowest CE estimates, 8.21%, whilst the method that gives the highest CE is the CT method, which gives an average CE of 10.09%. The increase in the CE that is observed in 2007 can be attributed to the financial crisis of 2008 with the first signs of the crisis having emerged in 2007. That year a great number of financial institutions made huge losses in financial assets, including subprime loans and CDOs.

Table 9.4
Cost of equity capital – Full Sample

Quarter	GLS method		CT Method		OJ Method		PEG Method		Average	
	N	r_{GLS}	N	r_{CT}	N	r_{OJ}	N	R_{PEG}	N	r_{AVG}
Pre-IFRS										
2002	88	10.66%	88	11.71%	82	10.18%	84	12.61%	88	11.35%
2003	88	8.93%	87	10.02%	85	8.55%	80	10.16%	88	9.33%
2004	88	8.88%	87	9.98%	81	8.71%	76	10.40%	88	9.42%
Average		**9.49%**		**10,57%**		**9.15%**		**11.06%**		**10.04%**
Post-IFRS										
2005	88	8.43%	87	9.04%	80	7.34%	74	8.93%	88	8.44%
2006	88	8.72%	88	9.24%	80	7.13%	72	8.79%	88	8.54%
2007	88	9.84%	88	10.54%	80	7.28%	71	9.12%	88	9.30%
Average		**9.00%**		**9.61%**		**7.25%**		**8.95%**		**8.76%**
All	**528**	**9.24%**	**525**	**10.09%**	**488**	**8.21%**	**457**	**10.00%**	**528**	**9.40%**

Figure 9.1
Cost of Equity Capital by Estimation Method

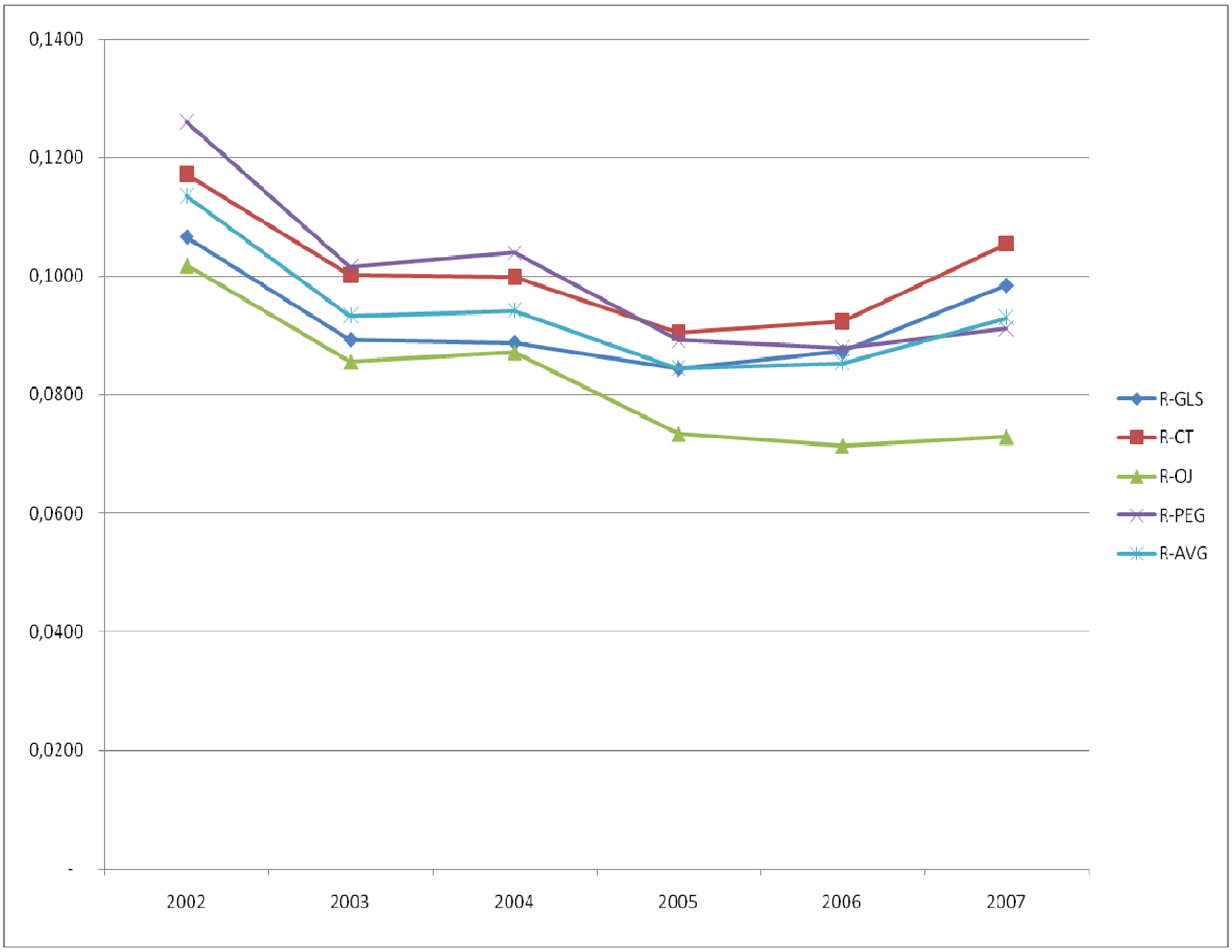

Table 9.5 reports the average CE for 2002 – 2007 for the different groups of banks that are used in the testing of Hypotheses H_7, H_8 and H_9, i.e., those banks that are followed by Low and High number of analysts; those that are domiciled in Continental and Anglo-Saxon countries, and those domiciled in Strong and Weak enforcement environments.

Table 9.5
Cost of equity capital
Low following vs. High following analyst
Continental vs. Anglo-Saxon
Strong vs. Weak Enforcement

Years	Low		High		Anglo-Saxon		Continental		Strong		Weak	
	N	r_{AVG}	N	r_{AVG}	N	r_{AVG}	N	r_{AVG}	N	r_{AVG}	N	r_{AVG}
Pre-IFRS												
2002	43	0.1203	45	0.1071	30	0.1079	58	0.1165	47	0.1159	41	0.1109
2003	43	0.0957	45	0.0912	30	0.0909	58	0.0947	47	0.0919	41	0.0950
2004	43	0.0961	45	0.0924	30	0.0868	58	0.0981	47	0.0916	41	0.0973
Average		**0.1040**		**0.0969**		**0.0952**		**0.1031**		**0.0998**		**0.1011**
Post-IFRS												
2005	43	0.0834	45	0.0855	30	0.0813	58	0.0861	47	0.0807	41	0.0888
2006	43	0.0850	45	0.0858	30	0.0877	58	0.0842	47	0.0844	41	0.0866
2007	43	0.0904	45	0.0955	30	0.0968	58	0.0911	47	0.0929	41	0.0931
Average		**0.0863**		**0.0889**		**0.0886**		**0.0871**		**0.0860**		**0.0895**
All		**0.0952**		**0.0929**		**0.0919**		**0.0951**		**0.0929**		**0.0953**

Figures 9.2 - 9.4 present these data graphically.

Figure 2
Cost of Equity – Low analyst following vs. High analyst following

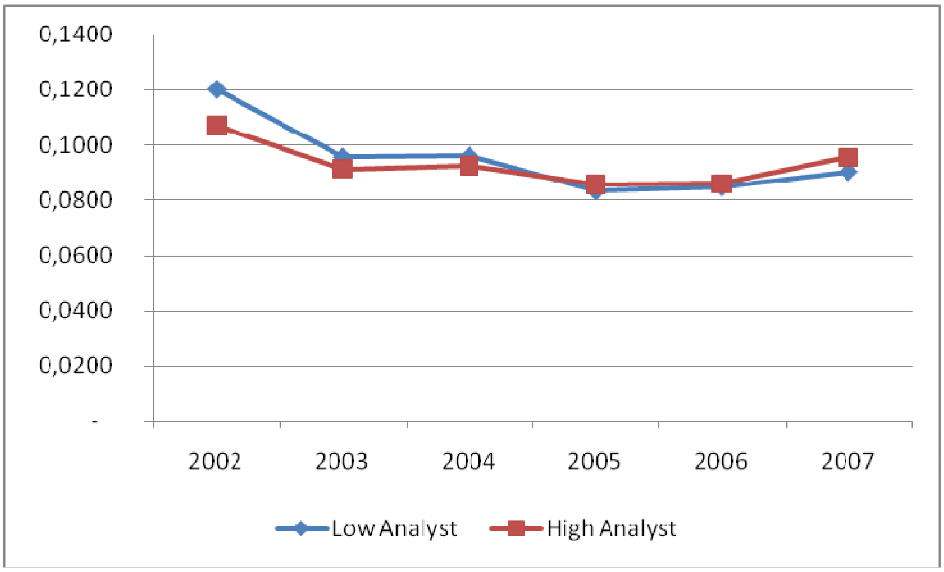

Figure 3
Cost of Equity – Continental vs. Anglo Saxon

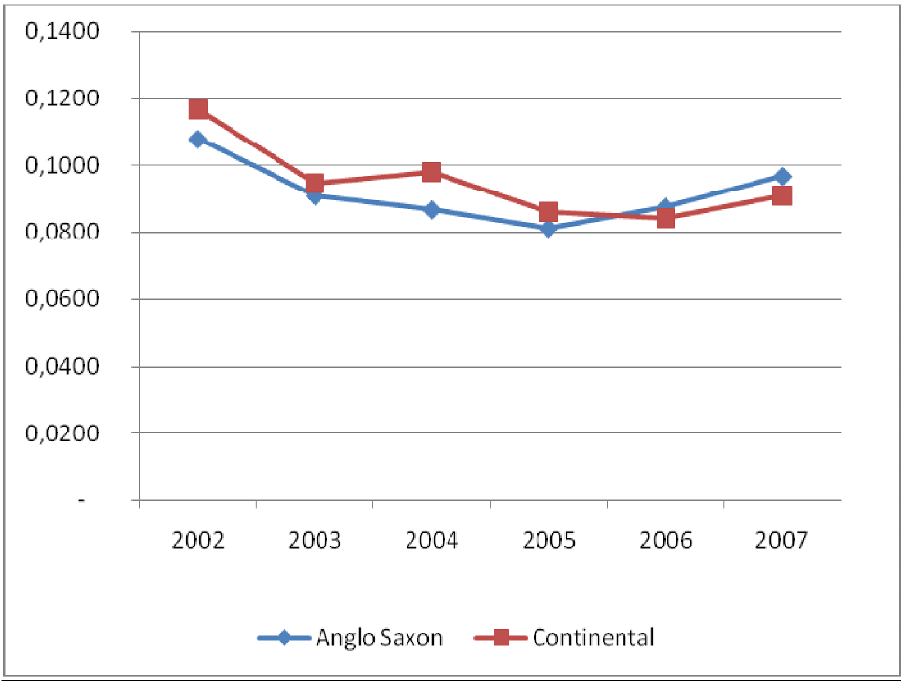

Figure 4
Cost of Equity – Strong Enforcement vs. Weak Enforcement rule

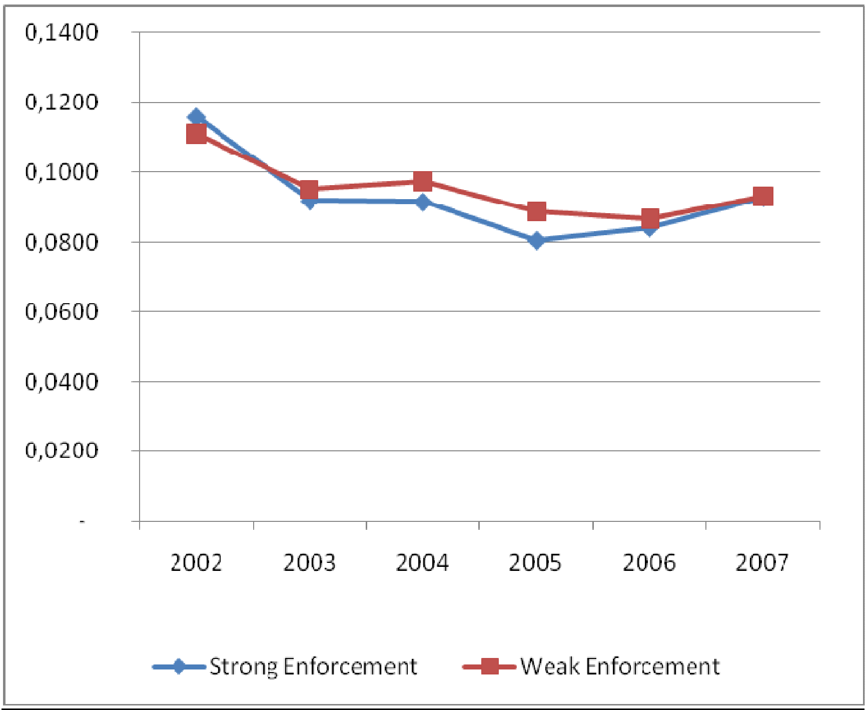

Figure 9.2 indicates that before the mandatory adoption of IFRS banks with low analyst following had higher CE than banks with high analyst following (e.g., in 2003 banks with low analyst following had a CE of 9.57%, whilst banks with high analyst following had a CE of 9.12%). However, this discrepancy almost disappears after the mandatory adoption of IFRS in 2005. Figure 9.3 depicts the CE of banks domiciled in Continental and Anglo-Saxon countries. On average, banks in the Anglo-Saxon group, for 2002 – 2007, had lower CE than banks in the Continental group. However, during the post-IFRS period and especially in 2006 – 2007, Continental banks experienced lower CE than Anglo-Saxon banks (e.g., in 2006 Continental banks hold a CE of 8.42%, whilst Anglo-Saxon banks a CE of 8.77%). Figure 9.4 presents the CE of banks domiciled in Strong enforcement vs. Weak enforcement rule countries. For most of the post-IFRS period, banks domiciled in Strong enforcement rule countries experienced lower CE.

Table 9.6 reports the difference-in-difference analysis for the CE around the mandatory adoption period of IFRS. The data is taken from Tables 9.4 and 9.5, and are the average CE for the pre-IFRS period and post-IFRS period for the full sample (Section A of the Table) and for the different groups of interest (i.e., banks with high vs. low analyst following (Section B); banks from Continental vs. Anglo-Saxon countries (Section C); and banks in Strong vs. Weak enforcement environments, (Section D)).

Table 9.6
Difference-in-differences analysis for the cost of equity
Around the mandatory adoption period of IFRS

A) Full Sample

	Pre-IFRS period	Post-IFRS period	Diff
Full sample, N = 528 bank-years	10.04%	8.76%	-1.28%***

B) Low vs. High Analyst Following

	Pre-IFRS period	Post-IFRS period	Diff
Low Analyst, N = 258 bank quarters	10.40%	8.63%%	-1.77%***
High Analyst, N = 270 bank-quarters	9.69%	8.89%	-0.80%***
Diff	0.71%	-0.26	**-0.97%****

C) Anglo-Saxon vs. Continental sample

	Pre-IFRS period	Post-IFRS period	Diff
Continental, N = 348 bank quarters	10.31%	8.71%	-1.60%***
Anglo-Saxon, N = 180 bank-quarters	9.52%	8.86%	-0.66%
Diff	0.79%	-0.15%	**-0.94%***

D) Strong vs. Weak Enforcement sample

	Pre-IFRS period	Post-IFRS period	Diff
Strong, N = 282 bank-quarters	9.98%	8.60%	-1.38%***
Weak, N = 246 bank quarters	10.11%	8.95%	-1.16%***
Diff	-0.13%	-0.35%	**-0.22%**

1. The CE data is that from the average CE (r_{AVG}).
2. The three stars (***) indicate statistical significance of the differences in means, with p-values < 0.01 based on two-tailed t-tests. The two stars (**) indicate statistical significance of the differences in means, with 0.01<p-value<0.05 based on two-tailed t-tests. The one star (*) indicates statistical significance of the differences in means, with 0.1>p-value>0.05.

The results show that the average CE for the full sample of European commercial banks has decreased from 10.04% in the pre-IFRS period to 8.76% in the post-IFRS period which is a decrease of 1.28%. This difference is significant based on the equality test of means (p-value<0.01). This finding rejects Hypothesis H_6 that the mandatory adoption of IFRS did not have a material impact on the CE.

Further results support Hypothesis H_7 that banks with low analyst following experienced a higher reduction in their CE after the mandatory adoption of IFRS (1.77% as compared to 0.80% for high analyst following). The difference in the mean reductions (-0.97%) is significant at the 5% level of significance. Hypothesis H_8 is also supported. but in the 10% level. Banks from Continental countries experienced 1.60% reduction in their CE, whilst banks from Anglo-Saxon countries experienced only a 0.66% reduction, which is a difference of 0.94%. This difference is significant at the 10% level. With respect to Hypothesis H_9, banks from Strong enforcement rule countries experienced 1.38% reduction in their CE as opposed to a reduction of 1.16% that banks in Weak enforcement rule countries experienced. This finding indicates a difference in the mean reductions of 0.22, which based on the equality test of means is not significant.

9.4 Multivariate analysis

9.4.1 Primary analysis

The univariate analysis above indicates that the CE of European commercial banks has decreased after the mandatory adoption of IFRS. This section reports the findings of the multivariate analysis which involves the testing of Equation (7.6):

$$CE_{it} = \gamma_0 + \gamma_1 POST_{it} + \gamma_2 MAND_{it} + \gamma_3 POST*MAND_{it} + \gamma_4 CAR_{it} + \gamma_5 LD_{it} + \gamma_6 BETA_{it} + \gamma_7 VARERN_{it} + \gamma_8 BM_{it} + \gamma_9 LOG(ASSET)_{it} + \gamma_{10} LEV + \gamma_{11} RF_{it} + \gamma_{12} USLIST_{it} + \sum_{k}^{18} \delta_k COUNTRY_{ki} + \omega_{it}$$

Table 9.7 reveals that the issue of multicollinearity is not present among the independent variables. The correlations between the independent variables are low with just a few values over the fifty percent. Table 9.8 reports the primary findings that test Hypothesis H_6. The explanatory power of the model depends on the CE method. The GLS method gives the highest adjusted R-squared, 68%, while the CT method provides the lowest adjusted R-squared, 31%. The adjusted R-squared of the average CE method is 45%, indicating that the independent variables explain a significant proportion of the variation of the dependent variable, the average CE. This explanatory power is higher than that of Li (2010) but lower than that reported by Daske et al. (2008). For example, Li (2010) reports an adjusted R-squared of 22% in her primary analysis, while Daske et al. (2008) report an adjusted R-squared of around 80%.

The coefficient of the primary variable of interest, POST, is found significant with a negative sign under all the CE estimation methods. This finding rejects the null Hypothesis H_6 that the CE has not been affected by the mandatory adoption of IFRS. The coefficient of POST indicates a reduction of 111 to 383 basis points in the CE from the pre-IFRS period to the post-IFRS period, depending on the method of the CE. The average reduction in the CE is 291 basis points.

This finding is in conformity with that of Daske et al. (2008), who reported a significant reduction in the CE for a sample of worldwide firms from different industries. However, the findings of that study held only when the researchers took into account the anticipation effect (See, literature review, Chapter 5, Section 5.2.2.2).

Table 9.7
Correlation matrix of the sample variables

	R_AVG	BETA	VARERN	CAR	LD	LEV	BM	LOG ASSET	RF	USLIST	VAR COEF	RVAR	LOG MVE	LTG	MAND	POST	STRNG	FOLLOW	LOWF	CONT
R_AVG	1																			
BETA	0.06	1																		
VARERN	0.06	-0.08	1																	
CAR	-0.03	0.13*	0.05	1																
LD	-0.07	-0.11*	-0.02	0.09	1															
LEV	0.14*	-0.05	-0.01	-0.20*	0.24*	1														
BM	0.23	-0.16*	0.01	-0.09	0.02	0.14*	1													
LOG(ASSET)	-0.05	0.40*	-0.09*	-0.30*	-0.11*	0.23*	-0.17*	1												
RF	0.21*	-0.10*	0.02	-0.12*	-0.01	-0.01	0.09*	-0.05	1											
USLIST	-0.03	0.21*	-0.02	-0.02	-0.07	-0.11*	-0.12*	0.40*	-0.02	1										
VARCOEF	0.34*	0.20*	-0.10*	0.07	0.01	0.12*	0.03	-0.14*	-0.09*	-0.08	1									
RVAR	0.39*	0.31*	0.01	0.12*	-0.03	0.02	-0.01	-0.18*	0.07	-0.06	0.47*	1								
LOG(MVE)	-0.16*	0.45*	-0.07	-0.14*	-0.07	0.02	-0.41*	0.90*	-0.01	0.43*	-0.16*	-0.15*	1							
LTG	-0.01	-0.03	0.19*	0.07	-0.06	-0.13*	-0.02	-0.13*	0.01	-0.02	-0.40*	0.06	-0.11*	1						
MAND	-0.13*	-0.37*	0.07	-0.30*	0.08	-0.04	0.03	0.07	0.12*	0.04	-0.26*	-0.27*	0.02	0.04	1					
POST	-0.25*	0.09*	0.03	-0.09*	-0.03	0.13*	-0.07	0.13*	0.07	0.01	-0.16*	-0.24*	0.17*	-0.03	-0.01	1				
STRNG	-0.05	0.05	-0.02	0.13*	0.07	0.17*	0.17*	-0.10*	0.01	0.12*	0.06	0.05	-0.17*	-0.05	-0.17*	0.01	1			
FOLLOW	-0.09*	0.48*	-0.06	-0.20*	-0.06	0.17*	-0.21*	0.77*	0.01	0.35*	-0.12*	-0.15*	0.75*	-0.09	0.02	0.26*	-0.01	1		
LOWF	0.05	-0.44*	0.09*	0.07	0.09	-0.11*	0.19*	-0.72*	0.13*	-0.35*	0.10*	0.04	-0.67*	0.06	-0.08	-0.01	0.01	-0.68*	1	
CONT	0.06	0.19*	-0.04	-0.01	-0.01	0.01	-0.19*	0.12*	-0.24*	-0.20*	0.14*	0.11*	0.18*	-0.01	-0.29*	-0.01	-0.67*	0.05	-0.03	1

Notes: The * indicates p-values < 0.05

Table 9.8
Primary regression model

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0431	3.2411***	0.0075	0.3110	0.0995	2.8800***	0.0714	1.8444*	0.0723	3.5531***
POST	-0.0111	-3.4478***	-0.0185	-3.1607***	-0.0350	-4.3174***	-0.0383	-4.5789***	-0.0291	-5.9035***
MAND	0.0015	0.1864	0.0175	1.1885	-0.0335	-1.6725*	-0.0091	-0.3710	-0.0117	-0.9511
MAND*POST	0.0058	1.6991*	0.0058	0.9338	0.0230	2.6784***	0.0239	2.6770***	0.0164	3.1175***
CAR	-0.0268	-1.0548	0.0857	1.8454*	0.0517	0.8166	-0.0020	-0.0304	0.0273	0.7020
LD	-0.0014	-2.4090**	-0.0046	-4.2080***	-0.0069	-4.6380***	-0.0073	-3.8442***	-0.0049	-5.3450***
BETA	0.0070	2.9963***	0.0023	0.5504	-0.0061	-1.0330	0.0057	0.9222	0.0015	0.4241
VARERN	0.0001	1.8641*	0.0001	0.4813	0.0005	2.3303**	0.0003	1.4956	0.0003	2.5160**
BM	0.0174	18.2833***	0.0002	0.1344	0.0403	5.0928***	0.0497	5.9643***	0.0094	6.4709***
LOG(ASSET)	0.0001	0.1817	0.0028	2.1746**	-0.0030	-1.6100	-0.0013	-0.6815	-0.0008	-0.7873
LEV	0.0007	2.6691***	0.0011	2.1444**	0.0012	1.7194*	0.0014	1.8068*	0.0012	2.7768***
RF	0.0064	9.7871***	0.0093	7.7382***	0.0039	2.2371**	0.0054	2.8933***	0.0072	7.1253***
USLIST	0.0029	1.2562	0.0015	0.3526	0.0074	1.2480	0.0001	0.0204	0.0042	1.1755
Country dummies	Included		Included		Included		Included		Included	
N	444		444		422		390		444	
Adj. R^2	0.68		0.31		0.47		0.40		0.45	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Under all CE methods, the interaction term, MAND*POST, is positive, which means that banks that did not adopt the IFRS before 2005 (the year of mandatory adoption) experienced a lower reduction in the CE as compared to banks that voluntarily adopted IFRS prior to 2005. However, it is only significant under the OJ, the PEG, and importantly, under the AVG method. The relevant coefficients reported in Table 9.8 were used to calculate the implied CE for the mandatory and voluntary adopters, before and after the mandatory adoption of IFRS. The results are presented in Table 9.9 using the average CE. Mandatory adopters experienced a CE of 0.0606 in the pre-IFRS period which has decreased by 0.0127 to 0.0479 in the post-IFRS period. On the other hand, voluntary adopters had a CE of 0.0723 in the pre-IFRS period and a CE of 0.0432 in the post-IFRS period, implying a reduction of 0.0291[34]. This result is opposite to the findings of Li (2010) who found that mandatory adopters experienced a higher decrease in the CE than voluntary adopters. However, consistent with Li (2010), the findings also show that the difference in the CE between the mandatory adopters and the voluntary adopters in the pre-IFRS period (0.0606 and 0.0723, respectively) has been eliminated in the post-IFRS period (0.0479 and 0.0432, respectively).

Table 9.9
CE of Mandatory and Voluntary adopters
based on the coefficients of the AVG method in Table 9.8

	Pre-IFRS	**Post-IFRS**	**Diff.**
Mandatory Adopters	0.0606	0.0479	-0.0127***
Voluntary Adopters	0.0723	0.0432	-0.0291***
Diff.	-0,0117	0,0047	

*** indicates p-values < 0.01.

34 The CE estimates of the mandatory and the voluntary adopters have been calculated by the r_{AVG} model in Table 9.8 by setting the two dummy variables of POST and MAND equal zero or one. For example, the CE of the mandatory adopters in the pre-IFRS period (i.e. 0.0606), is calculated by setting the POST variable equal to zero and the MAND variable equal to one. Thus, the CE of this group is the sum of the intercept of the model (0.0723) with the coefficient of MAND (-0.0117).

The findings in this thesis can be interpreted as follows. In contrast to voluntary adopters, firms which adopted IFRS only when they became mandatory did not expect substantial benefits, such as a reduction in the CE, and this is why they did not adopt IFRS earlier. In fact, as the post-IFRS results show, the mandatory adoption of IFRS resulted in the elimination of the CE advantage (a 0.0117 lower CE) they had during the pre-IFRS period over the voluntary adopters. As Li (2010, p. 623) explains this finding is:

‘consistent with the assertion that a uniform set of high-quality accounting standards improves financial reporting convergence across the EU member states’.

The significance of the control variables vary depending on which CE estimation method is used. The results of the bank specific variables are mixed. The capital adequacy ratio (CAR) is found to be insignificant under all the CE methods. The LD variable is found to be significant in all CE models with a negative coefficient. Mansur et al. (1993) predict a positive association between this ratio and measures of risk (e.g. CE). As discussed in the methodology (Chapter 7, Section 7.3.2), a high net loans-to-deposits ratio should be associated with higher liquidity risk. However, the negative coefficient of LD is supported by Wetmore (2004, p. 100) who argues that,

‘One argument in favor of high level of loan activity is banks securitize their loans thus reducing risk by removing them from the balance sheet. This permits them to make additional loans without having to increase the deposit base’.

However, whether the activity of securitization is a plausible explanation to support a negative coefficient for the LD ratio is an empirical testable question.

BETA is found to be significant with the expected positive sign only under the GLS method (coefficient = 0.0070, *p*-value = 0.0029). This finding indicates that banks with higher betas have a higher risk which is reflected in their CE. The variable that controls for the variability of earnings (VARERN) has a significant positive sign in two out of the five methods, the OJ method (coefficient = 0.0005, *p*-value = 0.0203) and the average CE method (coefficient = 0.0003, *p*-value = 0.0122), indicating that the CE increases as the variability in earnings increases.

In conformity with the literature, the BM ratio is found to be significant and positive (Daske, 2006; Gebhardt et al., 2001; Gode & Mohanram, 2003) while the variable controlling for size, LOG(ASSET) is found significant (*p*-value = 0.0302) only under the CT method with a positive sign. The significant coefficient (p-value = 0.0057 for the average CE method) of the leverage ratio, LEV supports the view that there is a positive relationship between leverage and CE.

The variable of time-series variation in risk-free rates, the RF, is highly significant with a positive sign under all CE methods. This finding suggests that the higher a country's risk-free rates are, the higher are the rates of return that investors demand from their investments in that country, which is translated into higher CE for firms domiciled in that country. Finally, the US cross-listing variable is insignificant under all methods.

9.4.2 Additional analysis

This section reports the results of tests relating to Hypotheses: H_7, H_8 and H_9. Additional analysis examines whether the impact on the CE by the mandatory adoption IFRS vary with: i) analyst following, ii) the classification of accounting standards, and iii) countries' legal enforcement rules.

The results on whether analyst following affects the impact of the IFRS on the CE are reported on Table 9.10 (Hypothesis H_7 in Chapter 7). The coefficient of POST is still significant with a negative sign under all CE methods. This indicates again that the CE has decreased in the post-IFRS period for the full sample. However, the coefficient of the interaction term, POST*LOWF, is not found to be significant except under the GLS model. Thus, there is little support for Hypothesis $H_{7,}$ that banks with low analyst following experienced lower reduction in their CE. This finding contradicts the results of Botosan (1997) and Botosan & Plumlee (2002) who reported a higher reduction in the CE of firms with low analyst following. However, with respect to mandatory and voluntary adopters, results indicate that the three-way interaction term, POST*MAND*LOWF, is significant and negative under two out of five CE methods (i.e. the GLS and the CT method). This reveals that mandatory adopters with low analyst following had a greater reduction in their CE after the mandatory adoption of IFRS than the voluntary adopters. With respect to the other control variables, the results are similar to those relating to the primary regression model (see Table 9.8). An exception is the LEV variable which is significant in less models (GLS and AVG model) and the LOG(ASSET) which is insignificant under all models.

Table 9.10
Regression results based on analysts' following

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0460	3.2153***	0.0205	0.7786	0.0402	1.0827	0.0430	1.0264	0.0570	2.5824**
POST	-0.0173	-4.1095***	-0.0254	-3.2787***	-0.0299	-2.8087***	-0.0417	-3.7315***	-0.0330	-5.0733***
MAND	-0.0039	-0.4716	0.0176	1.1516	-0.0054	-0.2623	0.0044	0.1748	-0.0032	-0.2539
LOWF	-0.0044	-0.6423	0.0035	0.2807	0.0789	4.6023***	0.0419	2.3214**	0.0290	2.7310***
POST*MAND	0.0165	3.7082***	0.0195	2.3775**	0.0178	1.5912	0.0270	2.2836**	0.0242	3.5139***
POST*LOWF	0.0128	2.0499**	0.0160	1.3921	-0.0150	-0.9656	0.0058	0.3598	0.0073	0.7648
MAND*LOWF	0.0120	1.7451*	-0.0028	-0.2202	-0.0734	-4.2581***	-0.0425	-2.3452**	-0.0245	-2.2993**
POST*MAND*LOWF	-0.0240	-3.6124***	-0.0305	-2.4892**	0.0127	0.7567	-0.0063	-0.3560	-0.0167	-1.6338
CAR	-0.0358	-1.4370	0.0721	1.5698	0.0743	1.1935	0.0105	0.1555	0.0272	0.7078
LD	-0.0014	-2.3903**	-0.0043	-4.0374***	-0.0066	-4.5209***	-0.0069	-3.6034***	-0.0047	-5.1729***
BETA	0.0079	3.2653***	0.0007	0.1678	-0.0018	-0.2936	0.0072	1.0907	0.0030	0.8011
VARERN	0.0001	2.0561**	0.0001	0.4590	0.0004	1.8903*	0.0002	1.2357	0.0003	2.2501**
BM	0.0172	18.587***	0.0002	0.1525	0.0393	4.9579***	0.0486	5.7074***	0.0094	6.5805***
LOG(ASSET)	0.0002	0.3254	0.0018	1.2916	-0.0007	-0.3437	-0.0003	-0.1363	-0.0003	-0.3246
LEV	0.0006	2.2205**	0.0008	1.5101	0.0010	1.4038	0.0012	1.5515	0.0010	2.2135**
RF	0.0064	9.8296	0.0092	7.6801***	0.0035	2.0411**	0.0054	2.8970***	0.0070	6.9773***
USLIST	0.0025	1.0758	0.0013	0.3089	0.0024	0.4148	-0.0027	-0.4398	0.0023	0.6369
Country dummies	Included		Included		Included		Included		Included	
N	444		444		422		390		444	
Adj. R^2	0.70		0.33		0.50		0.41		0.48	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

The interaction term POST*CONT in Table 9.11 tests hypothesis H_8. The significant and negative coefficient indicates that, compared to banks domiciled in Anglo-Saxon countries, banks domiciled in Continental countries experienced a higher reduction in their CE. This result provides support for Hypothesis H_8. The differences between the Anglo-Saxon accounting systems and IFRS are regarded to be small which means that the benefits of adopting IFRS should be greater for banks domiciled in countries with Continental accounting systems. Under the average CE method, the negative coefficient of POST*CONT indicates that the CE of banks in Continental countries decreased by 180 basis points more than the CE of banks in Anglo-Saxon countries. This decrease ranges from 76 to 231 basis points depending on which CE method is used. The three-way interaction term, POST*MAND*CONT, is significant and positive under the OJ, the PEG, and the AVG method (e.g., for the AVG method, coefficient = 0.0157 and p-value = 0.0001). This indicates that mandatory adopters domiciled in Continental countries experienced a lower reduction in their CE after the mandatory adoption of IFRS than voluntary adopters.

Finally, the findings regarding the influence of countries' enforcement rules support hypothesis H_9 (Table 9.12). The interaction term POST*STRNG is significant and negative which suggests that banks domiciled in strong enforcement countries have a higher reduction in their CE than banks domiciled in weak enforcement countries. This finding is in conformity with the results of previous studies, such as those of Li (2010). The reduction in the average CE is 136 basis points for banks in weak enforcement countries and 371 basis points (136 + 235 basis points) for banks in strong enforcement countries. The difference in the reduction of the CE varies from 79 to 341 basis points based on the CE method. The three-way interaction term, POST*MAND*STRNG, gauges the difference in the reduction of CE between the mandatory adopters

Table 9.11
Regression results based on countries' classification of accounting standards

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0422	3.1708***	0.0061	0.2536	0.0995	2.8748***	0.0709	1.8295*	0.0715	3.5049***
POST	-0.0035	-1.7109*	-0.0099	-2.6256***	-0.0118	-2.0988**	-0.0167	-2.6841***	-0.0111	-3.4837***
MAND	0.0018	0.2339	0.0181	1.2293	-0.0335	-1.6677*	-0.0090	-0.3650	-0.0114	-0.9206
POST*CONT	-0.0076	-1.9707**	-0.0087	-1.2360	-0.0231	-2.3609**	-0.0214	-2.0502**	-0.0180	-3.0554***
POST*MAND*CONT	0.0050	1.4290	0.0045	0.7084	0.0229	2.6080***	0.0247	2.7118***	0.0157	2.8994***
CAR	-0.0284	-1.1164	0.0831	1.7847*	0.0515	0.8094	0.0012	0.0177	0.0258	0.6618
LD	-0.0014	-2.3835**	-0.0046	-4.1837***	-0.0069	-4.6291***	-0.0074	-3.8609***	-0.0049	-5.3244***
BETA	0.0069	2.9802***	0.0022	0.5361	-0.0061	-1.0317	0.0057	0.9231	0.0014	0.4142
VARERN	0.0001	1.9380**	0.0001	0.5505	0.0005	2.3229**	0.0003	1.4532	0.0003	2.5541**
BM	0.0173	18.2074***	0.0001	0.0880	0.0403	5.0828***	0.0500	5.9754***	0.0093	6.4262***
LOG(ASSET)	0.0001	0.2214	0.0028	2.2078**	-0.0030	-1.6084	-0.0013	-0.6629	-0.0008	-0.7622
LEV	0.0007	2.5847**	0.0011	2.0696**	0.0012	1.7082*	0.0015	1.8442*	0.0012	2.7206***
RF	0.0063	9.5770***	0.0092	7.5574***	0.0039	2.2148**	0.0055	2.9226***	0.0071	6.9834***
USLIST	0.0028	1.2226	0.0013	0.3231	0.0074	1.2463	0.0001	0.0153	0.0041	1.1542
Country dummies	Included		Included		Included		Included		Included	
N	444		444		422		390		444	
Adj. R^2	0.69		0.31		0.47		0.40		0.46	

Notes:
The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table 9.12
Regression results based on countries' enforcement rules

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0445	3.3727***	0.0121	0.5048	0.1012	2.9307***	0.0737	1.9094*	0.0752	3.7339***
POST	-0.0066	-4.2080***	-0.0136	-4.7190***	-0.0141	-3.4930***	-0.0135	-3.1997***	-0.0136	-5.6268***
MAND	-0.0010	-0.1334	0.0122	0.8266	-0.0367	-1.8178*	-0.0116	-0.4716	-0.0158	-1.2850
POST*STRNG	-0.0079	-1.9963**	-0.0141	-1.9335*	-0.0265	-2.6509***	-0.0341	-3.3014***	-0.0235	-3.8658***
POST*MAND*STRNG	0.0116	2.8532***	0.0181	2.4284**	0.0307	2.9656***	0.0316	2.8844***	0.0264	4.2445***
CAR	-0.0300	-1.1855	0.0783	1.6938*	0.0498	0.7860	-0.0023	-0.0344	0.0231	0.5980
LD	-0.0014	-2.4010**	-0.0045	-4.1949***	-0.0069	-4.6596***	-0.0074	-3.8825***	-0.0049	-5.3880***
BETA	0.0070	2.9919***	0.0027	0.6420	-0.0060	-1.0182	0.0065	1.0487	0.0019	0.5477
VARERN	0.0001	2.0645**	0.0001	0.6525	0.0005	2.4537**	0.0003	1.5758	0.0003	2.7026***
BM	0.0172	18.2599***	0.0001	0.0318	0.0387	4.8573***	0.0476	5.6830***	0.0092	6.3951***
LOG(ASSET)	0.0001	0.2333	0.0027	2.1698**	-0.0030	-1.6328	-0.0015	-0.7581	-0.0008	-0.8343
LEV	0.0007	2.4170**	0.0009	1.8394*	0.0011	1.6002	0.0014	1.6892*	0.0011	2.5037**
RF	0.0065	9.8984***	0.0094	7.8499***	0.0045	2.5241**	0.0062	3.3159***	0.0075	7.4922***
USLIST	0.0027	1.1821	0.0011	0.2775	0.0073	1.2348	0.0001	0.0163	0.0040	1.1257
Country dummies	Included		Included		Included		Included		Included	
N	444		444		422		390		444	
Adj. R^2	0.69		0.31		0.47		0.40		0.47	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

and the voluntary adopters. The results indicate that mandatory adopters domiciled in strong enforcement rule countries had a lower reduction in their CE (for the AVG method, the coefficient of POST*MAND*STRNG equals 0.0264, p-value = 0.0001). On the other hand, voluntary adopters had a greater reduction in their CE when the IFRS became mandatory.

Overall, the results regarding the control variables, of the additional models, do not differ materially from those of the primary regression model (Table 9.8). The BETA variable is found significant only under the GLS method. The variability in earnings (VARERN) is found significant with the expected positive sign in the GLS, the OJ and the AVG method. Again, the ratio of Loans to Deposits (LD) is significant under all CE methods, however with the opposite sign of the expected. The LEV variable is found significant in only one of the four CE methods and in the average CE. Finally, the BM and the RF variables are also significant with the expected signs, while the size variable, the natural logarithm of ASSET is significant in only one of the CE methods.

9.5 Robustness tests

9.5.1 Primary analysis

The primary findings reported above indicate that the CE has significantly decreased after the mandatory adoption of IFRS in 2005. Based on the average CE estimates this reduction is 291 basis points (Table 9.8). In order to test whether these findings are affected by model specification issues this section provides further evidence using alternative specification models.

Table 9.13 presents the results of the model that operationalizes a number of control variables in a different way by using alternative variables (as explained in the methodology, Chapter 7, these variables are: RVAR instead of BETA, VARCOEF instead of VARERN, LOG(MVE) instead of LOG(ASSET)). The coefficient of POST is found to be significant and negative again (for the AVG model, coefficient = -0.0186; *p*-value = 0.0001). The average CE model indicates a reduction of 186 basis points from the pre to the post-IFRS period. The control variables, RVAR, VARCOEF, and LOG(MVE), continue to be significant with the expected signs. Specifically, the return variability (RVAR) is significant with a positive sign under the GLS (*p*-value = 0.0019), the PEG (*p*-value = 0.0002), and the AVG (*p*-value = 0.0053) models. The coefficient of the alternative variable to earnings variability (VARCOEF) is significant and positive as expected (e.g., for the AVG model, coefficient = 0.0002; *p*-value = 0.0001). The size variable, LOG(MVE), is only significant under the OJ method with a coefficient of -0.0036 and a *p*-value of 0.0118. The results with respect to all of the other variables are not different from those of the primary regression model (Table 9.8).

Table 9.14 reports the findings of a model that controls for outliers by taking the natural logarithms of the continuous independent variables. Under all the CE methods, the results show a reduction in the CE after the mandatory adoption of IFRS. The coefficient of the POST variable for the AVG method is -0.0276 with a *p*-value of 0.0001. A notable difference between the model that controls for outliers and the primary estimation model in Table 9.8 is that the explanatory power of the former model increases significantly up to 73% for the GLS model.

Table 9.13
Regression model using alternative control variables

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0539	4.4873***	0.0328	1.5182	0.1020	3.8560***	0.0242	0.8527	0.0756	4.6212***
POST	-0.0091	-2.6203***	-0.0197	-3.1504***	-0.0218	-2.9070***	-0.0118	-1.6214	-0.0186	-3.9202***
MAND	-0.0044	-0.5397	0.0097	0.6524	-0.0280	-1.5690	0.0323	1.5623	-0.0118	-1.0432
MAND*POST	0.0053	1.4614	0.0075	1.1497	0.0119	1.5260	0.0026	0.3460	0.0089	1.7943*
CAR	-0.0323	-1.2875	0.0495	1.0956	-0.0153	-0.2837	-0.0544	-1.0189	-0.0133	-0.3899
LD	-0.0014	-2.3236**	-0.0045	-4.0867***	-0.0047	-3.5805***	-0.0063	-4.0087***	-0.0038	-4.4931***
RVAR	0.0685	3.1310***	0.0561	1.4228	0.0529	1.1180	0.1773	3.7759***	0.0837	2.8053***
VARCOEF	-0.0001	-1.3922	-0.0001	-1.9489*	0.0006	6.8903***	0.0009	9.7367***	0.0002	4.5989***
BM	0.0172	16.5504***	0.0003	0.1993	0.0174	2.2359**	0.0316	4.1388***	0.0080	5.6965***
LOG(MVE)	-0.0001	-0.1708	0.0020	1.8223*	-0.0036	-2.5298**	-0.0004	-0.2944	-0.0010	-1.2370
LEV	0.0008	2.7732***	0.0015	2.7610***	0.0008	1.3578	0.0015	2.3192**	0.0011	2.6730***
RF	0.0063	9.0572***	0.0088	7.0599***	0.0033	2.0963**	0.0042	2.6910***	0.0061	6.4191***
USLIST	0.0055	2.3795**	0.0047	1.1204	0.0061	1.2041	-0.0001	-0.0147	0.0052	1.6455
Country dummies	Included		Included		Included		Included		Included	
N	430		430		414		382		430	
Adj. R^2	0.67		0.29		0.52		0.53		0.50	

Notes:
RVAR = is the annual return variability defined as the standard deviation of the monthly returns at year end, VARCOEF = is the coefficient of variation of all the FY1 analysts' estimates. It is a measure of spread of the estimates in terms of the standard deviation. MVE = is the market value of equity and is stated in millions of Euros. All the other variables are defined in Table 9.8. Although the model controls for the country-effect, the table do not provides the results for the country dummy variables for brevity. The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

The significance of most of the control variables is similar to the findings in Table 9.8. VARERN, BM, and the RF are found significant with positive coefficients and LD has a negative coefficient. For the first time the CAR is found significant with a negative sign, however only under the GLS method (coefficient = -0.0093; *p*-value = 0.0049). As discussed in Chapter 7 the higher it is the capital adequacy ratio the lower the CE which is supported by the negative sign.

Table 9.15 reports the findings of the growth model which includes a proxy for the long-term growth in earnings per share. Consistent with the findings of the primary model and the other robustness tests, the coefficient of POST, shows that the CE has decreased after the mandatory adoption of IFRS, under all CE methods. The results regarding the LTG are mixed. Although, it is found significant under two CE methods, its coefficient is estimated to be positive under the CT method (coefficient = 0.0098) and negative under the PEG method (coefficient = -0.0173).

Finally, Table 9.16 reports the results of the model that uses as the dependent variable the risk premium instead of the CE. As explained in the methodology chapter (Chapter 7), this model aims to test whether the results are sensitive to other measures of the required rate of return.

Table 9.14
Regression model controlling for outliers

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0692	6.1843***	0.0791	3.6245***	0.1353	4.3514***	0.1177	3.4924***	0.1034	5.9294***
POST	-0.0080	-2.6345***	-0.0182	-3.0676***	-0.0402	-5.0085***	-0.0442	-5.3334***	-0.0276	-5.8260***
MAND	0.0045	0.6918	-0.0099	-0.7841	-0.0232	-1.3546	-0.0176	-0.9278	-0.0127	-1.2595
MAND*POST	0.0076	2.3596**	0.0082	1.3045	0.0266	3.1300***	0.0284	3.2092***	0.0180	3.5815***
LOG(CAR)	-0.0093	-2.8282***	0.0020	0.3128	-0.0054	-0.6247	-0.0136	-1.4395	-0.0065	-1.2627
LOG(LD)	-0.0036	-2.3155**	-0.0068	-2.1950**	-0.0182	-4.3593***	-0.0141	-3.0697***	-0.0108	-4.3755***
LOG(BETA)	0.0045	3.6660***	0.0058	2.3838**	-0.0029	-0.8745	0.0038	1.0811	0.0029	1.4895
LOG(VARERN)	0.0022	2.9720***	-0.0007	-0.4986	0.0105	5.3067***	0.0100	4.7942***	0.0054	4.7431***
LOG(BM)	0.0346	20.9623***	0.0114	3.5599***	0.0217	4.0616***	0.0275	4.8881***	0.0235	9.1218***
LOG(ASSET)	0.0002	0.3726	0.0016	1.2574	-0.0032	-1.7374*	-0.0012	-0.6179	-0.0008	-0.8178
LOG(LEV)	0.0008	1.8100*	0.0014	1.5055	0.0021	1.6216	0.0006	0.5053	0.0013	1.7136*
RF	0.0040	6.2297***	0.0078	6.2842***	0.0034	1.9219*	0.0045	2.4133**	0.0049	4.9909***
USLIST	0.0017	0.7962	0.0002	0.0636	0.0025	0.4367	-0.0036	-0.5940	0.0005	0.1569
Country dummies	Included		Included		Included		Included		Included	
N	442		442		420		388		442	
Adj. R^2	0.73		0.31		0.49		0.41		0.51	

Notes:
The results presented in this table are from the robustness test that attempts to control for the outliers by taking the natural logarithms of all the independent continuous variables. All variables are defined in Table 9.8. Although the model controls for the country-effect, the table do not provides the results for country dummy variables for brevity. The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table 9.15
Regression model controlling for long-term growth expectations

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0430	3.2435***	0.0073	0.3068	0.0992	2.8763***	0.0632	1.6478	0.0723	3.5495***
POST	-0.0112	-3.5095***	-0.0191	-3.2685***	-0.0343	-4.2313***	-0.0366	-4.4174***	-0.0290	-5.8854***
MAND	0.0017	0.2190	0.0182	1.2465	-0.0341	-1.7042*	-0.0031	-0.1275	-0.0118	-0.9542
MAND*POST	0.0060	1.7657*	0.0065	1.0401	0.0223	2.6068***	0.0225	2.5483**	0.0164	3.1027***
CAR	-0.0274	-1.0810	0.0840	1.8194*	0.0531	0.8390	0.0040	0.0598	0.0274	0.7044
LD	-0.0014	-2.4333**	-0.0046	-4.2661***	-0.0068	-4.6218***	-0.0075	-3.9904***	-0.0049	-5.3357***
BETA	0.0072	3.0849***	0.0029	0.6890	-0.0065	-1.1013	0.0052	0.8515	0.0014	0.4113
VARERN	0.0001	0.9532	-0.0001	-0.6916	0.0006	2.7714***	0.0006	2.7001***	0.0003	2.3490**
BM	0.0173	18.3042***	0.0001	0.1126	0.0417	5.2411***	0.0531	6.3838***	0.0094	6.4652***
LOG(ASSET)	0.0001	0.1071	0.0026	2.0697**	-0.0029	-1.5472	-0.0012	-0.6096	-0.0008	-0.7755
LEV	0.0008	2.8593***	0.0013	2.4640**	0.0011	1.5038	0.0012	1.5589	0.0012	2.7231***
RF	0.0064	9.7423***	0.0092	7.6936***	0.0039	2.2449**	0.0055	2.9827***	0.0072	7.1204***
USLIST	0.0031	1.3393	0.0020	0.4830	0.0069	1.1722	-0.0005	-0.0955	0.0042	1.1615
LTG	0.0034	1.6228	0.0098	2.5359**	-0.0082	-1.5419	-0.0173	-3.0511***	-0.0007	-0.2187
Country dummies	Included		Included		Included		Included		Included	
N	444		444		422		390		444	
Adj. R^2	0.69		0.32		0.48		0.42		0.46	

Notes:
The results presented in this table are from the robustness test that controls for the growth potentials of banks. LTG = is the long-term growth, and is the five years consensus growth rate provided by analysts in the I/B/E/S. When the growth rate was not available it is calculated by analysts' forecasted eps, using the formula (FY2/FY1-1). All other variables are defined in Table 9.8. Although the model controls for the country-effect, the table do not provides the results for country dummy variables for brevity. The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table 9.16
Regression model using Risk Premiums as the dependent variable

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0258	1.9379*	0.0043	0.1834	0.0718	2.1098**	0.0509	1.3384	0.0586	2.9485***
POST	-0.0113	-3.4187***	-0.0186	-3.1721***	-0.0369	-4.4997***	-0.0397	-4.7240***	-0.0293	-5.8998***
MAND	0.0026	0.3170	0.0177	1.2044	-0.0319	-1.5699	-0.0078	-0.3153	-0.0108	-0.8718
MAND*POST	0.0051	1.4596	0.0057	0.9154	0.0226	2.5977***	0.0237	2.6424***	0.0159	2.9962***
CAR	-0.0119	-0.4576	0.0885	1.9186*	0.0758	1.1875	0.0155	0.2304	0.0391	1.0023
LD	-0.0016	-2.6307***	-0.0046	-4.2495***	-0.0072	-4.7984***	-0.0075	-3.9168***	-0.0050	-5.4671***
BETA	0.0058	2.4245**	0.0021	0.5014	-0.0087	-1.4715	0.0039	0.6405	0.0005	0.1632
VARERN	0.0002	2.1722**	0.0001	0.5212	0.0006	2.6753***	0.0004	1.7491*	0.0003	2.6941***
BM	0.0169	17.2923***	0.0001	0.0823	0.0326	4.2391***	0.0441	5.4734***	0.0090	6.1866***
LOG(ASSET)	0.0001	0.2149	0.0028	2.1806**	-0.0027	-1.4385	-0.0012	-0.6070	-0.0008	-0.7606
LEV	0.0007	2.5617**	0.0011	2.1438**	0.0012	1.7112*	0.0014	1.7947*	0.0001	2.7427***
USLIST	0.0032	1.3405	0.0015	0.3661	0.0075	1.2543	0.0004	0.0649	0.0044	1.2319
Country dummies	Included		Included		Included		Included		Included	
N	444		444		422		390		444	
Adj. R^2	0.73		0.32		0.48		0.43		0.50	

Notes:
The results presented in this table are from the robustness test that uses as a dependent variable the risk premium instead of the CE. The risk premium is calculated as the difference between the CE and the risk-free rate. All other variables are defined in Table 9.8 Although the model controls for the country-effect, the table do not provides the results for country dummy variables for brevity. The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Similar, to the models that use the CE as the dependent variable, the coefficient of POST continues to be negative and significant. For example, for the AVG model the coefficient is -0.0293 (*p*-value = 0.0001) indicating a reduction of 293 basis points after the mandatory adoption of IFRS. Regarding the control variables the findings do not change materially from those presented above (Table 9.8). CAR is still insignificant and LD is significant with a negative sign. BETA and the size variable LOG(ASSET) are only significant under the GLS (*p*-value = 0.0158) and the CT (*p*-value = 0.0298) method, respectively. Overall, the VARERN, the BM, and the LEV variables continue to be significant and positive as before.

9.5.2 Additional analysis

This section provides the robustness tests for the addition analysis performed under Section 9.4.2. Four robustness tests are used for each of the additional tests. The robustness tests are similar to the ones used in the primary analysis (See, Section 9.5.1).

Findings of the analyst following analysis are presented in Tables D1-D4 of Appendix D. Results indicate again that banks with low analyst following do not experience lower reduction in their CE after the mandatory adoption of IFRS than banks with high analyst following. The interaction term POST*LOWF is insignificant almost in all the robustness tests and under all CE methods. This finding do not supports Hypothesis H_7. However, the POST variable that examines whether the CE has decreased for the full sample after the mandatory adoption of IFRS is highly significant in most of the models. For example, the coefficient of the AVG method for the model that controls for outliers indicates that the CE has significantly decreased by 309 basis points (t-stastistic = 4.8286, see Table D2 in Appendix D).

Tables D5-D8 in Appendix D report the robustness tests that examine whether banks domiciled in Continental countries experienced higher reduction in their CE after the mandatory adoption of IFRS. Contrary to the findings in Table 9.11, where most of the models clearly support the view that the CE of Continental banks has decreased more than the CE of Anglo-Saxon banks (POST*CONT is significant in four out of five CE methods), results from the robustness tests are mixed. The interaction term POST*CONT that tests Hypothesis H_8 is significant in only half of the robustness tests. For example, the coefficient of POST*CONT under the average CE method (i.e. AVG) of the robustness test in Table D5 in Appendix D is significant with a negative sign (coefficieint -0.0121, p-value = 0.0298). In contrast, under the CT method in Table D7 the coefficient of POST*CONT is insignificant (t-value = -1.3535, p = 0.1766). However, it should be noted that under all the robustness tests the average CE method gives a significant and negative coefffient for the interaction term POST*CONT. This is important given the fact that non of the CE methods (i.e. GLS, CT, OJ, and PEG) is proved to be superior in the literature, and thus the average CE is likely to provide a more accurate estimate of the CE. Moreover, most of previous studies use solely in their analysis the results from the average CE (Daske et al., 2008; Li, 2010).

Finally, Tables D9 – D12 in Appendix D report the findings of the test that examines whether banks domiciled in strong enforcement rule countries experienced higher reduction in their CE, from the pre-IFRS period to the post-IFRS period, than banks domiciled in weak enforcement rule countries. Under this test the POST variable continues to be significant and negative, as expected, indicating that European commercial banks hold a lower CE in the post-IFRS period. The interaction term POST*STRNG is significant and negative under all the robustness tests and in almost all the CE method, with the only exception the GLS, the OJ, and the PEG method in Table D9. In all other Tables (i.e. Tables D10 – D12) the POST*STRNG is always significant (e.g. in Table D12 under the AVG method, coefficient = -0.0248, and t-value = -4.0693). These findings support Hypothesis H_9 that banks domiciled in strong enforcement rule countries experienced lower reduction in their CE after the mandatory adoption of IFRS.

9.6 Conclusion

This chapter reports the findings of the economic consequences part of the thesis that examines the impact of the mandatory adoption of IFRS on European commercial banks' CE. Unlike previous studies (Daske et al., 2008; Lee et al., 2008; Li, 2010), which examined the CE using heterogeneous samples in terms of firms' industry, this thesis deals with only one industry the European commercial banking.

A major finding of the study is that the mandatory adoption of IFRS has reduced European banks' CE. The primary regression model indicates that the average CE of European banks has decreased by 291 basis points after the mandatory adoption of IFRS in 2005. This finding is also supported by several robustness tests: i) a robustness test that controlled for a number of alternative variables to the explanatory variables in the primary model (i.e. alternative proxies), ii) a model that controlled for outliers by taking the natural logarithms of the continuous independent variables, iii) a model that controlled for the growth expectations of banks, and iv) a model that used the risk premium as the dependent variable instead of the CE.

Additional analysis provided support to the view that institutional differences between countries affect the magnitude of the reduction in the CE. In particular, the primary results show that banks domiciled in countries with Continental accounting systems and Strong enforcement rules tend to have greater reduction in their CE. Banks domiciled in Continental countries experienced a greater reduction in their CE than banks domiciled in Anglo-Saxon countries. However, results from the robustness analysis provided mixed results. Specifically, half of the robustness test models and CE methods did not provide significant differences between banks domiciled in Continental and Anglo-Saxon countries.

Finally, banks domiciled in Strong enforcement rule countries had more reduction in their CE, after the mandatory adoption of IFRS, than banks in Weak enforcement rule countries. These findings hold both for the primary findings as well as for most of the robustness tests. With respect to analyst following, the results do not provide support for the hypothesis that banks with low analyst following experience a higher reduction in their CE than banks with high analyst following.

Overall, the findings of this chapter support the view that increased disclosure and transparent accounting standards (such as the IFRS) reduce the CE. The mandatory adoption of IFRS reveals benefits for the European commercial banks as it reduces the required rate of return that investors demand when they invest in such kind of institutions. This results in lower CE for the funds banks obtain from the capital markets.

Chapter 10: Synopsis and Conclusion

10.1 Introduction

This Chapter provides the conclusion of the thesis. The study deals with two major streams of accounting research, the value relevance research and the economic consequences research. The context of the study is the IFRS as has been applied by a single industry, the European banking sector. The research objective of the value relevance part is to explore the relevance of fair value estimates under IFRS. Evidence is provided on the value relevance of fair value disclosures of European banks for the fair value of loans and advances, held-to-maturity investments, deposits, and other debt. Moreover, in a separate empirical test, evidence is provided for derivatives' fair value recognition. The period of the study for the value relevance tests covers the first two years of the mandatory adoption of IFRS, namely: 2005 and 2006.

The research objective of the economic consequences part is to examine whether the mandatory adoption of IFRS resulted in net benefits for European commercial banks, such as a reduction in their cost of equity capital. The period for the economic consequences tests covers three years before the mandatory adoption of IFRS, the pre-IFRS period (i.e., 2002, 2003, and 2004) and three years after the mandatory adoption of IFRS, the post-IFRS period (i.e., 2005, 2006, and 2007).

The chapter is structured as follows: Section 10.2 summarizes the first seven Chapters of the thesis; Section 10.3 summarizes the main findings, reported in Chapters 8 and 9; Section 10.4 reflects on the limitations of the study; Section 10.5 makes recommendations for future research; finally, Section 10.6 draws the conclusion by summarising the study's contribution to knowledge.

10.2 Summary of the Chapters 1-7

Chapter 1 was the introductory chapter of the thesis. Its aim was to introduce the reader to the topics of the study and to set the research objectives.

Chapter 2 presented the regulatory environment within which European commercial banks operate. All European listed firms were required to adopt IFRS from 2005 onwards. The accounting standards that were expected to have profound effects on banks' financial reporting where those relating to the accounting for financial instruments (i.e. IAS 32, IAS 39, IFRS 7, and the new adopted IFRS 9). Hence, the discussion on accounting regulatory rules focuses solely on financial instruments which constitute the majority of banks' assets and liabilities. Commercial banks play an important role in an economy which is to collect public funds (i.e. deposits) and to allocate them to productive activities of the economy. Due to this role, banks are required to comply with capital adequacy rules. The capital adequacy rules that apply to European banks were the Capital Accord which has been replaced by Basel II. Both of these regulatory rules were analyzed in this chapter (Chapter 2).

Chapter 3 presented the theoretical framework of the thesis. The research methodology of the value relevance part and the economic consequences part was based on equity valuation theory which provided the theoretical underpinning of the study. Value relevance research examines the relationship between accounting numbers and market values. This link is provided by equity valuation models. The valuation models analysed in this chapter where the DDM, the RIVM, the Ohlson (1995) model, the Feltham & Ohlson (1995) model, the Ohlson & Juettner (2005) model, and the BSM. The value relevance of fair value disclosures (e.g. fair value of loans and advances) was examined under the BSM model. The value relevance of derivatives' fair value recognition was examined under the Ohlson (1995) model. With respect to the economic consequences test, valuation models were used to derive banks' cost of equity capital. Specifically, based on the RIVM and the Ohlson & Juettner (2005) model, four methods were used to provide estimates for the dependent variable of the economic consequence test (i.e. the cost of equity capital). Chapter 3 also discussed the relationship between accounting standards and cost of equity capital, which provides a justification about why increased disclosure and financial statements' comparability may decrease cost of equity capital. Finally, the chapter provided a critical view on the value relevance research.

Chapter 4 reviewed the value relevance literature on fair values. It was separated between banking and non-banking literature. Empirical studies on banks solely deal with the value relevance of financial instruments' fair values. Most of these studies focus on US GAAP and on US banks (Barth et al., 1996; Wang et al., 2005; Ahmed et al, 2006). The literature with respect to non-US data is rare. Moreover, there is no up-to-date literature that examines the value relevance of fair value disclosures of European banks that report under the IFRS. The non-banking literature includes different industries, such as industrial firms, mutual funds, property-liability insurers, software firms, investment property firms. This literature examines apart from financial instruments, other elements in financial statements such as tangible and intangible assets.

Chapter 5 provided the literature review of the economic consequences test. Empirical studies were separated between non-IFRS literature and IFRS literature. The non-IFRS literature deals with empirical studies that examine the impact of increased disclosure on cost of equity capital (Botosan, 1997; Richardson & Welker, 2001; Hail, 2002). The IFRS literature is separated further into voluntary and mandatory adoption of IFRS. Empirical studies on the voluntary adoption explore the economic consequences of the adoption of IFRS in a period where the IFRS where not required to be applied for financial reporting purposes (Daske, 2006; Daske et al., 2007). In contrast, mandatory empirical studies, which are related the most to this thesis, examined the impact of the adoption of IFRS on the cost of equity capital in a period where the IFRS were mandatory for financial reporting purposes (Lee et al., 2008; Daske et al., 2008; Li, 2010).

Chapter 6 developed the research methodology with respect to the value relevance of fair value disclosures and derivatives' fair value recognition. First, the chapter presented the hypotheses of the value relevance research. Second, the empirical models were developed. Similar to Barth et al. (1996), the value relevance of fair value disclosures of banks (i.e. fair value of loans and advances, held-to-maturity investments, deposits, and other debt) were examined under the BSM which is a standard valuation model in the value relevance literature of banks. Under this model the differences between market values and book values of equity are regressed on the changes between the fair values and book values of the financial assets and liabilities. Similar to Wang et al. (2005), derivatives' fair value recognition were tested under the Ohlson (1995) model. Under this model market value of equity is regressed on the book value of equity before trading and hedging derivatives, the net operating income, the net securities income, the fair values of trading and hedging derivatives, and a series of control variables. Apart from the primary specification models, a series of alternative specification models were developed for robustness.

Chapter 7 developed the research methodology of the economic consequences of the mandatory adoption of IFRS on the cost of equity capital. In the first step, four methods were analysed for the calculation of the cost of equity capital, which serves as the dependent variable in the economic consequences tests. These four methods are: the Gebhardt et al. (2001) and the Claus & Thomas (2001) methods which are based on the RIVM, and the Gode & Mohanram (2003) and Easton (2004) methods which are based on Ohlson & Juettner (2005) model. In the second step, cost of equity capital estimates were regressed on a dummy variable that indicated whether an observation was before or after the mandatory adoption of IFRS, a dummy variable for mandatory adopters and a series of other control variables. Similar to the value relevance part, a series of alternative models were developed for robustness.

10.3 Main findings

The empirical findings of this thesis are reported in Chapters 8 and 9. This section is separated into three sections: i) value relevance of fair value disclosures, such as fair values of loans and advances, held-to-maturity investments, deposits, and other debt; ii) value relevance of derivatives' fair value recognition; and iii) the economic consequences of the mandatory adoption of IFRS on banks' CE.

10.3.1 Value relevance of fair value disclosures

The results of the study support the view that the disclosures of fair values of loans and of other debt are significant in explaining market values over and above their amortised costs. The estimated signs for these instruments are in conformity with the predictions, positive for loans and negative for debt. This finding indicates that investors regard fair values as providing value relevant information, incrementally to amortized costs, which are priced by the market.

Fair values of held-to-maturity investments are not found to be value relevant. Their coefficients are estimated to be negative. The negative coefficient for the held-to-maturity investments indicates that investors penalize banks that hold such kind of instruments. This is because IAS 39 precludes the use of held-to-maturity assets for the interest rate hedging and thus any material change in their values that is not hedged by banks may result in losses. Furthermore, the uncertainly, surrounding the ability and intention of the management to hold these financial assets to maturity, leads investors to take a conservative stance on held-to-maturity investments. Fair value of deposits is also found insignificant. A plausible explanation can be the restriction imposed by IAS 39 that the fair values of financial liabilities with a demand feature (i.e. demand deposits) cannot be less than the amount payable on demand.

This study also provided evidence that the reliability of fair values of loans is subject to banks' financial health and to the legal environment in which banks are domiciled. In particular, low capital adequacy ratios as combined with weak enforcement rule countries result in lower coefficient for the fair value of loans. Banks with low capital adequacy ratios have more incentives to manipulate fair value estimates of loans in order to affect this ratio. Furthermore, the ability of banks to make any manipulation is subject to the legal environment in which they domicile. Thus, banks from weak enforcement rule countries have more freedom to manipulate fair value estimates than banks from strong enforcement countries. These results hold under different model specifications.

10.3.2 Value relevance of derivatives' fair value recognition

Findings indicate that fair values of net trading and hedging derivatives are value relevant incrementally to their notional amounts. Although notional amounts of derivatives give the magnitude of the involvement of banks in derivative contracts, they do not provide any clue on the current values of these instruments. In contrast, fair values of derivatives aid investors to conclude on whether these instruments are a value-added operation for banks.

Results also support the view that the coefficient of fair value estimates of derivatives is lower for banks with high earnings volatility (with the exception of the changes model). As predicted, banks with high earnings volatility have more incentives to manipulate the fair values of derivatives to smooth earnings. This statement holds only for trading derivatives but not for hedging derivatives. Further analysis indicates that hedging derivatives are used by banks to hedge the maturity gap between interest-sensitive assets and liabilities.

10.3.3 Economic consequences

Findings on the economic consequences test reveal that European commercial banks have benefited by the mandatory adoption of IFRS. The results indicate that their CE has decreased by 291 basis points from the pre-IFRS to the post-IFRS period. This observation also holds under different model specifications (i.e. robustness tests). Another important finding is that the reduction in the CE is higher for banks domiciled in strong enforcement rule countries than weak enforcement rule countries. Banks domiciled in weak enforcement countries apply IFRS more in a 'box-tick' way than banks from strong enforcement countries that are forced to apply IFRS in detail. This resulted in higher reduction in the CE of the later group of banks.

The primary findings also support the hypothesis (Hypothesis H_8) that banks that were using Continental accounting standards, before the mandatory adoption of IFRS, experienced greater reduction in their CE than banks using Anglo-Saxon accounting standards. Continental accounting standards (e.g. the German and French) have more differences with IFRS than Anglo-Saxon accounting standards (e.g. the U.K. and Irish). These differences resulted in higher reduction in the CE of banks using Continental accounting standards. However, the results of the robustness tests are mixed and thus this hypothesis is only supported by half of the robustness test models. Finally, findings provide no support that the CE of banks with low analyst following has decreased more than the CE of banks with high analyst following.

10.4 Limitations of the study

i) An important limitation of the study relates to data availability. A large number of banks do not provide detailed information in their financial statements regarding vital variables in the analysis. For example, some European banks do not provide clear information regarding fair value disclosures. Other banks do not report non-performing loans and the notional amounts of derivatives. Data limitations resulted in losing something less than the fifty per cent of the population for the value relevance test. However, even with this sample the number of banks is comparable to the samples of other studies (Barth et al., 1996).

ii) Another limitation of the value relevance tests is the measurement of some variables. For example, due to the fact that 'core deposits' (the CORE variable in the value relevance) are not observable, a proxy variable used which equals deposit liabilities with no stated maturities (i.e. demand deposits). Non-performing loans, NPL, which control for default risk, is another proxy variable. The fact that there is some measurement error in these proxy variables makes the interpretation of the findings of the value relevance part a more difficult task.

With respect to the economic consequence test data availability was more of an issue. Calculations of the CE were based on analysts' forecasted earnings per share that they cover only a limited number of banks. Thus, the sample of the economic consequences test is determined by the availability of analysts' earnings per share estimates.

iii) This thesis calculated the CE using four methods. Given that each method has its advantages and drawbacks, it is not clear in the literature which of these methods provide accurate estimates of the CE. Thus, most of previous studies (Daske et al., 2008; Li, 2010) used the average CE of a number of CE methods. Moreover, the estimation of the CE is based on subjective assumptions regarding the growth in earnings: the horizon period of the short-term growth in earnings and the long-term growth in earnings. Small changes in the assumptions may result in significant differences in the calculations of the CE. For example, even that the Gebhardt et al. (2001) and the Claus & Thomas (2001) methods are both based on the RIVM their different assumptions regarding the growth in earnings per share resulted in different amounts of CE. Thus, given the aforementioned limitations of the CE, the results of the economic consequences test should be interpreted with caution.

iv) Another limitation of the thesis is the short period of the analysis for the value relevance test. The relevance and reliability of fair values is examined for the first two years of the mandatory adoption of IFRS, 2005 and 2006. Most of the variables in the analysis have been hand-collected from annual reports. This procedure was time-consuming precluding the inclusion of more years in the analysis.

10.5 Recommendations for future research

i) This thesis deals only with European countries. However, IFRS have been adopted by over 100 countries around the world. An interesting study would be to extend the research to a world-wide sample including as many countries as possible.

ii) Furthermore, the analysis can be extended to more years to test whether the results sustain in the long-run. For, example a future study may examine whether fair values under the IFRS remained value relevant during the period of the financial crisis of 2008. Fair values have been accused of not reflecting the 'true' values of the financial assets when the markets are in disorder and sometimes inactive.

iii) The results of this thesis apply only to banks. However, a future study can test whether the results apply to other industries of the economy such as insurance companies or mutual funds. These firms also hold a large number of financial assets and liabilities in their balance sheets recognised in fair values. Results can also be provided for the economic consequences of the mandatory adoption of IFRS on insurance companies.

iv) The methodology of this thesis involved the use of empirical models to statistically test the hypotheses. However, an alternative research methodology could be a combination of quantitative and qualitative approach. For example, questionnaires could be sent to both banks'

CFO and Analysts asking them to comment on the perceived relevance and reliability of fair values estimates, using for example Likert scales. Moreover, they could be asked for the perceived economic consequences of the mandatory adoption of IFRS on banks' cost of equity capital.

v) Finally, given that the book value of equity of banks incorporates a significant amount of fair values (e.g., financial assets at fair value through profit or loss), another avenue for future research is to examine indirectly the value relevance of fair values by developing a model that regresses market values on banks' book value of equity. Moreover, similar to Kousenidis et al. (2010), this type of study can be extended to test the change in the value relevance of the book value of equity of banks from the pre-IFRS to the post-IFRS period.

10.6 Conclusion

The findings of this study contribute to our knowledge and understanding of the relevance and reliability of fair value accounting. A plethora of studies in the literature examined the value relevance of financial instruments' fair values. However, all these studies deal with US GAAP. For example, Barth et al. (1996) examined the value relevance of SFAS No. 107 for a number of US banks and found the fair values of loans significant over and above their book values. Other studies, such as Venkatachalam (1996) investigated the value relevance of SFAS No. 109 and found the fair values of derivative disclosures value relevant incrementally to the notional amounts. Moreover, Ahmed et al. (2006) provided evidence for SFAS No. 133. Their results indicate that fair value recognitions of derivatives are value relevant, whilst fair value disclosures are not.

Assuming that the results of the US studies hold also for European banks and for different accounting standards may lead to incorrect conjectures. For example, US market is regarded as highly efficient, whereas many European markets, such as the Polish and the Portuguese, may be less efficient or even inefficient. Thus, this study extends the results of the US literature to European banks and the IFRS context. The findings support the value relevance of fair value disclosures (required under IAS 32) of loans and other debt over their amortised costs (required under IAS 39). In addition, findings also support the value relevance of the fair values of derivative recognition. For the first time, many European banks have recognised derivatives in the financial statements.

Given that the sample of this thesis is a cross-country product it is likely that the relevance and reliability of fair values is subject to the institutional differences of European countries. Thus, this study contributes also to international accounting literature that examines the impact of institutional differences between countries on the information content of accounting numbers (Alford et al., 1993; Ali & Hwang, 2000; Hung, 2001). In particular, the scores provided by Kaufmann et al. (2009) are used to classify countries into strong enforcement rule and weak enforcement rule countries. It is argued that banks from weak enforcement countries have more freedom to manipulate fair values. This combined with low capital adequacy ratios and high earnings variability result in lower coefficients for the fair values of loans and trading derivatives, respectively.

This thesis also enhances our understanding of the risk management policies of European banks. Findings reveal that banks make wise use of hedging derivatives which is to hedge the maturity gap of financial assets and liabilities with maturities over a year.

With respect to the economic consequence test, this thesis contributes to the literature in at least two ways. i) Three recent studies provided evidence on the economic consequences of the mandatory adoption of IFRS (Daske et al, 2008; Lee et al., 2008; Li, 2010). However, all of these studies examined a mixture of different industries. For example, Li (2010) examines firms from 18 EU countries including financial institutions as one more industry in the analysis. Lee et al. (2008) exclude financial institutions from their analysis. In contrast, this thesis focuses in a single and important industry of the economy, that of commercial banking. It is possible that the economic consequences from the mandatory adoption of IFRS differ from sector to sector. Moreover, banks are a vital industry in an economy and a decrease in their cost of equity capital may leads to a reduction in interest rates with which they charge their customers, other things being equal. ii) Due to data availability at the time of their studies, Daske et al. (2008), Lee et al. (2008), and Li (2010) cover only limited number of years after the mandatory adoption of IFRS. For example, Baske et al. (2008) cover 2001 – 2005 periods with just one year after the mandatory adoption. Lee et al. (2008) and Li (2010) both cover 1995 – 2006 periods. In contrast, this thesis covers a balanced period with three years before (2002 – 2004) and three years after (2005 – 2007) the mandatory adoption of IFRS. Covering more years in the post-IFRS period strengthens the findings of the study showing that the economic consequences sustain in the long-run.

Appendix A
Literature review summary

Section 1: Studies in the value relevance literature concerning financial instruments

Author(s)	*Research Objective*	*Sample*	*Methodology*	*Primary variable(s) of interest*	*Control variables*	*Primary Findings*
Ahmed & Takeda (1995)	How the market values investment securities' realised and unrealised gains and losses.	US banks for the second quarter of 1986 to the fourth quarter of 1991. N=152 banks.	Use a returns level model	Realised G/L, and the changes in unrealised G/L	Earnings before realised G/L, changes of issuance new equity, the value of assets before investment securities less liabilities that mature in more than 1 year, multiplied by the changes in interest rates.	Changes in unrealised G/L and realised G/L are positively and significantly related to returns.
Ahmed et al. (2006)	Whether recognitions versus disclosures of derivatives' fair values are value relevant.	US banks for the period 1995-2000, N=146 banks.	Balance sheet model, in level and changes form.	Net fair values of disclosure and recognised derivatives.	Non-performing loans, core deposits.	Derivatives' fair value recognitions are value relevant but disclosures are not.
Barth (1994)	If disclosed investment securities' fair values and their related G/L are reflected in share prices incrementally to historical cost values.	US-Banks for the period 1971-1990. N=100 banks for the price level model, and N=87 banks for the returns level model.	Use a price level model to test the value relevance of investment securities' fair values and a returns level model to test the value relevance of investment securities' G/L.	For the price level model, investment securities' fair values, and for the returns level model, investment securities' fair value G/L.	For the price level model, historical cost of investment securities and book value of equity before investment securities. For the returns level, book value of securities G/L and earnings before securities G/L.	Investment securities' fair values are found value-relevant incrementally to historical values, but fair value gains and losses do not.
Barth & Clinch (1998)	To provide evidence on the relevance, reliability and timeliness of financial, tangible, and intangible assets' revaluations	Australian firms for the period 1991-1995. N=350 firms. Evidence provided separately for non-financial, mining, and financial industries.	Use the theoretical framework of Ohlson (1995).	Revalued amounts of investments; property, plant, and equipment; and intangible assets. Furthermore assets' revaluations are disaggregated further into two subclasses as follows: investments are disaggregated into investment in associates and other investments (primarily listed investments); PPE into property (primarily land and buildings) and plant and equipment; and intangible assets into goodwill and other intangibles.	Historical cost of investments; property, plant, and equipment; and intangible assets. Net operating income and a variable that represents the disclosed valuation increments or decrements of the primary variables of interest.	The revaluations that are found significant in explaining share prices across all the three industries are the listed investments and intangible assets other than goodwill. Investments in associated companies are value-relevant only for the mining industry. Regarding tangible assets, results indicate that revaluations of property are only significant for non-financial firms, whilst plant and equipment revaluations are significantly related to prices merely for the mining industry.

Barth et al. (1996)	If fair value disclosures under SFAS No. 107 are value-relevant.	US banks for the years 1992 and 1993. N=136 banks.	Use the Balance sheet model, regress the differences between market and book value of equity on the differences between fair values and book values of financial instruments.	Fair values of Investment securities, loans, deposits, long-term debt, and off-balance sheet instruments.	Book value of other than SFAS No. 107 assets and liabilities, Core deposits, fair value of net pensions, non-performing loans, and interest-sensitive assets and liabilities.	Fair values of investment securities and loans are found value relevant. Long-term debt's fair value only in some model specification. While deposits and off-balance sheet items not value-relevant.
Bernard et al. (1995)	Whether Danish banks and Thrifts manipulate price adjustments to investments and loan loss provisions.	Danish banks and thrifts for the period 1976-1989. N=78 banks.	Use two time series models. They regress separately the two primary variables of interest on their lagged values. If there is evidence of manipulation they assume that adjustments should be related over time.	Price adjustments and loan loss provisions.	No other controlling variables.	Managers tend not to manipulate price adjustments. For the loan loss allowance although there is some evidence of manipulation, this attitude, contrary to the concerns, is not related to banks' intention to reduce regulatory intervention.
Carroll et al. (2003)	If investment securities' fair values and their related fair value gains and losses are value-relevant.	US closed-end funds for the period 1982-1997. N=143.	Use the Balance Sheet Model and an earnings capitalisation model.	Investment securities' fair values, and fair value gains and losses.	Historical values of investment securities, net assets other than investment securities.	Evidence support the view that investment securities fair values and their related gains and losses are value-relevant and reliable. Findings are also robust for different types of investment securities.
Eccher et al. (1996)	If fair value disclosures under SFAS No. 107 are value-relevant.	US banks for the years 1992, N=293 banks, and 1993, N=319 banks.	Use the balance sheet model, regress the market to book value ratio on the differences between fair values and book values of financial instruments.	Fair values of Investment securities, loans, deposits, long-term debt, and off-balance sheet instruments.	Notional values of credit-related and market-related off-balance items, a proxy for core deposits.	Investment securities' fair values value-relevant. Loans' fair value only in some model specifications, For deposits, long-term debt and off-balance sheet items there is no evidence of value relevance.
Graham et al. (2003)	Whether fair values of equity method investments are value relevant	US firms, for the period 1993-1997. N=55 investors.	The model follows the theoretic framework of Ohlson (1995).	Fair values of equity method investments.	Book value of equity, Income variables.	Fair values of equity method investments are value relevant.
Goh et al. (2009)	How investors price fair values during the economic crisis of 2008.	US banks for the period of the first three quarters of 2008. N = 516.	The model follows the theoretic framework of Ohlson (1995).	Fair values of Level 1,2, and 3 hierarchy of SFAS No. 157.	Net book value, earnings per share, dummies to control for the stock exchange in which share prices are listed (NYSE or AMEX).	Mark-to-model (level 3) fair values are priced less than mark-to-market (level 1 and 2). However, mark-to-model values are priced higher for banks with high capital adequacy ratios and that audited by the big four.
Kolev (2008)	Whether mark-to-model estimates are more unreliable than mark-to-market.	US banks for the period of the first two quarters of 2008. N=177.	An ad hoc model.	Fair values of Level 1,2, and 3 hierarchy of SFAS No. 157.	Net book value, credit ratings, proxies for size, growth, profitability.	All levels of SFAS No. 157 are value relevant. Level 3 has the lower association with share prices.
Nelson (1996)	If fair value disclosures under SFAS No. 107 are value-relevant.	US banks for the years 1992, N=146 banks, and 1993, N=133 banks.	Use the balance sheet model, regress the differences between market and book value of equity on the differences between fair values and book values of financial instruments.	Fair values of Investment securities, loans, deposits, long-term debt, and off-balance sheet instruments.	Include variables to proxy for future growth opportunities, such as the historical growth in the book value of equity between the previous and the current year, and the current ROE.	Only investment securities' fair values value-relevant. Loans, Deposits, Long-term debt, and off-balance sheet instruments not value-relevant.

Park et al. (1999)	If disclosures under SFAS No. 115 are value-relevant.	US banks for the period 1993-1995. N=222 banks.	Use the Balance Sheet Model approach. Regress the differences between market and book value of equity on the difference between fair values and book values. In another model they regress the stock returns (raw and abnormal) on the same explanatory variables.	Fair values less book values of AFS and HTM investments.	Fair values less book values for loans, other assets, deposits, other liabilities, off-balance derivatives. For the returns model they also add two other variables, namely: earnings and the log of market value of equity to control for size.	AFS and HTM differences are important to investors in determining market prices in both levels and changes form. Using as a dependent variable raw and abnormal returns results are significant only for AFS securities, while for HTM results are only significant under the raw return model.
Petroni & Wahlen (1995)	If fair values of equity and fixed maturity debt securities are reflected in share prices. Test also for the reliability of different types of investments.	US property-liability insurers for the period 1985-1991. N=56.	Use the Balance sheet Model.	Fair values less book values for equity investments, fixed maturity investments.	Unpaid claims, net book value other than equity investments, fixed maturity investments and unpaid claims, book value of equity securities and fixed maturities, and the log of assets.	Equity investments and US Treasury investments' fair values are associated with share prices, but other types of securities, such as municipal and corporate bonds and other debt instruments proved insignificant. Tradable securities are considered more reliable.
Riffe (1997)	Whether notional amounts of off-balance items are value relevant.	US banks for the period September 1986 through December 1989. N=242.	Two estimation models: Balance sheet model and Ohlson (1995)	Notional amounts of market and credit-related off-balance sheet items.	Balance sheet model: BVE, Differences between market and book value of securities, differences between non-performing loans and allowance for loan losses. Ohlson model: BVE, earnings before trading G/L, a growth variable, and beta variable.	Notional amounts of off-balance sheet items are significantly related to market values.
Seow & Tam (2002)	Whether derivative-related desclosures contain additional value-related information.	US banks for the period 1990-1996. N=35.	An ad hoc model.	Disclosures on derivatives, such as notional amounts, derivative-related credit exposure, fair value gains and losses on trading and nontrading derivatives.	Earnings, market beta.	All derivative-related discluosures are found to convey new information to the market. (not for notional amouts).
Simko (1999)	If holding gains of financial instruments are value relevant.	US non-financial firms for the period 1992-1995. N=300.	Use the Feltham & Ohlson Model (1995).	Net cumulative unrecognised gains on financial assets, liabilities, and derivative contracts, measured as the difference between the fair values less the book values.	Book value of non-financial instruments, book value of financial instruments, Abnormal earnings of the current year, abnormal earnings of the previous year.	Findings are in favor only for the financial liabilities cumulative holding gains and only for the years 1993 and 1995. Financial assets' and derivative contracts' fair values are found insignificant
Song et al. (2010)	Whether SFAS No. 157 fair value hierarchy is value relevant.	US banks for the period of the first three quarters of 2008. Initial sample of N=431.	Use the theoretical framework of Ohlson (1995).	Fair values of Level 1,2, and 3 hierarchy of SFAS No. 157.	Non-fair value assets, Non-fair value liabilities, Net Income.	All levels are value relevant. Levels 1 and 2 hold coefficients close to the theoretical values of one, whist level 3 hold coefficients less than one. Value relevance of Levels varies with firm's strength of corporate governance.

Venkatachalam (1996)	If derivative disclosures under SFAS No. 119 are value relevant. If notional values of derivatives have incremental explanatory power over fair values.	US banks for the years 1993, N=98 banks, and 1994, N=99 banks.	Use the balance sheet model, regress the market value of equity on the fair values of derivatives used in ALM, the fair values of off-balance sheet items, and the notional values of derivatives.	Fair values of derivatives used in ALM, the fair values of off-balance sheet items, and the notional values of derivatives.	Fair values of on-balance sheet financial instruments under SFAS No. 107, net assets of all other items, fair value of net pensions, non-performing loans, and credit-risk values for off-balance sheet derivatives.	Fair values of derivatives used in the ALM are found value relevant. Notional values have incremental explanatory power relative to derivatives' fair values and vise versa.
Wang et al. (2005)	If derivative disclosures under SFAS No. 119 and SFAS No. 133 are value relevant.	US banks for the period 1994-2002, N=161 banks.	Their model is based on the Ohlson (1995) model.	Notional amounts of trading and non-trading derivatives.	Earnings, book value of equity, sales growth in the last three years. In another model specification they also control for derivatives' fair values.	Notional amounts of derivatives are related to share prices.

Notes: In the column "sample" the letter N indicates the maximum number of observations for every year.

Section 2: Studies in the value relevance literature concerning non-financial instruments

Author(s)	*Research Objective*	*Sample*	*Methodology*	*Primary variable(s) of interest*	*Control variables*	*Primary Findings*
Aboody et al. (1999)	Whether upward revaluations of fixed assets are positively related to changes in operating income and cash flows from operations.	UK firms for the period 1983-1995. N=1,334 firm-year observations.	Regress changes in operating performance on the increase of the revaluation reserve, while controlling for other variables.	Upward revaluation of fixed assets, using as a proxy the increase to the revaluation reserve.	Operating income of the previous period, market-to-book ratio (book value excludes the revaluation balance), the log of total assets (excluding the revaluation balance), and an indicator variable to control for changes in property values.	Current year revaluations of fixed assets are positively and significantly related to both operating income and operating cash flows.
Aboody and Lev (1998)	Examine the value relevance of the capitalisation of software development costs.	US software firms for the period 1987-1995. N=163 firms.	1. They implement a return specification model, 2. a price specification model, and 3. an intertemporal model, regressing earnings on capitalisation amounts.	The annual software capitalisation amount and the cumulative software asset.	1. For the return model, changes in the software development expenses (of the "expensers"), changes in software development expenses (of the "capitalizers"), change in the amortisation of software asset (for the "capitalizers"), net income in levels and in changes form before software development items. 2. For the price model, EPS and book value of equity before the capitalized software asset. 3. Similar control variables with the return model.	Capitalisation amounts are value relevant.
Barth & Clinch (1998)	see table 1 in this appendix.					

Danbolt & Rees (2008)	Whether fair value income is more value relevant than historical cost income.	British real estate and investment fund industries. Study period is 1993-2002. N=100 real estate firms and N=315 investment companies.	Use a RIVM.	Net income under fair value accounting and historical cost accounting.	Book value of equity, revaluation component of equity.	Fair value income is more relevant than historical cost income. However, in the presence of fair value of equity the results are weak.
Dietrich et al. (2001)	To investigate the reliability of fair value estimates of investment properties.	UK investment properties for the period 1988-1996. N=76 firms.	Univariate statistical analysis.	Appraisal estimates of investment properties.	N/A	Fair values of investment property understate actual selling prices by six percent, but are less biased and more accurate measures than historical costs.
Easton et al. (1993)	To examine the association of the revaluation of long-lived assets with share prices or returns.	Australian firms with ten years of financial statements from 1981. N=100 firms.	Is based on the theoretical foundation of Ohlson (1995).	Asset revaluation reserve.	Earnings per share.	Asset revaluation reserve explains variations in market-to-book ratios.
Lev and Sougiannis (1996)	Whether R&D capitalisation is value relevance. Their research inspired by FASB's concerns on the capitalisation of R&D expenses.	A large sample of US public firms for the period 1975-1981.	1. They first compute R&D capital and amortisation rates. 2. Second they adjust reported earnings and book values for the R&D capitalisation. 3. Finally they implement a level and a return model to test for the value relevance of R&D capitalisation.	Adjustments to reported earnings and book values as a result of the R&D capitalisation.	In the level model they use the reported (GAAP) earnings. In the return model they use reported (GAAP) earnings, the first-difference in reported earnings, reported earnings before R&D expenses.	R&D adjustments are highly correlated with share prices, in both level and return forms.
Owusu & Yeoh (2006)	Whether unrealised gains recognised in income statement are more value relevant than unrealised gains recognised in the revaluation reserve.	New Zealand investment property firms for the period 1990-1999. N=170 firm-year observations.	Use the BSM.	Market value of companies that recognise unrealised gains in income statement, and market value of companies that recognise unrealised gains in a revaluation reserve.	Market value of assets, market value of liabilities, market value of property intended for sale, net operating cash flows, a growth variable.	No evidence that recognition in income statement valued higher than recognition in a revaluation reserve.
So & Smith (2009)	Whether ivestors value the change in recognising changes in the fair value of investment properties from a revaluation reserve to income statement.	Hong Kong property firms for the period 2004-2006. N=92.	A short- window and a long-window event study.	Gains and losses in fair values of investment properties.	Earnings before gains and losses, firm size, leverage, change in Centa-City Intex.	Presenting changes in fair values of investment properties in income statement are more value relevant than presenting the changes in a revaluation reserve.

Section 3: Studies in the cost of equity literature (economic consequence test)

Author(s)	Research Objective	Sample	Methodology	Control variables	Findings
Botosan (1997)	Examines the effect of disclosure level on the cost of equity.	122 US firms coming manufacturing industry.	Regresses the CE on a self-constructed proxy of disclosure level and a number of control variables.	Firm size and market beta.	Only for firms that have low analysts following, greater disclosure translates into lower CE.
Botosan & Plumlee (2002)	Examines the association between cost of equity and level and timely disclosures, and investor relations activities.	US firms coming from a wide range of industries for the period 1985/86-1995/96.	Implement a DDM to estimate CE. Regress the CE on disclosure measure variables, such as annual report score, other publication score, and investor relations score.	Market beta and firm size (market value).	Negative association between cost of equity and level of annual disclosure, and positive association for timely disclosures. No association for the investor relations.
Christensen et al. (2007)	Examines the economic consequences for UK firms from the mandatory adoption of IFRS.	2,538 observations for UK firms. The period of study covers 1996-2004.	The model regresses the change in CE from the pre- to the post-announcement period on the degree of similarity of UK firms to German voluntary adopters.	Market value, book-to-market value, debt-to-market value, sales growth, operating profit margin.	UK firms with increased probabilities to have adopted IFRS if they permitted, experience greater benefits from the mandatory adoption of IFRS
Cuijpers & Buijink (2005)	Whether non-local GAAP adopters have lower levels of information asymmetry.	114 non-financial EU firms.	Uses the AEG model to estimate CE. Compares the CE of IFRS/US GAAP firms to a comparable sample (in terms of risk) of local GAAP firms.	Country origination, beta, size (measured as the natural logarithm of market capitalisation), and the likelihood of IFRS/US GAAP adoption.	IFRS/US GAAP firms exhibit an increased CE as compared to local GAAP firms.
Daske (2006)	Whether the voluntary adoption of internationally recognised financial reporting standards (IFRS/US GAAP) reduces the cost of equity.	75 switch and 280 initial international reporting German firms. A total sample of 13,000 HGB, 4,500 IFRS, and 3,000 US GAAP firm-months for the period 1993-2002.	Uses the RIVM and the AEG to estimate CE. Implements a multivariate analysis by developing dummies that take the value of 1 for IFRS and US GAAP and 0 for HGB.	Proxies for systematic (beta) and unsystematic risk (volatility), leverage, size, analysts' followings, cross-listing, B/M, Industry and time.	No evidence of lower cost of equity. In contrast, the CE has been increased.
Daske et al. (2007)	Examine the economic consequences of voluntary IFRS adoption.	Data of 73,575 firm-year observations from 24 countries worldwide. The period covers 1988-2004.	Use a model that regresses the CE on a dummy variable that takes the value of 1 for firms that apply IFRS and 0, otherwise. They use four methods to calculate CE.	US Listing, expected inflation, firm size, financial leverage, return variability, forecast bias.	'Serious' IFRS adopters experience significant declines in their CE relative to 'label' adopters.
Daske et al. (2008)	Examine the economic consequences (i.e. liquidity, CE, and the market valuation) of mandatory IFRS disclosures.	A sample of firms coming from 26 countries around the world that have mandatory adopted IFRS.	Estimate the CE as an implied figure using four methods. Use univariate and multivariate analysis.	Firms that are not required to use IFRS, firms that do not report in IFRS yet but are required to do so, Industry-year-fixed effects, size, financial leverage, risk-free rate, return variability, forecast bias.	Findings support greater liquidity after the IFRS adoption, and correcting for the anticipation effect the CE has been decreased while the market valuation increased.
Dhaliwal (1979)	Whether the requirement to disclose revenues and profits in further analysis by line-of-business has an impact on the CE.	25 firms in the experimental group (affected by the regulation), and 26 in the control group (non-affected by the regulation).	Regress the relative changes of three surrogates of CE on six control variables and a dummy variable that takes the value of 1 for firms in the experimental group and the value of 0 for firms in the control group.	Payout ratio, growth, leverage ratio, current liquidity ratio, size, earnings variability.	Results support the view that increased disclosures for revenues and profits in further analysis tend to lower CE.

Dhaliwal et al. (1979)	Whether the requirement to disclose revenues and profits in further analysis by line-of-business has an impact on the CE.	25 firms in the experimental group (firms affected by the reporting requirements) and 26 firms and 27 firms into two control groups.	Use proxies for the CE, the market beta, and the standard deviation of the distribution of stock's returns. Use a regression model.	payout ratio, frims' growth, leverage ratio, liquidity of firms, asset size, earnings variability.	Results support the view that increased disclosures for revenues and profits in further analysis tend to lower CE.
Francis et al. (2008)	1. Whether earnings quality relates to more disclosure. 2. Whether increased disclosure relates to lower CE.	677 US firms for a single year, 2001.	Develop a self-constructed index for the disclosure level. Regress this index on a proxy of earnings quality. Regress the CE estimates on the self-constructed index.	Market beta, size (lnMVE), book-to-market ratio, analyst following, number of segments in which the firm operates, firm performance (ROA).	Earnings quality is positively related to more disclosure, increased disclosure have a negative effect on the CE, the negative effect is eliminated conditional on earnings quality.
Hail (2002)	Examines the relationship between disclosure level and cost of equity for 73 Swiss firms.	73 non-financial firms listed on the Swiss Exchange.	Use a derivation of RIVM to estimate CE. Regress the CE on a proxy variable for disclosure level while controlling for other variables.	Market beta, leverage, firm size (the natural log of market value).	Significant negative results.
Lee et al. (2008)	Examine the impact of mandatory IFRS adoption on firms' CE.	For a sample of non-financial firms coming from 17 European countries.	Estimate CE based on the AEG and PEG models. For the analysis uses t-tests and regression analysis. Use a dummy variable taking the value of 1 for the post-IFRS period and 0 otherwise.	Control for institutional characteristic, market value, book-to-market, debt-to-equity ratio, sales growth, R&D expense, and % of closely held shares, country and industry variables.	Lower CE after the IFRS adoption for firms coming from high financial reporting incentive countries.
Leuz & Verrecchia (2000)	Whether increased disclosures have economic benefits for the adopters.	For the cross-section test uses 102 German firms included in the DAX 100 index during 1998.	Uses proxies to describe the information asymmetry component of CE, such as the bid-ask spread, trading volume and volatility. Regresses the proxies on a dummy variable taking the value of 1 if firm follows IFRS/US GAAP or 0 otherwise.	Performance, firm size, foreign listing, free float, self-selection bias.	Significant lower bid-ask spreads and higher trading volumes for firms following IFRS/US GAAP. These results are evidence of economic benefits. Results on the volatility in share prices are not supportive.
Li (2010)	Whether mandatory adoption of IFRS reduces the CE.	6,456 firm-year observations of 1,084 EU firms for the period 1995-2006.	Regress CE estimates on a dummy variable that takes the value of 1 for periods after the mandatory adoption of IFRS and 0 before.	Whether a firm is cross-listed in the U.S., country-specific inflation rate, firm size, return variability, financial leverage, industry and country fixed effects.	The results document a reduction of 48 basis points for the CE after the mandatory adoption of IFRS. Only firms from strong enforcement rule countries experience the lower CE.
Poshakwale & Coutris (2005)	Whether voluntary disclosures decrease the CE.	135 banks of which 73 European and 62 non-European (US, Canada, Australia).	Construct an index to proxy for banks' voluntary disclosures. Regress CE estimates on the index of voluntary disclosures.	Beta, bank size, P/BV, and P/E.	Significant lower CE for banks that disclosure more. The risk management practices contribute the most in the reduction of CE. European banks experience lower CE as compared to non-Europeans.
Richardson & Welker (2001)	Whether increased disclosures lowers the CE.	324 Canadian firms-years observations for the years 1990, 1991, and 1992.	Use the RIVM to estimate CE. Regress the CE on a variable measuring the level of financial and social disclosure and a number of control variables.	Number of analysts, leverage (debt to equity ratio), industry.	Increased financial disclosure lowers CE only for firms with low analysts' following. Increased social disclosure increases CE.

Appendix B

Section 1: Tables of the alternative specification models for the value relevance test – fair value disclosures

Table A. The March model

		2005			2006		
	Expect-ed sign	Coeff.	t-values	p-values	Coeff.	t-values	p-values
C	?	641.359	1.84	0.0679	997.973	1.79	0.0761
LNS	+	2.291	3.77	0.0002	2.342	4.69	0.0001
LNS*WEAK*LOWC	-	-4.805	-6.08	0.0001	-3.186	-2.86	0.0026
HTM	+	-2.683	-1.44	0.9237	-13.448	-3.05	0.9985
DEP	-	-0.410	-0.99	0.1607	-0.292	-1.02	0.1536
DT	-	-5.131	-5.32	0.0001	-4.391	-2.61	0.0052
NON39AS	+	0.352	18.39	0.0001	0.193	7.20	0.0001
NON39LI	-	-0.094	-4.89	0.0001	-0.128	-5.56	0.0001
NADER	?	-0.001	-10.81	0.0001	-0.001	-0.27	0.7812
NPL	-	0.103	1.18	0.8812	-0.331	-1.66	0.0495
GAP	-	0.022	1.76	0.9594	-0.031	-1.75	0.0414
CORE	+	0.012	1.10	0.1371	0.211	9.82	0.0001
OFF	?	0.064	7.30	0.0001	-0.022	-1.93	0.0562
Adjusted R-squared		0.92			0.85		
N		105			107		
White's chi-square		0.1047			0.0942		

Table B. The model that treats BVE as an independent variable instead of incorporating in the dependent variable

		2005			2006		
	Expect-ed sign	Coeff.	t-values	p-values	Coeff.	t-values	p-values
C	?	284.895	0.76	0.4434	678.369	1.37	0.1713
BVE	+	1.425	10.32	0.0001	1.818	10.28	0.0001
LNS	+	1.444	2.05	0.0216	1.755	3.98	0.0001
LNS*WEAK*LOWC	-	-2.798	-2.82	0.0029	-2.881	-2.95	0.0020
HTM	+	-5.517	-2.74	0.9964	-14.325	-3.69	0.9998
DEP	-	-1.036	-2.23	0.0139	-0.869	-3.18	0.0010
DT	-	-2.246	-1.84	0.0343	-7.390	-4.75	0.0001
NON39AS	+	0.234	7.56	0.0001	0.144	5.49	0.0001
NON39LI	-	-0.072	-3.34	0.0006	-0.047	-1.77	0.0397
NADER	?	-0.001	-5.97	0.0001	-0.001	-0.99	0.3229
NPL	-	-0.185	-1.54	0.9376	-0.876	-4.39	0.0001
GAP	-	0.003	0.26	0.6040	-0.012	-0.81	0.2074
CORE	+	0.027	1.95	0.0270	0.093	2.98	0.0018
OFF	?	0.026	2.13	0.0352	-0.052	-4.48	0.0001
Adjusted R-squared		0.98			0.97		
N		107			110		
White's chi-square		0.1883			0.2115		

Table C. The growth model
The growth variable (LNS_5YR_CH) is the five years change in net loans.

		2005			2006		
	Expect-ed sign	Coeff.	t-values	p-values	Coeff.	t-values	p-values
C	?	344.507	0.89	0.3750	1109.887	2.06	0.0413
LNS	+	2.234	3.30	0.0007	2.204	4.50	0.0001
LNS*WEAK*LOWC	-	-4.217	-4.77	0.0001	-3.139	-2.91	0.0023
HTM	+	-4.766	-2.31	0.9885	-14.795	-3.28	0.9993
DEP	-	-0.724	-1.56	0.0610	-0.343	-1.26	0.1049
DT	-	-3.650	-3.22	0.0009	-4.656	-2.85	0.0027
NON39AS	+	0.301	14.34	0.0001	0.200	7.70	0.0001
NON39LI	-	-0.085	-3.87	0.0001	-0.116	-4.14	0.0001
NADER	?	-0.001	-8.19	0.0001	-0.001	-0.08	0.9335
NPL	-	0.016	0.16	0.5648	-0.375	-1.93	0.0279
GAP	-	0.008	0.57	0.7168	-0.034	-2.04	0.0217
CORE	+	0.040	2.79	0.0032	0.201	7.60	0.0001
OFF	?	0.054	5.46	0.0001	-0.024	-2.14	0.0344
LNS_5YR_CH	+	0.014	1.59	0.0575	0.010	0.80	0.2110
Adjusted R-squared		0.91			0.85		
N		107			109		
White's chi-square		0.2291			0.2314		

Table D. The early adopters' model
The EARLY variable is a dummy variable that takes the value of one for banks that have adopted the IFRS before they became available in 2005, and zero otherwise.

		2005			2006		
	Expect-ed sign	Coeff.	t-values	p-values	Coeff.	t-values	p-values
C	?	162.214	0.40	0.6875	898.929	1.60	0.1125
EARLY	?	1015.062	0.95	0.3443	1549.545	1.02	0.3102
LNS	+	2.097	2.98	0.0019	2.262	4.83	0.0001
LNS*WEAK*LOWC	-	-4.207	-4.64	0.0001	-2.956	-2.69	0.0042
HTM	+	-4.594	-2.21	0.9853	-14.434	-3.32	0.9994
DEP	-	-0.589	-1.27	0.1022	-0.295	-1.09	0.1388
DT	-	-4.216	-3.90	0.0001	-4.020	-2.62	0.0051
NON39AS	+	0.302	14.00	0.0001	0.190	6.90	0.0001
NON39LI	-	-0.092	-4.30	0.0001	-0.124	-5.41	0.0001
NADER	?	-0.001	-8.46	0.0001	-0.001	-0.04	0.9658
NPL	-	0.031	0.31	0.6238	-0.434	-2.27	0.0125
GAP	-	0.015	1.16	0.8756	-0.034	-2.04	0.0218
CORE	+	0.055	4.46	0.0001	0.214	10.60	0.0001
OFF	?	0.051	5.18	0.0001	-0.021	-1.98	0.0505
Adjusted R-squared		0.91			0.85		
N		107			110		
White's chi-square		0.2510			0.2116		

Table E. The model that controls for the pension fund status

The pension fund status (PENS) is defined as the 'fair value of plan assets less the present value of pension liability'.

		2005			2006		
	Expect-ed sign	Coeff.	t-values	p-values	Coeff.	t-values	p-values
C	?	301.972	0.77	0.4422	1273.557	2.40	0.0182
LNS	+	2.192	3.17	0.0010	2.025	4.28	0.0001
LNS*WEAK*LOWC	-	-4.298	-4.78	0.0001	-3.640	-3.40	0.0005
HTM	+	-4.080	-1.91	0.9708	-14.949	-3.53	0.9997
DEP	-	-0.591	-1.27	0.1019	-0.196	-0.72	0.2348
DT	-	-4.223	-3.89	0.0001	-5.168	-3.29	0.0014
NON39AS	+	0.305	14.35	0.0001	0.191	7.46	0.0001
NON39LI	-	-0.096	-4.46	0.0001	-0.114	-5.02	0.0001
NADER	?	-0.001	-8.46	0.0001	0.001	0.32	0.7440
NPL	-	0.018	0.17	0.5678	-0.413	-2.25	0.0134
GAP	-	0.011	0.73	0.7678	-0.040	-2.42	0.0085
CORE	+	0.053	4.39	0.0001	0.200	9.96	0.0001
OFF	?	0.052	5.24	0.0001	-0.022	-2.14	0.0341
PENS	+	-0.363	-0.66	0.7461	-1.972	-2.21	0.9856
Adjusted R-squared		0.91			0.86		
N		107			110		
White's chi-square		0.2740			0.2540		

Section 2: Tables of the alternative specification models from the value relevance test – derivatives' fair values

Table A. The March model
The dependent variable is the market value of equity (March prices).

		2005			2006		
	Expect-ed sign	Coeff.	t-values	p-values	Coeff.	t-values	p-values
C	?	742.861	1.82	0.0707	1076.790	2.03	0.0445
BV	+	2.193	16.76	0.0001	1.632	10.01	0.0001
NOI	+	1.073	2.61	0.0052	1.856	4.03	0.0001
NSI	+	1.806	6.98	0.0001	2.594	5.71	0.0001
NTDER	+	2.462	6.12	0.0001	0.206	0.39	0.3470
NTDER*WEAK*VARIN	-	-1.051	-3.70	0.0002	-0.951	-1.86	0.0328
NHDER	+	3.066	7.38	0.0001	0.535	0.76	0.2239
NHDER*WEAK*VARIN	-	0.602	1.50	0.9317	0.239	0.21	0.5868
NADER	?	0.001	2.41	0.0177	-0.001	-3.41	0.0010
NPL	-	-0.563	-4.83	0.0001	-1.085	-4.51	0.0001
GAP	-	-0.015	-1.31	0.0967	-0.002	-0.13	0.4471
CORE	+	-0.121	-7.93	0.9999	-0.016	-0.54	0.7080
OFF	?	-0.026	-2.13	0.0353	-0.040	-2.83	0.0057
Adjusted R-squared		0.98			0.97		
N		105			107		
White's chi-square		0.1184			0.0719		

Table B. The growth model
The growth variable (LNS_5YR_CH) is the five years change in net loans.

		2005			2006		
	Expect-ed sign	Coeff.	t-values	p-values	Coeff.	t-values	p-values
C	?	406.461	0.91	0.3601	998.064	1.85	0.0669
BV	+	2.117	12.41	0.0001	1.639	8.95	0.0001
NOI	+	0.897	1.82	0.0355	1.756	3.78	0.0002
NSI	+	1.287	4.58	0.0001	2.499	5.54	0.0001
NTDER	+	1.952	4.22	0.0001	0.222	0.39	0.3481
NTDER*WEAK*VARIN	-	-1.120	-3.62	0.0003	-0.931	-1.75	0.0414
NHDER	+	2.763	7.45	0.0001	0.844	1.44	0.0763
NHDER*WEAK*VARIN	-	0.394	1.03	0.8478	0.990	0.98	0.8369
NADER	?	0.001	1.46	0.1471	-0.001	-2.86	0.0051
NPL	-	-0.667	-5.14	0.0001	-0.978	-4.20	0.0001
GAP	-	0.001	0.07	0.5313	-0.016	-1.07	0.1435
CORE	+	-0.074	-4.39	0.9999	0.003	0.10	0.4578
OFF	?	-0.037	-2.78	0.0065	-0.048	-3.25	0.0015
LNS_5YR_CH	+	0.004	0.40	0.3440	0.001	0.01	0.4922
Adjusted R-squared		0.97			0.97		
N		107			109		
White's chi-square		0.2510			0.2104		

Table C. The early adopter model
The EARLY variable is a dummy variable that takes the value of one for banks that have adopted the IFRS before they became available in 2005, and zero otherwise.

		2005			2006		
	Expect-ed sign	Coeff.	t-values	p-values	Coeff.	t-values	p-values
C	?	265.944	0.58	0.5601	953.133	1.70	0.0920
EARLY	?	1084.547	0.94	0.3450	945.724	0.63	0.5286
BV	+	2.140	15.05	0.0001	1.598	9.60	0.0001
NOI	+	0.774	1.75	0.0410	1.734	3.69	0.0002
NSI	+	1.276	4.56	0.0001	2.378	5.19	0.0001
NTDER	+	2.014	4.63	0.0001	0.163	0.31	0.3756
NTDER*WEAK*VARIN	-	-1.106	-3.58	0.0003	-0.985	-1.93	0.0282
NHDER	+	2.873	7.93	0.0001	1.107	1.89	0.0305
NHDER*WEAK*VARIN	-	0.388	1.02	0.8471	1.251	1.23	0.8907
NADER	?	0.001	1.27	0.2057	-0.001	-2.77	0.0066
NPL	-	-0.695	-5.58	0.0001	-0.797	-3.97	0.0001
GAP	-	0.003	0.27	0.6062	-0.020	-1.39	0.0827
CORE	+	-0.071	-4.29	0.9999	0.010	0.34	0.3646
OFF	?	-0.035	-2.55	0.0123	-0.047	-3.23	0.0017
Adjusted R-squared		0.97			0.97		
N		107			110		
White's chi-square		0.2290			0.2115		

Table D. The model controls for pension fund status
The pension fund status (PENS) is defined as the 'fair value of plan assets less the present value of pension liability'.

		2005			2006		
	Expect-ed sign	Coeff.	t-values	p-values	Coeff.	t-values	p-values
C	?	340.329	0.77	0.4417	1085.772	1.98	0.0503
BV	+	2.184	15.00	0.0001	1.589	8.91	0.0001
NOI	+	0.778	1.76	0.0402	1.723	3.66	0.0002
NSI	+	1.351	4.65	0.0001	2.390	5.20	0.0001
NTDER	+	2.040	4.67	0.0001	0.122	0.23	0.4076
NTDER*WEAK*VARIN	-	-1.178	-3.76	0.0002	-1.058	-2.08	0.0199
NHDER	+	2.871	7.91	0.0001	1.004	1.71	0.0451
NHDER*WEAK*VARIN	-	0.374	0.99	0.8380	1.113	1.07	0.8571
NADER	?	0.000	1.51	0.1331	-0.001	-2.51	0.0135
NPL	-	-0.657	-5.18	0.0001	-0.774	-3.86	0.0001
GAP	-	0.011	0.69	0.7554	-0.023	-1.44	0.0753
CORE	+	-0.076	-4.53	0.9999	0.008	0.27	0.3920
OFF	?	-0.040	-2.90	0.0046	-0.045	-2.88	0.0048
PENS	+	0.558	0.87	0.1926	-0.338	-0.37	0.6452
Adjusted R-squared		0.97			0.97		
N		107			110		
White's chi-square		0.2739			0.2322		

Table E. The model that disaggregates the notional amounts of derivatives in hedging and trading
NATDER is the notional amounts of trading derivatives and NAHDER is the notional amounts of hedging derivatives.

		2005			2006		
	Expect-ed sign	Coeff.	t-values	p-values	Coeff.	t-values	p-values
C	?	64.0245	0.25	0.7957	649.100	2.26	0.0263
BV	+	1.779	12.22	0.0001	1.496	13.30	0.0001
NOI	+	0.240	0.84	0.2012	0.530	1.61	0.0554
NSI	+	0.865	3.98	0.0001	0.556	1.29	0.1005
NTDER	+	1.523	5.09	0.0001	1.725	5.29	0.0001
NTDER*WEAK*VARIN	-	-0.924	-3.04	0.0017	0.079	0.16	0.5650
NHDER	+	1.905	6.18	0.0001	1.507	2.86	0.0027
NHDER*WEAK*VARIN	-	-0.640	-1.19	0.1175	-0.350	-0.28	0.3883
NATDER	?	-0.001	-2.74	0.0078	-0.001	-3.76	0.0001
NAHDER	?	0.001	0.28	0.7764	-0.004	-0.65	0.5144
NPL	-	-0.471	-4.38	0.0001	-0.433	-3.64	0.0003
GAP	-	0.007	0.57	0.7170	0.019	1.66	0.9504
CORE	+	-0.005	-0.29	0.6169	0.051	2.45	0.0083
OFF	?	0.001	0.07	0.9377	-0.010	-0.98	0.3301
Adjusted R-squared		0.99			0.99		
N		83			88		
White's chi-square		0.99			0.98		

Table F. The balance sheet model
Where, FVFAS is the aggregated fair values of the financial assets and FVFLI is the aggregated fair values of the financial liabilities.

		2005			2006		
	Expect-ed sign	Coeff.	t-values	p-values	Coeff.	t-values	p-values
C	?	274.343	0.81	0.4159	395.435	0.92	0.3569
FVFAS	+	0.887	6.83	0.0001	1.097	8.53	0.0001
FVFLI	-	-0.845	-6.32	0.0001	-1.038	-7.92	0.0001
NON39AS	+	0.990	7.53	0.0001	1.117	8.99	0.0001
NON39LI	-	-0.995	-8.11	0.0001	-1.189	-9.98	0.0001
NTDER	+	-0.427	-1.11	0.8664	-0.968	-2.45	0.9920
NTDER*WEAK*VARIN	-	-1.435	-5.35	0.0001	-1.868	-4.64	0.0001
NHDER	+	2.277	8.44	0.0001	2.897	5.64	0.0001
NHDER*WEAK*VARIN	-	-1.899	-6.86	0.0001	-1.654	-2.09	0.0193
NADER	?	-0.001	-6.64	0.0001	-0.001	-7.26	0.0001
NPL	-	-0.567	-5.15	0.0001	-0.600	-3.64	0.0004
GAP	-	0.002	0.22	0.5876	-0.038	-3.19	0.0019
CORE	+	0.031	2.16	0.0164	0.059	2.21	0.0144
OFF	?	0.047	4.53	0.0001	-0.001	-0.05	0.9550
Adjusted R-squared		0.98			0.98		
N		107			110		
White's chi-square		0.1884			0.1739		

Appendix C

Table C1
Descriptive statistics for the CE
Based on Gebhardt et al. (2001) method

Panel A: By Year	Mean	Median	Max	Min	Std. Dev.	Number of Observations
2002	10.66%	9.72%	25.07%	6.88%	3.11%	88
2003	8.93%	8.76%	18.71%	1.11%	2.26%	88
2004	8.88%	8.81%	17.63%	5.43%	1.72%	88
2005	8.43%	8.55%	18.91%	4.72%	1.76%	88
2006	8.72%	8.69%	20.35%	4.22%	1.99%	88
2007	9.84%	9.75%	22.05%	4.56%	2.27%	88
All	9.24%	9.02%	25.07%	1.11%	2.35%	528

Panel B: By Country (for all years, 2002 – 2007)	Mean	Median	Max	Min	Std. Dev.	Number of Observations
Austria	8.76%	8.91%	9.62%	7.71%	0.68%	6
Belgium	9.78%	9.68%	12.14%	7.51%	0.95%	24
Czech Republic	7.37%	6.76%	9.61%	6.02%	1.40%	6
Denmark	9.73%	9.48%	13.87%	7.35%	1.44%	30
Finland	9.40%	8.92%	11.11%	8.07%	0.98%	12
France	10.22%	10.16%	12.63%	8.70%	0.93%	30
Germany	9.95%	10.34%	19.16%	5.17%	2.90%	36
Greece	8.25%	8.21%	11.72%	6.32%	1.11%	30
Hungary	9.28%	9.55%	10.01%	7.55%	0.90%	6
Ireland	9.07%	8.74%	12.17%	7.45%	1.23%	24
Italy	9.01%	8.93%	20.79%	1.11%	2.59%	60
Netherland	9.43%	9.12%	19.16%	6.63%	2.40%	24
Norway	12.93%	11.79%	25.07%	8.60%	3.60%	42
Poland	7.92%	7.71%	17.66%	4.22%	2.81%	24
Portugal	8.39%	8.54%	9.26%	7.01%	0.64%	18
Spain	7.80%	7.79%	10.16%	4.56%	1.33%	48
Sweden	9.07%	9.24%	10.16%	7.54%	0.63%	24
Switzerland	8.47%	8.07%	12.21%	6.05%	1.62%	24
UK	8.53%	8.44%	12.73%	5.25%	1.50%	60
All	9.24%	9.02%	25.07%	1.11%	2.35%	528

Table C2
Descriptive statistics for the CE
Based on Claus & Thomas (2001) method

Panel A: By Year	Mean	Median	Max	Min	Std. Dev.	Number of Observations
2002	11.71%	11.06%	29.82%	4.48%	4.01%	88
2003	10.02%	10.05%	20.14%	4.49%	2.31%	87
2004	9.98%	10.25%	21.25%	0.74%	2.70%	87
2005	9.04%	9.39%	12.87%	3.55%	1.86%	87
2006	9.24%	9.47%	13.96%	4.15%	1.98%	88
2007	10.54%	10.60%	20.59%	4.00%	2.65%	88
All	10.09%	10.04%	29.82%	0.74%	2.81%	525

Panel B: By Country (for all years, 2002 – 2007)	Mean	Median	Max	Min	Std. Dev.	Number of Observations
Austria	10.60%	10.31%	13.33%	9.30%	1.44%	6
Belgium	9.58%	10.67%	13.12%	3.55%	2.93%	24
Czech Republic	9.25%	9.37%	10.74%	7.50%	1.12%	6
Denmark	9.44%	9.35%	16.42%	6.35%	2.10%	30
Finland	9.81%	9.05%	13.03%	7.28%	1.98%	12
France	10.95%	10.32%	19.00%	7.47%	2.48%	30
Germany	11.21%	9.88%	29.82%	5.40%	5.12%	36
Greece	11.71%	11.77%	14.89%	6.62%	1.83%	30
Hungary	11.02%	11.07%	11.95%	9.93%	0.81%	6
Ireland	11.17%	10.88%	15.29%	8.66%	1.51%	24
Italy	9.85%	10.00%	26.83%	0.74%	3.60%	58
Netherland	10.76%	10.44%	14.55%	4.48%	2.18%	23
Norway	7.99%	7.69%	13.00%	4.64%	2.12%	42
Poland	11.11%	9.14%	21.97%	6.99%	4.41%	24
Portugal	9.80%	9.93%	12.06%	7.10%	1.26%	18
Spain	9.59%	9.93%	14.04%	5.54%	1.82%	48
Sweden	9.75%	9.68%	11.00%	8.50%	0.72%	24
Switzerland	8.45%	7.92%	14.39%	5.06%	2.42%	24
UK	10.60%	10.62%	15.05%	7.38%	1.77%	60
All	10.09%	10.04%	29.82%	0.74%	2.81%	525

Table C3
Descriptive statistics for the CE
Based on Gode & Mohanram (2003) method

Panel A: By Year	Mean	Median	Max	Min	Std. Dev.	Number of Observations
2002	10.18%	9.14%	35.04%	4.12%	4.46%	82
2003	8.55%	7.46%	17.66%	0.93%	3.78%	85
2004	8.71%	8.11%	44.38%	3.05%	5.22%	81
2005	7.34%	7.25%	15.18%	1.23%	2.98%	80
2006	7.13%	7.08%	13.44%	2.50%	2.45%	80
2007	7.28%	7.32%	13.02%	2.19%	2.42%	80
All	8.21%	7.69%	44.38%	0.93%	3.84%	488

Panel B: By Country (for all years, 2002 – 2007)	Mean	Median	Max	Min	Std. Dev.	Number of Observations
Austria	10.15%	9.71%	12.11%	9.18%	1.10%	6
Belgium	7.44%	7.20%	14.59%	3.61%	2.58%	24
Czech Republic	6.08%	5.83%	11.48%	1.72%	3.26%	6
Denmark	8.05%	6.59%	35.04%	1.67%	6.16%	30
Finland	5.87%	5.92%	10.36%	2.71%	2.48%	12
France	8.12%	7.44%	16.40%	1.24%	3.19%	30
Germany	10.93%	8.87%	44.38%	3.36%	7.26%	34
Greece	11.50%	11.63%	17.01%	6.78%	2.12%	30
Hungary	10.12%	10.67%	11.84%	7.49%	1.73%	6
Ireland	8.01%	7.54%	13.02%	5.08%	2.04%	24
Italy	9.03%	9.10%	16.78%	2.92%	2.97%	54
Netherland	6.23%	5.81%	12.30%	1.23%	2.53%	18
Norway	7.11%	6.25%	17.20%	3.27%	3.64%	16
Poland	12.48%	11.15%	20.61%	6.64%	4.13%	24
Portugal	7.06%	6.86%	09.86%	2.50%	1.78%	18
Spain	8.06%	8.28%	12.29%	4.54%	1.68%	48
Sweden	4.82%	4.54%	08.13%	2.19%	1.57%	24
Switzerland	7.41%	7.27%	11.07%	4.64%	1.68%	24
UK	6.44%	6.70%	12.53%	0.93%	2.12%	60
All	8.21%	7.69%	44.38%	0.93%	3.84%	488

Table C4
Descriptive statistics for the CE
Based on Easton (2004) method

Panel A: By Year	Mean	Median	Max	Min	Std. Dev.	Number of Observations
2002	12.61%	11.38%	39.11%	2.73%	5.47%	84
2003	10.16%	9.63%	23.53%	3.12%	3.91%	80
2004	10.40%	9.74%	42.79%	3.59%	4.63%	76
2005	8.93%	9.18%	17.17%	2.17%	2.54%	74
2006	8.79%	9.00%	13.51%	2.83%	2.11%	72
2007	9.12%	9.05%	15.26%	3.39%	2.65%	71
All	10.00%	9.57%	42.79%	2.17%	4.03%	457

Panel B: By Country (for all years, 2002 – 2007)	Mean	Median	Max	Min	Std. Dev.	Number of Observations
Austria	11.50%	11.72%	12.84%	9.81%	1.13%	6
Belgium	9.02%	9.18%	13.96%	3.80%	2.42%	22
Czech Republic	8.43%	8.05%	16.28%	3.87%	4.22%	6
Denmark	10.85%	9.55%	34.18%	2.17%	6.68%	22
Finland	8.42%	9.05%	12.57%	2.83%	3.66%	7
France	9.50%	9.12%	14.74%	4.88%	2.40%	29
Germany	14.04%	10.94%	42.79%	6.17%	8.19%	35
Greece	12.29%	12.05%	19.72%	8.22%	2.53%	30
Hungary	9.99%	10.06%	11.15%	8.84%	0.99%	6
Ireland	9.75%	9.62%	14.69%	6.62%	1.87%	24
Italy	10.61%	10.75%	22.75%	2.73%	3.54%	53
Netherland	8.32%	8.42%	15.38%	2.89%	3.11%	16
Norway	9.58%	8.62%	19.70%	3.28%	3.87%	14
Poland	12.04%	10.14%	19.92%	4.21%	4.42%	24
Portugal	8.80%	8.89%	12.46%	4.97%	1.95%	16
Spain	9.36%	9.56%	12.69%	5.22%	1.76%	47
Sweden	7.57%	7.14%	13.62%	4.26%	2.42%	18
Switzerland	8.39%	8.41%	14.68%	3.12%	2.94%	24
UK	8.96%	9.29%	13.27%	3.39%	2.12%	58
All	10.00%	9.57%	42.79%	2.17%	4.03%	457

Appendix D

Robustness tests of the additional analysis on the economic consequences test

Table D1
Regression results based on analysts' following
Using alternative control variables to some variables used in the model of Table 9.10

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0607	4.8259***	0.0453	1.9779**	0.0461	1.6624*	0.0028	0.0941	0.0624	3.6003***
POST	-0.0119	-2.6318***	-0.0260	-3.1649***	-0.0149	-1.5197	-0.0093	-0.9637	-0.0194	-3.1234***
MAND	-0.0070	-0.8321	0.0115	0.7479	-0.0046	-0.2528	0.0419	1.9715**	-0.0033	-0.2881
LOWF	-0.0070	-0.9340	-0.0031	-0.2261	0.0880	5.3908***	0.0461	2.8591***	0.0294	2.8228***
POST*MAND	0.0140	3.0148***	0.0217	2.5685**	0.0056	0.5591	0.0017	0.1767	0.0143	2.2413**
POST*LOWF	0.0080	1.2218	0.0161	1.3475	-0.0218	-1.5434	-0.0094	-0.6818	0.0005	0.0596
MAND*LOWF	0.0116	1.5248	0.0025	0.1855	-0.0795	-4.7989***	-0.0435	-2.6624***	-0.0252	-2.3990**
POST*MAND*LOWF	-0.0212	-3.0878***	-0.0323	-2.5733**	0.0172	1.1441	0.0041	0.2755	-0.0115	-1.2123
CAR	-0.0400	-1.6459	0.0406	0.9164	-0.0066	-0.1274	-0.0518	-0.9743	-0.0154	-0.4617
LD	-0.0013	-2.2689**	-0.0043	-3.9210***	-0.0045	-3.5099***	-0.0057	-3.6764***	-0.0036	-4.3349***
RVAR	0.0885	3.9805***	0.0711	1.7533*	0.0781	1.6142	0.1909	3.8694***	0.1036	3.3766***
VARCOEF	-0.0001	-1.4416	-0.0001	-2.0509**	0.0005	6.5155***	0.0009	9.3215***	0.0002	4.3014***
BM	0.0169	16.6618***	-0.0001	-0.0549	0.0215	2.7569***	0.0325	4.1202***	0.0083	5.9559***
LOG(MVE)	-0.0005	-0.7927	0.0005	0.3992	-0.0002	-0.1535	0.0008	0.5233	-0.0005	-0.5581
LEV	0.0005	1.9581*	0.0010	1.8886*	0.0007	1.1394	0.0013	1.9179**	0.0008	1.9835**
RF	0.0059	8.6603***	0.0086	6.8925***	0.0023	1.5078	0.0037	2.3148**	0.0056	5.9534***
USLIST	0.0053	2.3414**	0.0043	1.0507	0.0012	0.2440	-0.0028	-0.5689	0.0034	1.0864
Country dummies	Included		Included		Included		Included		Included	
N	430		430		414		382		430	
Adj. R^2	0.69		0.32		0.55		0.53		0.51	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table D2
Regression results based on analysts' following
Regression model controlling for outliers

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0667	5.5125***	0.0846	3.6191***	0.0723	2.2361**	0.0749	2.1035**	0.0815	4.3984***
POST	-0.0121	-2.9050***	-0.0234	-2.9025***	-0.0383	-3.5937***	-0.0512	-4.5483***	-0.0309	-4.8286***
MAND	0.0006	0.0886	-0.0068	-0.5053	0.0086	0.4812	0.0014	0.0731	-0.0006	-0.0584
LOWF	-0.0022	-0.3405	0.0037	0.2992	0.0891	5.3608***	0.0538	3.0560***	0.0349	3.5022***
POST*MAND	0.0135	3.1139***	0.0194	2.3020**	0.0242	2.1839**	0.0351	2.9801***	0.0231	3.4605***
POST*LOWF	0.0077	1.2755	0.0122	1.0405	-0.0073	-0.4725	0.0126	0.7696	0.0060	0.6447
MAND*LOWF	0.0078	1.1923	-0.0041	-0.3232	-0.0840	-4.9907***	-0.0511	-2.8677***	-0.0322	-3.1913***
POST*MAND*LOWF	-0.0134	-2.0627	-0.0260	-2.0678**	0.0034	0.2031	-0.0165	-0.9331	-0.0120	-1.2056
LOG(CAR)	-0.0099	-3.0045***	0.0023	0.3616	-0.0018	-0.2143	-0.0104	-1.1154	-0.0051	-1.0119
LOG(LD)	-0.0035	-2.2128**	-0.0072	-2.3388**	-0.0153	-3.7590***	-0.0119	-2.5962***	-0.0097	-3.9790***
LOG(BETA)	0.0052	3.9313***	0.0042	1.6457	-0.0030	-0.8602	0.0030	0.8033	0.0025	1.2607
LOG(VARERN)	0.0022	3.0792***	-0.0005	-0.3511	0.0119	6.1362***	0.0112	5.3887***	0.0061	5.3532***
LOG(BM)	0.0338	20.2494***	0.0096	2.9903***	0.0193	3.6191***	0.0250	4.3454***	0.0223	8.7366***
LOG(ASSET)	0.0005	0.7558	0.0006	0.4191	0.0001	0.0290	0.0012	0.5509	0.0001	0.1338
LOG(LEV)	0.0008	1.6560*	0.0014	1.5230	0.0014	1.1439	0.0002	0.1525	0.0010	1.3690
RF	0.0039	6.1913***	0.0079	6.3840***	0.0032	1.8830*	0.0047	2.5052**	0.0049	5.0145***
USLIST	0.0014	0.6705	0.0006	0.1401	-0.0030	-0.5286	-0.0079	-1.2762	-0.0014	-0.4208
Country dummies	Included		Included		Included		Included		Included	
N	442		442		420		388		442	
Adj. R^2	0.73		0.33		0.52		0.43		0.53	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table D3
Regression results based on analysts' following
Regression model controlling for long-term growth expectations

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0439	3.0583***	0.0132	0.5041	0.0410	1.0983	0.0450	1.0810	0.0558	2.5114**
POST	-0.0170	-4.0337***	-0.0243	-3.1563***	-0.0300	-2.8109***	-0.0424	-3.8165***	-0.0328	-5.0330***
MAND	-0.0025	-0.3075	0.0224	1.4621	-0.0059	-0.2866	0.0050	0.1977	-0.0024	-0.1899
LOWF	-0.0014	-0.2033	0.0139	1.0590	0.0777	4.3351***	0.0280	1.4843	0.0307	2.7740***
POST*MAND	0.0162	3.6339***	0.0184	2.2517**	0.0179	1.5962	0.0278	2.3593**	0.0240	3.4777***
POST*LOWF	0.0116	1.8484*	0.0119	1.0349	-0.0146	-0.9287	0.0110	0.6773	0.0066	0.6858
MAND*LOWF	0.0091	1.2790	-0.0128	-0.9766	-0.0722	-4.0217***	-0.0292	-1.5521	-0.0262	-2.3616**
POST*MAND*LOWF	-0.0228	-3.4001	-0.0261	-2.1318**	0.0122	0.7254	-0.0106	-0.6009	-0.0160	-1.5468
CAR	-0.0355	-1.4261	0.0733	1.6067	0.0742	1.1898	0.0117	0.1742	0.0274	0.7121
LD	-0.0014	-2.3942**	-0.0043	-4.0712***	-0.0066	-4.5147***	-0.0072	-3.7739***	-0.0047	-5.1688***
BETA	0.0082	3.3888***	0.0018	0.4220	-0.0019	-0.3104	0.0063	0.9610	0.0032	0.8482
VARERN	0.0001	1.1148	-0.0001	-0.9146	0.0004	1.7799*	0.0005	2.2334**	0.0002	1.7070*
BM	0.0172	18.6067***	0.0002	0.1440	0.0396	4.9470***	0.0515	6.0310***	0.0094	6.5729***
LOG(ASSET)	0.0002	0.3547	0.0019	1.3570	-0.0007	-0.3486	-0.0005	-0.2344	-0.0003	-0.3131
LEV	0.0007	2.3732**	0.0009	1.8254*	0.0010	1.3664	0.0011	1.4335	0.0010	2.2605**
RF	0.0063	9.7389***	0.0090	7.5637***	0.0035	2.0437**	0.0057	3.0238***	0.0069	6.9258***
USLIST	0.0025	1.0880	0.0014	0.3320	0.0024	0.4137	-0.0025	-0.4053	0.0023	0.6405
LTG	0.0031	1.4460	0.0109	2.7581***	-0.0012	-0.2355	-0.0143	-2.3958**	0.0018	0.5566
Country dummies	Included		Included		Included		Included		Included	
N	444		444		422		390		444	
Adj. R^2	0.70		0.34		0.50		0.41		0.47	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table D4
Regression results based on analysts' following
Regression model using Risk Premiums as the dependent variable

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0301	2.0757**	0.0171	0.6618	0.0144	0.3903	0.0250	0.6033	0.0438	2.0072**
POST	-0.0194	-4.4800***	-0.0259	-3.3553***	-0.0355	-3.3167***	-0.0456	-4.0926***	-0.0347	-5.3196***
MAND	-0.0039	-0.4534	0.0177	1.1526	-0.0055	-0.2651	0.0048	0.1887	-0.0032	-0.2504
LOWF	-0.0076	-1.0754	0.0028	0.2267	0.0738	4.2531***	0.0383	2.1162**	0.0263	2.4650**
POST*MAND	0.0173	3.7510***	0.0197	2.4008**	0.0207	1.8264*	0.0290	2.4420**	0.0248	3.5752***
POST*LOWF	0.0171	2.6673***	0.0169	1.4860	-0.0067	-0.4298	0.0116	0.7190	0.0109	1.1345
MAND*LOWF	0.0146	2.0503**	-0.0022	-0.1769	-0.0694	-3.9690***	-0.0399	-2.1894**	-0.0224	-2.0835**
POST*MAND*LOWF	-0.0273	-3.9829***	-0.0312	-2.5595**	0.0052	0.3098	-0.0110	-0.6242	-0.0195	-1.8898*
CAR	-0.0210	-0.8201	0.0753	1.6503*	0.0983	1.5622	0.0269	0.3977	0.0395	1.0231
LD	-0.0015	-2.6272***	-0.0044	-4.0856***	-0.0069	-4.6833***	-0.0071	-3.6897***	-0.0048	-5.3067***
BETA	0.0067	2.6764***	0.0004	0.1087	-0.0047	-0.7598	0.0054	0.8193	0.0019	0.5261
VARERN	0.0002	2.3758**	0.0001	0.5075	0.0005	2.2657**	0.0003	1.4820	0.0003	2.4471**
BM	0.0167	17.5148***	0.0001	0.0895	0.0312	4.0275***	0.0432	5.2323***	0.0090	6.2610***
LOG(ASSET)	0.0002	0.3034	0.0018	1.2912	-0.0005	-0.2497	-0.0002	-0.1144	-0.0003	-0.3275
LEV	0.0006	2.2118**	0.0008	1.5195	0.0010	1.4294	0.0013	1.5742	0.0010	2.2298***
USLIST	0.0029	1.2096	0.0014	0.3300	0.0027	0.4599	-0.0023	-0.3721	0.0026	0.7251
Country dummies	Inlcuded		Included		Included		Inlcuded		Inlcuded	
N	444		444		422		390		444	
Adj. R^2	0.74		0.34		0.50		0.43		0.52	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table D5
Regression results based on accounting classification
Using alternative control variables to some variables used in the model of Table 9.11

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0525	4.3613***	0.0305	1.4084	0.1009	3.8060***	0.0242	0.8512	0.0739	4.5007***
POST	-0.0013	-0.5870	-0.0081	-2.0017**	-0.0071	-1.4096	-0.0094	-1.8095*	-0.0065	-2.1273**
MAND	-0.0038	-0.4674	0.0107	0.7181	-0.0273	-1.5310	0.0324	1.5603	-0.0110	-0.9750
POST*CONT	-0.0078	-1.9229*	-0.0117	-1.5928	-0.0148	-1.6693*	-0.0023	-0.2694	-0.0121	-2.1812**
POST*MAND*CONT	0.0042	1.1289	0.0057	0.8488	0.0107	1.3458	0.0027	0.3499	0.0074	1.4723
CAR	-0.0356	-1.4138	0.0441	0.9715	-0.0189	-0.3496	-0.0540	-1.0042	-0.0175	-0.5110
LD	-0.0014	-2.2801**	-0.0045	-4.0465***	-0.0047	-3.5537***	-0.0063	-3.9980***	-0.0037	-4.4524***
RVAR	0.0709	3.2337***	0.0601	1.5196	0.0558	1.1730	0.1770	3.7407***	0.0867	2.9011***
VARCOEF	-0.0001	-1.4206	-0.0001	-1.9749**	0.0006	6.8683***	0.0009	9.7105***	0.0002	4.5763***
BM	0.0172	16.547***	0.0003	0.1814	0.0170	2.1821**	0.0316	4.1126***	0.0080	5.6820***
LOG(MVE)	-0.0001	-0.0660	0.0021	1.9140*	-0.0036	-2.5046**	-0.0004	-0.2935	-0.0009	-1.1364
LEV	0.0008	2.6572***	0.0014	2.6531***	0.0008	1.2969	0.0015	2.3087**	0.0010	2.5633**
RF	0.0061	8.7376***	0.0086	6.7785***	0.0032	1.9864**	0.0042	2.6738***	0.0059	6.1414***
USLIST	0.0054	2.3033**	0.0044	1.0506	0.0060	1.1806	-0.0001	-0.0141	0.0050	1.5739
Country dummies	Included		Included		Included		Included		Included	
N	430		430		414		382		430	
Adj. R^2	0.67		0.29		0.52		0.52		0.49	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table D6
Regression results based on accounting classification
Regression model controlling for outliers

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0683	5.9952***	0.0766	3.4501***	0.1323	4.2068***	0.1167	3.4289***	0.1009	5.6914***
POST	0.0003	0.1650	-0.0081	-2.1562**	-0.0107	-1.9460*	-0.0146	-2.3947**	-0.0077	-2.5810**
MAND	0.0048	0.7430	-0.0089	-0.7018	-0.0219	-1.2711	-0.0172	-0.9052	-0.0118	-1.1560
POST*CONT	-0.0083	-2.3312**	-0.0101	-1.4532	-0.0295	-3.0665***	-0.0295	-2.8914***	-0.0199	-3.5694***
POST*MAND*CONT	0.0072	2.1649**	0.0071	1.1033	0.0253	2.8837***	0.0279	3.0581***	0.0170	3.2709***
LOG(CAR)	-0.0094	-2.8521***	0.0017	0.2670	-0.0059	-0.6798	-0.0138	-1.4533	-0.0067	-1.3145
LOG(LD)	-0.0036	-2.3130**	-0.0068	-2.1931**	-0.0182	-4.3527***	-0.0141	-3.0617***	-0.0108	-4.3731***
LOG(BETA)	0.0045	3.6440***	0.0057	2.3586**	-0.0029	-0.8846	0.0038	1.0756	0.0028	1.4607
LOG(VARERN)	0.0022	3.0070***	-0.0005	-0.4017	0.0107	5.3386***	0.0100	4.7728***	0.0056	4.8056***
LOG(BM)	0.0345	20.728***	0.0112	3.4526***	0.0213	3.9613***	0.0273	4.7963***	0.0232	8.9531***
LOG(ASSET)	0.0002	0.3916	0.0016	1.2819	-0.0032	-1.7460*	-0.0012	-0.6248	-0.0008	-0.7841
LOG(LEV)	0.0008	1.8110*	0.0014	1.5082	0.0021	1.6160	0.0006	0.4987	0.0013	1.7174*
RF	0.0039	6.1291***	0.0077	6.1659***	0.0032	1.8380*	0.0045	2.3737**	0.0049	4.8661***
USLIST	0.0017	0.7860	0.0002	0.0511	0.0026	0.4423	-0.0036	-0.5874	0.0004	0.1414
Country dummies	Included		Included		Included		Included		Included	
N	442		442		420		388		442	
Adj. R^2	0.72		0.31		0.48		0.41		0.50	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table D7
Regression results based on accounting classification
Regression model controlling for long-term growth expectations

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0421	3.1715***	0.0059	0.2462	0.0992	2.8717***	0.0626	1.6293	0.0715	3.5016***
POST	-0.0034	-1.6720*	-0.0097	-2.5771**	-0.0118	-2.1101**	-0.0169	-2.7459***	-0.0111	-3.4838***
MAND	0.0021	0.2683	0.0189	1.2901	-0.0341	-1.7003*	-0.0029	-0.1192	-0.0114	-0.9237
POST*CONT	-0.0078	-2.0440**	-0.0094	-1.3535	-0.0224	-2.2856**	-0.0195	-1.8854*	-0.0180	-3.0400***
POST*MAND*CONT	0.0052	1.4883	0.0051	0.8017	0.0223	2.5441**	0.0235	2.6071***	0.0156	2.8870***
CAR	-0.0291	-1.1448	0.0812	1.7556*	0.0530	0.8338	0.0079	0.1187	0.0260	0.6643
LD	-0.0014	-2.4075**	-0.0046	-4.2413***	-0.0068	-4.6136***	-0.0076	-4.0139***	-0.0049	-5.3154***
BETA	0.0071	3.0695***	0.0028	0.6749	-0.0065	-1.0999	0.0052	0.8526	0.0014	0.4020
VARERN	0.0001	1.0171	-0.0001	-0.6302	0.0006	2.7627***	0.0006	2.6612***	0.0003	2.3805**
BM	0.0173	18.2277***	0.0001	0.0635	0.0417	5.2313***	0.0535	6.4020***	0.0093	6.4205***
LOG(ASSET)	0.0001	0.1472	0.0026	2.1044**	-0.0029	-1.5451	-0.0011	-0.5868	-0.0008	-0.7510
LEV	0.0008	2.7758***	0.0013	2.3877**	0.0011	1.4961	0.0013	1.6082	0.0012	2.6697***
RF	0.0063	9.5282***	0.0090	7.5066***	0.0039	2.2255**	0.0056	3.0230***	0.0071	6.9781***
USLIST	0.0030	1.3058	0.0019	0.4526	0.0069	1.1707	-0.0006	-0.1023	0.0041	1.1410
LTG	0.0035	1.6406	0.0099	2.5515**	-0.0082	-1.5395	-0.0174	-3.0647***	-0.0006	-0.2081
Country dummies	Included		Included		Included		Included		Included	
N	442		442		420		388		442	
Adj. R^2	0.72		0.31		0.48		0.41		0.50	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table D8
Regression results based on accounting classification
Regression model using Risk Premiums as the dependent variable

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0254	1.8970*	0.0024	0.1032	0.0724	2.1223**	0.0508	1.3351	0.0581	2.9075***
POST	-0.0056	-2.6781***	-0.0104	-2.7989***	-0.0158	-2.8428***	-0.0195	-3.1660***	-0.0127	-4.0442***
MAND	0.0027	0.3317	0.0183	1.2436	-0.0321	-1.5809	-0.0076	-0.3082	-0.0107	-0.8574
POST*CONT	-0.0057	-1.4431	-0.0082	-1.1827	-0.0209	-2.1095**	-0.0199	-1.8984*	-0.0165	-2.7925***
POST*MAND*CONT	0.0049	1.3500	0.0045	0.7048	0.0232	2.6105***	0.0250	2.7294***	0.0156	2.8585***
CAR	-0.0123	-0.4715	0.0866	1.8755*	0.0774	1.2079	0.0200	0.2952	0.0386	0.9880
LD	-0.0016	-2.6222***	-0.0046	-4.2332***	-0.0072	-4.7993***	-0.0076	-3.9480***	-0.0050	-5.4559***
BETA	0.0058	2.4124**	0.0020	0.4782	-0.0087	-1.4642	0.0040	0.6519	0.0005	0.1561
VARERN	0.0002	2.1883**	0.0001	0.5908	0.0006	2.6281***	0.0003	1.6770*	0.0003	2.7022***
BM	0.0168	17.2187***	0.0001	0.0300	0.0328	4.2482***	0.0447	5.5139***	0.0090	6.1514***
LOG(ASSET)	0.0001	0.2269	0.0028	2.2109**	-0.0027	-1.4323	-0.0011	-0.5818	-0.0008	-0.7492
LEV	0.0007	2.5282***	0.0011	2.0745**	0.0013	1.7320*	0.0015	1.8597*	0.0012	2.7130***
USLIST	0.0032	1.3295	0.0014	0.3417	0.0075	1.2539	0.0003	0.0557	0.0044	1.2228
Country dummies	Included		Included		Included		Included		Included	
N	444		444		422		390		444	
Adj. R^2	0.73		0.32		0.48		0.42		0.50	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table D9
Regression results based on countries' enforcement rule
Using alternative control variables to some variables used in the primary model (Table 9.8)

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0559	4.6727***	0.0392	1.8229*	0.1026	3.8594***	0.0232	0.8110	0.0784	4.7929***
POST	-0.0057	-3.4482***	-0.0141	-4.6986***	-0.0115	-3.1273***	-0.0085	-2.3823**	-0.0109	-4.7849***
MAND	-0.0075	-0.9014	0.0024	0.1625	-0.0292	-1.6186	0.0334	1.5880	-0.0152	-1.3374
POST*STRNG	-0.0068	-1.5973	-0.0163	-2.1228**	-0.0119	-1.2900	-0.0029	-0.3287	-0.0128	-2.1990**
POST*MAND*STRNG	0.0115	2.6173***	0.0221	2.7836***	0.0147	1.5354	0.0008	0.0845	0.0158	2.6331***
CAR	-0.0365	-1.4623	0.0412	0.9170	-0.0157	-0.2907	-0.0515	-0.9605	-0.0163	-0.4796
LD	-0.0014	-2.3473	-0.0045	-4.1322***	-0.0047	-3.59820***	-0.0063	-4.0212***	-0.0038	-4.5366***
RVAR	0.0657	3.0021***	0.0473	1.1991	0.0501	1.0502	0.1759	3.7122***	0.0784	2.6185***
VARCOEF	-0.0001	-1.7004*	-0.0001	-2.3512**	0.0006	6.7408***	0.0009	9.6300***	0.0002	4.3037***
BM	0.0171	16.594***	0.0002	0.1358	0.0167	2.1311**	0.0316	4.1159***	0.0079	5.6537***
LOG(MVE)	-0.0001	-0.0920	0.0021	1.8636*	-0.0036	-2.5530**	-0.0004	-0.3064	-0.0010	-1.2406
LEV	0.0007	2.5903	0.0013	2.5080**	0.0008	1.3314	0.0015	2.3468**	0.0010	2.5204**
RF	0.0063	9.0717***	0.0091	7.2017***	0.0036	2.2217**	0.0043	2.7122***	0.0063	6.5817***
USLIST	0.0053	2.2939**	0.0043	1.0386	0.0062	1.2074	-0.0001	-0.0001	0.0051	1.6065
Country dummies	Included		Included		Included		Included		Included	
N	430		430		414		382		430	
Adj. R^2	0.68		0.30		0.52		0.52		0.49	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table D10
Regression results based on countries' enforcement rule
Regression model controlling for outliers

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0685	6.1342***	0.0798	3.6719***	0.1336	4.3407***	0.1179	3.5516***	0.1035	6.0167***
POST	-0.0012	-0.7755	-0.0105	-3.4829***	-0.0150	-3.6220***	-0.0143	-3.3083***	-0.0101	-4.2203***
MAND	0.0035	0.5465	-0.0133	-1.0572	-0.0268	-1.5779	-0.0204	-1.0878	-0.0157	-1.5731
POST*STRNG	-0.0098	-2.6079***	-0.0160	-2.1928**	-0.0379	-3.8635***	-0.0461	-4.5554***	-0.0275	-4.7486***
POST*MAND*STRNG	0.0114	2.9752***	0.0181	2.4299**	0.0410	4.0440***	0.0427	4.0189***	0.0289	4.8835***
LOG(CAR)	-0.0093	-2.8240***	0.0020	0.3109	-0.0051	-0.5976	-0.0124	-1.3335	-0.0062	-1.2209
LOG(LD)	-0.0037	-2.3431**	-0.0070	-2.2635**	-0.0184	-4.4501***	-0.0149	-3.2681***	-0.0111	-4.5424***
LOG(BETA)	0.0044	3.5595***	0.0056	2.3379**	-0.0033	-0.9853	0.0037	1.0661	0.0027	1.4099
LOG(VARERN)	0.0024	3.3265***	-0.0003	-0.2618	0.0114	5.7934***	0.0108	5.2506***	0.0060	5.2949***
LOG(BM)	0.0343	20.6646***	0.0109	3.3770***	0.0200	3.7384***	0.0261	4.6508***	0.0227	8.8833***
LOG(ASSET)	0.0003	0.4674	0.0017	1.3261	-0.0031	-1.6652*	-0.0010	-0.5525	-0.0007	-0.7212
LOG(LEV)	0.0008	1.7643	0.0014	1.4596	0.0020	1.5481	0.0006	0.4595	0.0012	1.6639**
RF	0.0041	6.4682***	0.0080	6.4667***	0.0041	2.3447**	0.0055	2.9633***	0.0054	5.5033***
USLIST	0.0016	0.7639	0.0001	0.0382	0.0023	0.4006	-0.0039	-0.6508	0.0003	0.1160
Country dummies	Included		Included		Included		Included		Included	
N	442		442		420		388		442	
Adj. R^2	0.73		0.31		0.49		0.42		0.52	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table D11
Regression results based on countries' enforcement rule
Regression model controlling for long-term growth expectations

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0445	3.3774***	0.0120	0.5032	0.1008	2.9229***	0.0654	1.7074*	0.0752	3.7298***
POST	-0.0067	-4.2332***	-0.0137	-4.7762***	-0.0139	-3.4484***	-0.0130	-3.1237***	-0.0136	-5.6187***
MAND	-0.0008	-0.1073	0.0128	0.8729	-0.0371	-1.8388*	-0.0054	-0.2200	-0.0159	-1.2854
POST*STRNG	-0.0082	-2.0567**	-0.0147	-2.0333**	-0.0258	-2.5795**	-0.0324	-3.1643***	-0.0235	-3.8547***
POST*MAND*STRNG	0.0120	2.9470***	0.0191	2.5818**	0.0297	2.8653***	0.0294	2.7138***	0.0264	4.2265***
CAR	-0.0307	-1.2165	0.0763	1.6626*	0.0513	0.8109	0.0041	0.0615	0.0231	0.5995
LD	-0.0014	-2.4274**	-0.0046	-4.2569***	-0.0069	-4.6435***	-0.0076	-4.0278***	-0.0049	-5.3796***
BETA	0.0072	3.0844***	0.0033	0.7824	-0.0064	-1.0825	0.0060	0.9773	0.0019	0.5394
VARERN	0.0001	1.0972	-0.0001	-0.5744	0.0007	2.8536***	0.0007	2.7428***	0.0003	2.4832**
BM	0.0172	18.2738***	0.0001	0.0029	0.0401	5.0021***	0.0510	6.1032***	0.0092	6.3886***
LOG(ASSET)	0.0001	0.1573	0.0026	2.0666**	-0.0029	-1.5720	-0.0013	-0.6832	-0.0008	-0.8265
LEV	0.0007	2.6181***	0.0011	2.1660**	0.0010	1.4016	0.0012	1.4590	0.0011	2.4648**
RF	0.0065	9.8579***	0.0093	7.8125***	0.0045	2.5246**	0.0063	3.3880***	0.0075	7.4835***
USLIST	0.0029	1.2688	0.0017	0.4097	0.0069	1.1630	-0.0006	-0.0979	0.0040	1.1164
LTG	0.0036	1.7290*	0.0102	2.6459***	-0.0078	-1.4787	-0.0170	-3.0032***	-0.0004	-0.1348
Country dummies	Included		Included		Included		Included		Included	
N	444		444		422		390		444	
Adj. R^2	0.69		0.32		0.48		0.42		0.46	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Table D12
Regression results based on countries' enforcement rule
Regression model using Risk Premiums as the dependent variable

	r_{GLS}		r_{CT}		r_{OJ}		r_{PEG}		r_{AVG}	
Variables	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Intercept	0.0288	2.1739**	0.0098	0.4177	0.0782	2.2960**	0.0584	1.5387	0.0641	3.2494***
POST	-0.0069	-4.2327***	-0.0137	-4.7386***	-0.0152	-3.7579***	-0.0141	-3.3611***	-0.0138	-5.6681***
MAND	-0.0005	-0.0635	0.0123	0.8331	-0.0363	-1.7798*	-0.0113	-0.4558	-0.0155	-1.2463
POST*CONT	-0.0098	-2.3876**	-0.0143	-1.9808**	-0.0303	-3.0203***	-0.0368	-3.5745***	-0.0248	-4.0693***
POST*MAND*CONT	0.0124	2.9635***	0.0182	2.4492**	0.0331	3.1790***	0.0334	3.0530***	0.0270	4.3155***
CAR	-0.0165	-0.6379	0.0803	1.7486*	0.0695	1.0923	0.0106	0.1575	0.0326	0.8437
LD	-0.0016	-2.6091***	-0.0046	-4.2290***	-0.0072	-4.8048***	-0.0076	-3.9487***	-0.0050	-5.4966***
BETA	0.0060	2.5242**	0.0026	0.6116	-0.0080	-1.3553	0.0053	0.8564	0.0013	0.3629
VARERN	0.0002	2.3572**	0.0001	0.6847	0.0006	2.7781***	0.0004	1.7943*	0.0003	2.8598***
BM	0.0168	17.2879***	-0.0001	-0.0100	0.0314	4.0830***	0.0428	5.3213***	0.0089	6.1540***
LOG(ASSET)	0.0001	0.2117	0.0027	2.1707*	-0.0028	-1.5087	-0.0014	-0.7149	-0.0009	-0.8363
LEV	0.0006	2.2509**	0.0009	1.8336*	0.0011	1.5457	0.0013	1.6483	0.0011	2.4453**
USLIST	0.0030	1.2642	0.0012	0.2879	0.0074	1.2373	0.0003	0.0480	0.0042	1.1754
Country dummies	Included		Included		Included		Included		Included	
N	444		444		422		390		444	
Adj. R^2	0.73		0.33		0.48		0.43		0.51	

The *** indicates p-values < 0.01, ** indicates p-values < 0.05, and * indicates p-values < 0.10.

Appendix E

1. Global positions of OTC derivatives markets by type of instrument

	Positions at end-June 2004		Positions at end-June 2007	
	Notional amounts	Gross market values	Notional Amounts	Gross market values
Foreign exchange contracts	31,500	1,116	57,597	1,611
Interest rate contracts	177,457	4,582	388,627	6,724
Equity-linked contracts	5,094	321	10,760	1,213
Commodity contracts	1,354	176	8,255	690
Credit derivatives	4,474	131	51,095	906
Other derivatives	191	65	78	1
Total contacts	**220,070**	**6,391**	**516,412**	**11,145**

The table is a brief reproduction of the Table C.5 in the Triennial Central Bank Survey (BIS, 2007). Amounts outstanding, in billion of US dollars

2. Exchange rates used to translate banks' accounts into Euros

CURRENCIES	***30/12/2005***	***29/12/2006***
CYP - Cyprus Pound	0.5735	0.5782
DKK - Danish Kroner	7.4605	7.4560
GBP - UK pound	0.6853	0.6715
CZK - Czech Koruna	29.0000	27.4850
HUF - Hungarian Forint	252.8700	251.7700
LVL - Latvian Lat	0.6962	0.6972
LTL - Lithuanian Lita	3.4528	3.4528
MTL - Maltese Lira	0.4293	0.4293
RON - Romanian Leu	3.6802	3.3835
SKK - Slovak Koruna	37.8800	34.4350
SIT - Slovenian Tolar	239.5000	239.6400
SEK - Swedish Krona	9.3885	9.0404
USD - US Dollars	1.1797	1.3170
PLN - Polish Zloty	3.8600	3.8310

Notes: 1) Exchange rates are per euro, 2) Data on exchange rates are retrieved from DataStream, and are those provided by ECB on the last available date of each year 2005 and 2006.

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