The influence of the mandatory adoption of IFRS on the value relevance of earnings for Dutch listed companies

Master's thesis

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Abstract

Since 2005 Dutch companies are obliged to report their financial statements in accordance with IFRS. The goal of this law, imposed by the EU, was to increase transparency on the European capital markets, and consequently, to increase the value relevance of the earnings number. This number was decreasing already for quite some year (Lev and Zarowin, 1999). However, it was in doubt whether this result would be achieved due to some possible disadvantages associated with the mandatory adoption of IFRS. Therefore, this study aims to explore whether the value relevance of earnings number increased after IFRS was imposed. Over a sample of Dutch listed firms no evidence is found that IFRS caused a change in value relevance, both on the long and short run. Some evidence is reported that the financial crisis has had a negative impact on the value relevance of earnings.

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1. Introduction

In March 2003 the Committee of European Security Regulators [CESR] issued 'Standard NO.1 on financial information'. One of the enactments included in this standard, was the mandatory adoption of the International Financial Reporting Standards [IFRS] by European listed companies from 2005 onwards (CESR, 2003). The main goal of the mandatory adoption of IFRS was to develop "*an efficient and effective financial information system in a transparent European capital market*" (CESR, 2003, p.3). Or as described by Devalle, Onali and Magarini (2010), to increase the transparency of European capital markets. Furthermore, the introduction of IFRS was expected to lead to more harmonious markets. Consequently, cross-border investments should increase which would lead to more liquid capital markets and lower costs of capital for European listed companies. Overall, this should lead to an increase in the value relevance of the earnings number for European listed companies.

However, this view has been questioned widely. For example, Barth, Landsman and Lang (2008) argue that the mandatory adoption of IFRS as the reporting standard in the EU might also lead to decreased flexibility in reporting on behalf of the firms' management. This would imply that management is unable to choose the proper accounting standards to reflect the actual performance and position of the firm. This would consequently lead to lower quality of financial reporting, and lower value relevance of earnings. Furthermore, conditions surrounding IFRS, but not IFRS itself, might also have a negative impact on the expected benefits of the mandatory adoption of IFRS.

An interesting feature of IFRS is that it is created in a setting that is mostly shareholder-oriented (Hung & Subramanyam, 2007). However, as Hung and Subramanyam (2007) argue, a number of European countries is more oriented towards the stakeholder. Therefore, the mandatory adoption of IFRS might lead to a misfit between the local standards applicable to a stakeholder-oriented country and IFRS. This might hinder the benefits of IFRS adoption, and lead to a lower value relevance of the earnings number. According to Van Bekkum, Hijink, Schouten and Winter (2010) the Netherlands is among the countries that are more stakeholder-oriented than shareholder-oriented. This is particularly evident is several laws protecting the rights of employees (such as those that establish the power of work councils) or laws reducing the rights of shareholders (e.g. the delegation of authority towards an executive board).

Agostino et al. (2010) argue that the value relevance of earnings is often used as a proxy of the information quality of accounting information. This implies that if the value relevance of earnings decreases, the quality of accounting information decreases as well, even though this information has been audited by the auditor. If the quality of accounting information decreases, less use will be made

of accounting information and as a consequence, the importance of the auditor decreases as well. This might imply that when the information quality of accounting information decreases further, the role of the auditor in auditing this information becomes less important as well. Why pay the cost for audited financial statements if little value is attached to this information by the public? Therefore, it is important for the profession that the value relevance of the earnings number does not decrease any further.

1.1 Research question

It is thus quite important to further investigate the current state of the value relevance of earnings. This current state is unclear due to the conflicting expectations concerning the role mandatory IFRS-adoption has had on the value relevance of the earnings number for Dutch listed companies. Consequently, this study tends to explore whether the earnings number has become more relevant, by investigating whether the influence of earnings on stock prices, and the association between earnings and stock prices has increased after the mandatory adoption of IFRS. Therefore the main research question of this study is:

Did the mandatory introduction of IFRS in the Netherlands lead to a change in the value relevance of earnings number for Dutch listed companies?

Section two will briefly introduce the concepts that are important in answering this research question, and that will be used extensively in this study.

The focus on the earnings number only (instead of focusing on for example book value of the company as well) is based on Nichols and Wahlen (2004), who claim that the earnings number is the financial statement number that is most closely related towards share prices.

This study investigates two sub questions. First, did the financial crisis have an impact on the value relevance of the earnings number? For example, Graham, King and Bailes (2000) found that the value relevance of earnings declines in times of crisis. Secondly, did the value relevance of earnings decline in the period after IFRS was adopted (even though it was adopted)? Cohen, Holder-Webb, Nath and Wood (2011) found that investors extensively use different types of non-financial information (e.g. information on corporate governance or corporate social responsibility practices). Furthermore, they state that investors will use this type of information more and more in the long run, possibly reducing the (relative) value relevance of earnings.

1.2 Relevance

Despite the critics of academics as Holthausen and Watts (2001), who claim that value-relevance studies lack a proper underlying theory and therefore are only association studies that are barely relevant for outsiders, Barth, Beaver and Landsman (2001) remain confident in the relevance of value-relevance studies. They claim that the outcomes of value-relevance studies are relevant for standard-setters and other non-academics. Following this reasoning, the outcomes of this study are interesting for standard-setters in for example the United States [US] or any other non-IFRS country that might be willing to adopt IFRS in the future. Currently, in the US debates are going on concerning the adoption of IFRS as the primary reporting standard. An interesting argument in this debate could be the value relevance of the IFRS earnings number when compared to the value relevance of an earnings number composed under any local GAAP [Generally Accepted Accounting Principles]. If it is found that IFRS adoption leads to a increase (decrease) in the value relevance of the earnings number, this could be an argument in favor of (against) the adoption of IFRS in the US (Hail, Leuz & Wysocki, 2010).

1.3 Contribution

This study aims to contribute to prior literature in several ways. First, this study adds to the current body of literature that discusses the impact of IFRS adoption on the value relevance of the earnings number, but differs from those in respect to the research method used. Whereas other studies used one-year samples in which financial statements were issued in both local GAAPs and IFRS, this study uses a longer period as its sample, as will be discussed in more detail later. Second, this study will establish whether the value relevance of the IFRS earnings number in times of crisis differs from the value relevance in non-crisis periods. Prior literature has shown a decrease in the value relevance of earnings in times of crisis. However, these studies didn't contain countries in which IFRS adoption was mandatory at that time. Finally, this study provides insights in the development of the value relevance of earnings over time. Prior literature has shown that this number is declining, however these usually didn't cover recent time periods, which this study will cover.

Over a sample of 58 Dutch listed companies, it is found that the mandatory adoption of IFRS did not lead to a change in the value relevance of the earnings number. Furthermore, evidence is found that the value relevance of the earnings number did not decrease any further after IFRS was adopted. Some un-robust evidence is found that the ongoing financial crisis has a negative impact on the value relevance of the earnings number.

1.4 Overview

The remainder of this study looks as follows. Section two explains some concepts that will be used extensively during this study. Section three shows to what extent the standards of IFRS differ from Dutch GAAP. The fourth section looks at prior literature, which lead to the following questions: Does the share-return-to-earnings-relation that underlies value relevance studies actually exist? What are the findings of the early value relevance studies? What are the findings of value relevance studies that compare IFRS to local GAAPs?

Section five discusses the hypotheses that will be tested and the theories underlying these hypotheses. The sixth section extensively discusses the methodology used to test the hypotheses developed in section four. Section seven discusses the data, followed by the results in section eight and the concluding remarks in the final section.

2. Concepts

In this study there are some concepts that are used often. Therefore it is good to briefly discuss the definition of these concepts that will be used throughout this study. The concepts that will be discussed here are: value relevance (of the earnings number), the earnings number and share return.

2.1. Value relevance

Barth (2000) defines the relevance of a line-item as the ability of that particular line-item to influence the decisions of the users of financial statements. This thus implies that the more the behavior of financial statements users changes after the issuance of the earnings number, the more relevant the earnings number is to them. The value relevance of earnings (or any other line item) is also linked to the quality of the information conveyed by this number (Barth et al., 2008). In the same manner as before, the bigger the change in share price caused by this number, the higher is the quality of this number, and the more relevant this number is.

Based on these explanations of value relevance, it is appropriate to look at the relation between the earnings number and share return to measure value relevance of earnings. Investigating this relation gives a proper picture of how the actions of financial statement users are influenced by the earnings number. Other types of studies (such as questionnaires) would only look at the beliefs of financial statement users, and do not measure what actually matters: the actual actions of the financial statement users (Lev & Zarowin, 1999).

2.2. The earnings number

The earnings number represents the profit made by a company over a certain period, and is used by investors as a measure to evaluate the performance of that company. In this study earnings is defined as 'income before extraordinary items', which is in line with Lev and Zarowin (1999) and Francis and Schipper (1999).

2.3. Rate of return on a share

Share return is defined in the literature as the return earned from investing in a particular share and is measured as the appreciation in share price plus dividends. Consequently, return rates can be calculated by adding up the change in share price and dividends received during that period, and dividing this number by the beginning of the period share price. This implies that if an investor earns a rate of return of 5% on his investments, he has made a 5% profit relative to his investment at the beginning of the period (Little, 2014).

3. Differences between IFRS and Dutch GAAP

From 1998 onwards the Dutch Accounting Standards Board [DASB] adopted a strategy that was based upon convergence with IFRS. Consequently, the Dutch accounting standards became more and more similar to IFRS over the period 1998 until 2003. After this period the DASB lost its power to enforce regulation on Dutch listed companies, due to the EU-wide enforcement of IFRS. Since then the DASB shifted its focus from Dutch listed companies towards unlisted companies. Instead of convergence towards IFRS, the strategy shifted towards one in which a wait-and-see approach was adopted concerning the quality of new IFRS regulations. New IFRS regulations were first evaluated extensively to review their appropriateness for Dutch non-listed companies. As a consequence, the number of differences between Dutch GAAP and IFRS started to increase again after 2003. However, these differences are only applicable to non-listed companies (Holla, 2006).

Even though the DASB adopted a convergence strategy, a number of differences between IFRS and Dutch GAAP still existed in 2005. These differences could lead to differences between the GAAP and IFRS earnings numbers, if these different regulations would have a significant influence on the earnings number. It is therefore important to review the consequences of the different regulations in more detail. Differences in the way line-items should be presented, are not taken into consideration, since these do not directly influence the earnings number.

According to Holla (2006) the differences between Dutch GAAP and IFRS impact the following balance sheet items:

- plant, property and equipment [PPE]; Dutch GAAP does not require the evaluation of the assumptions used in depreciating PPE, whereas this is a requirement under IFRS;
- inventory; the use of LIFO is allowed under Dutch GAAP, whereas it is not under IFRS;
- financial assets; whereas under IFRS most financial assets are recorded at fair value, valuation at cost is most common under Dutch GAAP;
- deferred tax assets (or liabilities); a deferred tax asset or liability is created more often under IFRS than under Dutch GAAP. Furthermore, the valuation basis differs between IFRS and Dutch GAAP;
- goodwill and other intangibles; a different definition of goodwill is in place under Dutch GAAP. Also the expected lifetime of goodwill and other intangibles is defined under Dutch GAAP, whereas it isn't under IFRS. Also rules concerning impairment testing differ.

According to Holla (2006) the following income statement items are influenced by the differences between Dutch GAAP and IFRS:

- share-based payments; both the valuation method and moment of recognition of the grant are different under IFRS and Dutch GAAP;
- financial income; under IFRS the effective interest rate must be used, whereas under Dutch GAAP it is allowed to use the effective interest rate to calculate interest income and expenses, but it is not a requirement.

The differences between the regulations of IFRS and Dutch GAAP are discussed more extensively in table 1. From the discussion of these differences it becomes clear that indeed there still were quite some differences between the Dutch standards and IFRS in 2005. Therefore, it is obvious that different earnings numbers could have been composed using the different two regulations. Consequently, it is likely that differences arise in the value relevance of the earnings numbers composed under the different regulations.

Table 1: Differences between Dutch GAAP and IFRS

Topic	IFRS Regulation	Dutch GAAP regulation	Actual differences
Balance sheet areas			
PPE	The assumptions made in the process of deprecation (method, useful live and residual value) must be evaluated each balance sheet date	The assumptions used in depreciating PPE don't have to be evaluated	Dutch GAAP doesn't require the evaluation of assumptions used in depreciating PPE, whereas IFRS does require this
Inventory	Allowed methods of recording inventory: - FIFO [First-in, First-out] - Weighted average cost	Allowed methods of recording inventory: - FIFO - Weighted average cost - LIFO [Last-in, First-out]	The use of LIFO is allowed under Dutch GAAP, whereas it isn't under IFRS
Financial Assets	Derivatives are always on the balance sheet and recorded at Fair Value. Loans, receivables and held-	Derivatives may be off balance sheet under certain conditions. Derivatives and most of the other financial	Whereas under IFRS most financial assets are recorded at fair value, valuation at cost is most common

	to-maturity financial assets are recorded at amortized costs. Other financial assets are recorded at fair value.	assets can be recorded at both fair value or cost.	under Dutch GAAP
Deferred Tax Asset/Liability	Under IFRS a deferred tax asset/liability is recognized in three situations: - when an asset or liability is recognized, but not part of a business combination and both accounting profit and taxable profit are unaffected; - when goodwill is initially recognized; or - when adjustments are made to goodwill and the amortization of these amounts are not tax deductible.	Under Dutch GAAP a deferred tax asset/liability is only recognized at the initial recognition of goodwill, and when this goodwill is tax deductible. The deferred asset or liability is recorded on a discounted basis.	An deferred tax asset or liability is create more often under IFRS than under Dutch GAAP. Also the valuation basis differs

	The deferred tax asset or liability is recorded on a undiscounted basis.		
Goodwill and other intangibles	Goodwill is defined as the excess of the cost of an acquisition over the fair value of the acquired assets and liabilities and contingent liabilities assumed. Goodwill and other intangible assets have indefinite lifetimes, however annually an impairment test must be performed at the same date each year, but not necessarily the balance sheet date.	Goodwill is defined as the excess of the cost of an acquisition over the fair value of the acquired assets and liabilities assumed. Goodwill and other intangible assets are assumed to have a lifetime that usually doesn't exceed 20 years. Only if the lifetime is expected to exceed 20 years impairment tests are required, performed at the balance sheet date.	A different definition of goodwill is in place under Dutch GAAP. Also the expected lifetime of goodwill and other intangibles is defined under Dutch GAAP, whereas it isn't under IFRS. Also rules concerning impairment testing differ.
Income statement areas			
Share based payments	Under IFRS share-based payments are recorded at fair value. Costs of these payments are recognized over the period in which these are	Under Dutch GAAP share based payments are recorded at the intrinsic value. Furthermore, the costs should be recognized at the	Both the valuation method and moment of recognition of the grant are different under IFRS and Dutch GAAP.

	received.	moment the payment is granted.	
Financial income and expenses	Interest income and expense have to be calculated using the effective interest rate.	It is recommended to use the effective interest rate to calculate interest income and expenses, however it is a requirement.	Under IFRS the effective interest rate must be used, whereas under Dutch GAAP it may be used to calculate interest income and expenses.

4. Literature review

Before turning towards literature that discusses the value relevance of earnings (after the adoption of IFRS), it is important to show whether there actually is a relationship between earnings and share returns. If there would be no relation between earnings and share price, it would be expected that earnings are relatively irrelevant in determining the share price. However, if proof will be found in support of the relation between share price and earnings, this would imply that earnings do matter in stock valuation.

4.1. Relation between earnings and share price

One of the earliest studies on this topic was performed by Ball and Brown (1968). They investigated whether a firm's net income is reflected in its share price. Given the fact that accounting lacks an all-embracing theoretical framework, it was argued that a firm's profit might be a meaningless figure. Using three different models it was investigated whether this presumption was justified. These models regressed the change in share return on either the change in income or the change in earnings per share [EPS] compared to the year before, both corrected against the market index, or the change in EPS that was uncorrected. Using a sample ranging from 1946 - 1966 including all firms available in Compustat, Ball and Brown (1968) found that the abovementioned presumption does not hold; there actually is a relation between earnings and share return. Firms that outperformed market expectations faced positive abnormal returns, whereas firms that underperformed (according to market expectations) faced negative abnormal returns.

A study extending the work of Ball and Brown was performed by Nichols and Wahlen (2004). It was argued by Nichols and Wahlen (2004) that the relation between earnings and share returns flows via three links. First, earnings in the current period provide information on the earnings in future periods. Secondly, the information on future earnings provides the ability to form expectations on future periods dividends. Finally, the present value of these expectations on dividends represents the share value of the firm's shares. Based on this framework, Nichols and Wahlen (2004) argued that the earnings number is important in determining the share price; a presumption strengthened further by the extensive use of earnings-based valuation models by investors. Therefore, following Ball and Brown (1968) it was predicted that unexpected earnings changes should have an influence on share return. This prediction was tested using a sample comprising all firms listed on the NYSE, AMEX and NASDAQ during the 1988-2002 period. In line with the results found by Ball and Brown (1968), Nichols and Wahlen (2002) found that the firms with a positive change in earnings (compared to the earnings number of that firm one year earlier) faced positive abnormal share returns, whereas

firms with negative earnings changes faced negative abnormal share returns. Furthermore, it was found that the size of the earnings surprise matters. Firms with higher (lower) earnings surprises face higher (lower) abnormal share returns. Therefore, the findings by Nichols and Wahlen (2004) provide further evidence for the relation between earnings and share returns.

Easton, Harris and Ohlson (1992) investigated the ability of earnings to explain share returns over longer time periods. Based on the presumption that earnings over longer time-periods better reflect a firm's performance than over shorter time-periods, it is expected that the more aggregated earnings (earnings over an interval of more than one year, with a maximum of 10 years) are, the higher the correlation between earnings and stock return. Tests of this prediction are performed using a sample of all firms in the 1987 version of Compustat. Easton et al. (1992) found support for these predictions. The longer the time-interval, the higher the correlation between earnings and share return is. These findings again provide support for the relation between share returns and earnings.

Prior literature thus provides extensive evidence for the existence of a relation between stock returns and earnings. Therefore it can be stated that earnings do matter in the valuation of stocks. Having established the existence of this relation, it now is important to take a look at prior literature that has tried to quantify the role earnings in stock valuation; to take a look at value relevance studies.

4.2. Value relevance studies

Several studies have tried to quantify value relevance. One of these studies was performed by Lev and Zarowin. Lev and Zarowin (1999) defined value relevance of earnings as the ability of variations in earnings to explain variations in share return. They argued that accounting rules were not able to properly match costs and benefits, and that the earnings number was distorted, thereby reducing the value relevance of earnings. According to Lev and Zarowin (1999) the costs and benefits of for example research and development were not properly accounted for. These costs are expensed at the moment they are made, however the benefits of these costs are received in later time periods, creating a mismatch between costs and benefits. Due to this mismatch information on R&D is not properly reflected in the earnings number, causing a decrease in the value relevance of the earnings number. Since such costs are increasing over time, it was expected that the distortion between costs and benefits kept on increasing. Therefore, Lev and Zarowin (1999) expected the earnings number to become less informative over time; to become less value relevant. This hypothesis was tested using US data ranging from 1977 to 1996. It was found that although highly fluctuating, the earnings number decreased over the sample period. Furthermore, it was found that the ERC [Earnings

Response Coefficient] decreased during the sample period, providing extra evidence for the reduction in value relevance of the earnings number. Lev and Zarowin (1999) argued that this reduction in the value relevance would hurt the welfare of both firms and investors if they are unable to find the necessary information at limited costs.

A similar study was performed by Francis and Schipper. However, Francis and Schipper (1999) defined value relevance as "*the total return that could be earned from foreknowledge of financial statement information*" (Francis & Schipper, 1999, p.320). The hypothetical situation is created in which an investor knows the earnings number a company generates one year ahead, and consequently takes a long (short) position if the information is positive (negative).

Francis and Schipper (1999) expected the value relevance of earnings to decrease over time for two reasons. First, as was argued by Lev and Zarowin (1999), there might be a misfit between the accounting of costs and benefits in the current accounting system. Secondly, there are concerns regarding the timeliness of financial statements information. It might be that competing types of information become available earlier and thus outcompete financial statement information. Whether these arguments hold, is investigated using a sample comprising firms listed on the New York Stock Exchange [NYSE], American Stock Exchange [AMEX] and NASDAQ in the period 1950-1994. Francis and Schipper (1999) found mixed results. It was concluded that the returns that could be earned with foreknowledge based on solely the sign of the earnings change did not significantly change, whereas returns decreased if the sign and magnitude of the earnings change were taken into account. Thus, Francis and Schipper (1999) found partial evidence for a decrease in the value relevance of earnings. However, the results didn't significantly differ between high-technology firms and low-technology firms, which were used as proxies for firms with a high misfit between costs and benefits and a low misfit between costs and benefits. This indicates that the decrease in value relevance might not be caused by improper accounting regulations.

Collins, Maydew and Weiss (1997) investigated the value relevance of both earnings and book values using a model proposed by Olsen (as cited in Collins et al., 1997), that regresses share price over earnings and book values. The explanatory power of this equation is then defined as the value relevance of financial statements and is decomposed into an earnings part, book values part and common part using the theoretical decomposition of Theil (as cited in Collins et al., 1997). Collins et al. (1997) give two explanations for a possible reduction in the value relevance of earnings. First, there might be a misfit between costs and benefits (as explained above). Secondly, there might be an increase in the reporting of nonrecurring items and losses. Collins et al. (1997) test whether a possible reduction in value relevance of earnings might be due to any of these two reasons using a

sample containing all NYSE, AMEX and NASDAQ firms over the period 1953 to 1993. It was found that the combined value relevance of earnings and book values did not change over the 40-year period. However, the value relevance of earnings solely did decline over this period, being replaced by more relevant book values. Furthermore, it was found that both the misfit between costs and benefits as the increased reporting of nonrecurring items and losses do explain the reduction in the value relevance of earnings.

Hayn (1995) investigated the influence of losses on the value relevance of earnings. She argued that losses should be less relevant for investors since it would be likely that losses are temporary. If losses are not temporary, investors have the option to take their money out of the company; to liquidate instead of suffering from losses year after year. At that moment they can get the their share of the net value of all assets owned by the company at that particular moment. This implies that shares always have at least some value for investors. Consequently, the share price of a company can be calculated in two ways, either based on the expected future earnings, or based on the expected liquidation value of the company. Given the availability of this (put) option to sell the shares of a company at the liquidation value if the present value of the expected future earnings of a company declines dramatically, the share price of a company will always be the higher of the liquidation value and the present value of expected future earnings. Consequently, Hayn (1995) argues that losses are less likely to lead to strong stock market reactions. She argues that in the case of losses investors will rely more on other sources of information to replace the earnings number. Therefore, losses are likely to be less strongly related towards earnings, and thus less relevant. This assumption is tested using a sample consisting of all firms included in the 1991 version of Compustat over the period 1962 till 1990. It is found that when a value relevance study is undertaken including only profit making firms, the value relevance of the earnings number is about three times higher as when compared to a study that includes loss making firms as well. When a study is conducted including only loss making firms, the results indicate that losses are completely irrelevant for investors; there is no correlation between losses and fluctuations in earnings.

Ely and Waymire (1999) researched whether the value relevance of earnings increased after "*(1) the empowerment of the Committee on Accounting Procedure (CAP) in 1939 as the first U.S. standard-setting body, and (2) subsequent reorganizations of the standard-setting process which led to the establishment of the Accounting Principles Board (APB, 1959-73) and the Financial Accounting Standards Board (FASB, 1973-present)*" (p. 294). Based on the premise by the Financial Accounting Standards Board [FASB] that it is the objective of standards setters to increase the value relevance of earnings, the most important item generated by accounting, it was argued that such events should have led to an increase in the value relevance of earnings. However, reasons were given as well as for

why these events might not lead to the desired changes in value relevance. First, it might be too difficult for standard setters to agree on how the increases in value relevance should be reached. Secondly, there is a lag in standard setting when compared to 'real-life'. It thus might be that standards setters are too late in setting the new, more proper standards. Thirdly, there might be conflicting interests that result in standards that don't lead to increases in value relevance. Whether the abovementioned events led to increases in the value relevance of earnings was tested using a sample consisting of 100 randomly chosen NYSE listed firms in the period 1927 to 1993. The analysis provides some evidence that the value relevance increased over the sample period, however the significance of the outcomes diminishes after additional analysis.

Finally, Graham, King and Bailes (2000) investigated the consequences of the 1997 crisis in Thailand on the value relevance of earnings and book values for Thai firms. During this crisis, the Thai Baht was devalued, causing foreign exchange losses for Thai firms. Furthermore, the Baht became much more volatile after the devaluation in 1997. Consequently, the accounting framework might cause a mismatch between recognized profits and the subsequent cash flows. It was expected that this would lead to a decrease in the value relevance of earnings and book values, which was tested using a sample comprising quarterly data on all Thai listed firms in the first quarter of 1992 to the first quarter of 1998. Graham et al. (2000) found that after the crisis (the devaluation of the Baht) the value relevance of both earnings and book values declined, with the value relevance of earnings declining the most during this period. This evidence is in line with the findings of Hayn (1995). Since more losses were reported during the crisis, the overall value relevance of the earnings number will decline during a crisis, as Graham et al. (2000) found.

Prior literature has shown that the cause of decreasing value relevance of the earnings number over time might be the former accounting frameworks (local GAAPs). These accounting frameworks created a misfit between costs and benefits (Lev & Zarowin, 1999), might have been untimely (Francis & Schipper, 1999), couldn't properly handle nonrecurring items and losses (Hayn, 1995) and led to a lower value relevance of earnings in times of crisis (Graham et al., 2000). It was also found that reorganizations of the standards (setting processes) don't necessarily lead to increases in the value relevance of earnings (Ely & Waymire).

It was thus shown that some of the reasons for a decline in value relevance might come down to improper accounting standards. The question therefore arises whether the mandatory adoption of IFRS in for example the EU in 2005 has changed the value relevance in earnings. Several studies addressed this question so far, and these will be discussed next.

4.3. Value relevance of local GAAPs versus IFRS

Clarkson, Hanna, Richardson and Thompson (2011) conducted a value relevance study including the companies listed in 15 countries[1] that were included in Worldscope 2007. Since the 2004 GAAP financial statements had to be included in the 2005 financial statements converted to the correct IFRS amount, a perfect possibility exists to use a 'same firm year' research design. Since the only condition that has changed for the reconciliations of the 2004 earnings number is the accounting framework, any changes in the value relevance of the earnings number must be caused by changes in the accounting framework.

The value relevance of the 2004 GAAP earnings number is compared to the 2004 IFRS earnings number, while being measured as the ability of earnings and book values to explain differences in share prices. Using this design they test whether the adoption of IFRS has led to increases in value relevance. Furthermore, they looked at whether differences in value relevance exist between code law and common law countries. The final hypothesis investigated, was whether the adoption of IFRS has lead to capital market benefits. It was found that for common law countries the value relevance of earnings increased, whereas for code law countries the value relevance of earnings declined after the adoption of IFRS. Furthermore, it was found that the capital market benefits of IFRS introduction were only limited.

Another multi-country study was conducted by Aubert and Grudnitski (2011). They investigated the value relevance of the earnings number using a sample comprising of 12[2] European countries with firm information from 2005. However, a slightly different approach to measure value relevance was used since the focus was more on earnings in this study. Value relevance was measured as the association between EPS and the sign of earnings, and annual share return. Based on the claim by Daske and Gebhart (as cited in Aubert & Grudnitski, 2011) that IFRS provides higher quality information for investors, it was expected that the introduction of IFRS would lead to increases in the value relevance of earnings. The results showed that the earnings number produced under IFRS still is relevant for investors, however no differences in value relevance have been observed between the GAAP earnings number and IFRS earnings number. So IFRS adoption didn't lead to increases in value relevance in these 12 countries.

[1] These countries contained 3 code law countries: Australia, Ireland and the United Kingdom. The other 12 countries were Belgium, Denmark, Finland, France, Germany, Greece, Italy, the Netherlands, Norway, Portugal, Spain and Sweden.

[2] These were Belgium, Finland, France, Germany, Greece, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom.

The influence of IFRS adoption on the value relevance for firms from 9[3] European countries with an asset value of more than €10 million and positive earnings for the years 2004 and 2005 (the transition years) was investigated by Capkun, Cazavan-Jeny, Jeanjean and Weiss (2008). They defined value relevance as the influence the earnings number has on the market value of equity. Using the 'same firm year' design, Capkun et al. (2008) found that the disclosure of IFRS earnings was value relevant for investors. As a result the value relevance of earnings in these countries did increase after the adoption of IFRS.

The question whether the introduction of IFRS has led to an increase in value relevance for firms listed on the exchanges in Frankfurt, Madrid, Milan, Paris and London was investigated by Devalle, Onali and Magarini (2010). Based on the premise that the introduction of IFRS would lead to an increase in transparency and cross-border comparability, it was expected that the value relevance of earnings would increase after the introduction of IFRS. They therefore investigated whether the introduction of IFRS has led to a stronger relation between accounting measures and market data (share price). Using a chow test it was tested whether IFRS caused a trend break in the value relevance trend for any of these exchanges in the period 2002 to 2007. With value relevance being defined as the ability of earnings to explain share prices, Devalle et al. (2010) found that value relevance increased in all five countries.

The value relevance of IFRS compared to German GAAP and US GAAP was investigated by Bartov, Goldberg and Kim (2005). It was argued that since US GAAP and IFRS were developed in a more shareholder-oriented setting than German GAAP, the value relevance of earnings should increase after the transition from German GAAP towards IFRS. Furthermore, comparisons were made between the value relevance of US GAAP and IFRS. Using a sample comprising of German listed firms during the period 1998-2000, value relevance was tested following the method by Francis and Schipper (1999, the return that could be earned from having foreknowledge). It was found that this return was higher for firms reporting under IFRS or US GAAP (respectively an incremental 22% and 23%), implying that the value relevance of earnings is higher for firms reporting under IFRS or US GAAP. However, no significant differences were found in value relevance between IFRS and US GAAP. Hung and Subramanyam (2007) investigated whether the adoption of IFRS in Germany had led to higher value relevance of earnings as well. However, this study only focused on the 80 firms that voluntarily adopted IFRS in the period 1998 to 2002. Defining value relevance as the ability of accounting measures to explain variation in share prices, it was found that the value relevance of earnings decreased after the voluntary adoption of IFRS. Similar results were found by Schiebel

[3] These were the UK, France, Italy, Sweden, Norway, Spain, the Netherlands, Poland and Ireland.

(2009), who focused on companies listed on German stock exchanges as well. The companies included by Schiebel (2009) had to be listed during the period 2000 to 2004 and issue both German GAAP and IFRS financial statements. He defined value relevance as the influence the financial statements have on the market capitalization of the firm and found that although both IFRS and German GAAP are value relevant, German GAAP is more relevant for investors than IFRS.

In another study, Liao, Sellhorn and Skaife (2012) defined value relevance of earnings as the cross-country comparability of earnings numbers. In this particular study they compare the earnings numbers for German and French listed firms over the period 2006 to 2008. It was found that right after the adoption of IFRS the earnings numbers of German and French firms are highly comparable. However, in the longer run the comparability of earnings numbers decreases. As is explained by Liao et al. (2012), this is probably caused by the fact that managers from firms based in differing countries make different accounting choices.

Whether the value relevance of earnings for Spanish companies has changed after the introduction of IFRS was investigated by Callao, Jarne and Laìnez (2007). Using the 26 companies listed on the IBEX35 [Spanish Exchange Index] that had not adopted IFRS voluntarily or were not financial institutions or insurance companies, it was tested whether the financial statements over the first half of 2004 prepared using Spanish GAAP were more value relevant than the IFRS version of the financial statements over that period. With value relevance being measured as the gap between book values and market values, it is found that value relevance has declined in the Spanish market after the introduction of IFRS (since the gap between book values and market values has increased over the sample period). This study was later extended by Gastón, García, Jarne and Laínez Gadea (2010) to include the UK as well, in order to be able to make comparisons between code (UK) and common law (Spain) countries. Using a sample comprising companies listed on the Madrid Stock Exchange General Index and Financial Times Stock Exchange Index 100 in 2004, the value relevance of the financial statements is measured again as the gap between book values and market values. In both countries it was found that this gap increased, implying a decrease in value relevance of the financial statements, with results being more significant for Spain then for the UK.

In the UK firms were obliged to issue separate IFRS reconciliations of their GAAP earnings numbers. Since this was done after the GAAP earnings number became available, Horton and Serafeim (2010) had the possibility to investigate the incremental value relevance of these reconciliations. Furthermore, it was investigated whether the IFRS reconciliations provided investors with new information. Over a sample comprising the firms listed on the London Stock Exchange FTSE 350, it was found that the introduction of IFRS is value relevant, with value relevance being measured as the

influence the reconciliation has on the stock price five days after the announcement of the reconciliation. Proof was found as well for the premise that IFRS provides investors with new information, which is in line with the evidence of increased value relevance.

The influence of IFRS adoption on the value relevance of earnings in Norway was investigated by Gjerde, Knivsflå and Sættem (2008). Based on a sample comprising all firms listed on the Oslo Stock Exchange in 2004 and 2005, it was found that IFRS is more value relevant then Norwegian GAAP, with value relevance being measured as the ability of book values and earnings to explain share prices. However, when the focus is on earnings only, no higher value relevance was observed under IFRS. The value relevance of earnings was mainly harmed by transitory items, which supports suggestions by for example Bradshaw and Sloan (as cited by Gjerde et al., 2008).

Stergios, Athanasios and Nikolaos (2005) investigated whether the adoption of IFRS in Greece resulted in an increased value relevance using a sample of Greek firms listed on the Athens Stock Exchange that first adopted IFRS (voluntarily) in 2003 or 2004. With value relevance being defined as the ability of accounting measures to explain share price, it was found that the introduction of IFRS didn't change the observed value relevance of earnings for Greek companies.

Niskanen, Kinnunen and Kasanen (2000) investigated whether the value relevance of earnings composed under local accounting standard [LAS] differs from that under international accounting standards [IAS]. They investigate the case of Finland during the period 1984 to 1992, which results in 142 observations in which the statements were issued both in LAS and IAS. The case of Finland is interesting since the partially segmented stock market of Finland (with restricted [domestic] shares and unrestricted [international] shares) provides additional insights in the value relevance according to domestic and international investors. With value relevance being defined as the influence the earnings number has on share return, it was found by Niskanen et al. (2000) that the value relevance of LAS does not significantly differ from the value relevance of the IAS earnings number.

As in Europe, Australia adopted IFRS in 2005 as well. This provided Goodwin, Ahmed and Heaney (2008) with the possibility to investigate the influence of IFRS on the value relevance of earnings in Australia. It was expected by the Australian Accounting Standards Board [AASB] that the introduction of IFRS would increase the value relevance of accounting numbers. For a sample of 1065 firms listed on the Australian Stock Exchange over the period 2004 to 2006, it was tested whether the value relevance of earnings indeed increased, with value relevance being measured as the ability of earnings to explain share returns. In contrast to the expectations from the AASB, it was found that the adoption of IFRS did not lead to increased value relevance of earnings for Australian firms.

Instead of focusing on one or more countries, the study by Agostino, Drago and Silipo (2011) focuses on one specific sector; the European banking industry. Agostino et al. (2011) investigate whether the value relevance for the banking industry increased during the period 2000 to 2006. The companies included in the sample were all banks listed on a stock exchange in one of the EU-15 countries. With value relevance being measured as the influence of earnings on the stock price, Agostino et al. (2011) found that the introduction of IFRS has increased the value relevance of earnings in the European banking industry.

The results of the literature review are tabulated in table 2.

4.4. Conclusion

What is interesting to note about the evidence provided by prior literature, is that literature is highly conflicting. In particular, it seems that differing proxies yield differing results concerning the value relevance of earnings over the same sample country. For example, when we have a look at the studies that included five countries or more (and which included the same countries), only the study by Aubert and Grudnitski found evidence for no significant change in the value relevance of earnings (in all countries). Other multi-country studies sometimes found differing, conflicting results for similar countries. Furthermore, when we look at the results for, for example, the UK, highly differing outcomes were observed, ranging from increases (see Horton & Serafaim, 2010), to no changes (see Aubert & Grudnitski, 2011), or even decreases (see Gaston et al., 2010).

For this study it thus is important to take this fact into account; the use of only one measure for value relevance might give a distorted picture of reality. Therefore, this study will use multiple models to measure the value relevance of earnings. The first, based on the study by Lev and Zarowin (1999), uses the adjusted R^2 to measure the value relevance of earnings, whereas the second, based on the study by Francis and Schipper (1999), focuses on the influence of earnings on returns to measure the value relevance of earnings.

Table 2: Overview of prior literature

Authors	Sample (years and country)	Definition value relevance	Changes in value relevance observed
Clarkson et al.	Same year; 15 countries	Ability of earnings and book values to explain share prices	Increase for common-law countries; Decrease for code-law countries
Aubert and Grudnitski	Same year; 12 countries	Association between EPS and the sign of the change in earnings and share return	No change in value relevance
Capkun et al.	Same year; 9 countries	Influence of earnings on the market value of equity	Value relevance increased in all countries
Devalle et al.	Multi year (2002-2007); 5 countries	Relation between earnings and share prices	Increase in all 5 countries
Bartov et al.	Multi year (1998-2000); Germany	Return that can be earned from using foreknowledge	IFRS more value relevant than German GAAP
Hung and Subramanyam	Multi year (1998-2002); Germany	Ability of earnings to explain changes in share price	Decrease in value relevance
Schiebel	Multi year (2000-2004); Germany	Influence of earnings on the Market Value of equity	Decrease in value relevance
Liao et al.	Multi year (2006-2008); Germany and France	Cross-country comparability of the earnings number	In the first year after IFRS-adoption earnings were more comparable; however after the first year comparability decreased

Callao et al.	Same year; Spain	Gap between book value of equity and market value of equity	Value relevance decreased
Gaston et al.	Same year; Spain and UK	Gap between book value of equity and market value of equity	Value relevance decrease in both countries
Horton and Serafeim	Same year; UK	Influence of IFRS reconciliations on the share price	Increase in value relevance
Gjerde et al.	Same year; Norway	Ability of changes in earnings to explain abnormal share returns	No differences in value relevance
Stergios et al.	Same year; Greece	Ability of earnings to explain share prices	No differences in value relevance
Niskanen et al.	Multi-year (1984-1992); Finland	Influence of the earnings number on the share return	No differences in value relevance
Goodwin et al.	Multi-year (2004-2006); Australia	Ability of earnings to explain share returns	No difference in value relevance
Agostino et al.	Multi-year (2000-2006); Banking industry	Influence of earnings on share price	Value relevance increased

5. Hypothesis development

This section develops the hypotheses that will be tested in this study in order to give a proper answer to the research question. Since IFRS could have a (different) effect on the value relevance of the earnings number on the short and long term, and since the financial crisis might have had an influence on the value relevance of the earnings numbers as well, it is important to develop hypotheses for all these contingencies.

5.1. Hypothesis one

The first hypothesis discusses the short term effect of IFRS adoption on the value relevance of the earnings number. Devalle et al. (2010) explained that one of the goals of IFRS adoption was to increase the transparency of the financial statements across borders. In the years before IFRS was adopted, it was noted that the capital market highly internationalized. Therefore, it was argued that it would be good to increase to comparability of financial statements, by harmonizing the underlying accounting regulations. The increased harmonization was in turn expected to facilitate cross-border investments, leading to increased market liquidity and consequently a lower cost of capital.

Devalle et al. (2010) argued that this would imply that the financial statements, and thus the earnings number, would have become more important after the introduction of IFRS. Therefore, the association between the earnings number and market data (e.g. share price or share return) should increase; a higher value relevance of the earnings number should be observed after the adoption of IFRS.

However, Barth et al. (2008) noticed that there might be some downsides to IFRS adoption. They argued that the adoption of IFRS might lead to decreased flexibility in financial reporting on behalf of the manager. IFRS might force a firm's management to use a specific accounting regulation, even though this regulation might not provide the firm with the most informative financial statements. Consequently, accounting quality would decrease, leading to less relevant financial statements.

Another downside of the adoption of IFRS could be that it does not properly fit into the other regulations that are in place in the adopting countries, as was noted by Bartov et al. (2005). They argued that IFRS was developed in a shareholder-oriented setting. However, some European countries (such as the Netherlands) are more stakeholder-oriented. These orientations demonstrate different goals for financial reporting. According to Hung and Subramanyam (2007) this might harm the value relevance of the earnings number, if the firm's management and the investors are not able to sufficiently understand the implications of IFRS in time.

Due to these conflicting expectations concerning the value relevance of the earnings number after the adoption of IFRS, the first hypothesis is stated as:

H_1: The mandatory adoption of IFRS in the Netherlands did not lead to a change in the value relevance of the earnings number of Dutch listed companies.

5.2. Hypothesis two

The second hypothesis discusses the implications of the financial crisis on the value relevance of the earnings number. The Dutch economy was hit hard by the most recent global financial crisis (in this study identified as the period 2009-2012 [see also section 6.2]), and it might even be said that the Dutch economy is still in crisis (Aizenman, 2013). Prior literature has shown that a crisis might have an significant influence on the value relevance of the earnings number.

As was found by Graham et al. (2000) the value relevance of the earnings number decreases during a crisis, and decreases permanently if the crisis has a permanent, significant influence on earnings and the related cash flows (for example via more volatile exchange rates).

Further evidence for decreased value relevance during crisis times was provided by Hayn (1995). She found that losses usually inhibit a lower value relevance for investors, since losses usually aren't very persistent over time. Since shareholders always have the possibility to liquidate their stocks at some value, it would be unlikely to see the value of a stock decrease all the way to zero in the case of losses year over year. So stocks always have some value due to the possibility investors have to liquidate their stocks. Given the fact that a higher number of losses is reported during a crisis, one could suggest that the value relevance of the earnings number decreased during the financial crisis.

Based on the above evidence the second hypothesis is stated as:

H_2: The value relevance of the earnings number of Dutch listed companies decreased during the last global financial crisis.

5.3. Hypothesis three

The last hypothesis discusses the long term effects of the adoption of IFRS on the value relevance of the earnings number. How does the value relevance of the earnings number change over time after the adoption of IFRS?

Lev and Zarowin (1999) argued that the decreasing value relevance might be caused by 'change'. Firms change their behavior (e.g. more intangibles) and consequently different information is needed for investors. However, whereas firms changed, accounting standards did not change and

consequently the different information needed by investors is not (sufficiently) provided by the financial statements. As a consequence the financial statements gradually lose some of their relevance for investors. If IFRS better copes with this business change as did former accounting regulations, IFRS might lead to an earnings number that does not face this gradual loss in value relevance over time. However, if IFRS cannot cope with 'change' as well, it is expected that the value relevance of earnings will (continue to) decrease over time after IFRS was adopted.

Ely and Waymire (1999) gave some additional explanations for why the value relevance of earnings has been decreasing. According to them, increasing value relevance via regulations is an extremely complex process. Consequently, it might be hard for standard setters to implement regulations that will enhance value relevance. Secondly, it might be that standard setters are just too late. Since the standard setting process is a political process, it takes some time before regulations have been implemented that increase the value relevance. Consequently, it might be that their efforts are effective to some extent, but other problems have arisen already. Finally, due to the political process in which standards are set, it might be necessary to implement some important rules that also have the side effect of harming the value relevance of the earnings number. In other words, value relevance might not be the most important concern for standard setters. This also contributes to the expectation that the value relevance of earnings might continue to decrease after the adoption of IFRS.

Another suggestion could be that financial statement information just is not timely enough for investors (Francis & Schipper, 1999). Consequently they could decide to turn to other types of information. Cohen et al. (2011) investigated investors' needs for other types of information that are usually not included in the financial statements (e.g. economic performance indicators, corporate governance information and CSR information). They found that investors highly value these other types of information and already use these extensively. Furthermore, it was found that they will become more and more interested in these types of information and will use them more extensively in the future. This leads to the suggestion that financial statement information will be replaced by other types of information to some extent. This would imply that the value relevance of earnings will decline after IFRS was adopted.

Based on the suggestions above the third hypothesis is stated as:

H_3: After IFRS was adopted, the value relevance of the earnings number of Dutch listed companies decreased over time.

6. Sample selection

The sample of this research consists of all firms that are currently publicly listed in the Netherlands. The choice for the Netherlands as the sample country is made because of the Dutch stakeholder-oriented institutional environment (Van Bekkum et al., 2010), while IFRS was developed in a more shareholder-oriented environment. Consequently, the implementation of IFRS in the Netherlands might not lead to the outcomes desired by the EU (Hung & Subramanyam, 2007). Furthermore, focusing solely on the Netherlands as the sample country overcomes the problems of comparing the outcomes across countries whose institutional environments differ (as is in line with Hung & Subramanyam, 2007).

6.1. Sample selection process

First, the names of the companies listed in the Netherlands are retrieved from the website of the Amsterdam Exchange Index ([AEX] 2014). This results in a list of 141 companies currently listed in the Netherlands. The data on these companies is retrieved from the Thompson One Banker database (earnings, share price, dividends, and market capitalization) and Compustat (the accounting standards used). Due to data limitations 48 companies were dropped from the sample. Furthermore, in order to overcome problems concerning a self-selection bias, early IFRS adopters are removed from the sample. Eventually, 58 companies were found to be suited for the analysis. The exact breakdown of this process can be found in table 3.

The data on these 58 firms is obtained for the period 1995 - 2013. Due to the research design (one of the variables concerns the year-to-year change in earnings) the analysis can be performed from 1996 onwards. Obtaining the data for these firms results in a total of 939 firm years that will be included in the sample.

Table 3: breakdown of sample selection process

Starting number of companies	141
Companies not available in Thomson One Banker	13
Discarded due to a lack of data on earnings	11
Discarded due to a lack of data on dividends	2
Discarded due to a lack of data on stock prices	3
Discarded due to a lack of data on the standards used	32
Discarded due to being an early-adopter	8
Discarded due to the use of standards other then Dutch GAAP	7
Discarded for not being settled in the Netherlands	7
Number of firms included in the sample	58

6.2. Procedure for testing hypothesis two and three

In testing hypotheses two and three, the analysis will be performed over the data from 2005 and onwards. The years before 2005 are dropped from the sample, since these years are no longer relevant in testing these hypotheses. Furthermore, in testing hypothesis two the year 2013 will not be taken into account as well, to keep the pre-crisis years and crisis-years equal, and due to the relatively small number of observations included in the sample for this year.

Finally, for testing hypothesis two it is important to identify which years will be regarded as crisis years. According to Fry, Hsiao and Tang (2011) the great depression started in September 2008. The exact moment identified by them is the collapse of Lehman Brothers. However, when looking at the data on economic growth in the Netherlands, it is shown that the Dutch economy continued to grow until the end of that year. The first negative economic growth was reported for the first quarter of 2009 (Centraal Bureau voor de Statistiek, 2014). Therefore, the first crisis year in the sample is 2009. Since the crisis still has not ended (Aizenman, 2013), the last crisis year is 2012, the last year of the sample for hypothesis two.

7. Research design

As was made clear during the literature review, the use of different research methodologies might lead to differences in the outcomes observed. The two most common approaches used in the studies included in the literature review looked either at the explanatory power earnings have over some market data, or directly measured the effect earnings have on share return. Therefore, it seems appropriate to look at both types of models in order to reach more reliable conclusions concerning the value relevance of the earnings number. In this study, two models will thus be used; one, which looks at the explanatory power of earnings over share return, and one, which looks at the direct effect of earnings on, share return. The model developed by Lev and Zarowin (1999) is the model that will be used here to test the explanatory power of earnings over share return. As an association model, this model is able to assess the incremental value relevance achieved by any type of change in accounting measures. Furthermore, this type of model (as well as the other model used) measures the consequences of actual actions taken by investors and companies, whereas other types of models would investigate their opinions or beliefs.The model developed by Francis and Schipper (1999) is the model that will be used here as the model to directly measure the influence of earnings on share return. This model is chosen since it attaches value to the actual returns and earnings achieved by the company. Furthermore, this model is able to correct for market-wide effects observed in the data, which the first model cannot.

7.1. Lev and Zarowin model

Lev and Zarowin (1999) measure the value relevance of the earnings number as the explanatory power (adjusted R^2) it has over stock return (including dividends). Then, the higher the explanatory power, the higher is the value relevance of earnings. For the calculation of the explanatory power, the following equation is estimated for each year included in the sample:

$$R_{it} = \beta_0 + B_1 * E_{it} + \beta_2 * \Delta E_{it} + \varepsilon_{it} \qquad (1)$$

Where:

R_{it} = Stock return in year *t* for firm *i*, including dividends.

E_{it} = Earnings number before extraordinary items for firm *i* in year *t*.

ΔE_{it} = Change in earnings for firm *i* when compared to one year before which is used as a proxy for earnings surprises.

Both earnings and the change in earnings are scaled against the beginning of the years' market value of that company.

When estimated for each year, this results in a list of adjusted R^2's, with one observation for each year included in the sample. Consequently, this list can be regressed over time to see the development of the explanatory power of earnings over stock return, using the following equation (Lev & Zarowin, 1999):

$$Adjusted\ R_t^2 = \beta_0 + \beta_1 * t + \varepsilon_t \qquad (2)$$

Where:

$Adjusted\ R_t^2 =$ Explanatory power of earnings over stock return for year t; as was found by estimating equation (1)

t = time; where 1 = 1996 and 18 = 2013.

Equation 2 will then be used to reach conclusions regarding hypothesis one. The exact steps taken from here will be discussed after the introduction of the second model, since these steps are the same for both models.

7.2. Francis and Schipper models

Francis and Schipper (1999) defined the value relevance of earnings as the return that could have been earned from using foreknowledge. Based on a particular company (or better said earnings) characteristic an investment position is taken, as if it was done at the beginning of the book year. Doing this for all stocks included in the sample results in an investment portfolio that will be used for the calculations. In total Francis and Schipper (1999) created two portfolios in their study that are of interest in this study.

The first portfolio is based solely on the sign of the change in earnings. It is argued that a positive change in earnings is a sign of an increase in the stock price of that company. Consequently, a long position is taken in that stock. On the other hand, a negative change in earnings is expected to be an indicator of a declining stock price. Therefore, short positions are taken in these stocks (Francis & Schipper, 1999).

The second portfolio is composed based on both the sign of the earnings change and the magnitude of the earnings change. For each year the companies are ranked based on their earnings change scaled by the market capitalization. A long position is taken in the firms with the 40% highest

earnings change, whereas a short position is taken in the 40% firms with the lowest earnings change (Francis & Schipper, 1999).

After these portfolios have been composed, three different returns (including dividends) are calculated; the market return, the return earned from using the abovementioned investment portfolios and a return that could have been earned from having perfect foresight (as if one knows the correct sign of the change in share price). These returns are calculated over a 15-month period starting at the beginning of the book year. Note that the use of the 15-month period is in line with evidence provided by Nichols and Wahlen (2004) on the effect of the earnings number on stock returns. They found that investors start anticipating the firm's earnings early in the book year already, and that the information content of the earnings number is not fully included in the stock price until a significant period after the end of the book year.

In order to correct for market-wide effects on the share return the market return is deducted from the return earned from using the investment portfolios. This market-adjusted share return number (denoted as %) shows the return that could have been earned from having foreknowledge of the earnings number. Next, the market-adjusted return is divided by the return that could have been earned from having perfect foresight in order to control for time-series differences. This number (denoted as %MKT) is defined as the proportion of the information included in the share price that is captured by the earnings number, and is the proxy of value relevance (Francis & Schipper, 1999).

Performing these calculations for each year in the sample gives a list %MKT's that can be used as dependent variable in a regression analysis (with time as the independent variable) to reach conclusions concerning the hypotheses. The regression to be estimated is (Francis & Schipper, 1999):

$$\%MKT_t = \beta_0 + \beta_1 * t + \varepsilon_t \qquad (3)$$

Where:

$\%MKT_t$ = Proportion of all information included in the share price that is captured by the earnings number in year *t*.

t = Time; where 1 = 1996 and 18 = 2013.

7.3. Test for hypothesis one

From this moment on the analysis is the same for both models. After estimating equations (2) and (3) hypothesis one can be tested. This will be done by performing a Chow test. A Chow test is used in order to test for the existence of a structural break in a time-series regression. If this Chow test turns

out to be significant, this implies that the coefficients in the estimated equation, will significantly differ from each other if the sample is divided into two subsamples (Devalle et al., 2010). For this study this would thus imply that the adoption of IFRS has resulted in a significant change in the value relevance of the earnings number.

To obtain results for the Chow test the following regression will be estimated:

$$Adjusted\ R_t^2\ or\ \%MKT_t = \beta_0 + \beta_1 * t + \beta_2 * IFRS + \beta_3 * T * IFRS + \varepsilon_t \qquad (4)$$

Where:

IFRS = a dummy variable which denotes whether the observation is in a year in which IFRS is used or not

*T * IFRS* = a variable that measures the interaction effect between *T* and *IFRS*

Next an F-test is performed on the variables *IFRS* and *T*IFRS.* If these two variables taken together turn out to have a significant effect on the dependent variable, the introduction of IFRS has had a significant impact on the value relevance of the earnings number.

7.4. Test for hypothesis two

In order to test for the effect of the financial crisis on and the long term development of the value relevance of earnings (hypotheses 2 and 3) the sample will be changed as was described in the section on sample selection. To test for the effect of the financial crisis an additional variable will be added to equation (2) and (3) which measures the effect of the crisis:

$$R_t^2 = \beta_0 + \beta_1 * t + \beta_2 * Crisis + \varepsilon_t \qquad (5)$$

$$\%MKT_t = \beta_0 + \beta_1 * t + \beta_2 * Crisis + \varepsilon_t \qquad (6)$$

Where:

Crisis = a dummy variable representing the crisis years; where crisis = 0 if there is no crisis; crisis = 1 when there is a crisis.

t = Time; where 1=2005 and 8=2012.

If in equation (5) and (6) β_2 turns out to be significant, it is shown that the crisis has a significant influence on the value relevance of earnings.

7.5. Test for hypothesis three

To see the long term development of the value relevance of earnings equation (2) and (3) will be estimated again using the same sample as used for hypothesis 2, but including 2013 as well. In this setting the coefficient of interest is β_1. If this coefficient turns out to be significant, time does have a significant influence on the value relevance of earnings.

Finally, robustness test will be performed to increase the power of the results found initially. These tests repeat the original analysis twice, but loss-year observations will be excluded from the sample the first time, whereas outlier observations will be left out the second time.

7.6. Validity

This section discusses the validity of the models employed on three levels; construct validity and reliability, internal validity and external validity.

A construct is valid and reliable if that construct has been used extensively in prior literature. Given the fact that the constructs used in this study are taken from prior literature it can be concluded that the constructs are both valid and reliable.

A study is internally valid if one is able to eliminate all rival hypothesis; if a causal relationship is established in which is controlled for all possible other mediating factors (Smith, 2011). In this study a clear causal relation is established. IFRS is adopted, and the change is sought afterwards. However, no control variables have been used, however, no other significant changes to the Dutch accounting environment occurred during that period. Company specific factors could have been added to the model to correct for their influence, however instead of being a correcting factor, adding such variables would actually be a quest for explanations of the observed patterns (as was done by Lev and Zarowin [2009]), which is not a part of the goal of this study.

A study is externally valid if the results of the study can be generalized to the real world (Smith, 2011). This study contains relatively low external validity. Even though an archival study is performed, the findings are applicable only to the Dutch institutional setting. Consequently, it is necessary for others who want to extrapolate from these to compare the Dutch institutional setting to the institutional setting of the country at hand.

8. Results

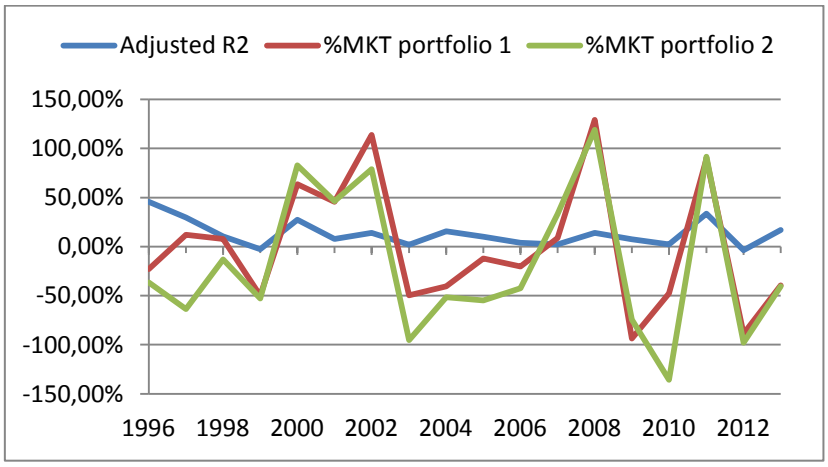
This section provides the results found when the approaches mentioned in the research design are applied to the sample of Dutch listed companies. First, the descriptive statistics will be presented and some interesting features about these will be discussed. Secondly, the results of the hypotheses testing will be discussed. The statistical justification of the models used can be found in appendix 1.

8.1. Descriptive statistics

The descriptive statistics can be found in table 4 and graph 1. The table shows the statistics when all observations in the sample are included. As can be seen from the data in the table and graph the value relevance of earnings is highly fluctuating for both of the models used in this study. This finding of highly fluctuating value relevance is in line with the findings in the studies by Lev and Zarowin (1999) and Francis and Schipper (1999).

Some interesting facts to note about table 4 is that for some years a negative adjusted R^2 was observed. This might be caused by the low number of observations that is used in running the regressions in combination with relative low value relevance for that year. Furthermore, it is observed that quite often a portfolio based on earnings characteristics is not able to outperform the equally weighted market portfolio (as is shown by the negative observations in the %-columns). Consequently, earnings information explains a negative part of the maximal return that could have been earned from using foreknowledge (shown by the negative %MKT). These findings imply that relying on earnings information to make investment decisions, leads to the forming of an investment portfolio that earns returns that are below the market's average.

Graph 1: Value relevance of earnings over time



In this graph the adjusted R^2 are converted into percentages.

Table 4: The value relevance of the earnings number in both models for the years 1996-2013.

		Lev and Zarowin model	Francis and Schipper model			
			Portfolio 1		Portfolio 2	
Year	N	Adjusted R^2	%	%MKT	%	%MKT
1996	39	0,4579	-16,62%	-22,86%	-27,07%	-36,57%
1997	42	0,2981	0,01%	11,94%	-31,80%	-63,72%
1998	48	0,1051	2,68%	7,68%	-4,66%	-13,05%
1999	42	-0,0268	-19,13%	-49,90%	-22,95%	-52,78%
2000	55	0,2732	18,91%	63,68%	25,10%	82,87%
2001	55	0,0774	12,46%	45,65%	13,57%	46,27%
2002	55	0,1407	39,99%	113,95%	43,59%	78,98%
2003	55	0,0186	-31,98%	-49,52%	-62,51%	-95,40%
2004	55	0,1576	-25,19%	-40,51%	-28,69%	-51,64%
2005	55	0,1009	-10,84%	-12,24%	-47,59%	-54,80%
2006	55	0,0401	-10,25%	-20,23%	-20,41%	-42,36%
2007	55	0,0238	1,49%	8,83%	7,41%	33,33%
2008	56	0,1386	63,54%	129,16%	56,83%	119,16%
2009	56	0,0753	-61,17%	-93,55%	-49,49%	-74,26%
2010	54	0,0216	-18,77%	-47,66%	-36,93%	-135,81%
2011	53	0,3367	24,17%	89,34%	26,75%	91,55%
2012	54	-0,0360	-47,61%	-88,76%	-53,90%	-98,01%
2013	41	0,1702	-16,68%	-39,61%	-16,41%	-40,45%
Average		0,1318	-5,28%	0,30%	-12,73%	-17,04%

N is the number of firm-year observations in that particular year.

The adjusted R^2 shows the adjusted R^2 found when a regression analysis is performed for each year estimating equation (1).

% shows the market adjusted return that could have been earned with a portfolio based on abovementioned earnings information.

%MKT shows the percentage of maximal return that could have been earned from using foreknowledge, that is explained by the abovementioned earnings information.

Furthermore, all proxies of value relevance seem to move in the same direction each time. However, the value relevance measures from Francis and Schipper (1999) fluctuate more strongly than the measure by Lev and Zarowin (1999). This might be an explanation for the differing results found in prior literature. Most studies that reported a decrease or insignificant change in the value relevance of the earnings number relied on a proxy similar to the one by Lev and Zarowin (1999), whereas the studies that reported a positive change in value relevance mostly used a measure of value relevance comparable to that by Francis and Schipper (1999). A differing choice of proxy might thus imply a stronger fluctuation in the observed value relevance, which in turn could lead to a higher significance observed in the explanatory variables.

The last point to mention about the descriptive statistics concerns the averages of each variable. For the Lev and Zarowin (1999) study the average adjusted R^2 found is about the same as the average found here. However, the average %MKT's found in the Francis and Schipper (1999) study are considerably higher than those found in this study (respectively 45% and 59% in the Francis and Schipper study, versus 0,3% and -17% in this study). However, since these studies consider different samples no conclusions should be based on these comparisons.

8.2. Hypothesis 1

Hypothesis one hypothesized that the value relevance of the earnings number did not significantly change after the adoption of IFRS. In order to obtain the results a chow test is performed, which tests whether all coefficients in the equation significantly differ between the pre-IFRS period and the post-IFRS period. Table 5 shows the results of performing the chow test.

For this number of observations and this number of variables tested in the null hypothesis the critical value to which we need to compare the F-test statistics found here, is 3,74 (Studenmund, 2011). Since the F-test statistics found in performing the Chow tests are lower than the critical value, it can be concluded that the mandatory adoption of IFRS in the European Union did not lead to a change in the value relevance of the earnings number for Dutch listed companies.

As hypothesized this would imply that the benefits of the mandatory adoption of IFRS do not outweigh the potential disadvantages caused by mandatory IFRS adoption. Dutch investors thus seem to attach more value to the accounting flexibility on behalf a firm's management, than to increased transparency in the financial sector. Another possible explanation might be that the Dutch stakeholder-oriented institutional environment is not properly tailored towards the needs of shareholder-oriented environment in which IFRS was designed.

Table 5: results hypothesis 1

Model	Constant	Time	IFRS	Time*IFRS	F-test statistic
Adjusted R^2	0,322	-0,031	-0,356	0,040	1,590
	(3,54)	(-1,92)	(-1,44)	(1,77)	
%MKT Portfolio 1	0,045	0,009	0,644	-0,064	0,130
	(0,09)	(0,10)	(0,46)	(-0,50)	
%MKT Portfolio 2	-0,223	0,021	-0,578	-0,063	0,090
	(-0,38)	(0,20)	(-0,36)	(-0,42)	

T-values are shown in the parentheses

Table 6: results hypothesis 2

Model	Constant	Time	Crisis
Adjusted R^2	0,066	0,004	0,008
	(0,53)	(0,09)	(0,04)
%MKT Portfolio 1	-0,492	0,302	-1,825*
	(-0,71)	(1,29)	(-1,70)
%MKT Portfolio 2	-0,804	0,377	-2,187*
	(-1,02)	(1,42)	(-1,79)

T-values are shown in the parentheses
* implies significant at the 10% significance level

8.3. Hypothesis 2

Hypothesis two hypothesized whether the ongoing financial crisis has had any influence on the value relevance of the earnings number. The variable of interest is 'Crisis' in equation (5) and (6). The results of the analysis are shown in table 6.

Table 6 shows that partial and weak evidence is found in favor of hypothesis two. For the models based on the Francis and Schipper (1999) study it is found that the variable crisis has a negative influence on the value relevance of the earnings number at the 10% significance level[4]. During the crisis years the earnings number thus is not a very good indicator of the change in stock price

[4] In a t-test with 8 observations and two explanatory variables the critical value of t to which the t-values should be compared is 1,476.

Table 7: results hypothesis 3

Model	Constant	Time
Adjusted R^2	0,050	0,009
	(0,60)	(0,63)
%MKT Portfolio 1	0,193	-0,055
	(0,34)	(-0,54)
%MKT Portfolio 2	-0,017	-0,041
	(-0,03)	(-0,35)

T-values are shown in the parentheses

during that period. As hypothesized, this might be caused by an increase in the number of losses reported by companies listed in the Netherlands or a significant (structural) change in the fundamentals of the earnings number for Dutch listed companies. On the other hand, for the adjusted R^2 model developed by Lev and Zarowin (1999) the crisis-variable is far from significant. In this model an economical crisis thus does not influence the value relevance of the earnings number. This difference in the outcome of the test is probably caused by the different way in which the value relevance of the earnings number was measured.

8.4. Hypothesis 3

Finally, hypothesis three hypothesized whether the value relevance of earnings continued to decline after the mandatory adoption of IFRS. Before IFRS was adopted, evidence was provided by Francis and Schipper (1999) and Lev and Zarowin (1999) for declining value relevance of the earnings number in general. It is therefore tested whether this pattern is also observed after IFRS was adopted. The results of this test are shown in table 7. In this table the variable of interest is 'Time'.

The coefficients estimated for the 'Time' variable are insignificant at any level of significance and for all models. It can thus be concluded that the value relevance of earnings did not significantly decrease after the mandatory adoption of IFRS for Dutch listed companies. It might thus be that IFRS better copes with business change as did Dutch GAAP. On the other hand it could also be the case that other types of information on the firms did not increase in (relative) importance, or that the political process of standard setting is good enough to cope with the decrease in value relevance that was observed in prior literature.

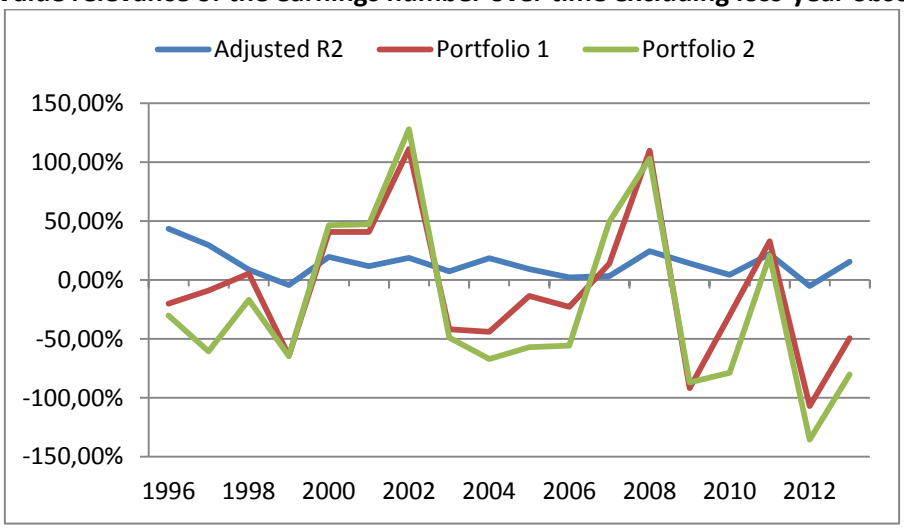
8.5. Robustness checks

In order to increase the robustness of the results found before, the tests performed earlier, will be performed again twice, each time with one big change to the data set. The first time loss-years will

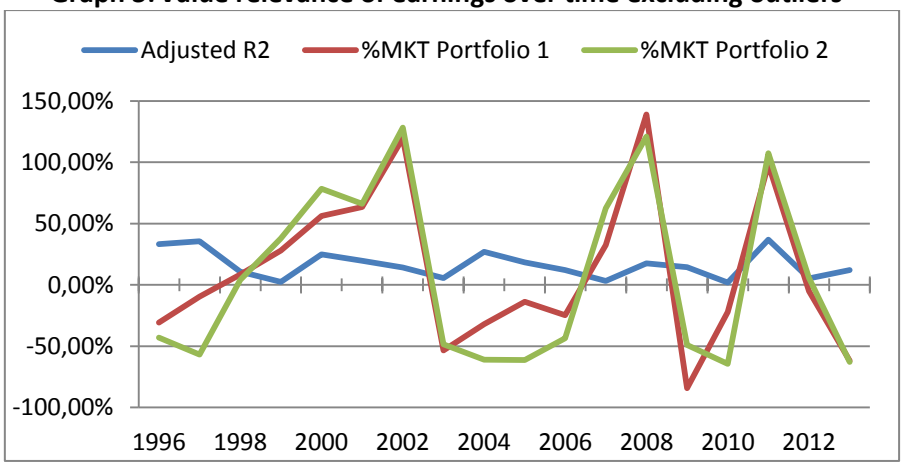
be excluded from the dataset. For the second repetition of these tests outliers will be excluded from the dataset. The decision whether an observation is an outlier or not is made using the Z-score. If the Z-score of an observation exceeds three, the observation is regarded as an outlier and removed from the sample. The changed descriptive statistics for these new datasets are respectively shown in tables 8 and 9, and graphs 2 and 3. What can be noticed from these figures is that the value relevance of earnings remains highly fluctuating during the entire period sample period. Furthermore, the direction of the change on average is similar for all proxies, with again the Francis and Schipper (1999) measures fluctuating more strongly than the Lev and Zarowin (1999) measure.

In contrast as to what was expected by Hayn (1995) the (average) observed value relevance of earnings is not higher when loss-years are excluded from the sample. In fact, the value relevance is even lower when loss-years are excluded for the measures by Francis and Schipper (1999).

Graph 2: Value relevance of the earnings number over time excluding loss-year observations[5]



Graph 3: Value relevance of earnings over time excluding outliers[5]



[5] In these graphs the value relevance of the earnings number is converted into a percentage.

Table 8: Value relevance of the earnings number in both models for the years 1996-2013 excluding loss year observations.

		Lev and Zarowin model	Francis and Schipper model			
			Portfolio 1		Portfolio 2	
Year	N	Adjusted R^2	%	%MKT	%	%MKT
1996	37	0,4357	-15,03%	-19,98%	-23,48%	-29,94%
1997	42	0,2981	-4,79%	-8,79%	-30,52%	-60,38%
1998	47	0,0871	1,91%	5,53%	-6,06%	-16,65%
1999	48	-0,0432	-24,97%	-64,30%	-29,14%	-64,55%
2000	49	0,1969	11,65%	40,82%	14,19%	46,49%
2001	47	0,1187	10,21%	40,92%	13,43%	47,34%
2002	45	0,1875	33,70%	111,32%	38,38%	128,16%
2003	43	0,0748	-25,95%	-41,83%	-32,17%	-48,68%
2004	51	0,1855	-28,15%	-43,90%	-43,34%	-67,07%
2005	52	0,0945	-12,43%	-13,40%	-51,79%	-56,96%
2006	52	0,0216	-11,82%	-22,84%	-27,11%	-55,62%
2007	52	0,0328	2,23%	13,82%	7,98%	49,44%
2008	47	0,246	41,78%	109,92%	47,91%	103,05%
2009	41	0,142	-74,60%	-91,81%	-67,63%	-86,92%
2010	46	0,0437	-10,78%	-29,71%	-29,39%	-78,68%
2011	38	0,2217	7,03%	33,05%	-6,91%	20,79%
2012	34	-0,0495	-78,06%	-106,88%	-115,67%	-135,33%
2013	31	0,157	-21,95%	-49,39%	-31,21%	-79,94%
Average		0,1362	-11,11%	-7,63%	-20,70%	-21,41%

Table 9: Value relevance of the earnings number in both models for the years 1996-2013 excluding outlier observations.

		Lev and Zarowin model	Francis and Schipper model			
			Portfolio 1		Portfolio 2	
Year	N	Adjusted R^2	%	%MKT	%	%MKT
1996	37	0,331	-17,52%	-30,70%	-49,17%	-43,04%
1997	41	0,3557	-4,90%	-9,72%	-29,79%	-56,90%
1998	47	0,1085	2,74%	8,29%	1,33%	3,96%
1999	50	0,0228	6,58%	27,89%	9,73%	37,91%
2000	54	0,2489	15,52%	56,19%	45,26%	78,50%
2001	52	0,1968	13,18%	63,40%	14,72%	66,19%
2002	55	0,1407	39,99%	119,61%	41,17%	128,34%
2003	51	0,0565	-26,54%	-53,49%	-25,66%	-48,42%
2004	53	0,2688	-16,96%	-32,07%	-30,05%	-60,95%
2005	54	0,1844	-11,04%	-13,72%	-46,92%	-61,38%
2006	52	0,1194	-10,84%	-24,71%	-18,90%	-43,67%
2007	54	0,0324	6,35%	32,36%	12,78%	62,55%
2008	54	0,1742	68,36%	138,81%	60,54%	120,95%
2009	54	0,143	-42,65%	-84,20%	-24,12%	-48,95%
2010	53	0,0191	-7,56%	-22,15%	-22,80%	-64,34%
2011	52	0,3674	24,64%	98,16%	30,12%	107,44%
2012	52	0,0524	-1,40%	-5,06%	1,56%	5,50%
2013	38	0,1218	-21,76%	-61,92%	-23,21%	-62,92%
Average		0,1635	0,90%	11,50%	-2,97%	6,71%

In the repetition of the tests for hypothesis one (table 10) it is found that the F-test statistics resulting from performing the chow-test again are low. Again, no proof is found that the value relevance of the earnings number changed after the adoption of IFRS.

Overall, strong evidence thus is provided in favor of hypothesis one. This thus implies that the disadvantages associated with the introduction of IFRS (lower flexibility on behalf of management and the misfit between the Dutch institutional framework and the institutional setting in which IFRS was created) approximately equal the advantages of the introduction of IFRS (higher comparability and increased transparency).

Table 10: Results hypothesis 1 robustness check

Panel A: Excluding loss-year observations

Model	Constant	Time	IFRS	Time*IFRS	F-test statistic
Adjusted R^2	0,280	-0,022	-0,229	0,025	0,680
	(3,22)	(-1,41)	(-0,97)	(1,16)	
%MKT Portfolio 1	-0,032	-0,003	0,508	-0,044	0,340
	(-0,14)	(-0,07)	(0,82)	(-0,76)	
%MKT Portfolio 2	-0,313	0,048	1,287	-0,143	0,570
	(-0,58)	(0,50)	(0,88)	(-1,06)	

Panel B: Excluding outlier observations

Model	Constant	Time	IFRS	Time*IFRS	F-test statistic
Adjusted R^2	0,268	-0,015	-0,148	0,016	0.30
	(3,19)	(-1,01)	(-0,65)	(0,77)	
%MKT Portfolio 1	0,065	0,020	0,380	-0,047	0.08
	(0,13)	(0,23)	(0,28)	(-0,38)	
%MKT Portfolio 2	-0,075	0,038	-0,015	-0,031	0.11
	(-0,13)	(0,39)	(-0,01)	(-0,22)	

T-values are shown in the parentheses

Table 11: Results hypothesis 2 robustness check

Panel A: Excluding loss-year observations

Model	Constant	Time	Crisis
Adjusted R^2	0,081	0,008	-0,042
	(1,00)	(0,46)	(-0,48)
%MKT Portfolio 1	0,037	-0,011	-0,357
	(0,14)	(-0,20)	(-1,23)
%MKT Portfolio 2	0,092	-0,045	-0,498
	(0,16)	(-0,38)	(-0,80)

Panel B: Excluding outlier observations

Model	Constant	Time	Crisis
Adjusted R^2	0,131	-0,001	0,022
	(1,48)	(-0,06)	(0,23)
%MKT Portfolio 1	0,192	-0,013	-0,139
	(0,32)	(-0,11)	(-0,21)
%MKT Portfolio 2	-0,025	0,015	-0,072
	(-0,04)	(0,11)	(-0,10)

T-values are shown in the parentheses

In the repetition of hypothesis two (table 11) no evidence is found in favor of the hypothesis, in contrast to the original test in which two out of three proxies showed to be significant at the 10%-significance level. None of the t-statistics in table 11 turns out to be significant at any level. Overall this implies that some evidence is found in favor of hypothesis two, but that this evidence is rather weak. Thus, there is some evidence reported that implies that the earnings number has undergone a small but significant change during the recent crisis.

The repetition of the analysis for hypothesis three yields the same results as the original analysis. There is no evidence that the value relevance of the earnings number decreased over time after IFRS was adopted; none of the t-statistics in table 12 turns out to be significant at any level. As hypothesized, it thus seems that IFRS can handle business change better than local GAAPs did, or that the political process of setting accounting standards is timely enough to overcome the possible causes of a reduction in value relevance.

Table 12: results hypothesis 3 robustness check

Panel A: Excluding loss-year observations

Model	Constant	Time
Adjusted R^2	0,083	0,004
	(1,10)	(0,26)
%MKT Portfolio 1	0,057	-0,047
	(0,20)	(-0,94)
%MKT Portfolio 2	0,119	-0,095
	(0,21)	(-0,96)

Panel B: Excluding outlier observations

Model	Constant	Time
Adjusted R^2	0,130	0,001
	(1,58)	(0,07)
%MKT Portfolio 1	0,200	-0,027
	(0,36)	(-0,27)
%MKT Portfolio 2	-0,021	0,008
	(-0,04)	(0,07)

T-values are shown in the parentheses

8.6. Summary

Overall, it can thus be said that this study did find evidence in favor of hypothesis one, and no evidence in favor of hypothesis three. Mandatory IFRS adoption did not lead to a change in the value relevance of earnings, and the value relevance of earnings did not decrease over time after IFRS was adopted. However, some evidence is found in favor of the hypothesis that the financial crisis had a negative impact on the value relevance of earnings. However, when the robustness of these results is tested, no extra support for this hypothesis is found.

9. Conclusion

Recent literature discussed what the influence of IFRS is on the value relevance of earnings by investigating the change in value relevance of earnings observed when looking at the same-year financial statements that were issued in both local GAAPs as well as in IFRS. This study extended on those studies by broadening the time-span that is observed, which gave the possibility to look deeper into the consequences of mandatory IFRS adoption for Dutch listed companies.

Over a sample of 58 Dutch listed firms it was found that the mandatory adoption of IFRS did not cause any change in value relevance of earnings, when tested using multiple models and under multiple conditions. Furthermore, no evidence was found that the value relevance of earnings decreased over time after IFRS was adopted. However, one of the two models found un-robust evidence of a decrease in the value relevance of earnings during crisis periods.

Overall, it can thus be said that the mandatory adoption of IFRS did not cause any changes in the value relevance of earnings for Dutch listed companies on both the short and long run. This thus implies that the quality of accounting information did not decrease any further since IFRS was adopted. Consequently, it can be said that the role of the auditor has not lost any of its relevance since IFRS was adopted. However, the value relevance of earnings remained fairly low. Consequently, a close eye should be held towards the future development of the value relevance of earnings in order to maintain the relevance of the accounting profession.

Unfortunately, this study is bound by some limitations. First of all, although focusing on only one country has some benefits, it makes it harder to generalize from the results of this study. Country-specific factors (e.g. shareholder versus stakeholder oriented countries) should be taken into account when trying to generalize from the results of this study. Secondly, as a consequence from including only one country in the sample, the number of observations is relatively low. As a consequence the econometrical methods relied upon in this study might not be perfectly suited for the purpose at hand (e.g. negative adjusted R2's where observed, possibly caused by the small number of observations included).

Based on these limitations, suggestions for future research would be to test the value relevance of earnings in other countries as well (e.g. a shareholder oriented country), using a multi-year design. Furthermore, one could extent this study by looking at the value relevance of book values and compare these to the value relevance of the earnings number.

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Appendix 1: Statistical support of the models

This appendix will present the statistical support for the models used in this study. The following tests will be performed:

- Multicollinearity test;

- Heteroskedasticity test;

-Serial correlation test; and

-Linearity test.

A1.1. Multicollinearity test

According to Studenmund (2011) (severe) multicollinearity would distort the results found in any research by leading to increased variances and standard errors. Consequently, due to the way the t-scores are computed, t-scores will fall. Therefore, multicollinearity could lead to the acceptation of null hypothesis that actually should be rejected; the number of type II errors will increase. It thus needs to be tested whether the models used here do not contain severe multicollinearity.

According to Studenmund (2011) one can check for severe multicollinearity in two ways, either by looking at the simple correlation coefficients or at 'Variance Inflation Factors' [VIFs]. When the models employed consists of only one or two explanatory variables the first method can be used, otherwise the VIF-method is preferred.

Since the models employed in this study contain only one explanatory variable the simple correlation coefficients method will be used here. This method uses a benchmark of 0.8 for severe multicollinearity. If the simple correlation coefficients in this study exceed this number, severe multicollinearity exists in (one of) the model(s) and corrections should be made in order to reach better results. The simple correlation coefficients are given in table A1

Table A1: multicollinearity test

	T	Adjusted R2	MKT portfolio 1	MKT portfolio 2
T	1,0000			
Adjusted R2	- 0,3413	1,0000		
%MKT portfolio 1	-0,1648	0,3960	1,0000	
%MKT portfolio 2	-0,0823	0,3620	0,9914	1,0000

As can be seen from table A1 all these correlation coefficients are far below the 0,8 benchmark. Only the correlation coefficients between MKT portfolio 1 and MKT portfolio 2 exceeds this benchmark. However since these two variables aren't used in the same regression this doesn't harm the results. It can thus be concluded that the models used in this study do not contain severe multicollinearity.

A1.2. Heteroskedasticity

According to Studenmund (2011) there are two main problems with a model that contains heteroskedasticity. First, the output provided is no longer the minimum variance estimator. Secondly, the estimates of the standard error are biased. Consequently, hypotheses testing is unreliable.

Studenmund (2011) provides two methods to test for heteroskedasticity, the Park-test and the White test. Here the White test will be used. In this test the squared residuals of the original regression are used in a new regression as the dependent variable. The independent variables are the same as in the original regression. Then, a chi-square test is performed. If the test statistic (equal to the number of observations times the unadjusted R^2) is larger than the critical value we can conclude that the model contains heteroskedasticity. The output obtained from performing this analysis is shown in table A2.

Since all the observed chi-square test statistics reported in table A2 are insignificant[6], it can be concluded that the three regressions estimated in this study all do not contain heteroskedasticity.

A1.3. Serial correlation

According to Studenmund (2011) serial correlation in a regression leads to the same problems as with heteroskedasticity: the estimated output no longer is the minimum variance estimator, and the estimates of the standard error are biased and lead to unreliable hypothesis testing.

Table A2: heteroskedasticity test

Model	R2	number of observations	Chi-square test statistic
Lev and Zarowin	0,0274	18	0,4932
%MKT portfolio 1	0,0810	18	1,4580
%MKT portfolio 2	0,1065	18	1,9170

[6] the critical value of a chi-square distribution with 18 degrees of freedom is 2,71 at the 10% significance level and higher for higher significance levels (Studenmund, 2011).

Table A3: serial correlation test

	Lev and Zarowin model	%MKT portfolio 1	%MKT portfolio 2
Durbin-Watson test statistic	2,0488	2,4208	2,1828

Studenmund (2011) proposes the Durbin-Watson *d* test to test for serial correlation in a regression. The corresponding Stata-output is shown in table A3 .

Since the observed values for all these models exceed the critical value, it can be concluded that the models estimated in this study do not contain any serial correlation[7].

A1.4. Linearity test

The final test performed is a linearity test for each regression estimated. This test establishes whether the linear equation estimated in this study are proper, or whether a non-linear equation would better fit the data.

According to Duke University (2014) one can test the linearity assumption by plotting all the observations in a graph together with the regression line. For a linear equation to be the proper equation, the observations should be spread evenly around the fitted line. Furthermore, the scatter plot of all the observations should not give any indications for any other pattern than a linear one. If one of these conditions is not met, a nonlinear equation should be estimated.

The three plots are given in the following graphs. The plot for the Lev and Zarowin model is in graph A1. The plot for the first portfolio by Francis and Schipper is in graph A2, while the plot for their second portfolio is in graph A3.

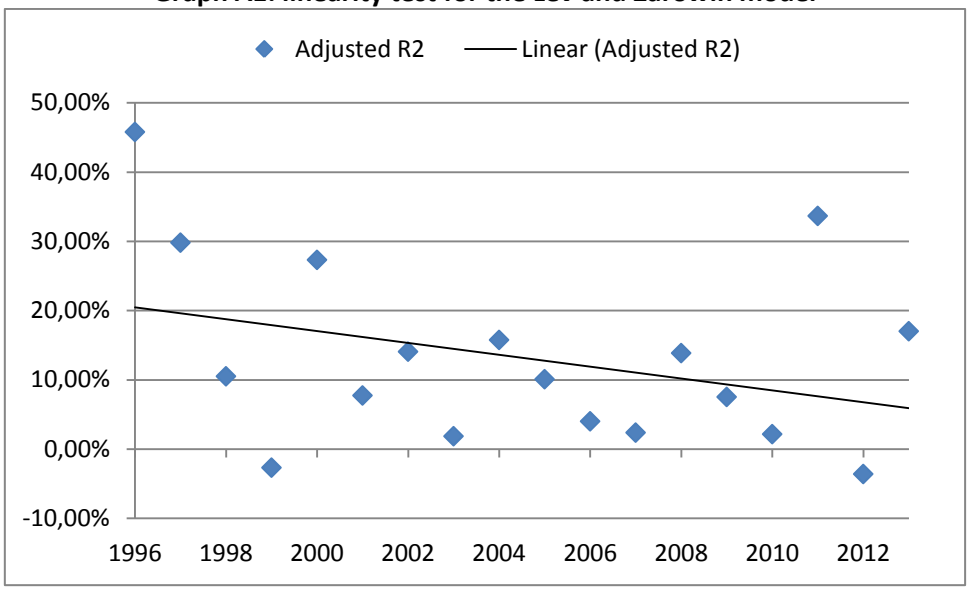
As can be seen from these plots, the observations are evenly distributed around the fitted line. Furthermore, none of the plots seems to give any indication for a bowed pattern. Therefore, it can be concluded that estimating a linear equation in the analysis is justified given these data.

A1.5. Summary

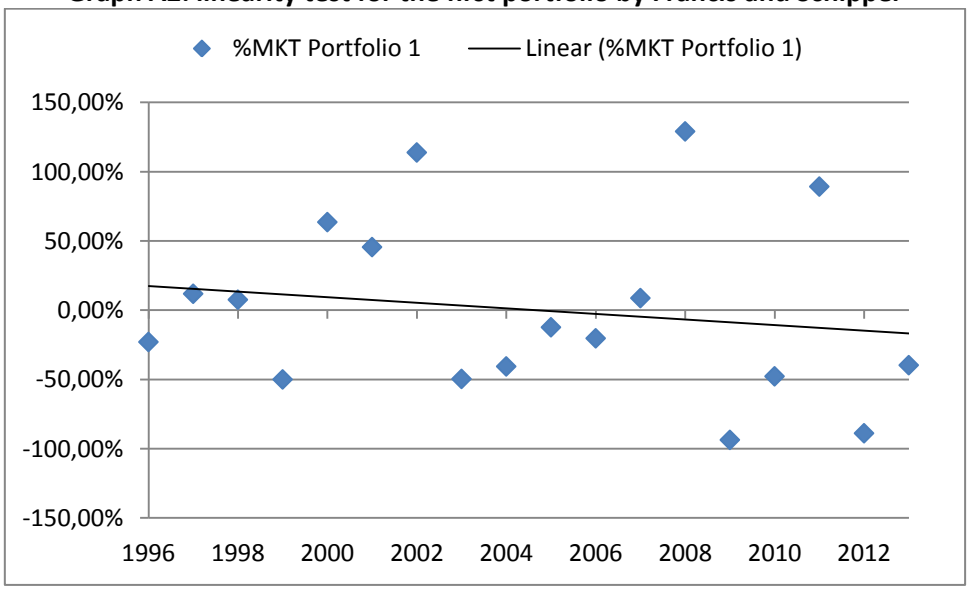
Since all the models pass all four test performed here, it can be argued that the models that the use of all the models in this study is justified. No corrections have to be made to these models or the data.

[7] The observed value exceeds 1,53 , which is the d_L value given by Studenmund (2011) at the 5% significance level. The results are thus insignificant.

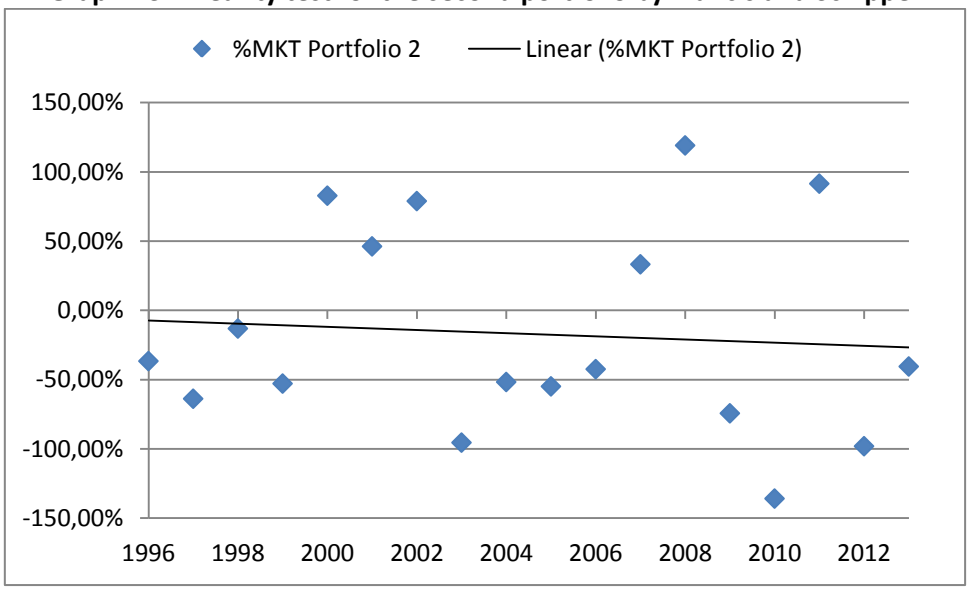
Graph A1: linearity test for the Lev and Zarowin model



Graph A2: linearity test for the first portfolio by Francis and Schipper



Graph A3: linearity test for the second portfolio by Francis and Schipper



A1.6. References appendix

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