
Value relevance of accounting indicators in Europe: the case of intangible items

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Abstract

The value relevance of accounting items has gathered attention from scientific community over the last decades. Since Beaver (1968) and Ball and Brown (1968), several studies can be found in this field. However, few have examined the value relevance of accounting items in continental Europe in the last years. In this dissertation, we aim to fulfil that gap in the literature and to understand the current situation of value relevance in the continental Europe context. Besides, we extend our analysis to intangibles, being as far as our knowledge, one of the first studies doing so.

Thus, we first test the value relevance of earnings and equity book value, considered to be the main items of financial statements. In a second part, we further examine the value relevance of intangible items. In order to accomplish our goal, we analyze data from firms listed in DAX 30, CAC 40, FTSE MIB, IBEX 35 and BEL 20 using a methodology based on Ohlson (1995) model.

We found earnings, equity book values, goodwill and brands and patents to possess ability to explain part of the firms' market values evolution. However, R&D expenses and other intangible assets presented unclear evidence about their value relevance. Intangible items as a whole were found to have incremental value relevance regarding other accounting information.

Giving the wide range of applications in which the relationship between accounting items and firms' market value are considered, this study potentially acquires significant importance for investors, managers, accounting regulators and other stakeholders in general.

Key words: value relevance, Europe, intangible items, equity valuation, financial reporting

JEL codes: G32, M41, O52

Resumo

A forma como os itens contabilísticos de uma empresa estão relacionados com o seu valor de mercado (*value relevance*) tem suscitado interesse da comunidade científica ao longo das últimas décadas. Desde Beaver (1968) e Ball e Brown (1968), vários estudos incidiram sobre esta área. No entanto, poucos analisaram a *value relevance* na Europa Continental durante os últimos anos. Nesta dissertação, pretendemos contribuir para preencher esse espaço na literatura e perceber como se encontra atualmente esta relação no contexto europeu. Para além disso, estendemos a nossa análise aos intangíveis, sendo ao que o nosso conhecimento permite, um dos primeiros estudos a fazê-lo.

Assim, primeiro testamos a *value relevance* do resultado líquido e capital próprio, consideradas as principais contas das demonstrações financeiras. Numa segunda fase, examinamos a *value relevance* dos intangíveis. De modo a alcançar esse objetivo, analisamos dados de empresas cotadas nos índices DAX 30, CAC 40, FTSE MIB, IBEX 35 e BEL 20, utilizando uma metodologia baseada no modelo de Ohlson (1995).

A análise dos nossos dados sugere que o resultado líquido, capital próprio, goodwill e marcas e patentes têm capacidade para explicar parte da evolução dos valores de mercado das empresas. No entanto, a evidência não é clara quanto à forma como as despesas de I&D e outros ativos intangíveis se relacionam com os valores de mercado. De todo o modo, os intangíveis como um todo apresentam relevância para explicar os valores de mercado das empresas.

Dada a variedade de situações em que a associação entre os valores contabilísticos e o valor de mercado das empresas é considerada, este estudo denota potencial importância para investidores, gestores, reguladores dos sistemas contabilísticos e outros stakeholders em geral.

Palavras-chave: value relevance, Europa, intangíveis, avaliação capital próprio, reporte financeiro

Classificação JEL: G32, M41, O52

Content Index

1. Introduction.....	1
2. Literature review	3
2.1 Value relevance definition	3
2.2 Importance of studying the value relevance of accounting items and literature gap.....	3
2.3 Factors that affect Value relevance	5
2.4 Value relevance on stock markets	6
2.4.1 Value relevance across the globe	6
2.4.2 Value relevance in emerging countries	8
2.4.3 Value relevance in European developed markets	10
2.5 Intangibles and value relevance	12
3. Methodology	15
3.1 Research hypothesis.....	15
3.2 Empirical models	15
3.3 Sample and descriptive statistics	17
3.3.1 Sample.....	17
3.3.2 Descriptive statistics.....	18
4. Results and discussion.....	23
4.2 Value relevance of traditional accounting measures	23
4.2 Value relevance of intangibles accounting measures	24
4.3 Discussion of results.....	26
5. Conclusion	29
6. References	31

Index of figures

Table 1 - Descriptive statistics of the sample deflated by total assets	18
Table 2 - Descriptive statistics of the sample deflated by the total number of outstanding shares	19
Table 3 – Pearson correlations among the model deflated by total assets	20
Table 4 - Pearson correlations among the model deflated by total outstanding shares.....	22
Table 5 - Estimation results for hypothesis #1	23
Table 6 - Estimation results for hypothesis #2	25

1. Introduction

Value relevance is a topic that attracts curiosity in scientific community. Despite there are several studies in this field, the conclusions about accounting information's value relevance are not consensual. While some authors argue accounting information has been losing value relevance (Balachandran & Mohanram, 2011; Robert K Elliott, 1995; Lev & Zarowin, 1999), others state it has not (Collins, Maydew, & Weiss, 1997; Ely & Waymire, 1999; Landsman & Maydew, 2002).

In European context, few studies focus accounting numbers' value relevance in the last years and conclusions regarding the relationship between accounting items and market values are not consensual. For example, different conclusions were achieved by Narktabtee and Patpanichchot (2011) and Devalle and Magarini (2012) regarding the value relevance of equity book values. Indeed, the first study found evidence suggesting book value to be significantly related with European firms market values, whereas no support is given to that hypothesis in the second one. This leads us to the first research question: are European accounting indicators value relevant? In order to understand that, we will apply the Ohlson (1995) model. Here, we will use book value and earnings as representatives of traditional accounting indicators since they are considered to be the primary summary measures of financial statements (Barth, Beaver, & Landsman, 1998). Besides, these variables are widely used across literature in the value relevance field.

Simultaneously, we will study the specific value relevance of intangible items. More precisely, we are going to address whether intangible items are value relevant and whether they have incremental ability for explaining market values. This results from several authors claiming a decline in value relevance stating it is due to the increasing weight of intangibles in economy (Lev & Zarowin, 1999; Srivastava, 2014), at the same time that scientific evidence does not clarify it. Besides, there are still doubts concerning the value relevance of intangible items in European markets. In order to assess the relationship between intangible items and European market values, we use an adaptation of the Ohlson (1995) model as in Oliveira, Rodrigues, and Craig (2010).

This topic should assume high interest for investors since they use financial information as a key tool for making investment decisions. Moreover, considering accounting figures frequently represent an important role in measuring their performance, this study may also be relevant for managers. Besides, taking in mind value relevance seems to be related with the economy evolution (Beisland, 2009) and accounting regulation quality (Dobija & Klimczak, 2010), this study may also take attention from other stakeholders such as consumers and accounting regulators.

In sum, in this study we aim to fulfill the gap in European literature concerning accounting numbers' value relevance and the special case of intangible items. In order to accomplish that, we examine a sample composed by firms listed in DAX 30, CAC 40, IBEX 35, FTSE MIB and BEL 20, for the time frame between 2011 and 2017.

This work is structured as follows: section 2 reviews the literature, section 3 presents a description of the methodology implemented and data, section 4 exposes the results and their discussion, section 5 summarizes and concludes with suggestions for future research.

2. Literature review

2.1 Value relevance definition

Francis and Schipper (1999) characterize value relevance as the ability of financial statement information to capture or summarize information that affects share values.

In turn, Lam, Sami, and Zhou (2013) describe value relevance as being the “informativeness of financial statements” in a sense that, the greater the value relevance, the more reliable financial statements are to make investment decisions and thus, the higher the connection between accounting items and the firm’s stock prices (Francis and Schipper, 1999; Sami and Zhou 2004). This stands in the reasoning of Dahmash, Durand, and Watson (2009) which state that value relevance is the capacity of financial statements “to confirm, or change, investors’ expectations of firm value”.

Concerning when accounting items are considered to be value relevant, Beisland (2009) affirms that accounting information is denoted as value relevant if there is a statistical association between the accounting numbers and market values of equity. In fact, the greater the correlation between accounting information and stock prices, the more the accounting item can explain about firm’s value changes and thus, the more value relevant it is considered to be.

Value relevance studies intend to perceive the importance and reliability of accounting numbers that are reflected in equity values (Naimah, 2012). In Barth, Beaver, and Landsman (2001) words, value relevance studies aim to assess whether particular accounting figures “reflect information that is used by investors in valuing firms’ equity”.

2.2 Importance of studying the value relevance of accounting items and literature gap

Measuring a firm’s performance is vital for understanding how the business is evolving. By doing that, managers become able to access whether they are being succeeded directing the company or not, and investors realize more clearly the possible risks and returns from the firm’s activity (Kopecká, 2017). Considering that accounting indicators are usually key measures when

assessing company's performance (Warren, 2015), test their value relevance becomes crucial to understand how reliable they are.

Value relevance is also used as a proxy for accounting regulation excellence. In fact, according to Dobija and Klimczak (2010), the significance level of accounting numbers in equity valuation indicates the stage of accounting regulation development. Thus, measuring European market's value relevance may assist accounting regulators perceiving how properly they are supervising and how they can improve the importance of financial statements.

Besides, the degree of value relevance also affects cost of equity. According to Francis, LaFond, Olsson, and Schipper (2004), higher value relevance means lower information risk to investors and, as a consequence, they may require a lower price to invest in the firm. From a macro-economic view, this leads to greater investment and thus, the value relevance level may impact the real economy (Beisland, 2009). Other stakeholders such as consumers and employees also base some economic decisions on firm's performance. For these reasons, measuring accounting information's value relevance assumes significant meaning.

Moreover, despite there are some studies about financial statements' value relevance focusing particular European countries, few have been conducted in European markets as a whole. This is a gap in scientific literature we undertake to clarify.

Another breach in literature is related with intangible items. The recent arising of a new high-tech economy mostly based in intangible assets, leads part of the scientific community arguing intangibles as one of the main reasons for a lower accounting numbers' value relevance. However, it seems to exist some doubts in empirical evidence about the extent of the relation between intangible items and market values. For example, Hirschey, Richardson, and Scholz (2001) found R&D expenses have a positive impact while Cazavan-Jeny and Jeanjean (2003) found a negative relation. Thus, in our research, we will try to answer the questions:

- 1) Are accounting indicators relevant to measure European firm's value?
- 2) Do intangible assets significantly affect European firms' market value?

2.3 Factors that affect value relevance

Across scientific literature, we can find several elements influencing accounting numbers' value relevance.

One of the determinants of accounting information's value relevance is the diversity of accounting practices among countries. Different accounting rules turn more difficult to understand the real meaning of an indicator in each country. Standardizing accounting practices allows to overcome (or at least reduce) that obstacle, strengthening the information's quality. This means more solid and value relevant financial reporting (Graham & King, 1998). In 2005, listed firms in European Union countries started being required to prepare their financial statements according to International Financial Reporting Standards (IFRS). Devalle, Onali, and Magarini (2010) studied the impact of this regulatory reform and concluded there was an increase in value relevance of European accounting data after the introduction of IFRS. According to Bao and Chow (1999), the international accounting standards provided better value relevance of financial reports than the Chinese norms. However, it is needed that legal and market structure to be similar, so that accounting standard harmonization successfully occurs on a practice level (Narktabtee & Patpanichchot, 2011).

The type of firms is also addressed as being one of the factors influencing value relevance. For example, Narktabtee and Patpanichchot (2011) found the improvement of value relevance depends on firm characteristics such as cash flow volatility, sales volatility, incidence of negative earnings and firm size. This last one was also noticed by Collins et al. (1997) who concluded that when small or startup firms were included in the sample, a shift of value relevance from earnings to equity book value occurred.

Other aspect influencing the financial statements' value relevance is the way business develops. In fact, in times of rapid change, there is more risk that business reporting will "fall behind the pace of change, failing to provide what users need to know" (Amir & Lev, 1996).

Related to that, the rising of intangibles is also pointed as an element affecting the value relevance of accounting numbers. Srivastava (2014) found that earnings quality is negatively related with firms' intangible intensity. This conclusion was achieved by noticing that cohorts of firms with successively more intangible intensity presented earnings consecutively with lower

quality. Besides, changes in intangible intensity were also found to be one of the drivers of the transfer of value relevance from earnings to book value found by Collins et al. (1997).

The development stage of the market is also mentioned as an influencing factor in the value relevance of accounting items. Indeed, emerging markets usually present a wide range of market problems which leads to be feasible to presume them to evidence lower value relevance when compared to more developed markets (Hellström, 2006; A. Lopes, 2002).

Other factors noticed as affecting value relevance are the presence of private investors in financing, the involvement of private sector entities in the accounting standard setting process and the practice of external auditing. In fact, these three factors were suggested as being value relevance drivers (Ali & Hwang, 2000).

2.4 Value relevance on stock markets

The relationship between accounting figures and stock prices and returns has been studied by many academics over the last decades. As mentioned previously in “importance of studying the value relevance of accounting indicators and literature gap” (section 2.2), contradicting conclusions have been found by the authors.

2.4.1 Value relevance across the globe

Until mid-1960s, little research had been done concerning the relation between financial statements and capital markets. The first significant work in this field was conducted by Ball and Brown (1968), which concluded positive earnings are value relevant in the American market. In that same year, Beaver (1968) presented evidence that earnings affected investor's perspectives on stock prices.

In 1995, Ohlson released a paper in which he developed and analyzed a model that establishes a relation between firm's market value and future earnings, book values and dividends. This paper represented a breakthrough and assumes high importance in value relevance field, since its model continues to be consistently used in several current studies.

Many authors defend that accounting numbers have been losing value relevance. Robert K Elliott (1995) states its usefulness is limited due to not reflecting information-age assets, "such

as information, capacity for innovation and human resources”. Lev and Zarowin (1999), Lo and Lys (2000) and Balachandran and Mohanram (2011) also found negative evolution in the association between capital market values and accounting figures. Lev and Zarowin (1999) focused their work on earnings, book value and cash flows while Lo and Lys (2000) concentrated their study on earnings. Balachandran and Mohanram (2011) examined the impact of accounting conservatism in financial statements’ value relevance. By gathering 100,984 observations from firms belonging to all industries in a 30 years time-period, they found no evidence suggesting conservatism affects value relevance's trend and concluded the value relevance of book value and earnings were generally lower.

On the other hand, several studies found no evidence supporting a decline in the value relevance of financial statements. In fact, Collins et al. (1997), Ely and Waymire (1999) and Francis and Schipper (1999) all concluded the level of value relevance of earnings combined with book value increased over time. Although Ely and Waymire (1999) study a larger period (from 1927 to 1993, while the remaining papers contemplate sample periods between 1950/70 and end of 20th century) this discrepancy maintains even if we compare similar time frames. Similarly, Barth, Li, and McClure (2018) found no decline in combined value relevance between 1962 and 2014. Francis and Schipper (1999) give however mixed evidence about financial statements’ value relevance. This happens because, despite the results mentioned before about earnings and book value combined and an increase in the value relevance of assets and liabilities, the authors also found a decrease in earnings alone.

As we can perceive, book value of equity and earnings are indicators widely used by academics when accessing financial statements’ value relevance. The equity book value is the accounting value of shareholders equity and represents the firm’s past performance. Earnings appear in the final line of income statement and are the company’s revenues subtracted by the expenditures incurred over a period. Thus, earnings express the profits generated by the firm over a certain time frame.

Nonetheless, other indicators are used by the scientific community as well. EBITDA was found to provide “value-relevant information beyond earnings and operating cash flow” in the year a firm takes part in a merger (Christian & Jones, 2004). The same study concludes that

earnings seem to lose usefulness in a merger context, which might be related with the difficulty to predict the merged firm's future earnings.

Bepari, Rahman, and Mollik (2013) found that the value relevance of earnings (operational cash flows) has increased (decreased) in the Australian market during the global financial crisis. These authors also concluded that operational cash flows have incremental value relevance to earnings and book value, and that earnings may have greater relative and incremental information content than operational cash flows.

According to Chandra and Ro (2008), revenue has ability to explain firm's valuation. This study also concludes that the value relevance of earnings has declined over time, while revenue's capacity "to incrementally convey new information" to firm's value did not diminished, having in fact, increased in the case of profit situations.

Dividends were found to be positively related with returns (Livnat & Zarowin, 1990) and the best explaining indicator of stock's price among earnings and book value when earnings are transitory and book value is a poor measure of value¹ (Brief & Zarowin, 1999).

2.4.2 Value relevance in emerging countries

While the first studies of value relevance focused mainly on US market, several researches on the field have been conducted in emerging markets recently.

A. Lopes (2002) examined the Brazilian market and found evidence suggesting earnings (book value) were value relevant and negatively (positively) related with stock prices. Besides, this study also concluded that, between 1995 and 1999, book value presented superior value relevance than earnings.

Concerning Asia, the results of Lam et al. (2013) suggest that book value and earnings are positively related with firm value in China, for the period between 1994 and 2008. Besides,

¹ The book value of equity can present low capacity to measure value, for example, in the existence of unrecognized assets (Brief & Zarowin, 1999)

these authors also found that total assets (liabilities) were positively (negatively) associated with firm value after 2002. Still in China, Bao and Chow (1999), concluded that the explanatory power of earnings and book value of equity had increased significantly between 1992 and 1996. Naimah (2012) found evidence suggesting that earnings and book value have ability to explain stock prices in Indonesia, being positively related.

In Turkey, the value relevance of accounting data increased with IFRS introduction (Uyar, 2013). This is consistent with Aksu, Cetin, and Mugan (2017), who reached the same conclusion, but also found that book value was more value relevant than earnings. According to these authors, inflation accounting and consolidations contributed to improve (decrease) the value relevance of book value (earnings) in Turkey.

Some emerging economies from Europe were studied over the last years. Dobija and Klimczak (2010) examined the value relevance of earnings in Poland. They concluded that, despite being value relevant, there is no evidence of improvement after new accounting regulations being introduced in 2000 and 2005. This lead them to infer that "market efficiency and value relevance were achieved early, despite potentially insufficient accounting regulations and professional standards of practice", and that "once basic market institutions are established, further developments in regulation may not lead to noticeable improvements in value relevance". Klimczak (2011) focused on the effects of the new accounting regulations adopted in 2005 (IFRS introduction) and found similar results: the impact of IFRS adoption was relatively small in the Polish case.

Filip and Raffournier (2010) studied the value relevance of earnings in Romania. Consistent with Takacs (2012), their results suggest the association level between accounting earnings and share returns is similar to the ones reported by studies in more mature markets. Takacs (2012) affirms this is a reasonable conclusion since her study addresses the years between 2005 and 2010, which represent "the most recent stage of a 20 years transition period marked by several radical changes".

Finally, Hellström (2006) found the value relevance of earnings and book value increased in Czech Republic during the research period examined (1994 to 2001). This may indicate an increase in accounting quality in this market, as a consequence of improvements in institutional

and accounting environment that occur in the transition of the economy from a centrally planned one to a market economy. Besides, Hellström (2006) also found evidence suggesting that the value relevance of Czech accounting information was lower than the Swedish one (used in the study as a representative of a developed market).

2.4.3 Value relevance in European developed markets

In the last years, some research has been done over value relevance in European financial statements. However, a great portion of that is dedicated to single-country studies, leaving behind investigation about the value relevance of European accounting numbers as a whole.

In France, both Lenormand and Touchais (2009) and Kimouche and Rouabhi (2016) found evidence suggesting equity book value and earnings were value relevant. Nafti, Boumediene, and Boumediene (2013) concluded IFRS introduction lead to more value relevant information. Indeed, Nafti et al. (2013) highlight that the information content of accounting numbers “reached 80% after the adoption, while it was 30% before”.

In the German case, Jermakowicz, Prather-Kinsey, and Wulf (2007) found that adopting IFRS, US GAAP, or cross-listing on the NYSE between 1995 and 2004 increased significantly the value relevance of earnings. In turn, Schiebel (2007) concluded that German GAAP was significantly more value relevant than IFRS (research period from 2000 to 2004). Finally, Christensen, Lee, Walker, and Zeng (2015) verified that voluntary adopters of IFRS between 1993 and 2006 denoted an increase in the value relevance of earnings, while the opposite was found to resisters.

Using data for the period between 2002 and 2007, Elbakry, Nwachukwu, Abdou, and Elshandidy (2017) studied the accounting information's value relevance before and after IFRS, not only in Germany but also in UK. The results suggest in both countries the value relevance of equity book value declined, being replaced by a rise in the value relevance of earnings per share. Moreover, it was also found that the incremental value relevance of earnings and equity

book values were higher in UK than in Germany. Despite the periods studied being different², this last conclusion is consistent with King and Langli (1998), who found that book value and earnings per share were significantly related with stock prices in Germany, Norway and UK, presenting capability to explain 40%, 60% and 80% of the share prices, respectively.

Concerning Portugal, Oliveira et al. (2010) concluded that the change to IFRS lead the value relevance of earnings to decline, while the ability of book value to explain stock prices seems to have been not affected.

In Spanish market, neither the reported “minority interest components of net total assets and earnings, nor their values under the full equity method of consolidation” were found to be value relevant (Abad et al., 2000).

Taking in count research using a broad sample of European countries, we can find the examples of Devalle et al. (2010), Narktabtee and Patpanichchot (2011) and Devalle and Magarini (2012).

Devalle et al. (2010) studies the effect of IFRS introduction in five european stock exchanges (Frankfurt, London, Paris, Milan and Madrid). According to their results, both earnings and equity book value were value relevant, and the explanatory ability of these accounting items has globally increased with this regulatory change, which is in line with Devalle and Magarini (2012) and Narktabtee and Patpanichchot (2011). Devalle et al. (2010) also found both earnings and equity book value were value relevant. Same conclusion is suggested by Devalle and Magarini (2012) regarding earnings, but not in the case of book value of equity.

Thus, although some studies examine the European value relevance status quo in the period next to the introduction of IFRS, no other research has been done concerning the European accounting value relevance in the more recent years.

² King and Langli (1998) analyzed a sample of 14.643 observations comprised in a 15 years time frame between 1982 and 1996

2.5 Intangibles and value relevance

Intangibles are defined as “nonphysical factors that contribute to, or are used in, the production of goods or the provision of services or that are expected to generate future productive benefits to the individuals or firms that control their use” (Blair & Wallman, 2000).

Intangibles are often divided in identifiable and unidentifiable assets. Identifiable assets comprise the ones that can be separated from the firm, allowing for that reason to be negotiated (sold, transferred, licensed, to evidence some examples). Trademarks, patents and copyrights represent some cases of identifiable assets. On the other hand, unidentifiable assets are the ones who cannot be isolated from the firm. Goodwill is the most paradigmatic example of an unidentifiable intangible asset.

Expenditures on intangibles are usually considered investments, since they are executed with the aim of capturing future benefits (Wyatt, 2008). In fact, according to Wyatt (2008), investments in intangibles have the ability to generate innovation, which can permit the firm to appropriate benefits from earlier R&D and advertisement investments through the form of new rents such as price premiums or property rights. Besides, expenditures on intangibles can also lead to market share expansion. These observations are also stated by Teh, Kayo, and Kimura (2008). Thus, many firms define investments in intangibles as a strategy to potentially achieve competitive advantages and as a possible source of unexpected returns (Germeraad, 2010).

In fact, several studies offer conclusions that indicate intangible assets may be responsible for explaining part of stock prices evolution. As mentioned before, Srivastava (2014) suggests the decline in the explanatory ability of accounting numbers is attributable to changes in the economy, such as an escalation of new firms with business models focused on intangible assets. This stands with Lev and Zarowin (1999), who stated the lessening of financial statements' value relevance might be a consequence of changes in business reality (difficulty in timely reflection of investments in innovation, for example) and lack of accounting standards that keep the pace of business environment modifications. For instance, Lev and Zarowin (1999) describe that being investments which are usually drivers of firm's growth, such as restructuring costs and R&D expenditures, immediately expensed while its benefits are reported later can lead

to distorted values of accounting numbers. As a result, their value relevance can be adversely affected, according to Zéghal and Maaloul (2011).

The idea intangible assets may be important when perceiving firms value is also reinforced by Barth et al. (2018). These authors found evidence suggesting Research & Development (R&D) expenditures and other indicators related with intangibles not only were value relevant, but also the level of their explanatory power increased between 1962 and 2014. This stands in line with Clausen and Hirth (2016), Hirschey et al. (2001) and Fama and French (1998), who found a positive relation between R&D expenditures and the firms' market value. Nonetheless, the evidence provided by Cazavan-Jeny and Jeanjean (2003) suggests that R&D expenses may only be relevant at a 10% level, being negatively related with the market value of firms.

Kimouche and Rouabhi (2016) also found intangibles to be value relevant. Besides, according to these authors, the presence of intangible items contributed for an improvement of the overall accounting information. Among the subclasses of intangibles studied, goodwill stood out presenting higher association with the market values. A positive relationship between goodwill and market values was found by Oliveira et al. (2010) and Sahut (2011) as well.

Additionally, Kallapur and Kwan (2004) concluded brand values are significantly and positively associated with firm's market values. Similar results were found by Barth, Clement, Foster, and Kasznik (1998), who also concluded brand values increment value-relevance in other items such as advertising expense and operating margin.

Another intangible item analyzed in the literature is the amount of patents possessed by a firm. Patents seem to be value relevant, as found by Sandner (2009) and Greenhalgh and Rogers (2006). Some studies do also conclude that patents contribute for better accessing the association between accounting items and market values. In fact, Hirschey et al. (2001) found results suggesting that "the relation between R&D expenditures and equity values tends to be more precisely measured" when patent information is considered.

Other intangibles such as advertising expenses and capitalized development costs were also found to be related with the firm's market value (Aboody & Lev, 1998; Barth, Clement, et al., 1998; Core, Guay, & Van Buskirk, 2003).

Despite the several signs that intangibles may be related with firm's value, some empirical evidence states intangible assets are value relevant but their explanatory power is low. For instance, Wyatt (2008) concluded R&D expenditures reflect value relevant information but also found this item to be scarcely reliable to predict variations in future benefits. Dahmash et al. (2009) found analogous conclusions concerning goodwill and identifiable intangible assets in the Australian GAAP. This may have to be with accounting procedures, which were found to not reliably measure intangibles, leading them to be less value relevant (Dontoh, Radhakrishnan, & Ronen, 2004; Francis & Schipper, 1999; Wyatt, 2008). Similar conclusions were found in the European context, where R&D are capitalized only in strict terms and for that reason without allowing most part of intangibles to be reported³. As a consequence, intangible items may present lower value relevance (Kimouche & Rouabhi, 2016).

Besides, the relations between investments in intangibles and the capturing of their benefits is complex and difficult to observe and model. This, allied to an usual inexistence of an active market, leads analysts to often struggle for predicting how the outcome of those activities will affect a firm (Barron, Byard, Kile, & Riedl, 2002; I. T. Lopes, 2011). As a result, intangible items turn to be frequently excluded from stock's valuations and consequently from analysts recommendations (Whitwell, Lukas, & Hill, 2007).

All in all, although intangible items seem to be linked to market values, there is no certainty about the ability of the first ones to explain the second ones. Thus, in order to understand what may be the relationship between intangible assets and market values, we test the value relevance of intangible assets in this study.

³ European rules follow the principles of IFRS, developed by the International Accounting Standards Board (IASB). According to this regulation, the expenditure for an intangible item is recognized as an expense, unless three conditions are simultaneously fulfilled:

- 1) the item meets the definition of an intangible asset ("an identifiable non-monetary asset without physical substance"),
- 2) it is likely that there will be future economic benefits from the asset;
- 3) the cost of the asset can be reliably measured. (IASB, 2019)

3. Methodology

This chapter aims to show the methodology implemented in this dissertation. First, we present the research hypothesis of this study in section 3.1. The empirical models used are described in section 3.2, while the data and sample are analyzed in section 3.3.

3.1 Research hypothesis

Accordingly what is discussed in the chapter 2.1⁴, there is a gap in recent literature regarding the value relevance of accounting numbers in European countries. Considering the higher the value relevance, the more reliable are financial statements (Lam et al., 2013) it is of the most importance to understand whether accounting items are value relevant in European markets or not. Thus, in order to test that, hypothesis #1 is:

Hypothesis #1: “Accounting information is value relevant in European markets”.

Besides, intangible items seem to be related with firm’s performance (Barth et al., 2018; Roberi K Elliott & Jacobson, 1991; Lev & Zarowin, 1999) but no robust conclusion was found by the scientific community. Thus, understanding the extent that intangible assets are connected with market values also reveals great importance. For that reason, hypothesis #2 is the following:

Hypothesis #2: “Intangible items are value relevant in European markets”

3.2 Empirical models

In order to empirically test our hypotheses, we apply a methodology based on the Ohlson (1995) model, as in Oliveira et al. (2010). This model relates the equity book value and earnings with the firm’s market value. This was an important characteristic for being the chosen model since accomplished the criterion of using both book value of equity and earnings. This principle

⁴ “Importance of studying the value relevance of accounting indicators”

was defined because, according to Barth, Beaver, et al. (1998), the balance sheet and income statement provide valuation-relevant information, being book value of equity and earnings the primary summary measures of those financial statements.

Other reason that lead us to select the Ohlson (1995) approach was the fact this is a renowned model in this field, being used by many studies⁵.

As in Oliveira et al. (2010), we scale all variables by the number of outstanding shares. However, due to some reluctances about this procedure (Barth & Kallapur, 1996; Brown, Lo, & Lys, 1999), we further estimate models scaled by total assets. Generalized Least Square method for panel data is applied due to its capacity to control econometric issues such as autocorrelation and heteroscedasticity.

Thus, our model equation for hypothesis #1 is:

$$MVE_{i,t} = \alpha_{0,t} + \alpha_1 BV_{i,t} + \alpha_2 E_{i,t} + \varepsilon_{i,t} \quad (1)$$

In this model, $MVE_{i,t}$ stands for the market value of firm i , three months after the end of the fiscal year t . $BV_{i,t}$ denotes the book value of equity of firm i , in year t , while $E_{i,t}$ stands for the earnings registered by firm i , in year t . The reason for using a lagged market value stands for giving time to investors to reflect the accounting information on market values. Additionally, $\alpha_{0,t}$ is a constant that represents the market value of the company i , in year t , when the accounting items assume value of zero. Residuals are denoted by $\varepsilon_{i,t}$.

In order to assess the value relevance of intangibles (hypothesis #2), we use the following equation:

$$MVE_{i,t} = \beta_{0,t} + \beta_1 (BV - IA)_{i,t} + \beta_2 E_{i,t} + \beta_3 G_{i,t} + \beta_4 RD_{i,t} + \beta_5 BP_{i,t} + \beta_6 OIA_{i,t} + \mu_{i,t} \quad (2)$$

⁵ Some examples are Aksu et al. (2017), Barth, Beaver, et al. (1998), Lev and Zarowin (1999) and Al Jifri and Citron (2009)

In this approach, intangibles are expressed by goodwill, research and development (R&D) expenses, brands and patents and other intangible assets. We isolate the recognized intangible assets (IA) from the book value of equity, so that we can measure their impact in the ability of explaining market value.

Therefore, in this model, $IA_{i,t}$ stands for the recognized intangible assets⁶ of firm i , in year t , $G_{i,t}$ denotes for the reported goodwill of firm i , in year t , while $(BV - IA)_{i,t}$ represents the book value subtracted by the intangible assets of firm i , in year t . The variable $RD_{i,t}$ stands for the R&D expenditures of firm i , in year t . Because of its larger analysis in scientific research, we use the value of brands and patents recognized as a proxy for Oliveira et al. (2010)'s intellectual properties variable. Thus, $BP_{i,t}$ expresses the value of brands and patents recognized by the firm i , in year t . The impact of other intangible assets is observed through the variable $OIA_{i,t}$, which denotes the recognized intangible assets subtracted by the amount of goodwill and brands and patents, for firm i in the year t . Residuals are represented by $\mu_{i,t}$ while $\beta_{0,t}$ is a constant that stands for the market value of the company i , in year t , when the accounting items assume value of zero. The remaining variables $MVE_{i,t}$, and $E_{i,t}$ have the same meaning as in model (1).

3.3 Sample and descriptive statistics

3.3.1 Sample

Our sample is constituted by firms listed in DAX30, CAC 40, IBEX 35, FTSE MIB and BEL20. A panel data structure was chosen for this investigation. That results due to the fact panel data usually offers econometric estimates with improved efficiency, as it often includes an increased number of degrees of freedom and is less susceptible to multicollinearity. Thus, the data was retrieved from *Datastream* database and firm's annual reports, for the period between 2011 and 2017. Companies in the financial services, utilities and real estate investment trusts (REIT) were excluded. The same was applied for firms with missing data. The variables were

⁶ This variable comprises identifiable intangible assets and goodwill

winsorized at three standard deviations from the mean, in order to control the impact of extreme observations. The resulting sample is a balanced panel data of 217 observations. From these, 35.5% were retrieved from DAX30's constituents while 32.3% belong to firms listed in CAC 40 index. IBEX 35, FTSE MIB and BEL20 amount for 12.9%, 9,7% and 9,7% of the observations, respectively.

3.3.2 Descriptive statistics

The descriptive statistics of the sample are present in Table 1 and 2. The first shows the numbers of the model deflated by total assets (TA), whereas the second refers to the model scaled by the number of outstanding shares (S).

Table 1 - Descriptive statistics of the sample deflated by total assets

	Mean	Median	Min	Max	St.Dev	N
$\frac{MVE}{TA}$	0.714	0.667	0.000	2.947	0.548	217
$\frac{BV}{TA}$	0.368	0.337	-0.017	1.014	0.186	217
$\frac{BV - IA}{TA}$	0.043	0.014	-0.421	0.823	0.231	217
$\frac{E}{TA}$	0.037	0.040	-0.128	0.156	0.042	217
$\frac{G}{TA}$	0.231	0.183	0.002	0.576	0.163	217
$\frac{RD}{TA}$	0.034	0.019	0.000	0.519	0.074	217
$\frac{BP}{TA}$	0.067	0.038	0.000	0.247	0.071	217
$\frac{OIA}{TA}$	0.039	0.027	0.000	0.173	0.040	217

From Table 1 we can observe the equity market value of our median firm corresponds to 66.7% of the global value of its total assets. Besides, we can infer the median book value of

equity is equivalent to 33.7% of the global value of the firm's assets, decreasing to 1.4% when intangible assets are not considered. Between 2011 and 2017, the European median firm registered earnings to total assets (return on assets) of 4%. Regarding intangible items, from Table 1 we can state goodwill and brands and patents amounted respectively to 18.3% and 3.8% of the European median firm's global assets. The median firm presented R&D expenses equivalent to 1.9% of its total assets. The same firm registered other intangible assets amounting for 2.7% of its total assets.

Table 2 - Descriptive statistics of the sample deflated by the total number of outstanding shares

	Mean	Median	Min	Max	St.Dev	N
$\frac{MVE}{S}$	44.156	33.660	0.003	243.240	41.535	217
$\frac{BV}{S}$	23.574	18.236	-0.540	139.014	23.688	217
$\frac{BV - IA}{S}$	3.891	0.288	-48.640	58.824	15.808	217
$\frac{E}{S}$	2.775	1.734	-7.830	27.100	4.065	217
$\frac{G}{S}$	13.287	8.755	0.250	64.980	13.197	217
$\frac{RD}{S}$	2.007	0.639	0.000	14.070	2.959	217
$\frac{BP}{S}$	4.748	2.036	0.000	28.420	6.696	217
$\frac{OIA}{S}$	2.857	1.020	0.000	37.550	6.232	217

From analyzing Table 2, we can notice the market value per share of our median firm corresponds to 33.66€. Besides, we can infer the median book value of equity per share is equivalent to 18.236€, decreasing to 0.288€ when intangible assets are not considered. Our median firm registered earnings per share of 1.734€ between 2011 and 2017. Regarding intangible items, the median firm presented goodwill per share and brands and patents per share of 8.755€ and 2.036€, respectively. The median value of R&D expenses incurred by our median

firm were equivalent to 0.639€. The same firm registered other intangible assets amounting for 2.857€ per share.

In what concerns the level of correlation between the different variables used in this study, the degree of Pearson's correlation can be found in Table 3 and 4.

Table 3 - Pearson correlations among the model deflated by total assets

	$\frac{MVE}{TA}$	$\frac{BV}{TA}$	$\frac{BV - IA}{TA}$	$\frac{E}{TA}$	$\frac{G}{TA}$	$\frac{RD}{TA}$	$\frac{BP}{TA}$	$\frac{OIA}{TA}$
$\frac{MVE}{TA}$	1							
$\frac{BV}{TA}$	0.628	1						
$\frac{BV - IA}{TA}$	0.216	0.526	1					
$\frac{E}{TA}$	0.443	0.563	0.135	1				
$\frac{G}{TA}$	0.243	0.264	-0.632	0.241	1			
$\frac{RD}{TA}$	-0.043	0.038	-0.045	0.031	0.191	1		
$\frac{BP}{TA}$	0.529	0.461	-0.169	0.525	0.445	-0.010	1	
$\frac{OIA}{TA}$	-0.237	-0.187	-0.296	-0.062	0.101	0.062	-0.311	1

As we can perceive by observing Table 3, there is no strong correlation between the variables in our model deflated by total assets. R&D expenses presents the lower level of correlations, recording a value of 0.038 with book value of equity, 0.031 with earnings and -0.010 with brands and patents. The higher levels of correlations are noticed between book value of equity and market value (positive association of 0.628), goodwill and book value of equity subtracted by intangible assets (negative relation of 0.632) and finally, earnings and book value of equity (positive association of 0.563). Despite those robust levels of correlation, they do not achieve values that lead us to believe in the existence of substantial linearity problems in this model.

Specifically examining the relation between the dependent variable (market value of equity) and the independent variables, we can verify that only R&D expenses and other intangible assets are negatively related. In fact, these two variables present correlations of -0.043 and -0.237 respectively. Besides, R&D expenses seems to be the least related variable, opposing to book value of equity which shows the higher correlation with market value among the independent variables (0.628).

Regarding the model deflated by the total outstanding shares, Table 4 unveils us there is no significant association between the variables. Other intangible assets and market value present the lowest correlation (0.110), followed by book value of equity subtracted by intangible assets with market value (0.196) and brands and patents (0.202). On the opposite side, book value of equity presents a robust relation with brands and patents and other intangible assets (both 0.745). Book value of equity and earnings present the largest correlation (0.822). As occurred in the previous model, these levels of correlation permit us to admit there is no collinearity between the variables used.

In this case, all independent variables have a positive relation with the market value of equity. This means that when a firm notices an increase in any of the independent variables, the market value of equity increases as well. Regarding the correlation with the independent variable, we can verify the greater association with the market value of equity is registered by brands and patents (0.689) while the lowest is recorded by other intangible assets (0.110, as already mentioned).

Table 4 - Pearson correlations among the model deflated by total outstanding shares

	$\frac{MVE}{S}$	$\frac{BV}{S}$	$\frac{BV - IA}{S}$	$\frac{E}{S}$	$\frac{G}{S}$	$\frac{RD}{S}$	$\frac{BP}{S}$	$\frac{OIA}{S}$
$\frac{MVE}{S}$	1							
$\frac{BV}{S}$	0.622	1						
$\frac{BV - IA}{S}$	0.196	0.617	1					
$\frac{E}{S}$	0.626	0.822	0.549	1				
$\frac{G}{S}$	0.520	0.569	-0.256	0.410	1			
$\frac{RD}{S}$	0.268	0.652	0.436	0.510	0.361	1		
$\frac{BP}{S}$	0.689	0.745	0.202	0.620	0.659	0.374	1	
$\frac{OIA}{S}$	0.110	0.745	0.452	0.581	0.385	0.624	0.447	1

4. Results and discussion

In this chapter we analyze the results achieved in this study. Accordingly, sections 4.1 and 4.2 present the results for hypothesis #1 and #2, respectively. The discussion of the results can be found in section 4.3.

4.1 Value relevance of traditional accounting measures

In the table below, we can find the results of our estimations for hypothesis #1, related to the value relevance of earnings and equity book value in European market values (model 1). Those results were achieved using GLS method for panel data.

Table 5 - Estimation results for hypothesis #1

	Model outstanding shares	Model total assets
Constant	8.507 (1.647)	0.033 (0.029)
BV	1.287*** (0.110)	1.558*** (0.103)
E	1.419*** (0.541)	2.377*** (0.469)
F-statistic	223.841***	261.770***
R-squared	0.676	0.709
Adjusted R-squared	0.674	0.707

This table presents the estimation output of model (1): $MVE_{i,t} = \alpha_{0,t} + \alpha_1 BV_{i,t} + \alpha_2 E_{i,t} + \varepsilon_{i,t}$. The second column represents the estimation result when variables deflated by the number of outstanding shares. The third column comprehends the output of the estimation when variables are deflated by total assets. $MVE_{i,t}$ stands for the market value of firm i , three months after the end of the fiscal year t . $BV_{i,t}$ denotes the book value of firm i , in year t , while $E_{i,t}$ stands for the earnings registered by firm i , in year t . Panel-corrected standard errors (PCSE) robust to heteroscedasticity and cross-sectional dependence are denoted in parenthesis. The statistical significance is represented as * at 0.10, ** at 0.05 and *** at 0.01.

According to Table 5, both earnings and equity book value are positively related with the European firm's market value.

Thus, and considering this association is valid at a 1% level of significance for both models applied, our results give us strong evidence supporting that earnings and book value of equity are value relevant for the European market, during the studied period.

4.2 Value relevance of intangibles accounting measures

Table 6 presents us the results of the estimation of model (2), used to test the value relevance of intangible items within the European markets. As happened for the previous test, model (2) was estimated using GLS method for panel data.

As we can perceive by analyzing Table 6, the results suggest that goodwill and brands and patents are positively associated with market values. However, an inconclusive evidence is presented regarding research and development expenses. In fact, the model deflated by the outstanding shares proposes this variable is not value relevant. On the other hand, research and development expenses seem to be value relevant according the model scaled by total assets. As this last one presents a negative coefficient for the variable, we can state that if research and development expenses are value relevant, then they may have a negative impact on the market value of European firms.

Similar conclusion can be retrieved concerning other intangible assets. When deflated by total outstanding shares, the evidence supports that other intangible assets are not value relevant, which is not suggested by the alternative approach (model scaled by total assets). Nevertheless, considering the corresponding coefficient is negative in both estimations, we are able to affirm that in case other intangible assets are value relevant, then they may be negatively related with the market values.

By observing Table 6, we learn that earnings and book values of equity (these, now without considering intangible assets) continue to be positively associated with market values.

Table 6 - Estimation results for hypothesis #2

	Model outstanding shares	Model total assets
Constant	8.045 (1.062)	0.152 (0.031)
BV-IA	0.677*** (0.128)	1.019*** (0.114)
E	2.898*** (0.532)	1.497*** (0.306)
G	1.416*** (0.127)	1.335*** (0.124)
R&D	0.652 (0.514)	-0.623*** (0.169)
BP	2.535*** (0.290)	2.824*** (0.342)
OIA	-2.893*** (0.325)	-0.349 (0.325)
F-statistic	185.319***	261.770***
R-squared	0.841	0.788
Adjusted R-squared	0.837	0.782

This table presents the estimation output of model (2): $MVE_{i,t} = \beta_{0,t} + \beta_1(BV - IA)_{i,t} + \beta_2E_{i,t} + \beta_3G_{i,t} + \beta_4RD_{i,t} + \beta_5BP_{i,t} + \beta_6OIA_{i,t} + \mu_{i,t}$. The second column represents the estimation result when variables deflated by the number of outstanding shares. The third column comprehends the output of the estimation when variables are deflated by total assets. $MVE_{i,t}$ stands for the market value of firm i, three months after the end of the fiscal year t. $(BV - IA)_{i,t}$ represents the book value subtracted by the intangible assets of firm i, in year t, while $E_{i,t}$ stands for the earnings registered by firm i, in year t. $G_{i,t}$ denotes for the reported goodwill of firm i, in year t whereas $RD_{i,t}$ stands for the research and development expenditures of firm i, in year t. $BP_{i,t}$ expresses the value of brands and patents recognized by the firm i, in year t. $OIA_{i,t}$ denotes the recognized intangible assets subtracted by the amount of goodwill and brands and patents, for firm i in the year t. Panel-corrected standard errors (PCSE) robust to heteroscedasticity and cross-sectional dependence are denoted in parenthesis. The statistical significance is represented as * at 0.10, ** at 0.05 and *** at 0.01.

We can also notice an increase of the overall explanatory power of the model estimated in this section when compared to the one estimated in section 4.1. In fact, an evolution from an

adjusted r-squared of 0.674 to 0.837, in case of scaling by the total outstanding shares, and from 0.707 to 0.782, when deflating the variables by the total assets, can be found in our results. Therefore, the evidence provided by Table 5 and Table 6 suggests that intangible items have explanatory power over European market values and thus, are value relevant.

4.3 Discussion of results

As expected, our results suggest earnings and equity book value are value relevant and present a positive association with market values in the European context.

This stands in line with Devalle and Magarini (2012) and Narktabtee and Patpanichchot (2011) who found a positive relation between earnings and firm's market value in European markets. Besides, similar association was found by Kimouche and Rouabhi (2016) and Lenormand and Touchais (2009) in the French market. Regarding equity book value, identical findings were obtained in Devalle et al. (2010), Lenormand and Touchais (2009) and Elbakry et al. (2017). A possible explanation may rely in the fact that earnings and equity book values are viewed by investors as "reliable signs for the perspective of equity valuation", and for that reason, are widely employed by financial analysts in equity valuation processes (Kimouche & Rouabhi, 2016). Similar results were found when intangibles were excluded from book values, reinforcing the idea that earnings and equity book values may be value relevant within the European markets.

Another finding of this study is that goodwill and brands and patents are significantly related with market values, presenting both items a positive association with European market values, as expected. Regarding goodwill, the results are consistent with Kimouche and Rouabhi (2016), Sahut (2011) and Oliveira et al. (2010), and may be enhanced by the periodic impairment reviews required in European accounting, which may reflect a more realistic value for goodwill and, consequently, a closer relation with the firm's market value (Al Jifri & Citron, 2009). The positive impact of brands and patents on firm's market value was also anticipated. This may be related with the fact that brands and patents may create property rights over innovations and/or make larger market shares feasible. This, in turn, may generate benefits for firms and consequently, for investors (Wyatt, 2008). Besides, according to I. T. Lopes (2011), brands and

patents belong to a class of intangible assets whose great portion of risk is already mitigated. This leads us to believe that the higher robustness of brands and patents may persuade investors to use these items to valuation purposes, turning them more value relevant. Our results concerning this variable stand with Barth, Clement, et al. (1998), Kallapur and Kwan (2004) and Sandner (2009).

Concerning research and development expenses, our evidence gives no clear image about the effects of this item in firm's market value. In fact, while the approach deflating with the number of outstanding shares indicates research and development expenses seem to be not relevant, the other one scaling with the total assets suggests R&D expenses may be value relevant for explaining European market values but with a negative sign. Despite contradicting an important part of the literature, which states research and development expenses have a significant and positive relation with firm's market values (see Barth et al. (2018), Clausen and Hirth (2016) and Hirschey et al. (2001), e.g.) these results are in line with some empirical evidence. In fact, research and development expenses were also found to be non-related with market values by Oliveira et al. (2010), when studying the Portuguese case. Besides, Cazavan-Jeny and Jeanjean (2003) concluded that research and development expenses were negatively related with the market values of French firms. According to these authors, this relationship can be caused by the difficulty of investors in interpreting R&D expenses, as this information is not easily verifiable and firms may distort R&D disclosures.

Other intangible assets is composed by the firm's remaining intangible assets. This category presented no value relevance or a negative relationship with the firm's market values. This result can be related with the fact that, despite requiring the fulfillment of restrict terms, the current accounting standards in Europe still allow the capitalization of some assets whose benefits are uncertain (intangible assets in development, for example). This may lead investors to respond cautiously to the capitalization of those assets in the short term, starting to use them more confidently as economic benefits start getting realized (Dargenidou, Jackson, Tsalavoutas, & Tsoligkas, 2019). However, the broad composition of this category may be the main instigator of our results.

Finally, the estimation considering intangibles verified a higher adjusted coefficient of determination when compared to the estimation of the traditional accounting measures (earnings and equity book value). In fact, an increase of 16.7 and 8.1 percentage points could be noticed in the adjusted R-squared, when deflating model (2) by the outstanding shares and total assets respectively. These values are in line with similar studies, who found an increase of 10.29 p.p. (Oliveira et al., 2010) and 20.00 p.p. (Kimouche & Rouabhi, 2016) in R-squared. Thus, it seems feasible to infer from our evidence that intangible assets as a whole may have explanatory power over the market values of European firms.

5. Conclusion

In this study we intend to perceive the value relevance of accounting items in the European context. Although this subject generates curiosity among the scientific community, few studies have been recently conducted in continental European markets. Thus, our sample is composed by 217 observations, gathered from firms listed in DAX30, CAC 40, IBEX 35, FTSE MIB and BEL20 between 2011 and 2017.

In the first part of the dissertation, we focus on earnings and book values as these are considered to be the primary summary measures of financial statements (Barth, Beaver, & Landsman, 1998). In the second part, considering its upsurge in business reality (André, Filip, & Paugam, 2016; Srivastava, 2014), we explore the relationship between intangible items and market values. Here, goodwill, R&D expenses, brands and patents and other intangible assets are used as representatives of intangible items.

Our results suggest that earnings, equity book values, goodwill and brands and patents are value relevant. More specifically, these indicators were found to be significantly and positively related with European firms' market value. Regarding R&D expenses and other intangible assets, a solid conclusion could not be found. However, the evidence indicates that, in case they are value relevant, R&D expenses and other intangible assets present a negative association with firms' market values.

Another finding is that intangibles seem to increment value relevance to earnings and equity book value. In fact, we found an adding power in the adjusted coefficient of determination between 8.1 and 16.7 percentage points which is in line with similar studies within European markets.

Following these results, we can affirm earnings, equity book values, goodwill and brands and patents have ability to explain part of the firms' market values evolution in the European context. This means those accounting items may be used as indicators for investments decisions. Besides, and in a similar line of reasoning, these results indicate that earnings, equity book values, goodwill and brands and patents are qualified for belonging a panel of indicators measuring managers performance.

Moreover, our estimations presented relatively high levels of adjusted R-squared (0.674 and 0.707 in the model only considering earnings and equity book value, 0.837 and 0.782 when considering these and intangibles). These values suggest a sign of quality in the accounting standards implemented in Europe. Besides, the high level of R-squared also lead us to infer that investors face a reduced information risk. As a consequence, this kind of risk may not contribute severely for a high cost of equity.

Some limitations should, however, be taken in count when interpreting these results. In fact, a larger sample could provide more reliability to these conclusions. Thus, future research may extend the sample examined, whether by including other than the main markets of each country or by expanding the geographies studied. Besides, analyzing the way firm's characteristics impact the value relevance of intangible assets could give additional valuable insights for better understanding how these items are related with firm's value.

6. Bibliography

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