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**Worldwide Convergence of IFRS: Evidence from the Global Automotive Industry**

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**TITLE:** *Worldwide Convergence of IFRS: Evidence from the Global Automotive Industry*

**ABSTRACT**

Worldwide convergence of International Financial Reporting Standards (IFRS), ongoing since 2002, is a requirement if international comparability between publicly listed companies is to be ensured. Convergence is examined from the point of view of regulators, accountants, and users of financial information. For this purpose, data on 534 companies from the global automotive industry is used. This paper concludes that worldwide convergence is mostly being effective. Its triumph, however, varies depending on the set of accounting standards being compared to IFRS. Options within IFRS, national tax regulation, cultural differences, different company strategies and country resistance are found to hinder convergence.

**KEYWORDS:** Accounting Standards, Convergence, Financial Ratios, Automotive Industry

**1. INTRODUCTION**

*“As 2014 approaches, the [US Securities and Exchange Commission] appears to still be in idle mode”<sup>1</sup>.*

Today, the importance of financial reporting has escalated to new heights. Companies are going global, and so is the access to information on which investors rely to assess the performance of the reporting entity. Financial Reporting conveys this information under accounting reports called financial statements.

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<sup>1</sup> <http://www.bna.com/sec-decision-ifrs-b17179880491>, checked on 07/06/2014.

Financial statements are prepared in accordance with accounting standards. IFRS is a “...set of accounting standards, developed and maintained by the IASB with the intention of those standards being capable of being applied on a globally consistent basis—by developed, emerging and developing economies—thus providing investors and other users of financial statements with the ability to compare the financial performance of publicly listed companies on a like-for-like basis with their international peers.”<sup>2</sup>

Given the objectives of IFRS, it is no surprise that the multitude of accounting standards in existence, adding unnecessary noise to the usefulness of financial statements, has always been subject of much heated debate. The Securities and Exchange Commission (SEC), for example, responsible for recognizing the United States Generally Accepted Accounting Principles (US GAAP) as authoritative, has kept on stalling IFRS adoption, even after the International Accounting Standards Board (IASB) acknowledged the relevance “of North-American positions for the purpose of international convergence”<sup>3</sup>.

Inspired by the obstacle posed by the US on the adoption of IFRS, this paper studies worldwide convergence of IFRS. Convergence is important because it is the driving factor that allows financial statements of publicly listed companies to be compared with those of their peers around the world, the ultimate objective of IFRS.

By now, IFRS attained a status close to that of global accounting standards, covering more than half of the world’s GDP<sup>4</sup>. However, IFRS faces yet two significant obstacles. On the one hand, the differences between IFRSs applicable worldwide. For instance, differences among national GAAPs may persist even after IFRS adoption (Nobes, 2013).

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<sup>2</sup> <http://www.ifrs.org/About-us/Pages/What-are-IFRS.aspx>, checked on 07/06/2014.

<sup>3</sup> [http://ec.europa.eu/internal\\_market/accounting/docs/governance/reform/131112\\_report\\_en.pdf](http://ec.europa.eu/internal_market/accounting/docs/governance/reform/131112_report_en.pdf), checked on 20/06/2014.

<sup>4</sup> Of the world’s GDP 56% is presented under IFRS. Checked online on 14/07/2014 at: <http://www.ifrs.org/Use-around-the-world/Pages/Analysis-of-the-IFRS-jurisdictional-profiles.aspx>

On the other hand, the existence of different accounting standards, such as the US GAAP, and the consequences of their differences on financial statements' items comparability.

That being said, *convergence* is examined from three perspectives, namely the point of view of regulators, accountants, and users of financial information. For this purpose, data on 534 companies from the global automotive industry is used.

From the point of view of regulators, this paper examines whether IFRS have been expanding. Convergence is measured as the increase overtime in the proportion of companies that have adopted IFRS. As the Financial Accounting Standards Board (FASB) puts it "... the ultimate goal of convergence is the development of a unified set of high-quality, international accounting standards that companies worldwide would use..."<sup>5</sup>

Nobes (2013) stated that simply using IFRS, however, may not guarantee economic convergence. He pointed out options as a significant obstacle, but didn't actually explore this, recommending it for future researchers. Hence, based on the void left by him, this paper studies the convergence of accounting choices for companies under IFRS. Focusing, therefore, on convergence from the point of view of accountants. Convergence is verified if there is a decrease in the amount of methods chosen, an increase in the number of companies opting for the same alternative, or absence of statistically significant differences between ratios of companies belonging to groups with different characteristics.

Lastly, this study will assess convergence from the users' point of view, using all accounting standards considered. Inspired by Haverty (2006), convergence is defined as the lack of differences between financial ratios of companies under different standards.

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<sup>5</sup> <http://www.fasb.org/jsp/FASB/Page/SectionPage&cid=1176156245663>, checked on 15/08/2014.

Most studies regarding IFRS focused on comparability, or the impact of IFRS adoption, rather than convergence. This paper adds to the current literature by building a dataset, on a specific industry, with which to assess the matter of accounting standards convergence, and by studying convergence on a global scale with recent data. In addition, this paper draws attention to aspects hindering convergence, even if not related with standards.

A single industry was picked to conduct the research here proposed, mainly, for two reasons. Firstly, it is important to reduce as much as possible the impact of unobservable effects in the analysis, and the focus on a single industry allows one to disregard industry specific effects (different industries have typically different ratios, which could compromise the methodology of this study (Foster, 1986)). Last but not least, by focusing on the convergence of the information reported under different accounting standards, this paper necessarily commands that a cluster of similar companies is chosen to make an analysis.

The automotive is the perfect industry for this paper. First of all, it represents a significant part of GDP worldwide (“3 percent of all GDP output”(Klink, Mathur, Kidambi, & Sen, 2014)) and is on the rise (as emerging markets develop), meaning that the research here conducted is relevant for the global economy. Moreover, a lot of automotive manufacturers are traded publicly on exchanges. Not only is data much more readily available, as the quality of the data provided is higher, seeing as it’s scrutinized by the public, and a lot of it reviewed by audit firms<sup>6</sup>. Lastly, the sheer distribution of accounting standards in the industry makes it a good exhibit to try out for convergence. Most of the production of motor vehicles takes place in Germany (7%), USA (12%), Japan (11%) and China (24%). And three out of the four countries mentioned have not made IFRS adoption mandatory.

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<sup>6</sup> In 2012, only 2.84% of the companies used in this paper had not their accounts audited.

This paper is divided in six sections. Section two describes the framework based on which each type of convergence is studied. Section three reviews prominent research for each of the perspectives from which convergence is examined. Section four goes over the source of data, its analysis, and the research questions. Section five presents and discusses the results achieved. Finally, section six sums up the conclusions of the study; goes over its limitations, and makes suggestions for future research.

## **2. REGULATORY AND CONCEPTUAL FRAMEWORK**

### ***2.1 Analysis of Accounting Standards***

The IFRS Foundation, previously named International Accounting Standards Board (IASB), is responsible for the “single set of high quality, understandable, enforceable and globally accepted financial reporting standards...”<sup>7</sup> that are IFRS.

The first steps for regulatory convergence of IFRS were taken in 2002. In that year, the FASB, from the US, agreed on a joint programme with the IASB<sup>8</sup> to converge accounting standards, US GAAP and IFRS, and the European Union, under the approval of Regulation 1606/2002, agreed on making IFRS adoption mandatory for consolidated accounts of companies listed on European stock markets as of 2005. Meanwhile other countries, like Japan in 2004, jointly with the IASB, agreed on the convergence of the JP GAAP with IFRS. Later in 2006, China also adopted accounting standards close to IFRS (here called CN GAAP), striving for full convergence one day. As for India, the Securities and Exchange Board of India (SEBI) has allowed companies to prepare consolidated financial statements in accordance with IFRS until a new set of accounting standards, converging

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<sup>7</sup> <http://www.ifrs.org/The-organisation/Pages/IFRS-Foundation-and-the-IASB.aspx>, checked on 07/06/2014

<sup>8</sup> <http://www.ifrs.org/Use-around-the-world/Global-convergence/Convergence-with-US-GAAP/Pages/Convergence-with-US-GAAP.aspx>, checked on 07/06/2014.

IN GAAP with IFRS has been completed (Ind ASs). For a summary of the convergence status of the accounting standards mentioned refer to Appendix A.

## ***2.2 Industry Analysis***

Even if regulatory convergence of other accounting standards to IFRS seems to be taking place, as discussed in the sub-section before, a lack of convergence from accountants their point of view is possible. Therefore, it is important to analyze the automotive industry in order to know which options within IFRS should be studied.

The automotive industry comprises the companies that design, develop, manufacture, and sell motor vehicles, including services required to distribute cars and keep them running. Inventories play a key role in the industry, and so inventory valuation method is analyzed. Additionally, the industry can be regarded as capital intensive because it relies heavily on machines and materials, which it has to manufacture or purchase. For this reason, depreciation is also a very important topic. That being said, depreciation method too is studied. More details on the industry are presented in Appendix B, using a Porter's 5 Forces Analysis. Descriptive statistics of the automotive industry, as defined by the sample used in this paper, are detailed on Appendix C.

## ***2.3 Ratio analysis***

Even if convergence is verified from the point of view of regulators and accountants, one must consider whether there has also been convergence from the perspective of users of financial information, enhancing comparability of financial statements as is IFRS their goal. Indisputably, companies in the same industry allow for a comparative analysis based

on ratios. Even more so in a mature, and globalized industry such as the automotive industry. Users of financial information rely on ratios to assess the performance of an entity, which is why a ratio analysis is used to assess convergence from their perspective.

The DuPont decomposition used in this paper is as follows:

$$ROE = \left[ \frac{EBIT}{Sales} \times \frac{Sales}{Assets} \right] \times \left[ \frac{EBT}{EBIT} \times \frac{Assets}{Equity} \right] \times \frac{NI}{EBT}$$

(OM)      (AT)      (IB)      (LE)      (TB)

The operating margin (OM) is very sensitive to cultural differences, and company strategies. It measures the percentage of revenue available after production costs have been paid. The asset turnover (AT) is an efficiency ratio, telling how well the company is generating revenue from its assets. Together, operating margin and asset turnover, represent the return on assets (ROA) before taxes. The interest burden (IB) combined with the leverage effect (LE) are representative of the financial policy of a company. By increasing debt, the leverage effect will give a boost to return on equity (ROE), while, at the same time, the company will be subject to more financial expenses (interest burden goes up), decreasing ROE. So, there's a trade-off. The tax burden (TB), very dependent on country-specific factors, determines the impact of taxes paid by the company each year.

### 3. LITERATURE REVIEW

Based on the three types of convergence discussed, there are three groups of papers meaningful for the research here conducted: those focusing on regulatory convergence of IFRS; those related to convergence within IFRS, and those regarding convergence, or the lack of it, between accounting standards.



### ***3. 1. Regulatory convergence to IFRS***

Barth, Landsman, Lang, and Williams (2012) check out whether the application of IFRS by non-US firms led to comparable amounts to those reported by US firms using US GAAP. The sample used by the study comprises firms that have adopted IFRS between 1995 and 2006, overall from 27 countries, and a matched sample of US firms. Based on stock prices, stock returns, cash flows, earnings, and other variables, the authors find that IFRS adoption has enhanced comparability. Amounts under IFRS are found to be more comparable to amounts under US GAAP than amounts under local accounting standards.

### ***3. 2. Convergence within IFRS***

Daske, Hail, Leuz, and Verdi (2008) dedicate their paper to evidence on capital-market effects stemming from IFRS adoption. Their sample consisted in 35000 firm-year observations. They resort to classical tests of hypothesis, and regression analysis. For this purpose, they start by choosing independent variables to capture capital-market effects of IFRS. Then, they control for trends, changes in market liquidity and firm characteristics. They conclude that the effects of IFRS adoption are different, depending on how it is implemented (voluntary adopters are compared to mandatory adopters) and countries' level of enforcement and incentives.

Nobes (2013) assesses the international differences that have prevailed under the umbrella of IFRS adoption. Elements affecting IFRS practices are brought under scrutiny, as long as they can be held accountable for the significant differences existing between countries in what regards the application of IFRS. Based in past samples of the literature review, the author argues that differences survived since the adoption of IFRS. The author suggests eight hypotheses on which to conduct future research, being one of them "H4:

The choice of IFRS options by UK and German groups is different”, and another “H<sub>5</sub>: Covert options in IFRS are exercised differently by UK groups than by German groups”. This paper fills the void left by Nobes: it studies accounting choices for a group of companies under IFRS, namely, an overt option, inventory valuation method and, a covert option, depreciation method.

### ***3. 3. Convergence between IFRS and National Accounting Standards***

Moya and Oliveras (2006) analyze the financial impact of the voluntary adoption of IFRS on the statement of changes in equity and the income statement for German companies (non-financial DAX groups applying IFRS, and listed companies in the chemical pharmaceutical and fashion industries). Accounting differences are studied using reconciliations prepared by German companies. The authors conclude that the changes were significant. For example, retained earnings had a big increase, as HGB was far more conservative. Regarding industries, on the Ch&Ph industry, effects on non-current assets and liabilities proved more relevant, while on the fashion industry, changes in working capital were more noticeable. This study is the only one mentioned that focused on industries.

Callao, Jarne, and Laínez (2007) examine whether the comparability of financial statements has increased under IFRS. The authors use financial statements from before, and after, IFRS was adopted, comparing them, and looking for significant differences between balance sheet figures, income statement lines, and financial ratios. Their sample includes financial statements from 35 companies belonging to IBEX on June 30, 2005. The authors point out that there is evidence for significant differences between financial statements under IFRS and local accounting standards. Indebtedness and solvency ratios, along with return on assets and return on equity varied significantly due to the changes in financial

statement items, which the authors explain by assessing differences between Spanish accounting standards and IFRS. The authors suggest local accounting standards to converge with IFRS, so that there may be some gains to the adoption in the medium to long-term.

Lantto and Sahlström (2009) measure the impact of IFRS adoption on key financial ratios, which are used for the most part as key performance indicators. In order to explain the differences they found between ratios reported under Finnish GAAP as opposed to IFRS, they check the impact of specific standards on accounting figures, and associate them with the respective financial items. Their sample comprised 91 firms, reporting reconciliations to IFRS they used. In the end, the authors conclude that IFRS had indeed a significant impact on key accounting ratios, increasing profitability ratios, and gearing ratios, while decreasing the P/E ratio, equity ratios, and quick ratios.

Focusing on the United Kingdom (UK), Lueg, Punda, and Burkert (2014) check out if financial ratios were affected by the transition to IFRS. They further compare the impact on shareholder-oriented common law regimes with that in creditor-oriented law regimes. Ratios are computed under both IFRS, and the UK GAAP, in accordance with the reconciliation reports, and they are then tested for statistical significant differences. Afterwards, which financial statement items have led to the variation are detailed, and compared. Their sample included 101 firms with full range accounting data. Under IFRS, profitability and liquidity ratios increased significantly. P/E, however, declined. Lastly, whether the country is under a creditor or a shareholder-oriented code law regime does not matter. The causes for the differences verified are the same.

There has been a lot of research on IFRS, albeit most on the impacts of its adoption, which made sense at the time. Back in 2005 IFRS had just been freshly adopted. Now, however, close to a decade has past and conditions are met to assess a more pressing matter, the

goal of IFRS, convergence that should lead to comparability. This paper contributes to the literature by studying convergence between companies that have already adopted IFRS, and between these and companies that have still to adopt the standards. This is only possible because the research here conducted focuses on a single industry.

#### **4. RESEARCH METHODOLOGY**

##### ***4.1 Source of Data***

While this paper studies convergence from three different perspectives - the point of view of regulators, accountants, and users of financial information - they all share the same sample. At first, data was collected on the 977 companies of the industry available at Bloomberg. For some variables demanding a long-term analysis yearly data from 1990 all the way to 2012 was collected. However, for the most part, only the most recent period with the most accounting data available, which would prove to be 2012, was elected. A single year was used to eliminate time specific effects from the results. Data was also collected from the “Organisation Internationale des Constructeurs de’Automobiles” (OICA) in order to study the industry at a country-level, and from KPMG, on tax rates around the world<sup>9</sup>. Yearly observations were picked<sup>10</sup> and the US currency was used.

Data from all the sources used was merged in one single spreadsheet<sup>11</sup>, one of the main contributions of this paper to the currently available literature review. Afterwards the process of analyzing the data began, and the required ratios described before were computed. Out of the 997, 443 companies were excluded (Chart 1).

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<sup>9</sup> <http://www.kpmg.com/global/en/services/tax/tax-tools-and-resources/pages/corporate-tax-rates-table.aspx>, checked on 09/09/2014.

<sup>10</sup> It was then possible to check the values provided by the database with the values from companies annual reports, therefore ensuring internal validity of the data in use.

<sup>11</sup> This sheet had 535 rows and 706 columns just for 2012.

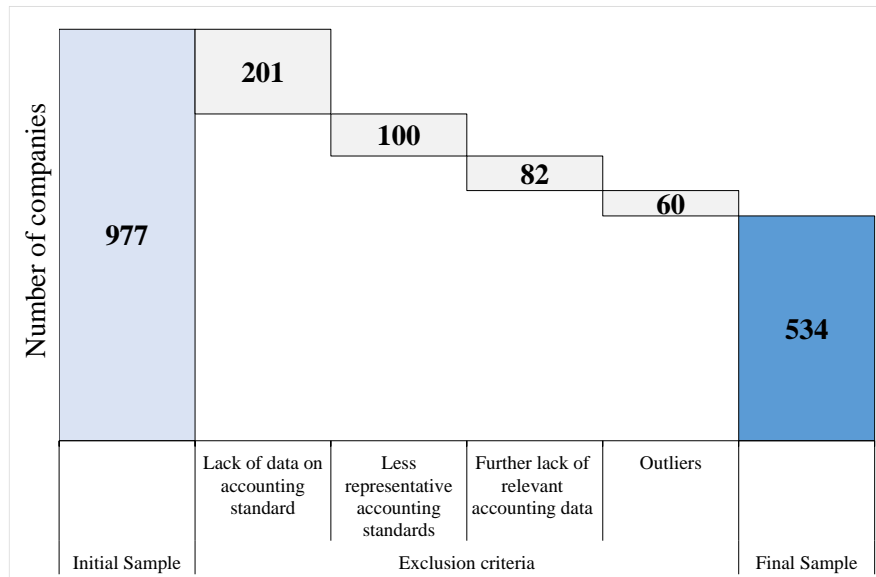


Chart 1 - Initial sample, exclusion criteria, and final sample

#### 4.2 Data Analysis

In 2012, of the 534 companies considered<sup>12</sup>, 40% is using IAS/IFRS, 20% JP GAAP, 17% IN GAAP, 16% CN GAAP, and the remaining 7% is using US GAAP. Most companies come from Japan (20%), followed by China (19%), India (17%), South Korea (15%), Taiwan (5%), and the United States (5%). Bivariate-wise, IAS/IFRS is responsible for 44% of total sales, followed by JP GAAP, US GAAP, IN GAAP, and CN GAAP, each having 24%, 23%, 6% and 3%, respectively. Focusing specifically in the IFRS group, totaling 214 observations<sup>13</sup>, companies are spread over 36 countries, with 37% being located in South Korea, 14% in Taiwan, 6% in Germany, 6% in China and 4% in France.

#### 4.3 Research Questions

Convergence is measured from three different perspectives. With this in mind, three research questions, one for each perspective on convergence, are presented.

<sup>12</sup> The majority of financial statements, 70%, is not consolidated, and 61% of the companies end the fiscal year in December. The data used in this paper for 2012 is from the last days of December for all companies as confirmed in Bloomberg and with staff working there via Bloomberg Help Desk.

<sup>13</sup> Out of the financial statements under IFRS, 95% are not consolidated, and 93% of the companies have their fiscal year end in December.

*RQ1: Has the proportion of companies applying IFRS increased overtime?*

*RQ2: For companies under IFRS, has there been convergence of accounting choices:*

*- In what regards inventory valuation method?*

*- In what regards depreciation methods?*

*RQ3: Are there differences between ratios computed under IFRS and other accounting standards:*

*- At a broad level?*

*- At country level?*

To answer these questions this paper uses descriptive statistics and classical tests of hypotheses<sup>14</sup> (both standard and non-parametric). Following Callao et al. (2007), the variable, for example the operating margin, is tested for normality<sup>15</sup> using Shapiro-Wilks tests. If normality holds, a t-test, testing for the difference between means, is viable to compare groups. If it does not, a Z statistic (Wilcoxon rank-sum test), the equivalent of a t-test, but no longer requiring normality, is used.

## **5. RESULTS**

Results are explained in the light of statistics and economic theory yes, but also accounting standards, and their differences based on the framework earlier developed. In addition, results are compared to those of other authors based on the literature review.

*RQ1: Has the proportion of companies applying IFRS increased overtime?*

Yes, there has been an increase in the proportion of companies using IFRS. From only four companies in 1990, three of them from Germany (BMW, Daimler, and Volkswagen), out of the 101 for which data was available (4%) all the way to 214 companies in 2012

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<sup>14</sup> At first regression analysis was performed. However, provided the severe lack of normality (not even transformations solved the problem) and homoscedasticity in the data, this methodology was dropped.

<sup>15</sup> Other studies, such as those by Lantto and Sahlström (2009) or Lueg et al., (2014), have also pointed out that most, if not all, financial ratios have non-normal distributions.

(40%) (Chart 2). In addition, it is possible to observe the progressive wipe out of other accounting standards from 2003 onwards, almost fully in favor of IFRS.

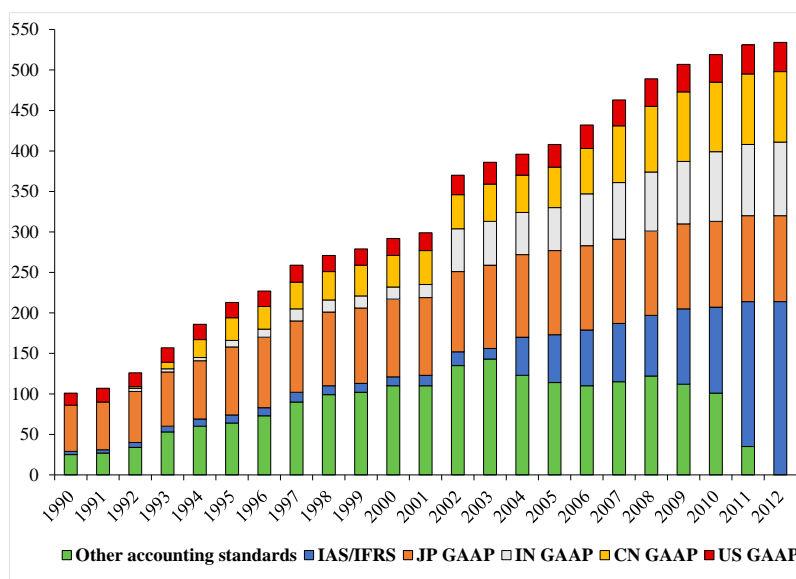


Chart 2 - Accounting standards distribution by number of companies (1990-2012)

The convergence process is said to have started in 2002, but to only be visible from 2005 onwards due to Regulation 1606/2002. In the automotive industry, however, it started before that, in 2004. Between 2003 and 2004 the percentage of companies using IFRS went up by 9 p.p., mostly thanks to early adoption by German and French companies.

This study goes further by analyzing, over the years, how many countries had at least one company using IFRS. The conclusions are identical. Until 2003 this number went up only by 16 p.p. (Chart 3). However, between 2003 and 2004 it soared to 42%. By 2012, at least 95% of the 37 countries had no less than one company using IFRS. Only Japan and India were left out in 2012, but both have plans for convergence.

It is also worthwhile to mention that even if IFRS are not mandatory in some of the countries analyzed, such as China and the US, for example, there are companies in there that have already adopted IFRS. In addition, there are companies that have chosen to present accounts according to IFRS even though they are presenting individual accounts.

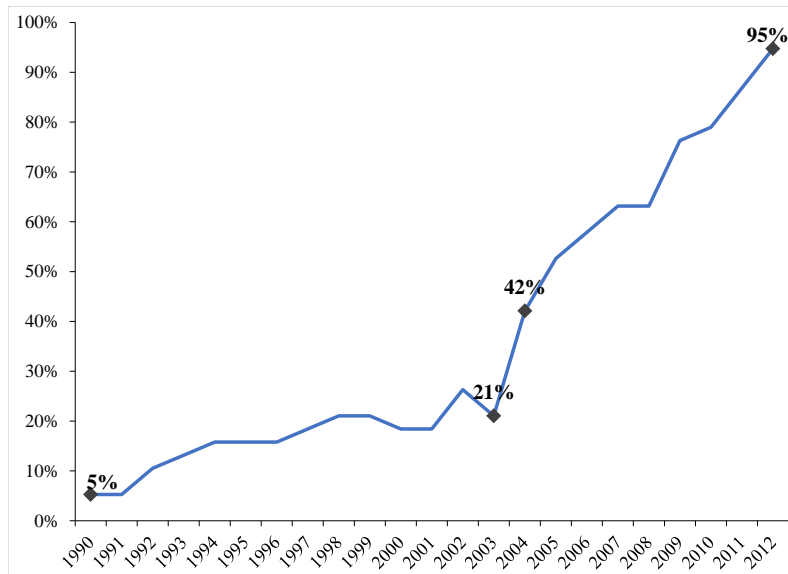


Chart 3 - Percentage of countries with at least one company using IFRS (1990-2012)

From 1990, up to 2012, IFRS came a long way. Both the proportion of companies under IFRS, and the amount of countries to which IFRS has spread, have increased. Hence, it is possible to conclude that regulatory convergence has taken place.

*RQ2: For companies under IFRS, has there been convergence of accounting choices:*

*- In what regards inventory valuation method?*

*- In what regards depreciation methods?*

Attention has been drawn to accounting choice as a cause of differences among IFRSs applied worldwide. IFRS provides options within standards, which means accountants can choose, or may have preferences. Nobes (2013) points out options as one of the reasons for the “survival of international differences under IFRS”.

In this paper a comparison between groups using different methods, in what regards inventory valuation and depreciation, is exploited. These two options are chosen for their importance for the automotive industry, as mentioned previously.

Regarding *inventory valuation method*, most companies in the automotive industry, as of 2012, were using the average cost method (75%) (Chart 4).



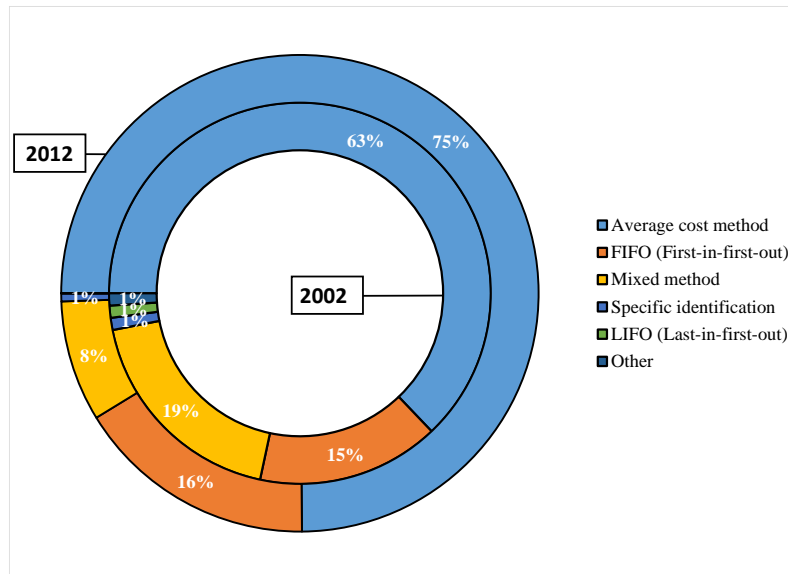


Chart 4 – Inventory method distribution by number of companies

Looking at historical data, we find evidence for convergence. Since 2002, LIFO, which was prohibited by IFRS, and other methods have disappeared completely. In addition, the amount of companies using the average cost method increased by 12 p.p.

However, in spite of the convergence observed, the simple choice of inventory method may still influence ratios. In order to provide an example, ratios of a group of companies that have chosen methods other than weighted average<sup>16</sup> are compared to that of a group that has chosen to do so. Inventory method affects mostly Asset turnover, and so, ROA.

The differences between asset turnovers turned out statistically significant at the 5% significance level (Figure 1). The same cannot be said about differences in ROA. Thus, there seems to be some evidence for “overt options”, such as, accounting choice, as one of the causes of differences among IFRSs applied worldwide as Nobes (2013) mentioned. However, their impact does not seem to stand out on broader ratios.

<sup>16</sup> The group of companies using weighted average was picked as benchmark because it had the biggest share of observations to conduct the analysis.

	Asset Turnover	Return on Assets
Other methods (n = 46)	1.49	4.16%
Average cost method (n = 137)	1.16	4.11%
Difference <sup>a</sup>	0.33 ***	0.50 p.p.
Normality	Rejected ***	Rejected ***
Statistic Z	1.959 **	0.241

\*, \*\*, \*\*\* represent statistical significance of differences at the 10%, 5%, and 1% significance levels, respectively. <sup>a</sup> t-statistic.

Figure 1 - Average cost method compared to other methods

The *depreciation method* chosen by companies is also analyzed (Chart 5), and striking evidence for convergence is found. The number of methods being used fell from four in 2002 to two by 2012, and 98% of the companies were using straight line, in the last year. A test for differences among groups does not even make sense in this case.

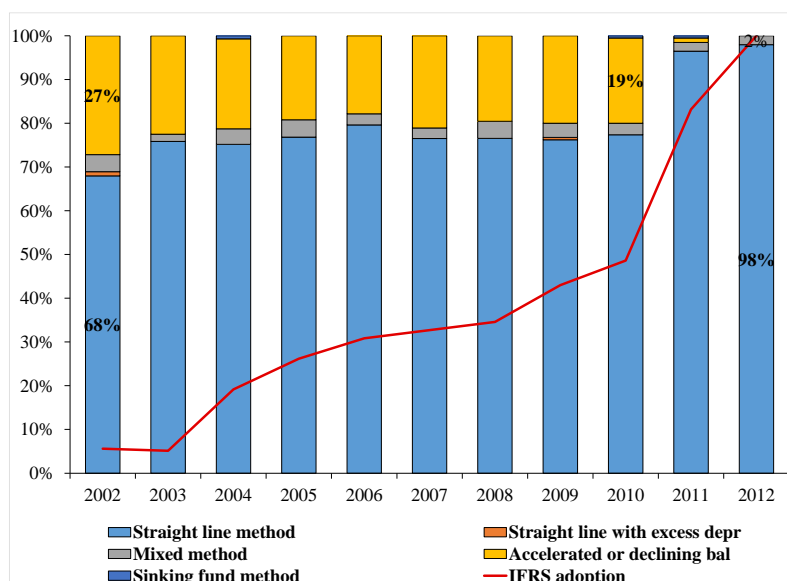


Chart 5 – Depreciation method distribution by number of companies

It is then possible to conclude that IFRS led to the convergence of accounting choices, even though the impact of options within IFRS cannot be ignored.

*RQ3: Are there differences between ratios computed under IFRS and other accounting standards:*

- At a broad level?

- At country level?

At first, ratios computed under IFRS are compared with ratios under any other standard. Next, this latter group is divided in four: CN GAAP; IN GAAP; JP GAAP; and US GAAP. Remarks made at a broad level are only detailed at country level again if worthwhile.

*At a broad level*, only differences in two ratios, operating margin and tax burden, between groups are statistically significant (Figure 2). All other, including those subject to little other than industry-specific effects (which were eliminated by picking a single industry), such as ROA, have no statistically significant differences.

On the one hand, operating margin is, one of the most sensitive ratios to companies' policies. On the other hand, the tax burden is probably the ratio most significantly impacted by country-specific effects via taxation, and so fiscal policy.

Differences in operating margins between groups were significant at the 5% significance level. The difference might be related to IAS 18 – Revenue Recognition and how standards differ in this aspect. Still, as the impact is later eroded on ROA, and the group with lower operating margins is also the one with higher asset turnovers and vice-versa, cultural differences<sup>17</sup>, or different company strategies<sup>18</sup>, may be held responsible.

As for the tax burden, the differences are significant at the 1% significance level. Differences between IAS 12 – Income Taxes and other accounting standards counterparts are too small to explain this. Hence, it is possible to say that national tax regulation, which has a significant impact in this ratio, is most likely the actual cause. While mostly ignored by accounting literature, national tax regulation plays a key role on this ratio and accounting overall. It poses a dreadful barrier to convergence. In fact, the average tax rate of the group of companies under IFRS is less 7.76 p.p. than that of the other group.

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<sup>17</sup> Roads in India may favor motorbikes rather than cars.

<sup>18</sup> Countries with more luxury brands should have higher operating margins and lower asset turnovers.

	Operating Margin	Asset Turnover	Return on Assets	Financial Leverage	Interest Burden	Tax Burden <sup>b</sup>	Return on Equity
IFRS (n = 214)	4.22%	1.21	4.06%	2.61	102.99%	78.03 % (24.94%)	7.52%
Non-IFRS Standards (n = 320)	5.78%	1.16	4.10%	2.66	98.48%	74.77% (32.70%)	8.64%
Difference <sup>a</sup>	-1.56 p.p. **	0.06	-0.04 p.p.	0.05	4.50 p.p.	3.26 p.p.	-1.12 p.p.
Normality	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***
Z statistic	2.280 **	-0.508	0.133	-1.517	-0.308	4.633 ***	-0.533

\*, \*\*, \*\*\* represent statistical significance of differences at the 10%, 5%, and 1% significance levels, respectively. <sup>a</sup> t-statistic. <sup>b</sup> In parenthesis is represented the nominal tax rate for the group of companies being considered.

Figure 2 - Companies under IFRS compared to companies under other accounting standards

Callao et al. (2007) found ROE to increase significantly, and operating income along with ROA to decrease significantly due to IFRS adoption. Lantto and Sahlström (2009) point out that at the time, IFRS adoption boosted profitability and gearing ratios significantly, while decreasing liquidity ratios slightly. Lueg et al. (2014), also concluded that profitability ratios went up significantly, and liquidity ratios decreased.

All these studies used reconciliations, however. Besides, they had fewer firms, and the research was conducted mostly for 2005, when adoption was taking place. Thereby focusing on the impacts of the adoption of IFRS, and not convergence as is this paper's purpose. Using data from 2012, this paper finds that, of the aforementioned, only differences in operating margin seem to be statistically significant. This can mean that this difference reported by Callao et al. (2007) persisted, but others disappeared overtime.

It is then possible to say that, for the most part, convergence has taken place between IFRS and other accounting standards at a broad level. Most reasons pointed out for the lack of convergence, such as taxation, are not something IFRS can solve on its own.

*At country level*, Chinese GAAP should be quite close to IFRS already, and in fact, evidence for convergence is found. Only two ratios proved significantly different between groups (Figure 3): operating margin and asset turnover. Asset turnover could differ due

to IAS 2 – Inventories. Still, there is no statistically significant difference between ROAs.

So, it is possible to argue that convergence took place.

	Operating Margin	Asset Turnover	Return on Assets	Financial Leverage	Interest Burden	Tax Burden <sup>b</sup>	Return on Equity
CN GAAP (n = 87)	7.09%	0.77	4.37%	2.39	97.83%	79.50% (25%)	8.17%
IFRS (n = 214)	4.22%	1.21	4.06%	2.61	102.99%	78.03 % (24.93%)	7.52%
Difference <sup>a</sup>	2.87 p.p. **	-0.45 ***	0.31 p.p.	-0.22	-5.16 p.p.	1.47 p.p.	0.65 p.p.
Normality	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***
Z statistic	3.115 ***	-6.429 ***	0.169	-0.896	-0.285	0.307	-0.530

\*, \*\*, \*\*\* represent statistical significance of differences at the 10%, 5%, and 1% significance levels, respectively. <sup>a</sup> t-statistic. <sup>b</sup> In parenthesis is represented the nominal tax rate for the group of companies being considered.

Figure 3 - Companies under CN GAAP compared to companies under IFRS

IN GAAP was said to be converging to IFRS, but this convergence would rely on a new set of accounting standards. Under non-parametric tests, the only ratio with no statistically significant differences between groups was ROA (Figure 4). However, India’s automotive industry, has been argued, is very different from that of other countries worldwide. Brough (2004) said that “India still lags far behind other major Asian markets.” A.T. Kearney alleged that “Leading global auto suppliers, spend 5 to 10 percent of their revenues on R&D, but in India most spend less than 1 percent” (Klink et al., 2014).

	Operating Margin	Asset Turnover	Return on Asset	Financial Leverage	Interest Burden	Tax Burden <sup>b</sup>	Return on Equity
IN GAAP (n = 91)	6.56%	1.39	4.71%	3.07	88.25%	75.65% (32.45%)	10.09%
IFRS (n = 214)	4.22%	1.21	4.06%	2.61	102.99%	78.03 % (24.93%)	7.52%
Difference <sup>a</sup>	2.34 p.p. **	0.18 ***	0.66 p.p.	0.46 **	-14.74 p.p.	-2.39 p.p.	2.57 p.p.
Normality	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***
Z statistic	2.412 **	3.928 ***	0.270	3.169 ***	-2.754 ***	-3.081 ***	2.126 **

\*, \*\*, \*\*\* represent statistical significance of differences at the 10%, 5%, and 1% significance levels, respectively. <sup>a</sup> t-statistic. <sup>b</sup> In parenthesis is represented the nominal tax rate for the group of companies being considered.

Figure 4 - Companies under IN GAAP compared to companies under IFRS

Japan agreed with the IASB to converge accounting standards. Some differences still persist, but JP GAAP has converged significantly with IFRS. Only asset turnover, interest

burden and tax burden differed significantly between groups (Figure 5). Asset turnover, may, once again, be related to IAS 2, which, for instance does not allow for costs of idle capacity and spoilage, while JP GAAP allows administrative overheads and storage costs to be included in inventories. Furthermore, while IFRS does not allow LIFO, JP GAAP does under certain criteria. Still, the same argument from before applies: ROA, did not exhibit statistically significant differences between groups, which provides evidence for convergence. The differences in interest burden could also be explained partly by differences between standards (IAS 17 – Leases and the corresponding JP GAAP standard). However, differences in tax rates or interest rates are likely to be the ones responsible.

	Operating Margin	Asset Turnover	Return on Assets	Financial Leverage	Interest Burden	Tax Burden <sup>b</sup>	Return on Equity
JP GAAP (n = 106)	4.28%	1.27	3.24%	2.49	113.47%	65.50% (38.01%)	6.86%
IFRS (n = 214)	4.22%	1.21	4.06%	2.61	102.99%	78.03 % (24.93%)	7.52%
Difference <sup>a</sup>	0.57 p.p.	0.05	-0.81 p.p.	-0.12	10.49 p.p.	-12.54 p.p. ***	-0.66 p.p.
Normality	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***
Z Statistic	-1.012	2.80 ***	-1.532	1.173	3.131 ***	-7.781 ***	-1.334

\*, \*\*, \*\*\* represent statistical significance of differences at the 10%, 5%, and 1% significance levels, respectively. <sup>a</sup> t-statistic. <sup>b</sup> In parenthesis is represented the nominal tax rate for the group of companies being considered.

Figure 5 - Companies under JP GAAP compared to companies under IFRS

Regarding US GAAP, it is known that the SEC has kept on postponing a decision on IFRS adoption, which points out one more reason for the lack of convergence that is country resistance. Still, convergence has been moderately achieved, perhaps because the FASB and IASB have, since 2002, worked together to converge accounting standards. Only differences in two ratios are statistically significant, both profitability ratios (Figure 6). It is important to add that the standard of US GAAP corresponding to IAS 18, shouldn't be very different, yet there's a lot of industry-specific guidance in US GAAP.

	Operating Margin	Asset Turnover	Return on Assets	Financial Leverage	Interest Burden	Tax Burden <sup>b</sup>	Return on Equity
US GAAP (n = 36)	5.08%	1.19	4.41%	2.80	81.80%	88.44% (40.00%)	11.34%
IFRS (n = 214)	4.22%	1.21	4.06%	2.61	102.99%	78.03 % (24.93%)	7.52%
Difference <sup>a</sup>	0.86 p.p.	-0.02	0.35 p.p.	0.19	-21.19 p.p.	-10.40 p.p. *	3.82 p.p.
Normality	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***
Z statistic	2.342 **	0.849	1.629	0.291	-0.384	-0.182	2.080 **

\*, \*\*, \*\*\* represent statistical significance of differences at the 10%, 5%, and 1% significance levels, respectively. <sup>a</sup> t-statistic. <sup>b</sup> In parenthesis is represented the nominal tax rate for the group of companies being considered.

Figure 6 - Companies under US GAAP compared to companies under IFRS

For a similar analysis to the one made to answer this research question, but including 2011 refer to Appendix D.

This paper concludes that worldwide convergence is mostly being effective. Its triumph, however, varies depending on the set of accounting standards being compared to IFRS. “Overt options” within IFRS, national tax regulation, cultural differences, companies their strategy and country resistance are found to hinder convergence.

## 7. CONCLUSION

This paper studied convergence from three perspectives: regulatory; within IFRS and between accounting standards with IFRS as benchmark. In doing so, this paper became useful for regulators, accountants, and users of information worldwide, respectively. Such was only possible by focusing on a single industry, which ensured comparability. The automotive industry was chosen for its maturity and distribution worldwide.

From a regulatory point of view, convergence took place overtime, with an increasing number of companies using IFRS and the amount of standards used worldwide falling.

Within IFRS, accounting choices pointed out towards convergence. The variety of depreciation methods, for example, reduced significantly as IFRS took over. Nonetheless, “overt options” may be held responsible for differences between IFRSs.

Among accounting standards, differences in profitability ratios, mostly in operating margin, proved the most common along with differences in tax burden. The research in this paper draws attention to cultural differences (i.e. country specific characteristics), company strategies, and national tax regulations, as aspects hindering convergence. At standard-level, CN GAAP looked to be the one that had more success in converging to IFRS. JP GAAP and US GAAP, both seemed to have been moderately successful in converging. Lastly, IN GAAP, was too messy to draw conclusions. India is suggested for future research. Country resistance to IFRS adoption was pointed out as a barrier to convergence. It is further relevant to add that out of the countries analyzed, those that have resisted IFRS adoption prove to have been less successful in converging.

This paper contributed to the literature, by providing a database with which to assess convergence and by making an international, up-to-date, study on convergence, also adding possible reasons for the lack of it.

If the groups of companies in this paper that had not adopted IFRS end up doing so, future research may use this paper on a comparative basis and conclude if differences ceased to exist and full worldwide convergence is within IFRS' reach. It would be further interesting to replicate this study, changing years, industries or accounting standards being studied. Variations on the research design could also be tried out, replacing classical tests of hypotheses with econometric analysis.

The future will bring up several challenges for IFRS. The continued survival of differences within IFRS and among different standards may be very hard to overcome. IFRS can do little about some of the remaining differences. Fiscal policy is not centralized, and some countries have the right to refuse IFRS adoption.



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## Appendix A – Accounting standards convergence status to IFRS up to 2014

Country	Convergence Status as of 2014	Domestic Regulation
China	Standards close to IFRS already.	CN GAAP
Japan	Convergence has been agreed on before. From 2010 onwards a set of international companies was allowed to report under IFRS.	JP GAAP
United States	Convergence is underway, although consistently delayed. Foreign issuers, however, are allowed to report under IFRS since 2007.	US GAAP
India	It is converging to IFRS on a date yet to be announced.	IN GAAP

Figure 1A – Summary of the convergence status of other accounting standards to IFRS

## APPENDIX B – Porter’s 5 forces analysis for the automotive industry

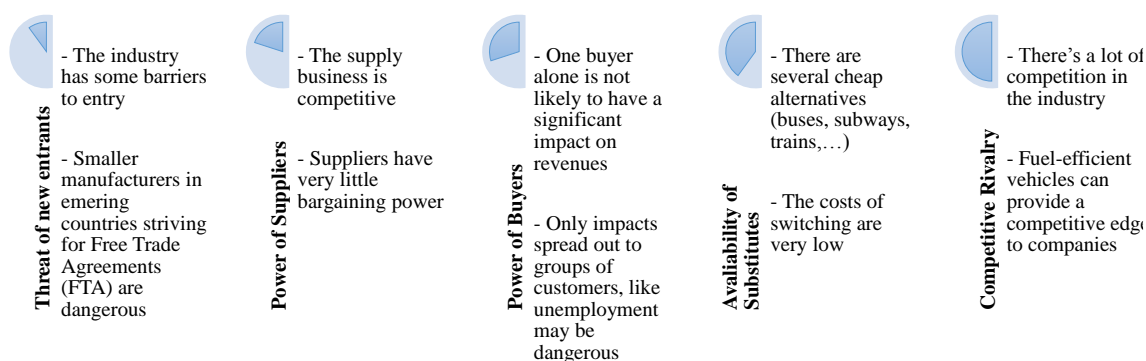


Figure 2A – Porter’s 5 forces analysis for the automotive industry

## APPENDIX C – Automotive Industry Statistics

	Total Assets	Revenues	Number of Employees
Mean	5.37E+09	4.88E+09	1.50E+04
Median	3.73E+08	3.87E+08	2.63E+03
Standard Deviation	2.96E+10	2.11E+10	4.47E+04
Kurtosis	119.94	86.49	60.30
Skewness	10.26	8.49	6.70
Minimum	1.63E+06	5.03E+05	35
Maximum	4.09E+11	2.67E+11	5.50E+05
Sum	2.87E+12	2.61E+12	6.28E+06
Count	534	534	418

Figure 3A – Statistics for the automotive industry

## APPENDIX D – Results of convergence from “users” their point of view for 2011 compared to 2012

The same analysis run to assess convergence from the users their point of view in the paper, is once again tried out in this Appendix. However, this time around the analysis is extended to include 2011. Only Japan is left out because of the Fukushima disaster that assailed the country on 11 March 2011.

2012	Operating Margin	Asset Turnover	Return on Assets	Financial Leverage	Interest Burden	Tax Burden <sup>b</sup>	Return on Equity
CN GAAP (n = 87)	7.09%	0.77	4.37%	2.39	97.83%	79.50% (25%)	8.17%
IFRS (n = 214)	4.22%	1.21	4.06%	2.61	102.99%	78.03 % (24.93%)	7.52%
Difference <sup>a</sup>	2.87 p.p. **	-0.45 ***	0.31 p.p.	-0.22	-5.16 p.p.	1.47 p.p.	0.65 p.p.
Normality	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***
Z statistic	3.115 ***	-6.429 ***	0.169	-0.896	-0.285	0.307	-0.530

\*, \*\*, \*\*\* represent statistical significance of differences at the 10%, 5%, and 1% significance levels, respectively. <sup>a</sup> t-statistic. <sup>b</sup> In parenthesis is represented the nominal tax rate for the group of companies being considered.

Figure 4A - Companies under CN GAAP compared to companies under IFRS (2012)

2011	Operating Margin	Asset Turnover	Return on Assets	Financial Leverage	Interest Burden	Tax Burden <sup>b</sup>	Return on Equity
CN GAAP (n = 84)	7.85%	0.85	5.43%	2.54	76.56%	82.92% (25%)	9.72%
IFRS (n = 174)	5.20%	1.17	4.74%	2.83	88.12%	92.67 % (26.19%)	11.54%
Difference <sup>a</sup>	2.66 p.p. **	-0.32 ***	0.68 p.p.	-0.29	-11.55 p.p.	-9.75 p.p.	-1.82 p.p.
Normality	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***
Z statistic	2.813 ***	-4.921 ***	0.563	-1.727 *	-1.186	0.947	-0.860

\*, \*\*, \*\*\* represent statistical significance of differences at the 10%, 5%, and 1% significance levels, respectively. <sup>a</sup> t-statistic. <sup>b</sup> In parenthesis is represented the nominal tax rate for the group of companies being considered.

Figure 4B - Companies under CN GAAP compared to companies under IFRS (2011)

2012	Operating Margin	Asset Turnover	Return on Asset	Financial Leverage	Interest Burden	Tax Burden <sup>b</sup>	Return on Equity
IN GAAP (n = 91)	6.56%	1.39	4.71%	3.07	88.25%	75.65% (32.45%)	10.09%
IFRS (n = 214)	4.22%	1.21	4.06%	2.61	102.99%	78.03 % (24.93%)	7.52%
Difference <sup>a</sup>	2.34 p.p. **	0.18 ***	0.66 p.p.	0.46 **	-14.74 p.p.	-2.39 p.p.	2.57 p.p.
Normality	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***
Z statistic	2.412 **	3.928 ***	0.270	3.169 ***	-2.754 ***	-3.081 ***	2.126 **

\*, \*\*, \*\*\* represent statistical significance of differences at the 10%, 5%, and 1% significance levels, respectively. <sup>a</sup> t-statistic. <sup>b</sup> In parenthesis is represented the nominal tax rate for the group of companies being considered.

Figure 5A - Companies under IN GAAP compared to companies under IFRS (2012)

2011	Operating Margin	Asset Turnover	Return on Asset	Financial Leverage	Interest Burden	Tax Burden <sup>b</sup>	Return on Equity
IN GAAP (n = 78)	7.58%	1.57	7.20%	3.20	77.11%	81.74% (32.45%)	17.83%
IFRS (n = 174)	5.20%	1.17	4.74%	2.83	88.12%	92.67 % (26.19%)	11.54%
Difference <sup>a</sup>	2.39 p.p. **	0.40 ***	2.45 p.p. **	0.36	-11.01 p.p.	-10.94 p.p.	6.29 p.p. **
Normality	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***
Z statistic	2.692 ***	5.990 ***	0.270 **	2.427 **	-4.232 ***	-2.359 **	4.191 ***

\*, \*\*, \*\*\* represent statistical significance of differences at the 10%, 5%, and 1% significance levels, respectively. <sup>a</sup> t-statistic. <sup>b</sup> In parenthesis is represented the nominal tax rate for the group of companies being considered.

Figure 5B - Companies under IN GAAP compared to companies under IFRS (2011)

2012	Operating Margin	Asset Turnover	Return on Assets	Financial Leverage	Interest Burden	Tax Burden <sup>b</sup>	Return on Equity
US GAAP (n = 36)	5.08%	1.19	4.41%	2.80	81.80%	88.44% (40.00%)	11.34%
IFRS (n = 214)	4.22%	1.21	4.06%	2.61	102.99%	78.03 % (24.93%)	7.52%
Difference <sup>a</sup>	0.86 p.p.	-0.02	0.35 p.p.	0.19	-21.19 p.p.	-10.40 p.p. *	3.82 p.p.
Normality	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***
Z statistic	2.342 **	0.849	1.629	0.291	-0.384	-0.182	2.080 **

\*, \*\*, \*\*\* represent statistical significance of differences at the 10%, 5%, and 1% significance levels, respectively. <sup>a</sup> t-statistic. <sup>b</sup> In parenthesis is represented the nominal tax rate for the group of companies being considered.

Figure 6A - Companies under US GAAP compared to companies under IFRS (2012)

2011	Operating Margin	Asset Turnover	Return on Assets	Financial Leverage	Interest Burden	Tax Burden <sup>b</sup>	Return on Equity
US GAAP (n = 36)	6.56%	1.23	2.49%	3.40	100.80%	89.82% (40%)	12.88%
IFRS (n = 174)	5.20%	1.17	4.74%	2.83	88.12%	92.67 % (26.19%)	11.54%
Difference <sup>a</sup>	1.36 p.p.	0.064	-2.24 p.p.	0.26	12.68 p.p.	-2.85 p.p.	1.34 p.p.
Normality	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***	Rejected ***
Z statistic	1.573	1.377	1.629 **	0.467	-0.229	-0.731	1.962 **

\*, \*\*, \*\*\* represent statistical significance of differences at the 10%, 5%, and 1% significance levels, respectively. <sup>a</sup> t-statistic. <sup>b</sup> In parenthesis is represented the nominal tax rate for the group of companies being considered.

Figure 6B - Companies under US GAAP compared to companies under IFRS (2011)