



RESEARCH ARTICLE

A COMPARATIVE STUDY ON EARNINGS MANAGEMENT BY EASTERN AND WESTERN EUROPEAN COMPANIES

<sup>1</sup>Susana Callao, <sup>2</sup>José I. Jarne and <sup>3</sup>David Wróblewski

<sup>1</sup>Callao, Susana, Lecturer in Accounting, University of Zaragoza, Faculty of Economy and Business,

<sup>2</sup>Jarne, José I., Lecturer in Accounting, University of Zaragoza, Faculty of Economy and Business,

<sup>3</sup>Wróblewski, David, Doctor in Accounting and Finance of the University of Zaragoza, Faculty of Economy and Business

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ABSTRACT

This study analyzes and compares the earnings management behaviour between Eastern and Western European countries taking into consideration the particularities and differences of both markets. The paper fills this gap in the literature as it analyzes the context of earnings management in the developing Eastern countries and its comparison to the Western well-developed European countries. This is the first study which compares these two markets. The results show that companies in the European countries included in the study, engage in earnings management, in particular in decreasing earnings practices. Around 70% of the companies from Eastern and Western European countries manage earnings to downward. Mean ranks from the Kruskal Wallis test indicate lower manipulation in Western European countries than in Eastern European countries. Additionally, in the heterogeneity of the European countries based on the cluster analysis we confirm that Eastern European countries follow the German companies' way of managing earnings. Finally, time-line analysis revealed that earnings management does vary in time and in extent for Eastern as well as for Western European countries. Nevertheless, we detect two main tendencies for all European countries: firstly, a decrease in manipulation between 2003/2004 and 2007; and between 2008 and 2009.

\*Corresponding author:

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INTRODUCTION

In Europe, for one side, we can observe globalisation as a "mega-trend". Globalisation is becoming increasingly significant, especially now at the beginning of a new century, when countries are trying to eliminate borders. Globalisation provides great opportunities for business. Companies can easily connect with counter partners and negotiate different issues. It entails a significant reduction of trade barriers. Free trade agreements are a typical characteristic and a force of this development, among other characteristics and opportunities.

On the other hand, indeed we may still observe important differences between Western and Eastern European countries (also known as communist Europe). Such differences may come from environmental factors such as: entrepreneurial culture, the financial and welfare systems, the legal framework and financial institutions (Kneiding, 2007).

Herrberg and Moxon-Browne (1995) underline the importance of the collapse of communist regimes in Eastern Europe and their subsequent gradual transition towards market economics and political pluralism. It has created a new insecurity in both parts of the European continent. It has brought a new set of problems for Western European countries: mass migration, high unemployment, and political volatility, among others (Herrberg and Moxon-Browne, 1995). Sitter (2003) clarifies, more than a decade after the collapse of communism in Eastern European countries the question of party system consolidation and stability remains somewhat contentious. Svedsen (2003) adds that even though the former Eastern Bloc countries have started implementing market-based reforms since 1989, the stock of trust has presumably not changed yet as it may take centuries to build. Moreover, the entry into the European Union by Eastern European countries creates a significant influence and pressure on relations between Eastern and Western European countries. It also creates integrity.

However, the method of just implementing the EU model in newly integrated countries, without seriously taking local realities into consideration, is not a viable one. Finally, the history, culture, religion, economic and social development in Eastern European countries had obviously taken a different course from that of Western Europe. Therefore, these differences may have influenced on the earnings management. Additionally, Western European markets are well-investigated in terms of the earnings management. There is a systematic research on earnings management in different countries, see for example, studies of Jeanjean (2000), Gill-de-Albornoz and Illueca (2005), Van Tendeloo and Vanstraelen (2005), Cormier and Martinez (2006), Burgstahler, Hail and Leuz (2006), García Osma and Noguera (2007), Poli (2013), Basilico (2014), Dilger and Graschitz (2015), Hooghiemstra *et al.* (2015), among others. However, there is barely touched earnings management in European emerging countries. Some descriptive studies can be found based on the sample from emerging countries, see studies of Wiercińska (2008), Wojtowicz (2010), Gierusz (2010), Welc (2011). As well as, we may find only few empirical research based on the sample from Eastern European countries, see studies of Wojtowicz (2015), Callao, Jarne and Wroblewski (2017a), Callao, Jarne and Wroblewski (2017b), Callao, Jarne and Wroblewski (2017c). Nevertheless, none of the study compares both markets. No longer Europe can be designate only by Western part. These developing markets increasingly gain importance in the European panorama.

Besides, not only, there are no comparative studies between Eastern and Western European countries, but there is surprisingly little space devoted to the comparative studies across different countries in general. Therefore, the objective of the study is to compare earnings management behaviour between Eastern and Western European countries taking into consideration the particularities and differences of both markets. The context of earnings management in the developing countries and its comparison to the Western well-developed countries may give important insights into the earnings management literature. The study aims to identify similarities and differences among European countries in earnings management. The importance of the European developing countries for the global European economy underlines the need for including them in the comparative study. Given the dissimilarities among both European markets (Western and Eastern), the country-specific variables, including the level of connection between accounting and taxation, owners' expectations, the company's image, different earnings targets, accounting and legal tradition, acquisition of potential investors, differences within national audit environments, the way of the response to the world financial crisis and the process of enlargement of the European Union, important differences in terms of history, culture, economy, we expect to find dissimilarities with respect to the earnings management across these two groups of countries. Therefore, first, we examine and compare the earnings management in eight European countries: four developing Eastern European countries: the Czech Republic, Poland, Hungary and Slovakia; and four Western: Germany, France, Spain and the UK. We analyze the scope and the sign of the earnings management trying to determine earnings manipulation for different European countries. Second, we rank and cluster countries looking for similarities, connections and differences among them. The current scenario may indicate significant differences among countries.

Finally, we focus on the changes in earnings management over time. The question arises whether the manipulation changes the same of different way within different European countries. Can we find similar tendencies over markets of Eastern and Western European countries? The empirical results indicate that companies in the European countries included in the study, engage in earnings management, in particular in decreasing earnings practices. Around 70% of the companies from Eastern and Western European countries manage earnings to downward. Mean ranks from the Kruskal Wallis test indicate lower manipulation in Western European countries than in Eastern European countries.

Additionally, the cluster analyses confirmed significantly different earnings manipulation between France, Spain, the UK and the Eastern European countries and Germany. However, in the heterogeneity of the European countries we perceived that Eastern European countries, to a certain extent, have assimilated the German companies' way of managing earnings, as cluster analyses confirmed that Eastern European countries came up in the same cluster as German companies. Finally, time-line analysis revealed that earnings management does vary in time and in extent for Eastern as well as for Western European countries. Moreover, we conclude that there is a difference in manipulation over the years among Eastern and Western European countries. Nevertheless, we detect two main tendencies: firstly, a decrease in manipulation between 2003/2004 and 2007; and between 2008 and 2009 we observe increases in manipulation for all European countries.

Therefore, we contribute to the earnings management literature at least in three important ways. First, comparative study may help to understand Western and Eastern markets in terms of the earnings management. It may reveal important characteristics of both markets, and help to illustrate links between both parts of Europe. It has not been done to date. Secondly, this work may also provide insights for those interested in comparative studies between different countries, as comparative studies are barely observed in earnings management literature. Finally, the existence of earnings management in firms from emerging Eastern European countries is not well documented. Therefore, present study may also contribute to the earnings management literature of developing Eastern European countries. The remainder of this paper is organized as follows. In Section 2, we present literature review describing prior research on comparative studies on earnings management. Section 3 describes sample selection and methodology. Section 4 provides the empirical results. Finally, section 5 concludes this paper with conclusions.

**Literature review:** The investigation of earnings management began in the US with the study of Healy (1985) and DeAngelo (1986) and it has increased with time. Numerous papers have investigated, both theoretically and empirically, diverse research questions on the topic of earnings management. In Europe, the investigation on earnings management appeared at the end of 90, as a response to the US investigators. The tendency of growing number of investigation on the topic of earnings management has been observed over next decades, see Figure 1. At present, a sample based on the European countries is a common source of sample to measure earnings management. Additionally, within the wide spectrum of studies from the Europe, we may observe that a common practice of researchers is the use of a one-country selection sample.

The authors in their study focus on one particular market. They respond to a special situation, such as for example, the pattern of discretionary accruals over time and their impact on earnings management on long-run stock price performance of IPOs in companies from Netherland (Roosenboom, Van der Goot and Mertens, 2003), the effect of price regulation on the accounting policy of Spanish electricity companies (Gill-de-Albornoz and Illueca, 2005), the information uncertainty associated with earnings management in German companies (Burghof and Johannsen, 2006), the effect of audit efforts on earnings management in Greece companies (Caramanis and Lennox, 2008), among other studies. Nevertheless, the literature on earnings management highlights the importance of the comparative studies that focus on more than one country in the research. Comparative studies are helpful in terms of evaluating the general tendencies of the companies from different countries and the existence of earnings manipulation. They are based on the moderate number of cases looking for the patterns of similarities and differences across the samples (Ragin, 1994). Figure 2 illustrates the scope of studies on earnings management based on the number of countries included into the earnings management analysis.

Callao, Jarne and Wroblewski (2014b) investigated more than 200 papers within the period of 1985 and 2013. The results are pretty clear, despite the importance of the comparative studies, there is still a small number of a papers focused on earnings management comparing activity of the companies within the different countries. Only 8% of all papers on earnings management are based on the multi-country sample (the study based on the sample with more than one country origin). The earnings management studies mainly use data of the unique country sample. In Table 1 based on the study of Callao, Jarne and Wroblewski (2014) we present the revision of the most important studies based on the multi-country European samples (comparative studies). We also have included some recent studies. We show the sample origin and the objective of the study. Finally, it is observed that earnings management in Eastern Europe is still ongoing. Callao, Jarne and Wroblewski (2017a, 2017b, 2017c) and Wojtowicz (2015), authors that focused their research on the developing European countries, confirm that earnings management in companies from emerging Eastern European countries was the subject of only several studies, mainly theoretical, see Table 2. There are no comparative studies among developing Eastern European countries.

## MATERIALS AND METHODS

**Sample :** The sample comprises non-financial firms from eight European countries: four Western European countries and four developing Eastern European countries. In particular, we select four Western European countries: France, Germany, Spain and United Kingdom; and four emerging Eastern European countries: Poland, Hungary, Slovakia and the Czech Republic. Our research period comprise years from 2003 to 2009. We select these countries from the following reasons. First, economic statistics reveal that both four Western and four Eastern European countries represent the most developed countries from each part of Europe (see data for Gross Domestic Product, interest rate, inflation rate, among others<sup>1</sup>).

At the same time, the figures reveal important differences between the blocs of Eastern and Western Europe. There is a still economic gap between the two parts of Europe. Given the above economic circumstances we are investigating earnings management in the most economically developed and strongest Western and Eastern European countries and their behaviour in terms of manipulation. Second, all eight European countries are European Union members. Western European countries were incorporated into the structures of the EU long ago. France and Germany have been EU member states in the beginning, the UK was incorporated in 1973, and Spain in 1986. On the other hand, emerging countries joined the European Union in 2004 (May of 2004), which still are adjusting and looking their place in European competition. Therefore, our sample includes the most 'important' EU member states both from Western and Eastern part of Europe and, as shown, from different integration moments. Entry into the European Union by Eastern European countries has created a significant influence and pressure on relations between Eastern and Western European countries. Therefore, it may have also important effect on the earnings manipulation.

Third, the selected countries represent three distinct legal traditions in Europe: French code law (France and Spain), German code law (Germany, and Eastern European countries) and English common law (UK) (David and Brierley, 1985; LaPorta *et al.*, 1998; Funken, 2003; Jaakko and Tapani, 2005; Deakin, 2008; Bernitz, 2010; Smits, 2010). Different legal traditions recognize different sources of law and thus prescribe different theories and methods for the administration of the companies. These differences may have an impact on diverse areas of the company such as: starting a business: number of procedures, time, cost, and minimum capital requirement; differences in protecting investors and getting credit could also be attributed to legal origin; distinct ways of supervising of markets; protecting the rights of workers; the differences in paying taxes, among others (see Grossfeld, 1990). Additionally, literature confirms that different legal traditions have a significant influence on the existence and scope of earnings management (see for example, La Porta *et al.*, 1997; Ball, Kothari and Robin, 2000; Ball, Kothari and Ashok, 2000; Leuz, Nanda and Wysocki, 2003; Daske and Gebhardt, 2006, among others)<sup>2</sup>. We have 42,381 companies from Western European countries; and 4,627 companies from Eastern European countries. Our total sample includes 47,008 companies, which make up 339,048 firm-year observations (for each firm we have seven observations: 7 years), see Table 3. Our research is based on non-consolidated financial statements. The descriptive statistics of assets and revenues are presented in Annex 1.

## METHODOLOGY

While there is no a perfect way to measure earnings management, drawing on the existing earnings management literature and taking into account the particularities of emerging Eastern European countries, we base on accruals models methodology and we estimate discretionary accruals

(<http://unctad.org/en/>), Trading Economics database ([www.tradingeconomics.com](http://www.tradingeconomics.com)), European Commission (<http://ec.europa.eu>), Doing Business database ([www.doingbusiness.org](http://www.doingbusiness.org)).

<sup>2</sup> Additionally, we focused on the limited year's data as we had some data collections' problems related to some variables. Unfortunately, emerging Eastern European countries are not widely presented with full data in Amadeus database or other source of information.

<sup>1</sup> See data: World Bank database ([www.worldbank.org/](http://www.worldbank.org/)), World Economic Forum database ([www.weforum.org](http://www.weforum.org)), World Investment Report

using a cross-sectional version of the Yoon and Miller model (2002), see equation 1. Based on the  $R^2$ , standard error of estimated variables, the p-value (which represents the statistical significance of variables), as well as the predicted sign, we confirm that the Yoon and Miller model (2002) is a reliable and solid model to measure the discretionary part of accruals for Eastern and Western European countries.

$$\frac{TA_{it}}{A_{it-1}} = \alpha_0 \frac{1}{A_{it-1}} + \alpha_1 \frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} + \alpha_2 \frac{\Delta EXP_{it} - \Delta PAY_{it}}{A_{it-1}} + \alpha_3 \frac{NCASH_{it-1} \times GPPEGRW_{it}}{A_{it-1}} + \varepsilon_{it} \quad (1)$$

where:

$TA_{it}$  - Total Accruals in year t

$A_{it-1}$  - Total Assets in year t -1

$\Delta REV_{it}$  - Annual change in revenues in year t

$\Delta REC_{it}$  - Annual change in receivables accounts in year t

$\Delta EXP_{it}$  - Change in operating expenses excluding non-cash expenses in year t

$\Delta PAY_{it}$  - Change in payables accounts in year t

$NCASH_{it-1}$  - Non-cash expenses such as depreciation in year t-1

$GPPEGRW_{it}$  - A rate of growth in gross property, plant and equipment in year t

$\varepsilon_{it}$  - The error term

Source: Yoon and Miller (2002)

To test whether differences in earnings management between Western and Eastern European countries exist, we calculate the value of discretionary accruals in absolute terms for firms in each country<sup>3</sup>. Additionally, to identify whether European companies manage earnings to decrease or increase them, we calculate the number of companies that showed positive and negative discretionary accruals per country and year. We also calculate the mean of discretionary accruals in positively ranked firms and the mean of negatively ranked firms.

Moreover, after verifying that the variable does not follow a normal distribution (see Annex 2), we run the Kruskal Wallis non-parametric test using the absolute value of discretionary accruals. The test is used for comparing independent samples of our eight countries of our two blocks of Western and Eastern European countries. We also perform cluster analyses. By cluster analysis, we look to figure out, whether the results of our eight sample companies can be divided into distinct groups. Using the absolute values of discretionary accruals we perform cluster procedure from two different perspectives: a cluster analysis by year; and a cluster analysis by the combined period of 2003-2009. Finally, we compare the behaviour of Eastern and Western European companies over time. We look for any significant differences in the level of discretionary accruals for our study period of 2003-2009. To this end, based on the value of discretionary accruals in absolute terms for firms in each country, we run Friedman non-parametric tests for each country. Friedman's test allows us to present an ordering by years (for each country) in terms of the level of earnings management. In this way we can evaluate if earnings management has increased or decreased over the years.

<sup>3</sup> The dependent variable is the absolute value of discretionary accruals because we want to measure the magnitude of manipulation without regard to its sign.

## RESULTS

**Comparing the means of earnings management, sign and magnitude of earnings management among european countries:** We compare the means of earnings management among European countries. Annex 3 shows the descriptive statistics on the regression by Yoon and Miller model (2002). We may confirm that European companies manage earnings, as we expected. Additionally, the results show managing earnings to decrease them. Previous earnings management literature confirms decreasing earnings practices in samples from other countries, see studies of Liberty and Zimmerman (1986), Jones (1991), Fudenberg and Tirole (1995), Key (1997), among others. Table 4 shows the results of the percentage of the companies with positive and negative sign of discretionary accruals, as the sign of earnings management may help to understand the why managers manipulate earnings. We may observe a very high percentage of observations with negative discretionary accruals for both markets:

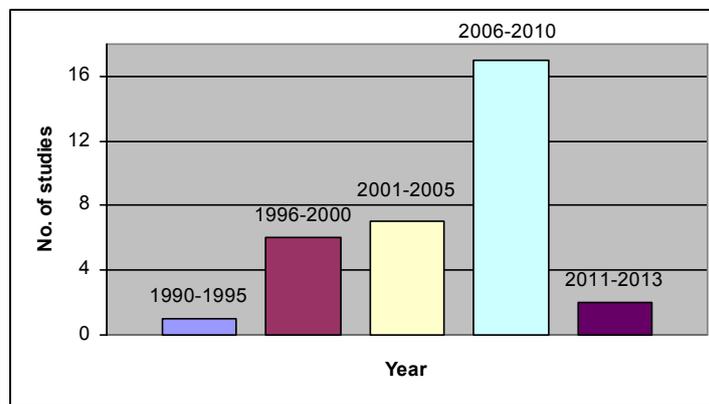
Eastern and Western European countries. It indicates of downward manipulation of earnings by managers of European companies. The highest percentage of companies showing negative discretionary accruals is observed for German sample ranges from 80% to 87%, followed by Slovakia and the UK companies with the proportion of negative sign of discretionary accruals, ranging from 71% to 75%. Finally, France, Spain, the Czech Republic, Poland and Hungary show similar, also high, negative to positive percentages, rounding 62-69% for negative to 31-37% for positive means. Therefore, Eastern and Western European companies during our analysis period have generated a competitive advantage by decreasing earnings mechanism. Different causes influence managers' decisions to decrease earnings. Literature points out those managers may decrease earnings *to meet bonus targets* (Healy, 1985) or *to protect their job* (Fudenberg and Tirole, 1995; Arya, Glover and Sunder, 2003). These two incentives can be very relevant in terms of the explanation of our results in increasing European competition generated by the incorporation of the new members into the European Union structures. Another possible reason for decreasing earnings may come from the firm's environment. Firms often *attempt to control fluctuations in reported earnings* and steer them to levels they consider desirable (Tokuga and Sakai, 2011). We may observe important fluctuations related to European background of the companies. Companies may want to opt for *"hiding" some of their earnings (decreasing earnings) for reporting in a future period* when earnings are lower and the marginal impact of a higher report is greater. More specifically, managers decrease earnings in periods when business performance is favourable and earnings are comparatively high (Ronen and Sadan, 1981; Lambert, 1984).

Increased European competition helps to obtain opportunities for doing business for the companies created by the dynamic markets. Moreover, decreasing earnings is additionally employed *to assure investors of a steady earnings flow* (George and Furstenberg, 2006), which is significant for our sample countries. Finally, decreasing earnings management may also be observed in the companies which use it to *lower owners' expectations*, see for example studies of Degeorge, Patel, and Zeckhauser (1999), Kasznik and McNichols (2002), Cotter, Tuna, and Wysocki (2006).

Managers may settle for less competitive expectations to make them more easily achieved, as can be observed for the European companies. Additionally, in Table 5 we compare the absolute value of means (the magnitude of means without considering its sign) of positive and negative discretionary accruals to evaluate the level of downwards and upwards manipulation in our eight European countries. We observe significant differences in terms of the means between Eastern and Western European countries. Eastern European countries show a higher level of positive means over the negative means of discretionary accruals (upwards manipulations are higher than the downwards manipulation), which may indicate that managers of our four Eastern samples countries are more likely to round down their results slightly. On the other hand, Western European countries have a significantly higher level of negative means over the positive. This indicates that managers manage earnings to decrease them, and they do it significantly. Eastern and Western European countries *differ significantly in terms of history, culture, or economy*. This different heritage may have an influence on managers' way of manipulating earnings.

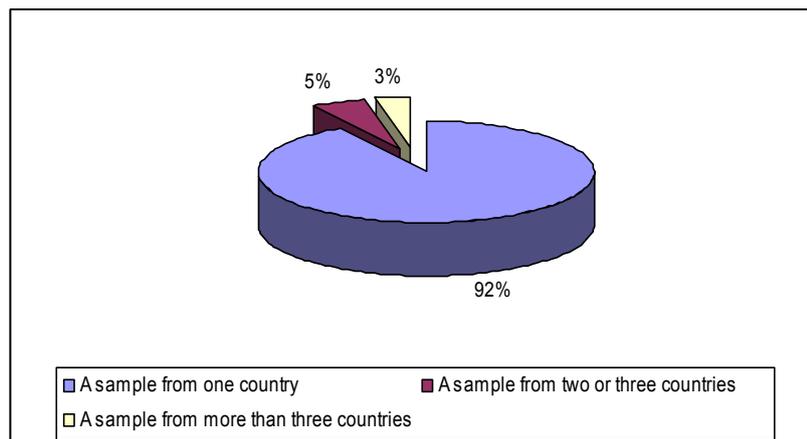
economical system through their recent incorporation to the European Union and collapse of their centrally-planned economies. Finally, our results confirm that companies from Western European countries decrease earnings more aggressively than the companies from emerging Eastern European countries. Western European companies are well established on the European market. They have more information. They are characterized by *stability* and maturity.

**Kruskal wallis non-parametric test:** We run the Kruskal Wallis non-parametric test using the absolute value of discretionary accruals to rank and compare the European countries in terms of the earnings management over our sample period. The results are presented in Table 6. Obtained results reveal a statistically significant difference in earnings management between different European countries every year. Mean ranks of each year indicate that we observe lower manipulation in Western European countries. We may observe the lowest manipulation in France, with the exception of 2008, where the companies from UK and Spain show a lower rank than France.



Source: Based on the study of Callao, Jarne and Wroblewski, 2014b.

**Figure 1. Number of studies on European countries**



\* It has been investigated a total of 207 papers. There are 14 descriptive studies without sample country. Therefore, the statistics includes total of 193 papers.

Source: Callao, Jarne and Wroblewski, 2014b.

**Figure 2. Number of studies divided into breadth of study sample**

On the one side Western European countries were marked by capitalism, and the long process of development of their market-oriented economies. They reached stability and solidity in running their business. On the other hand, Eastern European companies were influenced for many years by communism. They have just started to adapt to the Western democratic and

Additionally, from the Western European countries, companies from Germany show the closest level of manipulation to the Eastern European countries. Over all years German companies present the highest manipulation within the Western European countries. Nevertheless, it is still significantly below the Eastern European companies. Finally, companies from Eastern

**Table 1. Studies on earnings management based on multi-country samples / panel studies (comparative studies)**

Author (year)	Countries	N° of companies	Objective of study
Maijor and Vanstraelen (2002)	4 countries: France, UK, the Netherlands and Germany	The total number of firm year observations is 17,838 (France: 3,904 Germany: 3,992; the Netherlands: 1,244; UK: 8,698).	They studied earnings management in an international context. More specifically, they presented the effects of three factors on earnings management: the national audit environment, audit firm quality and reliance on international capital markets.
Coppens and Peek (2005)	8 countries: Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, United Kingdom	77,124 firm-year observations	The authors addressed the questions of whether private firms in eight European countries engage in earnings management, and if so, whether tax incentives affect such practices.
Burgstahler, Hail and Leuz (2006)	13 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Portugal, Spain, Sweden, United Kingdom	287,354 firm-year observations	The study examined how capital market pressures and institutional structures shape firms' incentives to report earnings that properly reflect their economic performance.
Maijor and Vanstraelen (2006)	France, Germany and UK	17,394 companies (France 3,904 Germany 4,067; UK: 9,423)	The study examined earnings management studying three factors: member state audit environment, audit firm quality and presence in international capital markets.
Drautz (2007)	Germany and UK	The final data sample consists of 175 observations including 63 German IPOs and 112 UK IPOs.	The authors concentrated on the question of whether earnings management is a function of the national audit environment and other factors influencing earnings quality.
Aussenegg, Inwinkl and Schneider (2008)	17 countries: Austria, Belgium, Denmark, France, Finland, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Sweden, United Kingdom	18,896 firm-year observations	The study examined how the transition from local GAAPs to IAS/IFRS of companies that are publicly traded on a European stock exchange affects earnings management.
Ittonen, Peni and Vähämaa (2009)	Finland and Sweden	Using a sample of 371 Finnish and Swedish listed firms.	They examined the association between earnings management and the gender of the audit engagement partner.
Callao and Jarne (2010)	11 countries: Belgium, Finland, France, Germany, Greece, Italy, Netherlands, Portugal, Spain, Sweden, United Kingdom.	1,408 firms (5,632 observations)	The authors focused on the effect of IFRS on earnings management.
Dilger and Graschitz (2015)	Germany and Austria	The total of 245 company years	The paper aimed at empirically showing which factors affect earnings management. In general, analyses showed that the distribution in earnings management intervals differ from the total population. Most noteworthy is that by adoption of principle-based accounting standards (IFRS/US-GAAP), in case of this study no differences of earnings quality was observable.
Hooghiemstra, Hermes, Oxelheim and Trond (2015)	Denmark, Finland, Norway or Sweden	A total of 3,249 firm-year observations (comprising 668 firm-year observations for Denmark, 685 for Finland, 480 for Norway and 1,416 for Sweden)	The paper examined the effects of the presence of a foreign board member on earnings management. It is found that the presence of a non-Nordic, foreign director is associated with significantly higher levels of earnings management.

Source: Callao, Jarne and Wroblewski, 2014a and the Author.

**Table 2: Studies on earnings management based on the sample from developing Eastern European countries**

Author (year)	Country	No. of companies	Objective of the study
Kamela-Sowinska (2003)	Poland	Based on the one company	Description of the case of Enron.
Prusak (2003)	Poland	Theoretical research	Treating the problem of the distortion of financial statements. Explaining the situation of the occurrence of accounting scandals. The role of the investor and the board in the companies in order to control.
Tokarski and Tokarski (2007)	Poland	Theoretical research	Treating the topic of creative accounting.
Wiercińska (2008)	Poland	Theoretical research	The issue of terminology connected with accounting frauds, which were committed by famous companies such as Enron, Worldcom etc., is brought up in the article. The author tries to explain the main differences between such terms as creative, aggressive and fraudulent accounting, which are often wrongly, and interchangeably used.
Tokarski (2009)	Poland	Theoretical research – mentioned the wide range of companies which use creative accounting	Balance policy is not only the art of making what is possible, but also the art of making it according to the law. Examples of these occurrences are known as: creative accounting, window dressing, incomes smoothing, or off balance sheet financing. The aim of the article is to show that financial statements can be an imperfect source of information about the financial situation of the enterprise and possible the negative consequences for potential users.
Gierusz (2010)	Poland	Theoretical research	The bankruptcy of Enron in December 2001, which shook the American economy and world public opinion, marked the beginning of a fierce discussion on the creative accounting. The purpose of this article is to attempt to define these issues.
Jackowicz and Kozłowski (2010)	Poland	382 banks from 11 different countries	The article examines the importance of thresholds of profitability in the operation of commercial banks originating from the countries of Central and Eastern Europe. The authors assume that the threshold is important, when banks take management actions. The results of these actions are characteristic discontinuities in distributions profitability measures around the threshold.
Wojtowicz (2010)	Poland	Theoretical research	This monograph is an attempt at a comprehensive look at the issue of the phenomenon known in the English-language literature as earnings management. The study presents the terminology on earnings management. In this paper the author proposes that earnings management be translated into Polish as "shaping the financial result."
Wojtowicz (2015)	Poland	Sample comprises 609 observations	The aim of the paper is to detect any signals of earnings management to achieve zero or small positive earnings surprises. Results are not sensitive to the choice of earnings surprise metric.
Callao, Jarne and Wroblewski (2017a)	Poland, the Czech Republic, Slovakia, Hungary	The total number of firm year observations is 32,389 (the Czech Republic: 14,343; Poland: 15,757; Hungary: 798; Slovakia: 1,491).	This paper provides evidence in terms of the incentives which lead managers from emerging European countries to manage earnings. Within the different incentives which lead managers to earnings management, the avoidance of debt covenants violations is a strong incentive for managers. Additionally, those firms considered as poor investments have incentives to manage earnings down as a consequence to opt for market niche. Moreover, emerging Eastern European companies have incentives to flatten earnings of current periods in order to benefit in the future. Finally, it is confirmed that privately-owned companies tend to maximize accounting earnings more than state-owned companies because they are in a weaker position related to a specific political and historical factors.
Callao, Jarne and Wroblewski (2017b)	Poland, the Czech Republic, Slovakia, Hungary	The total number of firm year observations is 31,493 (the Czech Republic: 14,231; Poland: 15,302; Hungary: 742; Slovakia: 1,218).	They investigate earnings management in unlisted firms across four emerging Eastern European countries. The results show that an average firm from emerging Eastern European countries manages earnings downwards. Results suggest that the manipulation varies over the years: a decrease in earnings management between 2003 and 2007, and increase in earnings manipulation between 2008 and 2009. It is also confirmed that there is a significant difference in earnings management between the emerging countries analyzed.
Callao, Jarne and Wroblewski (2017c)	Poland, the Czech Republic, Slovakia, Hungary	The total number of firm year observations is 14,378 (the Czech Republic: 7,168; Poland: 5,971; Hungary: 609; Slovakia: 630).	The study focuses on analyses of the existent earnings management models to evaluate their reliability in detection earnings management. The results confirm that the Jones (1991), Shivakumar (1996), Kasznik (1999) and Yoon and Miller model (2002) offers the most reliable results for detecting earnings management in emerging Eastern European post-communism economic environment. Additionally, based on broad analyses the results indicate that there is no superiority of the cross-sectional models vis-à-vis their time-series counterparts. Both methodologies are consistent in detecting earnings management for Eastern European companies.

Source: Callao, Jarne and Wroblewski, 2014a and the Author.

Table 3. Sample selection

Panel A: Western European samples					
	France	Germany	Spain	UK	Total
Total number of firms available in Amadeus data base	20,828	2,477	13,335	12,572	49,212
Incomplete data (missing data)	(1,316)	(489)	(1,132)	(916)	(3,853)
Extreme values <sup>1</sup>	(456)	(79)	(1,532)	(911)	(2,978)
Total sample firms in Western European countries	19,056	1,909	10,671	10,745	42,381
Total observations in Western European countries	152,448	15,272	85,368	85,960	339,048
Panel B: Eastern European samples					
	Czech R.	Poland	Hungary	Slovakia	Total
Total number of firms available in Amadeus data base	3,006	2,609	183	398	6,196
Incomplete data (missing data)	(779)	(208)	(62)	(163)	(1,212)
Extreme values	(178)	(150)	(7)	(22)	(357)
Total sample firms in Eastern European countries	2,049	2,251	114	213	4,627
Total observations in Eastern European countries	14,343	15,757	798	1,491	32,389
Total sample firms in European countries	21,105	4,160	10,785	10,958	47,008
Total observations in European countries	166,791	31,029	86,166	87,451	371,437

Table 4. Results of the earnings management: positive vs. negative discretionary accruals

	2003	2004	2005	2006	2007	2008	2009	Mean
Panel A: Czech Republic								
Zero or positive %	30.01%	36.26%	32.21%	40.95%	38.21%	27.38%	21.47%	32.36%
Negative %	69.99%	63.74%	67.79%	59.05%	61.79%	72.62%	78.53%	67.64%
Panel B: Poland								
Zero or positive %	30.96%	39.63%	29.05%	30.83%	35.14%	24.21%	22.30%	30.30%
Negative %	69.04%	60.37%	70.95%	69.17%	64.86%	75.79%	77.70%	69.70%
Panel C: Hungary								
Zero or positive %	42.11%	28.95%	32.46%	37.72%	35.09%	23.68%	23.68%	31.95%
Negative %	57.89%	71.05%	67.54%	62.28%	64.91%	76.32%	76.32%	68.05%
Panel D: Slovakia								
Zero or positive %	22.07%	36.62%	23.47%	27.70%	23.00%	24.88%	12.21%	24.28%
Negative %	77.93%	63.38%	76.53%	72.30%	77.00%	75.12%	87.79%	75.72%
Panel E: France								
Zero or positive %	31.40%	34.91%	36.11%	36.77%	39.53%	32.66%	26.66%	34.01%
Negative %	68.60%	65.09%	63.89%	63.23%	60.47%	67.34%	73.34%	65.99%
Panel F: Germany								
Zero or positive %	14.61%	16.13%	17.23%	18.49%	19.80%	16.08%	12.57%	16.42%
Negative %	85.39%	83.87%	82.77%	81.51%	80.20%	83.92%	87.43%	83.58%
Panel G: Spain								
Zero or positive %	37.96%	40.69%	40.83%	44.08%	43.08%	33.80%	23.27%	37.67%
Negative %	62.04%	59.31%	59.17%	55.92%	56.92%	66.20%	76.73%	62.33%
Panel H: UK								
Zero or positive %	25.08%	32.21%	31.77%	33.45%	30.60%	22.04%	27.66%	28.97%
Negative %	74.92%	67.79%	68.23%	66.55%	69.40%	77.96%	72.34%	71.03%

European show higher earnings management than Western European companies, as mentioned. The highest manipulation is observed for Hungary between 2003 and 2006; and then for Slovakia between 2007 and 2009. According to Aussenegg, Inwinkl, and Schneider (2008), developing firms may exhibit higher levels of earnings management (more earnings decreasing or increasing). They investigated earnings management in 15 different European countries capturing different dimensions of earnings management. They stressed the point that earnings management takes place whenever firms or decision makers in firms have the incentive to give a certain

impression of the *company's image*. Since developing firms might need to exposure the certain position that earnings management can be used as a response *to meet certain earnings targets*. As explained by the authors, this does not necessarily mean that they try to overstate their earnings on a period by period basis. It may also be possible that they design their accruals in order to smooth earnings between periods.

**Cluster Analysis:** We perform cluster analyses. By cluster analysis, we look forward whether our eight European companies can be divided into distinct groups.

Table 5. Summary of the means of positive and negative discretionary accruals

	2003	2004	2005	2006	2007	2008	2009	Mean
<b>Panel A: Czech Republic</b>								
Mean positive	0.1091	0.1106	0.1030	0.1065	0.1049	0.0926	0.0817	<b>0.1012</b>
Mean negative	0.0923	0.0958	0.0902	0.0811	0.0744	0.0883	0.0962	<b>0.0883</b>
Difference	0.0169	0.0148	0.0129	0.0254	0.0305	0.0043	-0.0145	<b>0.0129</b>
<b>Panel B: Poland</b>								
Mean positive	0.1026	0.1311	0.1075	0.1143	0.1110	0.0852	0.0757	<b>0.1039</b>
Mean negative	0.0928	0.0959	0.0898	0.0867	0.0893	0.0892	0.0918	<b>0.0908</b>
Difference	0.0098	0.0352	0.0177	0.0276	0.0216	-0.0040	-0.0161	<b>0.0131</b>
<b>Panel C: Hungary</b>								
Mean positive	0.2257	0.1781	0.0989	0.1696	0.0697	0.0684	0.0751	<b>0.1265</b>
Mean negative	0.0829	0.1066	0.0859	0.0704	0.0862	0.0955	0.0972	<b>0.0892</b>
Difference	0.1427	0.0716	0.0131	0.0992	-0.0165	-0.0271	-0.0221	<b>0.0373</b>
<b>Panel D: Slovakia</b>								
Mean positive	0.0971	0.1019	0.0590	0.1038	0.1377	0.1191	0.0896	<b>0.1012</b>
Mean negative	0.0888	0.0697	0.0827	0.0804	0.1214	0.1128	0.1232	<b>0.0970</b>
Difference	0.0082	0.0322	-0.0237	0.0234	0.0163	0.0064	-0.0336	<b>0.0042</b>
<b>Panel E: France</b>								
Mean positive	0.0900	0.0814	0.0784	0.0786	0.0758	0.0765	0.0678	<b>0.0784</b>
Mean negative	0.1505	0.1671	0.1661	0.1687	0.1968	0.1446	0.1332	<b>0.1610</b>
Difference	-0.0605	-0.0857	-0.0877	-0.0900	-0.1210	-0.0681	-0.0655	<b>-0.0826</b>
<b>Panel F: Germany</b>								
Mean positive	0.0813	0.0754	0.0825	0.0745	0.0720	0.0610	0.0735	<b>0.0743</b>
Mean negative	0.0968	0.0910	0.0970	0.0983	0.0897	0.0924	0.0928	<b>0.0940</b>
Difference	-0.0155	-0.0157	-0.0145	-0.0238	-0.0177	-0.0314	-0.0192	<b>-0.0197</b>
<b>Panel G: Spain</b>								
Mean positive	0.1681	0.1471	0.1344	0.1272	0.1136	0.0972	0.0777	<b>0.1236</b>
Mean negative	0.2024	0.2311	0.2331	0.3191	0.2910	0.1769	0.1397	<b>0.2276</b>
Difference	-0.0343	-0.0840	-0.0986	-0.1919	-0.1774	-0.0796	-0.0621	<b>-0.1040</b>
<b>Panel H: UK</b>								
Mean positive	0.0897	0.0935	0.0857	0.0871	0.0768	0.0679	0.0796	<b>0.0829</b>
Mean negative	0.1197	0.1437	0.1450	0.1506	0.1257	0.1184	0.1390	<b>0.1346</b>
Difference	-0.0300	-0.0502	-0.0593	-0.0635	-0.0489	-0.0505	-0.0594	<b>-0.0517</b>

Table 6. Results on Kruskal Wallis non-parametric test on Eastern and Western European countries

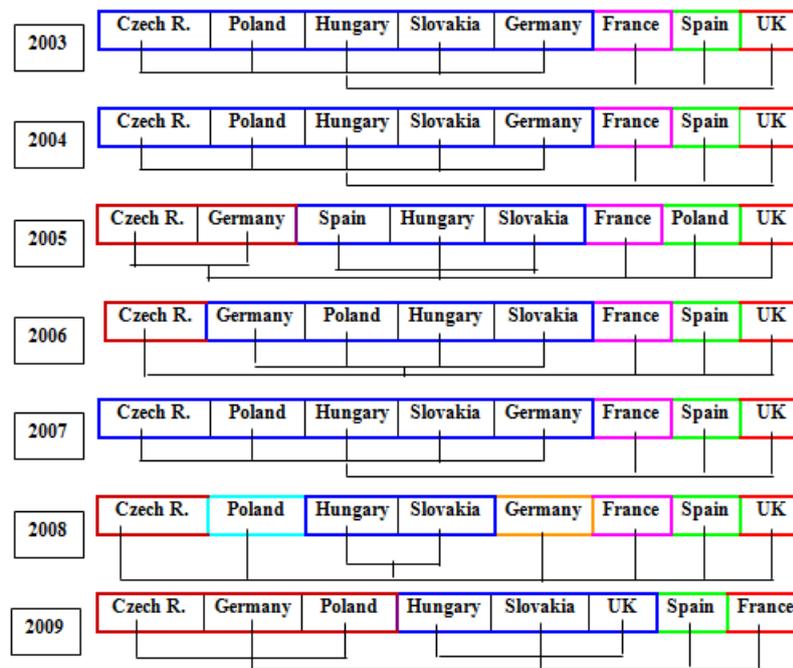
	Year	Kruskal-Wallis Results						
		2003	2004	2005	2006	2007	2008	2009
	<i>Chi-Square</i>	100,813*	300,304*	289,781*	223,733*	312,960*	204,562*	169,761*
Mean Rank	<i>Czech R.</i>	25,724.71	26,299.51	26,731.49	26,057.75	25,037.51	25,563.39	25,570.07
	<i>Poland</i>	24,703.07	27,391.19	26,091.74	25,928.91	27,213.75	24,920.29	24,661.50
	<i>Hungary</i>	27,890.72	29,145.06	26,935.11	26,109.75	26,189.63	25,149.80	26,452.45
	<i>Slovakia</i>	25,976.81	25,010.22	25,356.38	26,246.44	31,483.61	29,139.46	31,346.20
	<i>France</i>	23,218.96	23,113.72	22,755.53	22,873.13	22,900.03	22,684.75	22,984.24
	<i>Germany</i>	24,262.56	23,750.33	24,833.40	25,062.76	23,764.36	23,197.54	23,861.06
	<i>Spain</i>	23,800.44	23,462.26	24,038.30	23,921.80	23,525.61	22,669.20	23,583.65
	<i>UK</i>	23,712.28	23,449.36	23,883.83	23,889.45	23,451.94	22,484.43	23,549.50

\* significance at 1%

Using the absolute values of discretionary accruals we perform cluster procedure from two different perspectives: a cluster analysis by year; and a cluster analysis by the combined period of 2003-2009. Following, we present results on cluster analysis to contrast our results.

**Cluster analysis by year:** Annex 4 provides the results on cluster analysis by each year in a period of 2003-2009. Seven different clusters are performed. Each panel represents the results for each year. We can observe that each year's analysis shows a different number of clusters. In 2008 there are 8 groups; in 2005 and 2006 5 groups; and finally in 2003, 2004, 2007 and 2009 only 4 clusters.

All clusters' average earnings management scores are statistically significant (all seven years). Additionally, we detect that all clusters over different years (no matter whether there are four, five, or eight clusters in each year) are closely parallel, containing well clustered data by countries. We can observe that 95% to 100% of the observations of companies from one country are clearly matched into the same cluster. Only companies from France in 2008 are separated into two different groups (19.6% and 78.9%), but still they are clustered separately from the other countries. It may confirm that earnings management of companies from one country remains significantly similar or at least comparable over time.



Source: The author.

Figure 3. Cluster analysis by year. Dendrogram of countries

Table 7. Cluster analysis by year. Descriptive statistics

Year		Clusters							
		1	2	3	4	5	6	7	8
2003	Mean	0.1304	0.0839	0.0800	0.0707	-	-	-	-
	Std. Deviation	0.2038	0.0845	0.0797	0.0616	-	-	-	-
		Czech R., Poland, Hungary, Slovakia, Germany	Spain	UK	France				
2004	Mean	0.1190	0.0766	0.0750	0.0740	-	-	-	-
	Std. Deviation	0.1750	0.0737	0.0735	0.0740	-	-	-	-
		Czech R., Poland, Hungary, Slovakia, Germany	Spain	UK	France				
2005	Mean	0.1784	0.0810	0.0789	0.0722	0.0670	-	-	-
	Std. Deviation	0.2269	0.0701	0.0825	0.0649	0.0619	-	-	-
		Poland	Czech R., Germany	Hungary, Slovakia, Spain	UK	France			
2006	Mean	0.1887	0.0795	0.0782	0.0755	0.0624	-	-	-
	Std. Deviation	0.2414	0.0725	0.0814	0.0763	0.0546	-	-	-
		Czech R.	Poland, Hungary, Slovakia, Germany	Spain	UK	France			
2007	Mean	0.1159	0.0701	0.0651	0.0602	-	-	-	-
	Std. Deviation	0.1571	0.0703	0.0548	0.0527	-	-	-	-
		Czech R., Poland, Hungary, Slovakia, Germany,	UK	Spain	France				
2008	Mean	0.3249	0.1687	0.0830	0.0802	0.0702	0.0659	0.0649	0.0439
	Std. Deviation	0.3090	0.0511	0.0708	0.0684	0.0603	0.0501	0.0492	0.0304
		Hungary, Slovakia	France (19% of extreme results)	Czech R.	Poland	Germany	Spain	UK	France
2009	Mean	0.0977	0.0852	0.0760	0.0729	-	-	-	-
	Std. Deviation	0.1170	0.0759	0.0591	0.0618	-	-	-	-
		Hungary, Slovakia, UK	Czech R., Poland, Germany,	Spain	France				

Figure 3 (dendrogram) illustrates the connections in terms of the earnings management between the samples among different European countries. We may observe that France, Spain and the UK were always assigned into separate and individual clusters over all period years (with the exception of 2005 where Spain was clustered together with Hungary and Slovakia; and in 2009 UK was clustered together with as well Hungary and Slovakia). It means the scope of earnings management in each country is different. Germany, our last Western European country, was always clustered with Eastern European countries (only in 2008 was it clustered separately). In 2003, 2004 and 2007 Germany was matched with all four Eastern European countries; in 2006 with Poland, Hungary and Slovakia; in 2009 with Poland and the Czech Republic; and finally in 2005 with the Czech Republic. This may indicate that the earnings management behaviour of managers of Eastern European companies is most similar to that of managers of German companies.

We can also identify that in Eastern European countries, Hungary and Slovakia are always clustered together over all years. Poland and the Czech Republic also present similar behaviour, as they are jointly clustered in most of the cases. In 2003, 2004, and in 2007 all Eastern European countries are grouped in the same cluster, presenting the Eastern European block as a one cluster. In Table 7 we present the descriptive statistics on each cluster. The results indicate that the highest manipulation is observed in Eastern European countries over years, in particular in Slovakia and Hungary. On the other hand, the lowest earnings management occurs in France, followed by the UK, and then Spain<sup>4</sup>. Therefore, the cluster analyses confirmed our previously obtained results from the Kruskal Wallis test.

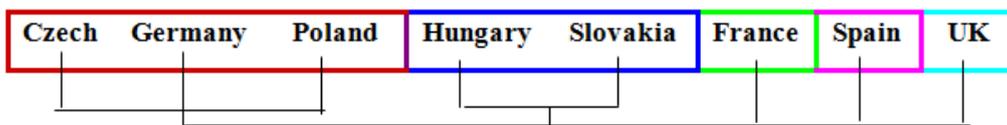
**Cluster analysis by combined period of 2003-2009:** In Annex 5 we perform a cluster analysis for the combined period of 2003-2009. The analysis shows the number of companies in each group to correspond percentage in total of companies from each country. The results are significant. We identify five different clusters. Again results of earnings management of the companies from one country were clustered in the same cluster with high percentage of 99% to even 100%. This result confirms previous analysis. The Czech Republic, Poland and Germany are assigned in the same cluster; with Hungary and Slovakia in another one. On the other hand, Spain, France and the UK are in separate, individual clusters, see also dendrogram, Figure 4. Finally, in Table 8 there are presented the descriptive statistics of the cluster. We confirm the previous results. Higher levels of manipulation are observed in Eastern European countries, in particular in Slovakia and

<sup>4</sup> Within the particularities of the results of the means, we observe that French companies are divided in two clusters in 2008, both separately from the other countries. One cluster contains most of the companies, having low mean of earnings management (0.04). The other cluster encloses a small number of companies with the extreme results of earnings management (the mean is 0.16, where the average mean of French companies is at 0.6-0.7 level). This is easily explained as the low number of companies with very high earnings management results compensates the other cluster containing 80% of the companies, having the mean below the average. Hence, France remains as the country showing the lowest scope of manipulation over time. Another singularity of the results may be observed in 2005. In this particular year Poland is clustered separately from the other Eastern European countries. It is for the first time, showing the highest mean of the earnings management (odd results). In the same year, Spanish companies are clustered together with Hungary and Slovakia, as a result, lowering the general mean of this cluster. The rest of the results are consistent and clear.

Hungary; followed by the cluster of Czech Republic, Poland and Germany. The lowest earnings management is seen in France, followed by the UK, and then Spain<sup>5</sup>. Therefore, our results confirm that Eastern European countries, to a certain extent, follow the activity of German managers in the way of earnings management. In almost all clusters' analyses, Eastern European countries came up in the same cluster with German companies. It may demonstrate a certain similarity and proximity of German companies and Eastern European countries. This situation may come from different reasons. First, the *heritage of Eastern European accounting has its origin in German accounting tradition*. Accounting in Eastern Europe has many similarities with that in Germany. In the absence of sophisticated equity capital markets, there was an emphasis on creditor protection and tax collection, and a preference for national charts of accounts, mainly based on the pioneering work of Schmalenbach in Germany in the 1920s. Many occupied countries in Eastern and Central Europe were forced to adopt the German model. Business transactions were regulated by means of Commercial Codes based on the German model (see for example, Bailey, 1988; Nobes and Parker, 2008).

Second, Eastern European countries *exhibit a similarly strong connection between accounting and taxation* as does Germany. Thanks to historical influence Eastern European countries strongly rely on the German example of tax regulations. Germany is an example of a European country that shows an important connection between accounting and taxation. The principle of prudence is the most important item in the German accounting environment. The main feature of this system is still the link between accounting and taxation (Haller, 1992). One example in the case of Germany is that this principle is assisted by the eligibility of the conformity principle that allows companies to choose a particular accounting treatment or policy in order to choose a particular tax treatment (Haller, 1992). Third, Germany and Eastern European countries present *the same legal tradition (civil-law)*. The French and Spanish legal traditions are also derived from civil-law. Nevertheless, some authors distinguish different groups within civil-law. They show at least two more groups: French civil-law and German civil-law (World Bank, 2004). Therefore, we may explain that despite the fact that all three countries belong to the civil-law tradition we find differences between them, and in consequence, Eastern European countries show more similarities to Germany than to France or Spain's legal traditions. La Porta *et al.* (1997); Ball, Kothari and Robin (2000); and Leuz, Nanda and Wysocki (2003) point out that a similar scope of earnings management may be expected between countries from the same legal tradition. Another possible reason for the close correspondence between German managers' activities and Eastern European countries may be the *similar culture*. As Arora and Fosturi (2000) point out, national culture has long been recognized as important in explaining behaviour. Aspects of national culture have been related to many areas of organizational behaviour such as foreign investment decisions, entry mode decisions (Arora and

<sup>5</sup> We also have performed cluster analyses using positive or negative values of the discretionary accruals of each company, using both procedures: cluster analysis by each year; and cluster analysis by the combined period of 2003-2009. The results show similar conclusions. Additionally, we also have performed cluster analyses by fixed number of clusters (three and two clusters) using as well: cluster analysis by each year; and cluster analysis by the combined period of 2003-2009. The results show similar conclusions.

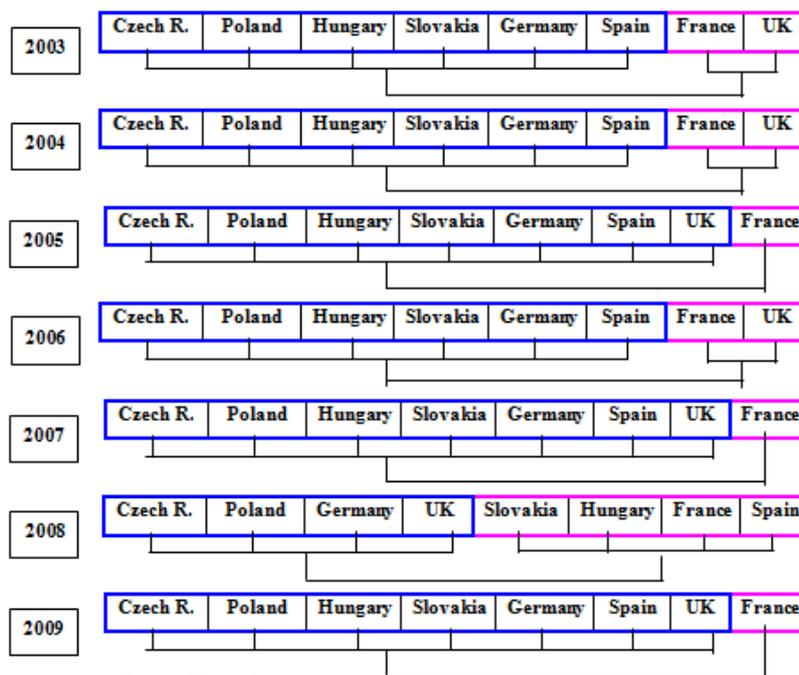


Source: The author.

Figure 4. Cluster analysis by combined period of 2003-2009

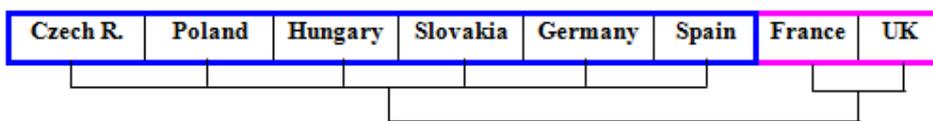
Table 8. Cluster analysis by combined period of 2003-2009 Descriptive statistics

2003-2009	Cluster				
	1	2	3	4	5
Mean	0.1193	0.0857	0.0794	0.0755	0.0671
Std. Deviation	0.1068	0.0849	0.0756	0.0744	0.0629
	Hungary, Slovakia	Czech R., Poland, Germany	Spain	UK	France



Source: The author.

Figure 5. Cluster analysis by year. Dendrogram of countries



Source: The author.

Figure 6. Cluster analysis by combined period of 2003-2009

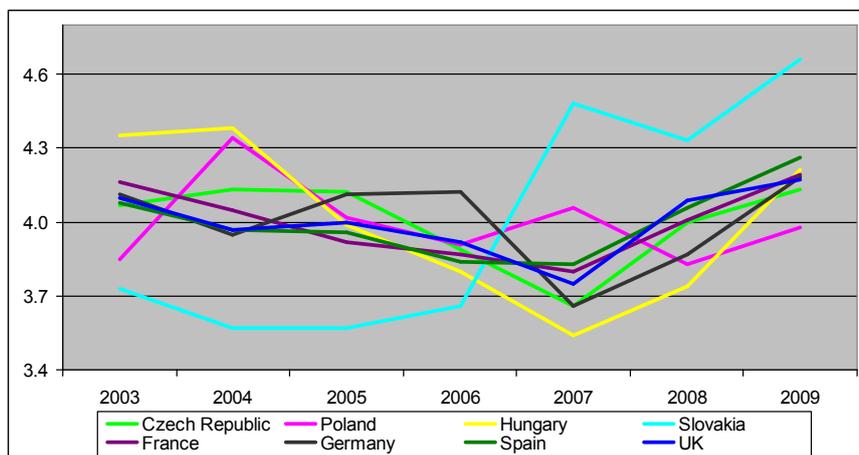


Figure 7. Trends of earnings management in the European countries over years

**Table 9. Descriptive statistics of cluster analysis of discretionary accruals by year within two fixed clusters**

		Clusters	
Year		1	2
2003	<i>Mean</i>	0.1100	0.0805
	<i>Std. Deviation</i>	0.2834	0.0863
		Czech R., Poland, Hungary, Slovakia, Germany, Spain	France, UK

		Clusters	
Year		1	2
2004	<i>Mean</i>	0.1044	0.0772
	<i>Std. Deviation</i>	0.1830	0.0840
		Czech R., Poland, Hungary, Slovakia, Germany, Spain	France, UK
2005	<i>Mean</i>	0.0904	0.0724
	<i>Std. Deviation</i>	0.1290	0.0775
		Czech R., Poland, Hungary, Slovakia, Germany, Spain, UK	France
2006	<i>Mean</i>	0.0954	0.0733
	<i>Std. Deviation</i>	0.1445	0.0784
		Czech R., Poland, Hungary, Slovakia, Germany, Spain	France, UK
2007	<i>Mean</i>	0.0831	0.0696
	<i>Std. Deviation</i>	0.1172	0.0770
		Czech R., Poland, Hungary, Slovakia, Germany, Spain, UK	France
2008	<i>Mean</i>	0.0815	0.0814
	<i>Std. Deviation</i>	0.0959	0.0790
		Hungary, Slovakia, Spain, France	Czech R., Poland, Germany, UK

		Clusters	
Year		1	2
2009	<i>Mean</i>	0.0908	0.0766
	<i>Std. Deviation</i>	0.0977	0.0697
		Czech R., Poland, Hungary, Slovakia, Germany, Spain, UK	France

**Table 10. Descriptive statistics of cluster analysis of discretionary accruals over combined period of 2003 -2009 within two fixed clusters**

		Clusters	
Period		1	2
2003-2009	<i>Mean</i>	0.0997	0.0745
	<i>Std. Deviation</i>	0.1717	0.0744
		Czech R., Poland, Hungary, Slovakia, Germany, Spain	France, UK

Table 11. Friedman non-parametric test: results

## Panel A: Eastern European countries.

		Czech Republic	Poland	Hungary	Slovakia
Chi-Square		77.251**	87.184**	15.534*	61.087**
Mean Rank	2003	4.07	3.85	4.35	3.73
	2004	4.13	4.34	4.38	3.57
	2005	4.12	4.02	3.99	3.57
	2006	3.89	3.91	3.8	3.66
	2007	3.66	4.06	3.54	4.48
	2008	4.00	3.83	3.74	4.33
	2009	4.13	3.98	4.21	4.66

## Panel B: Western European countries

		France	Germany	Spain	UK
Chi-Square		534.861**	84.036**	323.050*	272.000**
Mean Rank	2003	4.16	4.11	4.08	4.10
	2004	4.05	3.95	3.97	3.97
	2005	3.92	4.11	3.96	4.00
	2006	3.87	4.12	3.84	3.92
	2007	3.80	3.66	3.83	3.75
	2008	4.01	3.87	4.06	4.09
	2009	4.19	4.18	4.26	4.17

\* significance at 5%\*\* significance at 1%

Figure 8. Tendencies of earnings management in the European countries over the years.

	Czech Republic	Poland	Hungary	Slovakia	France	Germany	Spain	UK
2003				↓	↓	↓	↓	↓
2004	↓	↓	↓	↓	↓	↓	↓	↓
2005	↓	↓	↓	↓	↓	↓	↓	↓
2006	↓	↓	↓	↓	↓	↓	↓	↓
2007	↓	↓	↓	↓	↓	↓	↓	↓
2008	↑	↑	↑	↑	↑	↑	↑	↑
2009	↑	↑	↑	↑	↑	↑	↑	↑

Source: The author.

Fosturi, 2000), research and development decisions (Muralidharan and Phatak, 1999) and negotiation behaviour (Leung, 1988), among others. Germany, Poland, the Czech Republic, Hungary and Slovakia<sup>6</sup> are classified as Central European countries (see, for example, Pehe, 2002; Armstrong and Anderson, 2007) characterized by a similar culture. It may explain the similar behaviour as regards to earnings management between managers of Eastern European countries and Germany. Finally, we think that simple *geographical situation* and the proximity of Germany and Eastern European countries can additionally explain this cluster association. Managers of Eastern European countries could have taken an example from their neighbour country. Despite the similarities between Germany and Eastern European countries we also find significant differences between Eastern European countries and other three our Western European sample countries: France, Spain and UK. Therefore, to be able to explain such differences, we perform additional cluster analyses. We specify fixed number of clusters, as in prior clusters' analyses the number of clusters was determined automatically. In consequence, previously we have observed how companies within different countries were grouped in different clusters and in different numbers of clusters.

Previous cluster analysis has always distributed France, Spain and UK in separate clusters. Now, we are interested in whether specifying a limited low number of clusters helps to regroup these three countries France, Spain and UK with some Eastern European countries, or at least clusters them together. In consequence, we perform cluster analysis into the fixed number of two clusters. As previously, we perform cluster analysis using two different procedures: cluster analysis by each year; and cluster analysis by the combined period of 2003-2009. We use absolute values of discretionary accruals (the same procedure as previously; using the absolute values we avoid the compensation effect of negative and positive values of discretionary accruals, in the previous section we evaluated the effect of sign of discretionary accruals).

**Cluster analyses within two fixed clusters:** Annex 6 provides the results for cluster analysis by year; and Annex 7 provides the results for the combined period of 2003-2009. Additionally, Figure 5 and Figure 6 illustrate the clusters. The results show that Spain is clustered with Germany and Eastern European countries (with the exception of 2008). On the other hand, France and the UK are clustered together in a separate cluster. In 2005, 2007 and 2009 France is grouped individually and the UK joined the other six countries. Finally, descriptive statistics for two fixed clusters confirm, as expected, the

<sup>6</sup> Also Austria, Slovenia, Switzerland.

significantly lower level of discretionary accruals in the cluster of French and UK companies in comparison to the Eastern European, German and Spanish companies, see Table 9 and Table 10. Therefore, based on the detailed cluster analyses we have confirmed the heterogeneity observed in Western European countries, indeed, France and the UK show different earnings management behaviour than any other. One possible explanation of heterogeneity in earnings management between France, the UK and other our sample countries (Eastern and Western European countries) may come from the existent *differences within national audit environments*. Maijor and Vanstraelen (2002) explain that national audit environments vary strongly among different European countries in terms of independence rules, auditor education and auditor liability. Hence, it can be expected that the restrictions imposed by national audit environments on earnings management may vary. Their results confirm that France is the country that has the highest number of laws and regulations intended to improve audit quality. In particular, France imposes restrictions on the minimal length of the audit mandate. Moreover, management advisory services and advertising are not allowed. Statutory auditors are subject to reviews by peers and regulators. The UK is classified as the country with the second strictest audit quality regime due to the high risk of litigation. On the other hand, Germany shows more flexible audit quality regimes (Maijor and Vanstraelen, 2002). In particular, the results suggest that companies in countries with flexible audit quality regimes (Germany, or Spain<sup>7</sup> and other Eastern European countries that as mentioned follow the example of Germany) report significantly higher absolute values of discretionary accruals compared to companies in countries with strict audit quality regimes (France and the UK) (Maijor and Vanstraelen, 2002, 2006).

These results help us to understand why France and the UK are always clustered separately (in different groups than Germany or Spain, and other Eastern European countries). The strict and low flexibility of audits significantly affects managers' decisions in terms of earnings management, and in effect creates differences among the European countries. Additionally, we have previously confirmed that the UK and France show the lowest level of earnings management<sup>8</sup>. This is in accordance with the results presented by Maijor and Vanstraelen (2002), as strong audit quality limits the scope of earnings management. Another possible reason may come from the *different institutional environments* in each of our Western European countries. Leuz, Nanda and Wysocki (2003) build an aggregate earnings management measure, and compare it across a comprehensive sample of countries, including the UK, France, Spain and Germany. They found that earnings management practices differ significantly across countries, and that the divergences are linked to the different institutional environments in each country. Their evidence suggests that countries with a less dispersed ownership structure and weak investor rights (e.g. Germany) engage more in earnings management, even if there is strong legal enforcement. They argue explicitly that earnings management is more pervasive in countries where the legal protection of outside investors is weak, because in these countries insiders enjoy greater private control benefits and hence have stronger incentives to obfuscate firm performance (Leuz, Nanda, and Wysocki, 2003). Hence, we may explain why France and the

UK are not clustered with Germany and other Eastern European countries. At the same time, the possible similarity between Spain and Eastern European countries may be as a result of *similar process of transformation* of Eastern European countries' economies to the Spanish one. When we turn our attention to the 13 (mostly) Eastern European countries that have either recently joined the EU, or are in line to join, we may notice that Poland, for example, is the most similar to Spain in terms of labour productivity, geographical similarities, agricultural resemblance, inflation rate at that time, unemployment rate, interest rate, etc (at the time of EU ascension). Some authors even called Poland a New Spain. Caselli and Tenreyro (2005) ask: "Is Poland the Next Spain?". In this sense, Poland and other Eastern European countries may have some similarities with Spain, explaining the observed cluster association.

Kaitila (2010) explains that this similarity may exist in terms of *the quality of European Union countries' export structure*. He analyses the EU27 countries' export structures in the period of 1999 to 2008. He observes clear similarity indicators by pairs of countries indicating that between 1999 and 2008 the strongest quality-adjusted similarity exists between Germany–Austria, Netherlands–Belgium, Sweden–Austria, Spain–Poland (our sample countries), Poland–Czech Republic (our sample countries), and Romania–Bulgaria. In this sense, we find similarities between Spain and Eastern European countries, as over the years, all five countries attempted to avoid the situation of being placed in the periphery of the continent and having to face challenges alone.

**Friedman test. time-line analysis:** Table 11 presents the results of the Friedman tests. The results obtained suggest that earnings management does vary over time for Eastern as well as for Western European countries. The test shows the significance of the results (Chi-Square mostly significant at 1%) and verifies that there are differences in manipulation over the years in Eastern and Western European countries. Figure 7 shows the evolution of the mean ranks of each country. Therefore, we observe fluctuations in earnings management, and inconstant manipulation for Eastern as well as for Western European countries over our study period. The scope of the manipulation has been changing over time reflecting the general situation of the European market, as we observe important economic fluctuations in our period. First of all, the effect of the *process of enlargement of the European Union* took place during the period of study. The incorporation of new countries into the EU has influenced the increment of European competition. It has also stimulated free business negotiations, and the flow of capital, among others factors. Additionally, *the world financial crisis* entails more than a systemic impact on aggregate macro variables. It leads to the re-composition of the microeconomic structure, which in turn shapes the response of the economy to the crisis. In crisis situations firms and sectors must readapt their capabilities, learning processes and production and investment strategies. Managers from both markets, Eastern and Western, tried to cope with these situations, fulfilment of expectations of their owners to reach targets, and others aspects, by earnings management. They were not able to predict economic tendencies, so in effect they were modifying their activities, in terms of earnings management, as we may observe on the graphic. Managers of European companies have been responding to these fluctuations by earnings management.

<sup>7</sup> See for details, Spanish audit quality was analysed by García-Benau *et al.* (2004).

<sup>8</sup> see Kruskal-Wallis test.

Based on the Friedman test ranks, we detect two main tendencies: firstly, a decrease in manipulation between 2003/2004 and 2007. Our countries' mean ranks gradually reduced manipulation. All our Western European countries reduced manipulation starting from 2003 and Eastern European countries from 2004<sup>9</sup>, see Figure 8.

We also detect a second trend. Between 2008 and 2009 we observe increases in manipulation for all Eastern, as well as, Western European countries<sup>10</sup>. The first tendency of reducing the scope of earnings management<sup>11</sup> (2003-2007) can be explained by the effect of the collapse of Enron Corporation, WorldCom and other financial scandals in late 2001. Different authors have explained, see for example Gompers, Ishii and Metrick (2001), Manne (2002), Sosnoff (2002), Niskanen (2004), these *bankruptcies of big companies reflected the general weakness of markets and the possibility of earnings manipulation* by the managers of the companies. The revelation of gross accounting violations by these and other firms and the continued weakness of the financial markets have undermined both popular and political support for free-market policies. This effect has already led to the increased regulation of accounting and auditing authorized by the Sarbanes-Oxley Act (see Manne, 2002; Sosnoff, 2002; Niskanen, 2004). Increment control of financial statements was introduced in the following years around the world to prevent other such financial collapses. Therefore, strengthening the control may have reduced earnings management in European countries in the first years of our analysis period.

In addition, the *process of enlargement of the European Union* by incorporating new members into the global and European market had impact not only on the new incorporated countries, but also had an influence on the former members (in other words, Western European countries), resulting in strengthened competition in the European market. Managers reduced manipulation in response to the necessity of the transparency in terms of the possible acquisition of *potential investors*. Moreover, the macroeconomic conditions of the new comers of the European market and the older participants could also have an important impact on the decline in earnings management between 2003 and 2007. As pointed out by Clayton and Giesbrecht (1997) and Leuz, Nanda, and Wysocki (2003) the *macroeconomic performance* of the countries is an institutional factor that has been analyzed by authors in relation to earnings management. It leads to an open, global and boundary-less market, which helped economic development (see, for example, Czinkota and Ronkainen, 1997; Alon and Welsh, 2002). Both parts of Europe took advantage of the opportunity of making business without frontiers. Therefore, more possibilities for the companies have been reflected in lower levels of discretionary accruals.

However, in the last two years (2008-2009), we have already observed the effect of the *global financial crisis*. Managers of the European countries (both markets) perceived a lack of resources or at least fewer resources, stronger competition, and in effect the level of earnings management rose. As pointed out, in bad economic situations it is harder to achieve previously established targets. Conrad, Cornell, and Landsman (2002) and Cohen and Zarowin (2007) describe that during periods of crisis, managers manipulate earnings more (to

decrease or increase) to fulfil their companies' objectives. Managers of European companies were not able to follow the previously matched objectives and they may have opted for more earnings decreasing to be able to *fulfil future targets*.

## Conclusion

The study draws a comparative study between Eastern and Western European countries on earnings management practice. This is a first study which evaluates and compares earnings management between Eastern and Western European countries. We compared four well-developed markets of Western European countries: Germany, France, Spain and the UK, with emerging markets from the Czech Republic, Poland, Hungary and Slovakia, as developing Eastern European markets increasingly gain importance in the European panorama. No longer can Europe be designate only by Western part. The results indicate that companies in the European countries included in the study, engage in earnings management, in particular in decreasing earnings practices. Around 70% of the companies from Eastern and Western European countries manage earnings to downward. Literature points out those managers may decrease earnings to meet bonus targets (Healy, 1985); to protect their job (Fudenberg and Tirole, 1995; Arya, Glover and Sunder, 2003); attempt to control fluctuations in reported earnings and steer them to levels they consider desirable (Tokuga and Sakai, 2011); to opt for "hiding" some of their earnings (decreasing earnings) for reporting in a future period when earnings are lower and the marginal impact of a higher report is greater (Ronen and Sadan, 1981; Lambert, 1984); decreasing earnings is additionally employed to assure investors of a steady earnings flow (George and Furstenberg, 2006), among other reasons.

Nevertheless, we detect important differences in earnings management between Eastern and Western European countries. The magnitude of earnings management is not uniform across the four countries. Mean ranks from the Kruskal Wallis test indicate lower manipulation in Western European countries than in Eastern European countries. The lowest manipulation was observed in France, followed by the UK, Spain, and Germany. The highest manipulation is observed in Eastern European countries, particularly in Hungarian and Slovakian companies. Eastern and Western European countries differ significantly in terms of history, culture, or economy. This different heritage may have an influence on managers' way of manipulating earnings. On the one side Western European countries were marked by capitalism, and the long process of development of their market-oriented economies. They reached stability and solidity in running their business. On the other hand, Eastern European companies were influenced for many years by communism. They have just started to adapt to the Western democratic and economical system through their recent incorporation to the European Union and collapse of their centrally-planned economies.

Additionally, the cluster analyses confirmed significantly different earnings manipulation between France, Spain, the UK and the Eastern European countries and Germany. However, in the heterogeneity of the European countries we perceived that Eastern European countries, to a certain extent, have assimilated the German companies' way of managing earnings, as cluster analyses confirmed that Eastern European countries came up in the same cluster as German companies. This may be explained by the similar connection between accounting and taxation. Eastern European countries due to historical influence

<sup>9</sup> Slovakia companies showed this tendency between 2003 and 2006.

<sup>10</sup> For Slovakia we even observed it, one year before, in a period of 2007-2009.

<sup>11</sup> less decreasing earnings

strongly rely on the German example of principles accounting as well tax regulations. In addition, historical heritage, cultural and geographical proximity are other possible explanations of the proximity of Eastern European and German companies. Finally, time-line analysis revealed that earnings management does vary in time and in extent for Eastern as well as for Western European countries. Moreover, we conclude that there is a difference in manipulation over the years in Eastern and Western European countries. The scope of the manipulation has been changing over time reflecting the general situation of the European market (European Union membership of Eastern European countries, impact of world financial crisis, etc).

Nevertheless, we detect two main tendencies: firstly, a decrease in manipulation between 2003/2004 and 2007. Our countries' mean ranks gradually reduced manipulation. All our Western European countries reduced manipulation starting from 2003 and Eastern European countries from 2004. We also detect a second trend: between 2008 and 2009 we observe increases in manipulation for all Eastern, as well as, Western European countries. Our results can be explained by the effect of the economic crisis, and the entry into the European Union by new countries (Eastern European countries), which caused the intensification of competition in Europe. Our findings contribute to the investigation of earnings management, as it is a first study comparing Western and Eastern European countries in terms of earnings management. The comparative analyses help to understand the behaviour in terms of earnings management both markets: Western and Eastern. It reveals characteristics of both parts of Europe. Although we have filled in some gaps in our knowledge, other issues are still pending. Further research is needed to focus on the possible comparison of motivation for earnings manipulation for Eastern and Western European countries, as the issue of earnings management in Europe as a whole has so far remained unanswered. Future studies could also incorporate some other developing countries, or compare the results with US or Asian studies, as we may observe important number of studies from these markets. Lastly, future research could be carried out based on consolidated financial statement of only listed companies to compare the results with those obtained for separate financial statements. Moreover, it would allow us to test the effect of IFRS adoption on the quality of financial reporting.

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Annex 1: Descriptive statistics of the sample of Eastern and Western European countries

	Scrutiny period							
	2002	2003	2004	2005	2006	2007	2008	2009
<b>Panel A: France</b>								
<b>Total assets</b>								
Mean	107,885	107,308	116,620	129,400	138,081	147,700	159,568	161,118
Std. dev.	1,818,366	1,765,974	1,925,448	2,153,748	2,205,487	2,279,842	2,630,288	2,834,075
Median	8,002	8,439	9,066	9,796	10,644	11,712	12,217	11,756
<b>Revenues</b>								
Mean	106,147	105,962	110,781	118,486	127,784	135,837	143,209	130,746
Std. dev.	1,460,014	1,413,930	1,431,851	1,541,075	1,666,179	1,737,711	1,914,264	1,672,578
Median	14,598	15,322	16,417	17,399	18,778	20,301	21,304	19,887
<b>Panel B: Germany</b>								
<b>Total assets</b>								
Mean	800,554	809,872	826,194	893,104	935,597	933,107	983,745	996,406
Std. dev.	7,191,242	7,252,332	7,311,272	7,926,407	8,212,257	7,412,089	8,004,646	8,094,755
Median	71,139	71,857	73,088	76,795	81,336	84,718	86,751	88,349
<b>Revenues</b>								
Mean	685,932	690,213	715,782	758,712	796,995	838,025	889,771	820,067
Std. dev.	5,312,467	5,112,345	5,254,376	5,528,556	5,221,611	5,483,506	5,875,185	5,513,595
Median	69,979	72,427	75,727	79,114	84,856	86,491	91,205	84,152
<b>Panel C: Spain</b>								

<b>Total assets</b>								
Mean	74,512	79,557	87,119	100,525	119,792	136,669	142,215	144,197
Std. dev.	941,059	915,284	956,297	1,111,817	1,403,212	1,609,645	1,679,937	1,767,905
Median	11,203	12,688	14,464	16,444	18,928	21,109	21,786	21,166
<b>Revenues</b>								
Mean	64,812	69,786	77,197	87,580	99,649	108,115	109,000	97,230
Std. dev.	578,109	598,890	661,134	788,382	925,674	969,872	1,038,806	937,422
Median	13,334	14,679	16,203	17,747	19,601	21,473	20,607	17,895
<b>Panel D: UK</b>								
<b>Total assets</b>								
Mean	261,149	258,860	268,937	297,565	317,207	323,135	299,001	310,584
Std. dev.	3,033,038	2,878,022	2,771,836	2,928,540	2,818,706	2,861,634	2,921,747	3,095,246
Median	24,027	23,663	25,564	27,702	30,296	30,734	26,260	25,957
<b>Revenues</b>								
Mean	220,224	224,966	244,694	265,160	288,894	279,612	270,316	257,667
Std. dev.	2,049,623	2,156,010	2,456,726	2,518,801	2,571,346	2,490,870	3,107,349	2,593,854
Median	32,527	33,169	35,774	37,835	41,315	41,240	34,584	32,607
<b>Scrutiny period</b>								
	2002	2003	2004	2005	2006	2007	2008	2009
<b>Panel E: Czech Republic</b>								
<b>Total assets</b>								
Mean	12,187	12,628	14,238	15,894	17,845	20,255	21,004	20,610
Std. dev.	21,648	20,998	22,967	25,013	27,357	31,345	32,553	31,707
Median	5,328	5,590	6,486	7,378	8,563	9,656	9,892	9,659
<b>Revenues</b>								
Mean	14,751	15,578	19,139	21,594	24,953	28,913	28,705	25,666
Std. dev.	22,206	22,421	27,426	31,580	35,846	42,577	41,514	38,461
Median	7,782	8,283	9,858	10,841	13,103	14,898	14,857	13,068
<b>Panel F: Poland</b>								
<b>Total assets</b>								
Mean	12,995	12,128	15,010	17,228	19,321	22,989	21,835	22,388
Std. dev.	20,468	18,356	22,117	25,203	27,943	32,791	31,621	33,311
Median	5,633	5,365	6,923	8,104	9,276	11,829	11,268	11,570
<b>Revenues</b>								
Mean	14,844	14,421	19,117	21,033	23,678	29,290	27,541	27,317
Std. dev.	18,735	18,280	24,518	25,700	28,645	35,420	33,052	32,621
Median	8,776	8,402	11,062	12,408	13,767	17,131	16,222	15,970
<b>Panel G: Hungary</b>								
<b>Total assets</b>								
Mean	11,481	12,010	13,353	13,895	15,690	16,980	16,516	16,760
Std. dev.	14,077	16,498	16,542	18,410	20,037	21,212	20,137	23,458
Median	6,352	6,466	7,379	8,073	8,645	9,192	9,548	9,575
<b>Revenues</b>								
Mean	20,786	20,828	22,433	23,377	26,856	29,033	28,984	24,997
Std. dev.	30,105	29,447	24,209	27,818	29,954	30,589	27,537	22,446
Median	11,497	11,814	14,507	15,418	17,423	19,518	20,422	18,616
<b>Panel H: Slovakia</b>								
<b>Total assets</b>								
Mean	7,997	8,302	9,579	10,713	12,614	13,865	16,339	11,857
Std. dev.	7,690	7,649	9,000	10,169	11,965	12,075	14,893	10,964
Median	5,716	5,775	6,864	7,477	8,367	9,839	12,100	8,011
<b>Revenues</b>								
Mean	12,259	13,200	15,037	16,745	19,922	21,972	25,561	16,233
Std. dev.	11,831	12,414	13,801	15,287	18,257	19,845	22,446	15,323
Median	8,282	9,209	10,383	11,457	13,669	15,353	18,800	11,661

## Annex 2. Results on Normality test of our four samples

Tests of Normality				
	Country	Kolmogorov-Smirnov <sup>a</sup>		
		Statistic	df	Sig.
DA	Czech R.	.210	14,343	.000
	Hungary	.224	15,757	.000
	Poland	.244	798	.000
	Slovakia	.142	1,491	.000
	France	.118	133392	.000
	Germany	.127	13363	.000
	Spain	.194	79723	.000
	UK	.116	75215	.000

a. Lilliefors Significance Correction

## Annex 3: Statistics on the discretionary accruals of European countries.

	2003	2004	2005	2006	2007	2008	2009
<b>Panel A: Czech Republic</b>							
Mean of discretionary accruals	-0.0318	-0.0210	-0.0279	-0.0043	-0.0059	-0.0388	-0.0580
Standard deviation of DA	0.1478	0.1599	0.1409	0.1389	0.1663	0.1348	0.1220
Median of DA	-0.0422	-0.0310	-0.0401	-0.0206	-0.0200	-0.0464	-0.0587
<b>Panel B: Poland</b>							
Mean of discretionary accruals	-0.0323	-0.0059	-0.0325	-0.0248	-0.0190	-0.0470	-0.0544
Standard deviation of DA	0.1799	0.1625	0.1531	0.1760	0.1427	0.1404	0.1143
Median of DA	-0.0380	-0.0221	-0.0399	-0.0362	-0.0316	-0.0461	-0.0529
<b>Panel C: Hungary</b>							
Mean of discretionary accruals	0.0470	-0.0242	-0.0259	0.0201	-0.0315	-0.0567	-0.0564
Standard deviation of DA	0.3247	0.1783	0.1158	0.1905	0.1054	0.1143	0.1020
Median of DA	-0.0244	-0.0495	-0.0444	-0.0159	-0.0348	-0.0486	-0.0558
<b>Panel D: Slovakia</b>							
Mean of discretionary accruals	-0.0478	-0.0069	-0.0494	-0.0294	-0.0618	-0.0551	-0.0972
Standard deviation of DA	0.1098	0.1113	0.0841	0.1233	0.1643	0.1477	0.1058
Median of DA	-0.0508	-0.0286	-0.0480	-0.0424	-0.0708	-0.0608	-0.0969
<b>Panel E: France</b>							
Mean of discretionary accruals	-0.0277	-0.0220	-0.0178	-0.0157	-0.0112	-0.0252	-0.0441
Standard deviation of DA	0.1405	0.1270	0.1162	0.1175	0.1133	0.1097	0.1089
Median of DA	-0.0314	-0.0247	-0.0215	-0.0199	-0.0152	-0.0274	-0.0398
<b>Panel F: Germany</b>							
Mean of discretionary accruals	-0.0566	-0.0495	-0.0494	-0.0482	-0.0399	-0.0529	-0.0602
Standard deviation of DA	0.0972	0.0921	0.0957	0.0918	0.0862	0.0844	0.0876
Median of DA	-0.0529	-0.0469	-0.0489	-0.0509	-0.0401	-0.0476	-0.0553
<b>Panel G: Spain</b>							
Mean of discretionary accruals	0.0151	0.0168	0.0121	0.0183	0.0086	-0.0244	-0.0566
Standard deviation of DA	0.3455	0.2207	0.1845	0.1679	0.1622	0.1337	0.1190
Median of DA	-0.0217	-0.0158	-0.0161	-0.0100	-0.0120	-0.0300	-0.0506
<b>Panel H: UK</b>							
Mean of discretionary accruals	-0.0372	-0.0210	-0.0256	-0.0207	-0.0253	-0.0513	-0.0401
Standard deviation of DA	0.1172	0.1244	0.1156	0.1167	0.1035	0.1009	0.1126
Median of DA	-0.0407	-0.0283	-0.0285	-0.0247	-0.0279	-0.0455	-0.0383

## Annex 4. Cluster analysis by year. Number of firms and the percentage of each country by cluster division

Panel A: Year 2003											
	Cluster								Total	%	
	1		2		3		4				
	No.	%	No.	%	No.	%	No.	%			
<i>Czech R.</i>	2,049	100.0%								2,049	100%
<i>Poland</i>	2,251	100.0%								2,251	100%
<i>Hungary</i>	114	100.0%								114	100%
<i>Slovakia</i>	213	100.0%								213	100%
<i>France</i>	534	2.8%						18,522	97.2%	19,056	100%
<i>Germany</i>	1,909	100.0%								1,909	100%
<i>Spain</i>			10,671	100.0%						10,671	100%
<i>UK</i>	26	0.2%			10,719	99.8%				10,745	100%
	<b>7,096</b>		<b>10,671</b>		<b>10,719</b>		<b>18,522</b>			<b>47,008</b>	

Panel B: Year 2004											
	Cluster								Total	%	
	1		2		3		4				
	No.	%	No.	%	No.	%	No.	%			
<i>Czech R.</i>	2,049	100.0%								2,049	100%
<i>Poland</i>	2,251	100.0%								2,251	100%
<i>Hungary</i>	114	100.0%								114	100%
<i>Slovakia</i>	213	100.0%								213	100%
<i>France</i>	112	0.6%						18,944	99.4%	19,056	100%
<i>Germany</i>	1,909	100.0%								1,909	100%
<i>Spain</i>			10,671	100.0%						10,671	100%
<i>UK</i>	116	1.1%			10,629	98.9%				10,745	100%
	<b>6,764</b>		<b>10,671</b>		<b>10,629</b>		<b>18,944</b>			<b>47,008</b>	

Panel C: Year 2005												
	Cluster										Total	%
	1		2		3		4		5			
	No.	%	No.	%	No.	%	No.	%	No.	%		
<i>Czech R.</i>	34	1.7%	2,015	98.3%							2,049	100%
<i>Poland</i>	2,251	100.0%									2,251	100%
<i>Hungary</i>					114	100.0%					114	100%
<i>Slovakia</i>					213	100.0%					213	100%
<i>France</i>	300	1.6%							18,756	98.4%	19,056	100%
<i>Germany</i>	3	0.2%	1,906	99.8%							1,909	100%
<i>Spain</i>					10,671	100.0%					10,671	100%
<i>UK</i>	209	1.9%					10,536	98.1%			10,745	100%
	<b>2,797</b>		<b>3,921</b>		<b>10,998</b>		<b>10,536</b>		<b>18,756</b>		<b>47,008</b>	

Panel D: Year 2006												
	Cluster										Total	%
	1		2		3		4		5			
	No.	%	No.	%	No.	%	No.	%	No.	%		
<i>Czech R.</i>	2,049	100.0%									2,049	100%
<i>Poland</i>	32	1.4%	2,219	98.6%							2,251	100%
<i>Hungary</i>	5	4.4%	109	95.6%							114	100%
<i>Slovakia</i>	2	0.9%	211	99.1%							213	100%
<i>France</i>	573	3.0%							18,483	97.0%	19,056	100%
<i>Germany</i>	2	0.1%	1,907	99.9%							1,909	100%
<i>Spain</i>					10,671	100.0%					10,671	100%
<i>UK</i>	67	0.6%					10,604	99.4%			10,671	100%
	<b>2,730</b>		<b>4,446</b>		<b>10,671</b>		<b>10,604</b>		<b>18,483</b>		<b>47,008</b>	

Panel E: Year 2007											
	Cluster								Total	%	
	1		2		3		4				
	No.	%	No.	%	No.	%	No.	%			
<i>Czech R.</i>	2,049	100.0%								2,049	100%
<i>Poland</i>	2,251	100.0%								2,251	100%
<i>Hungary</i>	114	100.0%								114	100%
<i>Slovakia</i>	213	100.0%								213	100%
<i>France</i>	605	3.2%						18,451	96.8%	19,056	100%
<i>Germany</i>	1,909	100.0%								1,909	100%
<i>Spain</i>					10,671	100.0%				10,671	100%
<i>UK</i>	40	0.4%	10,705	99.6%						10,745	100%
	<b>7,181</b>		<b>10,705</b>		<b>10,671</b>		<b>18,451</b>			<b>47,008</b>	

Panel F: Year 2008																
	Cluster															
	1		2		3		4		5		6		7		8	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<i>Czech R.</i>	19	0.9%			2,030	99.1%										
<i>Poland</i>	29	1.3%					2,222	98.7%								
<i>Hungary</i>	114	100.0%														
<i>Slovakia</i>	213	100.0%														
<i>France</i>	277	1.5%	3,741	19.6%											15,038	78.9%
<i>Germany</i>	10	0.5%							1,899	99.5%						
<i>Spain</i>											10,671	100.0%				
<i>UK</i>													10,745	100.0%		
	<b>662</b>		<b>3,741</b>		<b>2,030</b>		<b>2,222</b>		<b>1,899</b>		<b>10,671</b>		<b>10,745</b>		<b>15,038</b>	

Panel G: Year 2009											
	Cluster								Total	%	
	1		2		3		4				
	No.	%	No.	%	No.	%	No.	%			
<i>Czech R.</i>	5	0.2%	2,044	99.8%					2,049	100%	
<i>Poland</i>	4	0.2%	2,247	99.8%					2,251	100%	
<i>Hungary</i>	114	100.0%							114	100%	
<i>Slovakia</i>	213	100.0%							213	100%	
<i>France</i>	364	1.9%						18,692	98.1%	19,056	100%
<i>Germany</i>	1	0.1%	1,908	99.9%					1,909	100%	
<i>Spain</i>					10,671	100.0%			10,671	100%	
<i>UK</i>	10745	100.0%							10,745	100%	
	<b>11,446</b>		<b>6,199</b>		<b>10,671</b>		<b>18,692</b>		<b>47,008</b>		

All analyses are significant at 1%.

#### Annex 5: Cluster analysis of combined period of 2003-2009. Number of firms and the percentage of each country by cluster division

	Cluster										Total firms	%
	1		2		3		4		5			
	No.	%	No.	%	No.	%	No.	%	No.	%		
<i>Czech R.</i>	40	0.3%	14,303	99.7%							14,343	100%
<i>Poland</i>	63	0.4%	15,694	99.6%							15,757	100%
<i>Hungary</i>	798	100.0%									798	100%
<i>Slovakia</i>	1,491	100.0%									1,491	100%
<i>France</i>								133,392	100.0%		133,392	100%
<i>Germany</i>	2	0.0%	13,361	100.0%							13,363	100%
<i>Spain</i>					74,697	100.0%					74,697	100%
<i>UK</i>	247	0.3%					74,968	99.7%			75,215	100%
	<b>2,641</b>		<b>43,358</b>		<b>74,697</b>		<b>74,968</b>		<b>133,392</b>		<b>329,056</b>	

Significant at 1%.

## Annex 6: Cluster analysis by year within two fixed clusters. Number of firms and the percentage of each country by cluster division

Panel A: Year 2003						
	Cluster					
	1		2		Total firms	%
	No.	%	No.	%		
<i>Czech R.</i>	2,049	100.00%	0	0.00%	2,049	100%
<i>Poland</i>	2,251	100.00%	0	0.00%	2,251	100%
<i>Hungary</i>	114	100.00%	0	0.00%	114	100%
<i>Slovakia</i>	213	100.00%	0	0.00%	213	100%
<i>France</i>	54	0.30%	19,002	99.70%	19,056	100%
<i>Germany</i>	1,909	100.00%	0	0.00%	1,909	100%
<i>Spain</i>	10,671	100.00%	0	0.00%	10,671	100%
<i>UK</i>	19	0.20%	10,726	99.80%	10,745	100%
	17,280		29,728		47,008	

Panel B: Year 2004						
	Cluster					
	1		2		Total firms	%
	No.	%	No.	%		
<i>Czech R.</i>	2,049	100.00%	0	0.00%	2,049	100%
<i>Poland</i>	2,251	100.00%	0	0.00%	2,251	100%
<i>Hungary</i>	114	100.00%	0	0.00%	114	100%
<i>Slovakia</i>	213	100.00%	0	0.00%	213	100%
<i>France</i>	63	0.30%	18,993	99.70%	19,056	100%
<i>Germany</i>	1,909	100.00%	0	0.00%	1,909	100%
<i>Spain</i>	10,671	100.00%	0	0.00%	10,671	100%
<i>UK</i>	8	0.10%	10,737	99.90%	10,745	100%
	17,278		29,730		47,008	

Panel C: Year 2005						
	Cluster					
	1		2		Total firms	%
	No.	%	No.	%		
<i>Czech R.</i>	2,049	100.00%	0	0.00%	2,049	100%
<i>Poland</i>	2,251	100.00%	0	0.00%	2,251	100%
<i>Hungary</i>	114	100.00%	0	0.00%	114	100%
<i>Slovakia</i>	213	100.00%	0	0.00%	213	100%
<i>France</i>	38	0.20%	19,018	99.80%	19,056	100%
<i>Germany</i>	1,909	100.00%	0	0.00%	1,909	100%
<i>Spain</i>	10,671	100.00%	0	0.00%	10,671	100%
<i>UK</i>	10,745	100.00%	0	0.00%	10,745	100%
	27,990		19,018		47,008	

Panel D: Year 2006						
	Cluster					
	1		2		Total firms	%
	No.	%	No.	%		
<i>Czech R.</i>	2,049	100.00%	0	0.00%	2,049	100%
<i>Poland</i>	2,251	100.00%	0	0.00%	2,251	100%
<i>Hungary</i>	114	100.00%	0	0.00%	114	100%
<i>Slovakia</i>	213	100.00%	0	0.00%	213	100%
<i>France</i>	73	0.40%	18,983	99.60%	19,056	100%
<i>Germany</i>	1,909	100.00%	0	0.00%	1,909	100%
<i>Spain</i>	10,671	100.00%	0	0.00%	10,671	100%
<i>UK</i>	8	0.10%	10,737	99.90%	10,745	100%
	17,288		29,720		47,008	

Panel E: Year 2007						
	Cluster				Total firms	%
	1		2			
	No.	%	No.	%		
<i>Czech R.</i>	2,049	100.00%	0	0.00%	2,049	100%
<i>Poland</i>	2,251	100.00%	0	0.00%	2,251	100%
<i>Hungary</i>	114	100.00%	0	0.00%	114	100%
<i>Slovakia</i>	213	100.00%	0	0.00%	213	100%
<i>France</i>	26	0.10%	19,030	99.90%	19,056	100%
<i>Germany</i>	1,909	100.00%	0	0.00%	1,909	100%
<i>Spain</i>	10,671	100.00%	0	0.00%	10,671	100%
<i>UK</i>	10,745	100.00%	0	0.00%	10,745	100%
	27,978		19,030		47,008	

Panel F: Year 2008						
	Cluster				Total firms	%
	1		2			
	No.	%	No.	%		
<i>Czech R.</i>	3	0.10%	2,046	99.90%	2,049	100%
<i>Poland</i>	5	0.20%	2,246	99.80%	2,251	100%
<i>Hungary</i>	114	100.00%	0	0.00%	114	100%
<i>Slovakia</i>	213	100.00%	0	0.00%	213	100%
<i>France</i>	19,056	100.00%	0	0.00%	19,056	100%
<i>Germany</i>	0	0.00%	1,909	100.00%	1,909	100%
<i>Spain</i>	10,671	100.00%	0	0.00%	10,671	100%
<i>UK</i>	0	0.00%	10,745	100.00%	10,745	100%
	30,062		16,946		47,008	

Panel G: Year 2009						
	Cluster				Total firms	%
	1		2			
	No.	%	No.	%		
<i>Czech R.</i>	2,049	100.00%	0	0.00%	2,049	100%
<i>Poland</i>	2,251	100.00%	0	0.00%	2,251	100%
<i>Hungary</i>	114	100.00%	0	0.00%	114	100%
<i>Slovakia</i>	213	100.00%	0	0.00%	213	100%
<i>France</i>	124	0.70%	18,932	99.30%	19,056	100%
<i>Germany</i>	1,909	100.00%	0	0.00%	1,909	100%
<i>Spain</i>	10,671	100.00%	0	0.00%	10,671	100%
<i>UK</i>	10,745	100.00%	0	0.00%	10,745	100%
	28,076		18,932		47,008	

All analyses are significant at 1%.

**Annex 7: Cluster analysis of combined period of 2003-2009 within two fixed clusters.  
Number of firms and the percentage of each country by cluster division**

	Cluster				Total firms	%
	1		2			
	No.	%	No.	%		
<i>Czech R.</i>	14,343	100.00%	0	0.00%	14,343	100%
<i>Poland</i>	15,757	100.00%	0	0.00%	15,757	100%
<i>Hungary</i>	798	100.00%	0	0.00%	798	100%
<i>Slovakia</i>	1,491	100.00%	0	0.00%	1,491	100%
<i>France</i>	849	0.60%	132,543	99.40%	133,392	100%
<i>Germany</i>	13,363	100.00%	0	0.00%	13,363	100%
<i>Spain</i>	74,697	100.00%	0	0.00%	74,697	100%
<i>UK</i>	160	0.20%	75,055	99.80%	75,215	100%
	121,458		207,598		329,056	

Significant at 1%.