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EFFECTS OF FINANCIAL AND NON-FINANCIAL INFORMATION DISCLOSURE ON PRICES' MECHANISMS FOR EMERGENT MARKETS: THE CASE OF BUCHAREST STOCK EXCHANGE

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ABSTRACT

This paper investigates the impact of publicly disclosed information on market values for Romanian companies listed on Bucharest Stock Exchange, using as benchmark a more developed market, the Madrid Stock Exchange. The study is motivated by the European Union's decision to require the use of the International Financial Reporting Standards for the consolidated financial statements of all listed companies (Regulation EC 1606/2002) and by the 2007 Romanian adoption of the Markets and Financial Instruments Directive (MiFID) - which is the cornerstone of the European Commission's Financial Services Action Plan. Thus, we compare the value relevance of Internet disclosed information provided by annual and interim financial reports and other non-financial news in the decision making process of investors. In order to evaluate the overall impact of information disclosure, we built a global disclosure indicator according to the so-called Principal Components Analysis by including individual disclosure dummies. Empirical tests support our research hypothesis according to which there is a relative incremental value of a higher volume and a better quality of information, reflecting prices' overreactions even in the case of a market with imperfect trading mechanisms.

Disclosure, Valuation, Bucharest Stock Exchange, Madrid Stock Exchange.

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INTRODUCTION

This study is motivated by the European Union's (EU) decision to require the use of the International Financial Reporting Standards (IFRSs) for the consolidated financial statements of all listed companies (Regulation EC 1606/2002) and by the 2007 Romanian adoption of the *Markets and Financial Instruments Directive* (MiFID) - which is the cornerstone of the European Commission's *Financial Services Action Plan*. Since MiFID requires listed companies to publish the price, volume and time of all trades in listed shares, even if executed outside of a regulated market, unless certain requirements are met to allow for deferred publication, this regulation implies, *inter alia*, the disclosure of a larger quantity of information for the listed companies in order to support the investors and to ensure a regular and transparent decisional base.

Several studies (Ferrarini & Recine; 2006, Moloney, 2007; Chiu, 2007; Jackson, 2009; Posner & Véron, 2010; Armstrong *et al.*, 2007; Agostino *et al.*, 2008; Beneish *et al.*, 2009) assess the potential impact of IFRSs adoption and MiFID implementation on market efficiency and investors' protection. Still, only a limited number of these examine the value relevance effects of MiFID implementation and of the mandatory adoption of IFRSs by the European Union's Member States, especially in the case of the new emergent markets (see Aharony *et al.*, 2010).

Thus, the goal of our study is to investigate the impact of public information disclosure on market values for the Romanian companies listed on Bucharest Stock Exchange. We achieve this by relating *Prices to Earnings Ratios* (PER) to a set of dummies designed to reflect the financial and non-financial information publicly disclosed through the companies' websites. Following previous studies, we view the value relevance of financial and non-financial information as an association between this information and stock market values.

In order to have a benchmark for our results, we compare these outcomes with the ones specific to a developed market, the Madrid Stock Exchange. It is a country-specific study and, consequently, it has only a limited analytical objective without providing a broader overview. However, the results obtained can be generalized, with some limitations, to other developing markets, if some common characteristics like rigid prices' mechanisms, low liquidity, incomplete trade mechanisms and limited set of financial assets available for trade apply.

We are particularly interested in comparing the value relevance of Internet disclosed information provided by annual and interim financial reports and other non-financial news in order to highlight the behaviour of the investors in respect to this type of information. Consistent with the literature, we anticipate a positive and significant incremental relevance of such information items even if an important non-uniformity of prices' adjustments can be expected.

We focus on the third quarter of 2010 data, considering that the 2007-2010 time span is large enough to allow us to observe some noticeable effects of MiFID implementation. We assume that investors react to new information by taking into account not only the recent prices' history, but also some fundamental descriptors of issuers' activity. Specifically, we base our approach on the large framework of valuation literature extended with the idea that next to the financial information, the non-financial information shocks should be considered in the description of investors' portfolio related decisions.

To evaluate the overall impact of information disclosure, we built a global disclosure indicator according to the so-called *Principal Components Analysis* by including individual disclosure dummies. The involved methodology implies that closer the global indicator to one, higher the level of disclosure specific to the respective company. This indicator is used to assess the effects induced by global information disclosure on prices (adjusted to issuers' performances).

The contributions of the study are subsumed to several analytical directions. Firstly, we examine the value relevance effects of the information disclosed by listed companies on an emergent market. Secondly, we provide a benchmark evaluation of our results. Thirdly, we find that there is a significant degree of heterogeneity for investors' decisions to new information arrived on the market. Furthermore, we show that the proposed global disclosure indicator is associated with prices' adjustments, even if the considered market cannot be characterized as an efficient one.

The remainder of the paper is organized as follows. In Section 1, we briefly review the disclosure literature and we develop our research hypothesis. In Section 2 we present the data and the methodological approach. Section 3 discuss the results and provides additional robustness tests and last section concludes.

1. PRIOR RESEARCH AND HYPOTHESES DEVELOPMENT

1.1 Literature review

The disclosure of financial information has been for long the subject of an important stream of literature. Understanding investors' reaction to new information is an important question that many managers are facing in the process of decision making. Zhang (2006) shows that information uncertainty contributes to investors' underreaction to new information. Hirshleifer (2001) and Daniel *et al.* (1998; 2001) argue that uncertainty intensifies psychological biases. Dumontier & Raffournier (2002) considers that companies release more frequently voluntary information. Bessiere &Sentis (2007) examines the link between uncertainty and investors reaction to goodwill write-offs (GWWos). They study a sample of French

firms during 2001-2004, based on the framework of Daniel *et al.* (1998) which posits that overconfidence leads to an overreaction to private information, followed by short adjustments when the information becomes public and, then, a long adjustment which reduces slowly the mispricing in the long run. Their tests confirmed the overconfidence effect on investors' reaction: the high-uncertainty sample was characterized by strongly negative abnormal returns during the period preceding GWWos announcement, associated with high volatility. They concluded that in the long run the overreaction to private information was corrected and there were observed positive abnormal returns, creating a reversal. Their results offer new perspectives about informativeness and timeliness of corporate voluntary disclosure.

The release of Regulation (EC) 1606/2002 motivated Aharony *et al.* (2010) in investigating the impact of IFRSs adoption in 14 European countries. By comparing the price and return-based value relevance models, they assessed how switching from domestic standards affects the informativeness of accounting numbers to investors. Aharony *et al.* (2010) found that, in the pre-IFRS mandatory adoption year, three items - goodwill, research and development expenses (R&D) and revaluation of property, plant and equipment (PPE) - had greater incremental value relevance to investors in equity securities, when domestic standards were compatible with IFRSs; and that investors benefited most from implementing IFRSs for these accounting items in EU countries where local standards deviated more from IFRSs.

Daske *et al.* (2008) argues that the capital market effects - in the case of mandatory IFRS adopters - are stronger in countries that have bigger differences between local GAAP and IFRSs and that these capital market effects only occur in countries with relatively strong legal and enforcement regimes and where the institutional environment provides strong incentives for transparent reporting.

Reporting according to IFRSs increases transparency and improves the quality of financial reporting. IFRS are more fair value oriented and more comprehensive, especially with respect to disclosures, than most local GAAP (Aharony *et al.,* 2010). In addition, Daske and Gebhardt (2006) provides evidences that the perception of disclosure quality increases around voluntary IFRSs adoption; and Barth *et al*. (2008) reports an increase in earnings' quality for a sample of firms that adopted IFRSs voluntarily. Recent studies indicate that accounting standards alone play a limited role in determining observed reporting quality; rather, firms' reporting incentives are pivotal in this respect (Ball *et al.,* 2000; Ball & Shivakumar, 2005; Burgstahler *et al.,* 2006). Consequently, changing the standards alone is not sufficient to improve the informativeness of the reported accounting numbers. For example, Ball (2006) and Daske *et al.* (2007) suggests that firms opposing the transition to IFRSs or towards more transparency are unlikely to make material changes to their reporting policies.

Dang and Hakenes (2010) showed that a policy of partial disclosure (and, hence, of intertemporal risk sharing) can maximize, but surprisingly also minimize, the market value of the firm. Disclosure regulation needs to be fine-tuned, and it can differ between firms or assets with different ownership structures, different risk structures, different payoff profiles, and different degree of liquidity.

The superior forecast ability of the two-year residual income valuation (RIV) model of Ohlson (1995) over the two-year Ohlson and Juetnner-Nauroth model (2005) (the so-called „OJ" model) is documented in Penman (2005) and Brief (2007). They cast doubt on the preference of OJ model over RIV model in providing more accurate forecast of firm valuation.

Dalley (2007) examined regulatory disclosure systems in US, using the securities laws as a paradigm, in an effort to determine when and how disclosure systems work and to provide guidelines for the use of disclosure by regulators. The author concluded that every disclosure scheme must have an articulated purpose; an identified mechanism through which it can accomplish that purpose; a design that takes into account the operation of that mechanism; and a careful analysis showing that the benefits of the system outweigh its costs. For EU Member States, MiFID is applied, representing a paradigm shift in the EU process of building a securities market. MiFID aims at removing the obstacles faced by companies in using the European 'passport' for investment, encouraging competition and ensuring a high level of investors' protection across Europe. The disclosure behaviour of a sample of listed Swedish and UK pharmaceutical companies was investigated by Gray and Skovsik (2004). They found that in both countries the companies have provided substantial disclosures relevant for the assessment of competitive advantages, especially with regard to research and development activities. However, disclosures concerning business growth, dividend policy and earnings persistence have been more prevalent among the Swedish companies.

Since the purpose of the present paper is to study the impact of publicly disclosed financial and non-financial information on market values for Romanian listed companies, we must address the relevant literature in the context of IFRSs adoption by companies trading financial instruments on Bucharest Stock Exchange.

Primary, the predisposition to adopt IFRSs and, thus, to embark in a quest for more transparent, reliable and comparable information, may be linked to the perceived benefits of this adoption. Munteanu (2011) examines the views of chief financial officers (CFOs) of Romanian listed companies, with regard to IFRS adoption by their companies, and in general. The survey reveals that the majority of the companies do not provide voluntarily IFRSs related information, but are forced by national regulation. Most do not indend to access international financial markets and/or there is no management or shareholders initiative. The exception is represented by financial institutions (as required by National Bank of Romania)

and companies which are wholly or majority owned by foreign investors. Ionaşcu *et al.* (2008) discusses the link between disclosure quality and cost of capital, whereas a latter version, Mihai *et al.* (2012), identifies possible economic benefits of IFRSs adoption, such as increase transparency, diminish information asymmetry and risk and, consequently, reduce the cost of capital. The paper shows that the average cost of equity did decrease after the IFRSs were adopted.

Based on a survey among the Research Departments of the brokerage firms operating on BSE, Ionaşcu and Ionaşcu (2012) hypothesizes that financial analysts rely more on simple valuation models and that accounting variables are perceived as less important compared to macroeconomic factors when it comes to forecast accuracy.

However, the literature regarding the mandatory /voluntary disclosure of financial and non-financial information on the websites of the Romanian listed companies reveals a lack of adequate or consistent disclosure of information in the case of these companies (Tiron Tudor, 2006). Popa *et al.* (2008) detects a poor use of internet advantages for investor relations, while Popa *et al.* (2009) suggests that there is a reduced disclosure of CSR information within the annual reports, even for the companies operating in sectors with great environmental impact. Using annual reports from 2005-2007 for the non-financial companies listed on BSE, Pop *et al.* (2009) shows that profitability, auditor type, IFRSs, bank debt and private ownership structure positively affects the extent of voluntary disclosure choices of sampled Romanian listed companies. The reason found for the low level of voluntary disclosure is explained by authors in connection with the functioning and development of BSE.

1.2 Hypothesis

While the impact of financial information disclosure on companies' market values is largely analysed for developed countries, fever studies have been carried out in the case of emerging markets (Reddy, 2001; International Valuation Standards Committee, 2003; Prasad, 2009).

Our study focuses on the effects of disclosed financial and non-financial information on stock prices in the case of an emergent market as the Romanian one. In particular, we study if the publicly disclosed information via companies' websites is able to affect investors' decisions even for markets with low liquidity, sticky prices and incomplete functional and institutional development. The choice of the Romanian case is motivated by that Bucharest Stock Exchange clearly displays such characteristics. This market is characterized by one of the lowest capitalization among the Central and Easter European countries, with relatively inefficient market allocation mechanisms and a reduced set of tradable financial assets.

Although the Capital Market Law no. 297/2004 has introduced some improvements related to OECD corporate governance principles in accordance with the White Paper on Corporate Governance in South East Europe, we find the recommendations of the BSE Code of Corporate Governance and its Implementation Guide (available at http://www.bvb.ro/About/Publications.aspx) as providing more support for our research hypothesis.

Explicitly, "the company must use in communicating with shareholders an adequate foreign language" (7th Recommendation, Implementation Guide) and it must provide an accessible and easily identifiable separate section of their website concerning investor relations – providing a wide range of information (8th Recommendation, BSE Code of Corporate Governance). Moreover, "the issuers will prepare and disclose periodical and continuous relevant information, according to the highest quality financial reporting standards – International Financial Reporting Standards (IFRSs) – and other Environment, Social and Governance standards. The information will be disclosed both in Romanian and English - as this is the *lingua franca* of the financial environment" (25th Recommendation, BSE Code of Corporate Governance).

Thus, we consider that the entire discussion of the relevant literature to the following research hypothesis:

H: In *caeteris paribus* conditions, there will be a relative incremental value of a higher volume and a better quality of information reflecting prices' overreactions even for a market with imperfect trading mechanisms. Still, less sophisticated investors' behaviours and a greater heterogeneity of prices' adjustments under the impact of the disclosed information is expected for such a market in comparison with more developed ones.

2. DATA AND METHODOLOGY

2.1 Using Spanish Capital Market as Benchmark

In order to provide a benchmark for our results, we are comparatively analyzing the case of companies listed on the Spanish capital market. There are several arguments for such a choice. Firstly, there are some recent functional similarities for both capital markets in the context of current financial and economic turmoil, despite their large structural, functional and institutional differences.

Table 1. **Key data of Romanian and Spanish capital markets and economies**

	Market capitalization (USD millions)		Number of listed companies		GDP per capita (curent USD)		FDI net inflows (BoP, current USD millions)	
	RO	SP	RO	SP	RO	SP	RO	SP
1995	100.37	150914.23	9	-	1564	15151	419	8086
1996	60.81	241028.10	17	-	1563	15766	263	9623
1997	632.43	290354.80	76	-	1565	14467	1215	8937
1998	357.14	399847.60	126	-	1872	15126	2031	14282
1999	316.81	431649.20	127	-	1585	15476	1041	18523
2000	415.96	504221.90	114	-	1651	14422	1037	38835
2001	1228.52	468203.21	65	-	1816	14958	1157	28164
2002	2717.51	461559.57	65	-	2102	16611	1144	39993
2003	3710.22	726243.37	62	-	2737	21037	1844	25607
2004	11937.56	940672.88	60	-	3481	24461	6443	24792
2005	18184.81	959910.39	64	-	4572	26042	6482	24573
2006	28204.04	1322915.30	58	3378	5681	27989	11393	31172
2007	35326.04	1781132.66	59	3537	7856	32105	9925	66682
2008	16272.56	948352.29	68	3576	9300	35000	13883	74226
2009	27455.68	1434540.46	69	3472	7500	31774	6310	6451

Source of data: Bucharest Stock Exchange (2010) for Romanian market (RO) and World Federation of Exchanges (2010) for Spanish market (SP); For economic data: World Bank (2010).

Since it has reopened in 1995, the Romanian capital market with the main component - the Bucharest Stock Exchange (BSE) - has registered different phases of evolution: 1) the reconstruction phase (1995-1996) with the development of institutional and functional infrastructure; 2) the first instability phase (1997-2000), when the BSE experienced a generalized instability, insufficient liquidity and severe frictions at the level of the insufficient developed mechanisms; 3) the sustainable evolution phase (2001-2005) characterized by a dominant upward trend, significant increase in market capitalization and higher correlations with other international markets; 4) the first uncertainty phase (2006-2007) with important peaks in volatility and frequent changes in trends; 5) the turbulence phase when in the context of international real and financial instability, the Romanian market was characterized between 2007- first part of 2009 by persistent downward trends and the increase of the market intrinsic volatility as an expression of the unbalanced bid/ask ratio due to higher risks in the transactional environment; 6) the second actual uncertainty phase when a new upward trend starts to develop but in an not yet consolidated manner.

Comparatively, as Biscarri and Gracia (2004) have found, the Spanish stock market has become increasingly similar to those of the more developed countries, although

some differences still persist. The Stock Market Law enacted in July 1989 set a new institutional market framework. A new monitoring institution (the National Stock Market Commission) was created, and more detailed informational requirements were specified, especially for primary markets participants. Other secondary markets, most noticeably those for financial derivatives, were added shortly afterwards. The Continuous Market began to function in April of 1989. This institutional construction was ensuring a corresponding degree of liquidity and openness. Still, there are some particularities which are differentiating the Spanish capital market from other developed ones. For instance, Biscarri and Gracia (2004) documents that average duration for both bull and bear phases are greater in the case of Spain comparing with others developed markets despite the fact that post-2001 this duration was shorter. Also, the amplitude for the bull phase remains, after a substantial diminution, somehow larger for Spanish market. As for Romanian market, it displays all the characteristic features of an emergent one, with slow prices' adjustment mechanisms and their effects on longer market cycles.

Secondly, there are some recent evidences of an increased cointegration of the Romanian capital market with the European ones. Thus, it can be argued that, at least for the most liquid stocks, there should be a certain degree of synchronization in market dynamics with individual European markets. In order to evaluate this hypothesis, we are testing the cointegration between the Romanian market ROTX index and the Spanish market IBEX35 index. ROTX is a free float weighted capitalization index and reflects in real time the prices' movements of "blue chip" companies traded on the Bucharest Stock Exchange. Being calculated also in EURO and disseminated in real time by the Wiener Borse, this index is suitable for cross-countries analyses.

Since overall Kwiatkowski *et al.* (1992) unit root tests tend to reject the null of returns' stationarity, we are performing a cointegration analysis between the indexes returns by involving the Engle and Granger (1987) and Phillips and Ouliaris (1990) cointegration tests. Table 2 report the results.

Table 2. **Testing the cointegration between Romanian ROTX and Spanish IBEX market indexes' returns**

A) Kwiatkowski, Phillips, Schmidt, and Shin unit root tests

	LM-Statistic
ROTX	0.60
IBEX	0.19

Notes: Null hypothesis: The return series is stationary; Critical values: 1%- 0.74; 5%- 0.46; 10%- 0.35; Constant included; Bandwidth: 2 (Newey-West (1987) procedure selection) using *Bartlett kernel*

B) Engle-Granger and Phillips-Ouliaris cointegration tests

Tau-statistic		
Engle-Granger test		*Phillips-Ouliaris* test
ROTX	-3.67 [-39.63] (0.00)	-27.53 [-719.74] (0.00)
IBEX	-30.96 [-826.82] (0.00)	-32.00 [-731.94] (0.00)

Notes: z-statistics in [] and probabilities in ();Null hypothesis: Series are not cointegrated; Cointegrating equation deterministics: constant;For Engle-Granger test: Lags specifications based on *Modified Hannan-Quinn* Info Criterion; For Phillips-ouliaris test:Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth).

It appears that both tests are rejecting the null hypothesis of no cointegration between the two indexes. Of course, such a result should be considered with caution and a more detailed analysis of the driving mechanisms for such a possible relationship between the Romanian and Spanish markets' phases is required. But, at least, it can be argued that some functional connections between these markets are starting to be in place driven by the Romanian integration in European Union process.

2.2 The sample

We have gathered our data regarding the Prices / Earnings Ratio directly from the websites of Bucharest Stock Exchange (http://www.bvb.ro/) and Bolsa de Madrid (http://www.bolsamadrid.es/) for a cumulative sample of 80 companies. Companies were surveyed during the third quarter of 2010.

In determining the existence of a website in at least on foreign language (English), the disclosure of annual as well as interim financial reports and the inclusion of a news section in the respective website, we have accessed the individual websites of each company in the sample. We have included in the final sample only companies that have identifiable information on Prices/Earnings Ratio (PER) and other complete data for all variables used in our models. In order to test our working hypothesis, we have constructed four dummy variables (see Table 3). All the values are corresponding to the third quarter of 2010.

Table 4 summarizes the sample selection process, showing the number of observations excluded from the initial sample, and the resulting final sample. Of the initial sample of 72 companies listed on Bucharest Stock Exchange, 27 are excluded due to the absence of PER information, resulting in a sample of 45 non-financial companies and financial institutions. From the companies included in the structure of IBEX 35 Bolsa de Madrid index, all are considered.

Table 3. **Dependent and explanatory variables**

Variable	Description	Source
Prices / Earnings Ratio	Is a measure of the price paid for a share relative to the annual net income or profit earned by the firm per share	Bucharest Stock Exchange (2010) and Bolsa de Madrid (2010)
Website in at least on foreign language (English)	Dummy variable which takes value of "1" if there is a company' website in at least one foreign language (from official EU languages) and "0" otherwise. If there are website versions in more than one foreign language, the variable takes the value "1"	Coded by authors based on companies' websites
Disclosure of annual financial reports	Dummy variable which takes value of "1" if on company' website are disclosure the annually financial reports and "0" otherwise	Coded by authors based on companies' websites
Disclosure of interim financial reports	Dummy variable which takes value of "1" if on company' website are disclosure the interim financial reports and "0" otherwise	Coded by authors based on companies' websites
News	Dummy variable which takes value of "1" if on company' website are disclosure information with potential impact on economic and financial performances and "0" otherwise	Coded by authors based on companies' websites

Table 4. **Sample construction**

ROMANIA				
	Total number of companies	**Number of companies in final sample**	**Non available PER data**	**Non available / non functional website**
First tier	22	22 (100%)	-	-
Second Tier	49	23 (47%)	26 (53%)	-
Third tier	1	0 (0%)	1 (100%)	-
Total	72	45 (62.5%)	27 (37.5%)	-
SPAIN				
IBEX 35	35	35	-	-

2.3 Methodology

In order to carry out our analysis, we appeal to the Generalized Linear Models (GLM) estimation framework. This methodology allows flexible specifications of the model and 'for non-normal data without clustering, generalized linear models are an appropriate alternative to linear models' (Tuerlinckx *et al.*, 2006: 225).

Such flexibility is required since the estimation procedure must be robust enough in order to deal with at least two sources of variables heterogeneity: a) the imperfections of prices' mechanisms for the Romanian market and b) the effects of the differences between IFRSs and Romanian GAAP.

The strategy of the baseline model formulation is based on a stepwise addition of several explanatory variables to the GLM framework with the lowest ρ-value at the ten percent level. Such a bottom-up approach has several advantages, since we are assuming the existence of various relations among the involved variables (see for arguments Lütkepohl, 2007). Thus, we start by analyzing the relevance of individual disclosure dummies in order to retain only the relevant ones. Furthermore, the disclosure dummies are aggregated in order to produce a global disclosure indicator by using the so-called *principal components analysis*. This procedure models the variance structure of a set of observed variables using linear combinations of the variables. These linear combinations (*components*) may be used in subsequent analysis, and the combination coefficients (*loadings*) can be used for a subsequent interpretation of the *components*. The global indicator is constructed by weighting the individual disclosure dummies with these *loadings*. We are involving such approach since: (a) this is a procedure of reducing the number of observed variables to a smaller number of *principal components,* which account for most of the variance of the observed variables; (b) we are expecting the dummies to be highly correlated; (c) component scores are a linear combination of the observed variables weighted by eigenvectors and, so, it allows for considering the relative importance of individual variables. Such global indicator is designed to be use for an overall assessment of disclosure impact on PER ratios.

The general specification of the model is non-linear of the form:

$$PER_i = \exp\left(\alpha + \beta Disclosure_i + \phi X_i\right) + \varepsilon_i$$
$$\varepsilon_i \sim Pois\left(IFRSs_i, \mu_i\right) \qquad (1)$$

Here, *PER* is *Prices to Earnings ratio* for individual company *i*, Disclosure represent the financial and non-financial information dummies and *X* are the other explanatory variables considered in the robustness check.

Such a specification falls into the GLM framework with a log link function and Poisson family distribution. *Disclosure* represents other explanatory variables included together with the disclosure dummies. The specification can be justified by the complexity of involved associations between the prices' mechanisms and information disclosure. Indeed, it seems implausible that the effects induced by this disclosure can affect the PER ratios only in a linear fashion.

It must be noticed that we are choosing as dependent variable the PER ratios, since these reflect the prices adjusted with the issuers' economic and financial performances. Thus, this variable is supposed to capture not only the efficiency of the prices' mechanisms, but also their alignment to market values of companies as these are based on the fundamental determinants related to issuers' activity.

2.4 Descriptive statistics

Table 5 presents the number of sample companies and the mean, maximum, minimum and standard deviations of PER and individual explanatory variables for both capital markets. The figures in the first row for each country are PER values (2010 reference) computed based on net profit for the last 4 quarters / last annual report issued according to the local GAAP. If the starting trade date is smaller than 4 quarters, the values are computed accordingly, by considering the last available quarters reports.

The other rows are the individual disclosure dummies. The values of dispersion, significantly larger in the Romanian case, are suggesting the existence of some outliers in variables especially for the PER ratios. More exactly, for 14 Romanian companies (31%) the values of the PER are greater than 20 and 6 (13%) are higher than 40.

Table 5. **Summary statistics of PER and Disclosure Indicators**

	Mean		**Maximum**		**Minimum**		**Standard deviation**	
	RO	SP	RO	SP	RO	SP	RO	SP
Prices / Earnings Ratio	18.68	12.82	61.00	31.74	1.94	4.07	14.43	7.11
Website in at least on foreign language (English)	0.78	0.91	1.00	1.00	0.00	0.00	0.42	0.29
Disclosure of annual financial reports	0.73	1.00	1.00	1.00	0.00	1.00	0.45	0.00
Disclosure of interim financial reports	0.76	1.00	1.00	1.00	0.00	1.00	0.43	0.00
News	0.76	1.00	1.00	1.00	0.00	1.00	0.43	0.00

These outliers are especially located in petroleum, transports and constructions' sectors of Bucharest Stock Exchange. 9 companies (20%) do not have websites in foreign languages and 12 companies (26, 7%) are not reporting annual or interim financial situations on their websites. Finally, 11 companies (24, 4) do not have an explicit or implicit news section. For IBEX35 companies, the outliers are located especially in energy, industry and financial sectors. 3 companies (8.57%) from the dataset do not provide a version of their websites in any foreign language.

2.5 Principal Components Analysis

Table 6 and Table 7 report the results of the principal component analyses for Romanian and Spanish markets. The first section of these tables summarizes the eigenvalues, showing the values, the forward difference in the eigenvalues and the proportion of total variance explained. Since we are performing principal components on a correlation matrix, the sum of the scaled variances for the four dummies is equal to 4. The first principal component accounts for 87% of the total variance of Romanian companies PER ratios (98% in the case of Spanish companies), while the second accounts for 9% (2%) of the total. The first two components account for over 96% (100%) of the total variation.

Table 6. **Principal Components Analysis (Romania)**

Number	**Value**	**Difference**	**Proportion**	**Cumulative Value**
1	3.46	3.11	0.87	3.46
2	0.35	0.18	0.09	3.81
3	0.17	0.16	0.04	3.99
4	0.01	---	0.00	4.00

Variable	PC 1	PC 2	PC 3	PC 4
Website in at least on foreign language (English)	0.47	0.69	0.54	0.02
Disclosure of annual financial reports	0.51	-0.49	0.16	0.69
Disclosure of interim financial reports	0.52	-0.44	0.13	-0.72
News	0.50	0.30	-0.82	0.03

Notes: Included observations: 45; Computed using: Ordinary (uncentered) correlations; Extracting 4 of 4 possible components.

Table 7. **Principal Components Analysis (Spain)**

Number	**Value**	**Difference**	**Proportion**	**Cumulative Value**
1	3.93	3.86	0.98	3.93
2	0.07	0.07	0.02	4.00
3	0.00	0.00	0.00	4.00
4	0.00	---	0.00	4.00

Variable	PC 1	PC 2	PC 3	PC 4
Website in at least on foreign language (English)	0.49	0.87	0.00	0.00
Disclosure of annual financial reports	0.50	-0.28	0.00	0.82
Disclosure of interim financial reports	0.50	-0.28	-0.71	-0.41
News	0.50	-0.28	0.71	-0.41

Notes: Included observations: 33; Computed using: Ordinary (uncentered) correlations; Extracting 4 of 4 possible components.

The second section describes the linear combination coefficients. It can be noticed that the first principal component (labelled 'PC1') is a roughly-equal linear combination of all four disclosure dummies. Thus, it might reasonably be interpreted as a global disclosure indicator. The second principal component (labelled 'PC2') has negative loadings for the disclosure of financial statements in the Romanian case and positive loadings for all others dummies which appears to represent a non-financial information specific component. In the case of Spanish companies, all the loadings of the second principal components, except the one corresponding to the *Website in at least one foreign language (English)* dummy, are negative. Such values of loadings can suggest for a more complex decisional behaviour of investors on the Spanish market.

The output of the principal components analysis can be used to construct global indicators of financial and non-financial information disclosure. Such indicators are susceptible to describe in a synthetic manner the public available information at the disposal of investors as it is this provided by the issuers.

3. RESULTS AND ROBUSTNESS CHECK

3.1 Main results

Columns 1 and 2 of Table 8 report the individual GLM estimations of the baseline regressions between PER values and disclosure variables both for Romanian and Spain companies. *Ex ante*, we expect positive coefficients for all explanatory variables. As shown in these columns, the estimated coefficients of all five disclosure variables are positive and statistical significant at 1%. Considering the values of the estimated coefficients and t-statistics, it appears that the existence of Internet disclosure in local language and the report of annual financial statements are the most powerful explanatory variables for Romanian companies' PER levels.

In the mean time, the benchmark values for Spanish companies reflect a different pattern. The most important difference consists in a significantly higher relative importance of non-financial news together with financial information disclosure. Such results can be viewed as supporting our first research hypothesis, since these imply a more sophisticated decisional behaviour in the case of the investors on Spanish market.

Table 8. **Disclosure and PER overreaction**

	Model 1 (GLM-*BHHH optimization* method)		**Model 2** (GLM-*Quadratic Hill Climbing optimization* method)		**Model 3** (Quantile Regression-median)		**Model 4** (OLS)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Country	RO	SP	RO	SP	RO	SP	RO	SP
Website in at least one foreign language (English)	2.78*** (4.28)	2.57*** (13.78)	2.78*** (4.28)	2.57*** (13.77)	2.78*** (4.28)	10.78*** (11.27)	16.13*** (6.91)	13.01*** (10.13)
Disclosure of annual financial reports	3.01*** (8.91)	2.55*** (26.42)	3.00*** (8.89)	2.55*** (26.41)	3.01*** (8.91)	10.78*** (12.51)	20.26*** (7.20)	12.82*** (10.54)
Disclosure of interim financial reports	3.00*** (9.39)	2.55*** (26.42)	3.00*** (9.37)	2.55*** (26.41)	3.00*** (9.39)	10.78*** (12.51)	20.17*** (7.37)	12.82*** (10.54)
News	2.80*** (4.11)	2.55*** (26.42)	2.80*** (4.10)	2.55*** (26.41)	2.80*** (4.11)	10.78*** (12.51)	16.51*** (9.27)	12.82*** (10.54)
Disclosure Indicator	1.43*** (12.32)	1.15*** (26.53)	1.42*** (12.28)	1.15*** (26.51)	6.46*** (5.03)	5.07*** (14.14)	9.44*** (8.12)	5.83*** (10.84)
Number of observations	45	35	45	35	45	35	45	35
Likelihood ratio (LR) statistic	0.02		0.03		0.11		0.001	

	Model 5 (ML-Censored Extreme Value) (9) (10)		Model 6 (GLM-*BHHH optimization* method) (11) (12)	
Country	RO	SP	RO	SP
Disclosure Indicator	13.46*** (7.55)	7.59*** (11.09)	1.46*** (9.92)	1.12*** (18.39)
Dividend per equity (domestic currency)			-0.03 (0.71)	0.18 (0.82)
Number of observations	45	35	45	35

Notes: ***, **, and * represent statistical significance at 1%, 5%, and 10% level. Figures in bracket represent the t- statistic; For the Generalized Linear Model estimations: a) *Family*: Poisson; b) Link function: Log; c) Optimization algorithm: *BHHH* (Model 1) and, respectively, *Quadratic Hill Climbing* (Model 2); For Quantile Regression estimation (Model 3): a) Coefficient covariance: Bootstrap (10000 replications); b) Sparsity estimation: *Siddiqui (mean fitted)* - bandwidth method:

Hall-Sheather (size parameter: 0.05); c) Random generator: *Knuth*; d) Bootstrap method: *Markov Chain Marginal* (as modified by Kocherginsky, He, and Mu, 2005); For Co-integrating Regression: Estimation method: *Fully-modified OLS*; For Co-integrating regression: Long-run variance calculation: a) Kernel: *Tukey-Parzen*; bandwidth method: Newey-West selection; The Likelihood ratio (LR) statistic is testing the significance level of the joint vector of foreign languages site, disclosure of annual and interim financial reports and news when the website in local language is already included. The null is: the additional set of regressors is not jointly significant; For ML-Censored Extreme Value: a) Optimization algorithm: *Quadratic Hill Climbing*; b) Distribution: *Extreme Value*.

However, it should be noticed that the levels of estimated coefficients are not significantly different on the two markets. In other words, a preliminary result is that the prices' overreactions to an increased disclosure of information differs more in terms of determinants that in terms of intensity. Distinctively, it appears that a website in a foreign language has for the Romanian companies a less important impact on their market prices, whereas annual and interim financial reports exercise deeper effects. The same situation is characteristic to the Spanish companies. We interpret such outcome as a result of an only partial openness to foreign investors for the two markets. A similar pattern appears for news dummies. Thus, it can be considered that there is a certain prevalence of financial information importance in the determination of market values over the non-financial one.

3.2 Robustness

The robustness of this output can be checked, for instance, by modifying the estimation procedure. The modifications might refer to: 1) changes in optimization procedure for GLM frame and 2) changes in methodology.

Thus, columns 3 and 4 of Table 8 present the results obtained when the optimization procedure shifts from *BHHH* algorithm to the so-called *Quadratic Hill Climbing* algorithm. With the exception of minor modifications in t-statistics, there are no significant changes in the relevance of considered variables with such shift. Columns 5 and 6 of the same table display the results of *quantile regression* estimation. Originally proposed by Koenker and Bassett (1978), *quantile regression* provides estimates of the linear relationship between regressors and a specified quantile of the dependent variable. One important special case of quantile regression is the *least absolute deviations* (LAD) estimator, which corresponds to fitting the conditional median of the response variable. Such method permits a more complete description of the conditional distribution than conditional mean analysis alone and, since does not require strong distributional assumptions; it offers a distributional robust method of modelling the relationship between different percentiles of dependent and the explanatory variables. We employ a bootstrap estimation (10000 replications) based on the *Markov Chain Marginal Bootstrap* (MCMB) in the version developed by Kocherginsky *et al.* (2005). This

version alleviates the autocorrelation problems that can appear in the standard version of MCMB by prior transforming the parameter space; and, after the performing of the MCMB algorithm, transferring the results back to the original space. This methodology substantially improves the significance of the estimated parameters. However, it can be observed that for the Spanish listed companies, this approach substantially modifies the values of the coefficients compared to the previous obtained estimators. Now, the intensity of prices' overreactions appears to be higher for Spanish stocks suggesting a higher degree of adjustments' speed to informational shocks.

Finally, for comparison purposes, columns 7 and 8 of Table 8 are reporting a basic OLS estimation. Such estimation produces higher estimated coefficients for all the involved variables, but does not change their relative importance.

Overall, the same positive effects of a larger volume of disclosed information on PER' levels are revealed by different estimation procedures. The same pattern is preserved if the global disclosure indicator is considered as explanatory. For all the estimation procedures, the values of the corresponding coefficients are higher in the case of Romanian companies comparing with the Spanish ones. Again, the quantile regression produces larger coefficient for both countries. One possible explanation can be found by verifying the quantile process stability. For instance, it can be applied a *Symmetric Quantiles Test* as developed in Newey & Powel (1987). In this approach, conditional symmetry implies that the average value of two sets of coefficients for symmetric quantiles around the median will equal the value of the coefficients at the median:

$$\frac{\beta(\tau)+\beta(1-\tau)}{2}=\beta(0.5) \quad (2)$$

Since in our estimation the model fits the median, there is a single set of restrictions:

$$\frac{\beta(0.25)+\beta(0.75)}{2}=\beta(0.5) \quad (2.1)$$

In other words, the test compares estimates at the first and third quartile with the median specification. For the Spanish companies, the value of the test equals 0.93 while for Romanian ones this equals 0.18. Hence, there can be highlighted a significant decisional heterogeneity of Romanian market investors to a greater volume of disclosed information, but there is little evidence of a symmetry departure on Spanish market. It can be argued that such evidence support the thesis that the investors' behaviour on an emergent market such the Romanian one is less systematic and is influenced in a non-uniform manner by informational shocks.

For the Romanian market stocks, a cautionary note must be considered especially for second and third tiers. For these stocks, there are not necessary continuous daily trading data and important volumes of transactions can be done outside of the organized market. Thus, it can be assumed that the dependent variable is only

"partially observed" since the non-market prices are not included in PER' estimations. Even more, there can be important prices' gaps between successive transactions due to low market liquidity. In order to account for such situations, a latent variable regression model can be seen as:

$$PER_i = \beta Disclosure\_Indicator'_i + \sigma\varepsilon_i \quad (3)$$

Here σ is a scale parameter that can be identified through censored and truncated regression models and can be estimate along with β. Such estimations are reported in Columns 9 and 10 of Table 8. Both left and right censoring arbitrary values (1, and, respectively, 62 which represents the next lower / higher integer to the minimum / maximum values of PER) are taken into account. For the distributions of error terms, an *extreme distribution* with

$$\varepsilon_i \approx -0.5772\left(\text{Euler's constant}\right), \text{var}\left(\varepsilon\right) = \frac{\pi^2}{6}$$

is involved. Such an asymmetric type of distribution is designed to reflect the heterogeneity of PER' values and the non-uniform reactions of investors to an increase in information disclosure. It appears that the estimated coefficients are in Romanian case significantly higher for this approach compared to the previous ones. We interpret this as an empirical evidence of prices' mechanisms imperfections, typical for an emergent market.

Another robustness issue concerns the impact of companies' dividend policies. Indeed, it can argued that dividends transmit a clear image about the company' financial health and constitute a synthetic indicator of stocks' returns. Also, dividends are free from periodical shocks; such as "write-offs" which can affect earnings. Thus, it can be expected an important predictor capacity of dividends for prices' levels. For instance, a study of Aras and Yilmaz (2008) on 12 emerging markets finds that market-to-book ratio stands to reveal significant results in terms of predicting stock returns for a one-year period among others for most of the emerging market countries, while dividends yields come in second place. In order to test for dividend policy relevance, we are adding dividends per equity (domestic currency) as a control variable (last two columns, 11 and 12, of Table 8). Surprisingly, we did not find any statistical relevance of this variable for PER ratios. The disclosure indicator remains significant at 1% and with coefficients' estimators close to the GLM estimations without control variable.

Overall, these results are supporting our research hypothesis by evidencing non-uniform reactions in prices' level to an increase in the volume of Romanian market available information. Also, these results are enforcing the necessity to account for functional and institutional differences in analyzing emerging markets and for the different determinants of investors' decisions compared to the developed markets. A subsequent result concerns the benchmark case of Spanish companies for which our analysis reveals the relevance of financial information for stocks valuation compatible with other studies (Aharony *et al.*, 2010).

CONCLUSIONS

Since the requirements of the Romanian capital market legislative framework are influenced by the adoption of the MiFID Directive and by the recommendations of BSE Code of Corporate Governance - in respect to the continuous disclosure of relevant information, according to the highest quality financial reporting standards (IFRSs) - we examine the current stage of information disclosure and its effects on market prices for Romanian companies listed on Bucharest Stock Exchange. In addition, we involve the Madrid Stock Exchange companies as a benchmark case for our results.

We expect a positive impact of an increased amount of disclosed information even for a market with rigid prices' mechanisms as the Bucharest Stock Exchange but with large heterogeneity of prices' adjustments and less complex portfolio management decisions. Our findings provide some empirical support for our research hypothesis: (1) all the disclosure variables are positive and significantly associated to PER ratios overreactions for both markets; (2) the effects exercised by the disclosure of non-financial information are less clear in the case of Romanian companies compared to the Spanish ones; (3) the intensity of prices' overreactions appears to be higher for Spanish stocks, suggesting a higher degree of adjustment speed to informational shocks; (4) the global disclosure indicator constructed base on principal components analysis methodology is positive and significant related to larger PER ratios values for both markets, but the amplitude of such relationship tends to be greater for the Bucharest Stock Exchange.

We have performed a robustness check by modifying the estimation methodology and complementing the analysis by adding a descriptor of issuers' dividend policies. We are finding that our results are robust in respect to the estimation procedures' changes, but we are not able to found any statistical relevance of dividend per share for the levels of PER ratios.

Overall, these results suggest a clear post-MiFID adoption relevance of disclosed information both in an emerging as well as in a developed European Union markets. Still, these results should be interpreted with caution for at least four reasons. Firstly, we document a positive effect post-MiFID adoption in an emergent market, but we do not evaluate the costs involved by such an adoption. Supplementary, the implementation in practice of the Directive requirements is far from complete in the Romanian case. Further research may examine whether the benefits outweigh the costs especially in more advanced implementation phases. Secondly, we take into account the impact of highly aggregated disclosure dummies on prices mechanisms without considering more details for each individual variable. Consequently, it is possible that our findings are not generally applicable to individual informational items. Future studies should provide a more

detailed analysis. Thirdly, we use as dependent only the PER ratios while other market values estimators with possible different reactions to information disclosure are not considered. The examination of cross-countries data does not allow us to complete the dataset with this value for all companies listed on Bucharest Stock Exchange, especially, for second and third tiers. Finally, we do not study the changes over time in market informational efficiency.

Thus, further research directions may include aspects such as: whether potential changes in the informational efficiency provide an alternative explanation for observed differences in the incremental value of disclosed financial and non-financial information; an analysis of the impact of IFRSs adoption (voluntary or mandatory; for shorter or longer time spans) on the quality of information provided to the investors; the efficiency of the regulatory enforcement mechanisms as well as the consequences of deepening the financial integration into European markets.

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