Q. Reference: PUB-NP-056

Mr. Coyne argues that analyst bias has been reduced, based primarily on the results of a 2010 study in the Financial Analysts Journal. Is Mr. Coyne aware of any available Canadian evidence documenting such an improvement?

A. Mr. Coyne is aware of one research paper drafted originally in January 2005, by Alain Coën, Aurélie Desfleurs, and Jean-Francois L'Her that examines factors that contribute to financial analyst forecast error. The authors found country, industry and the nature of analyst coverage were not predominant determinants of forecast error. "Rather, financial analysts make more accurate forecasts when the earnings increase and are positive, and have difficulties forecasting decreases and losses."[1] The lowest forecast errors were observed for countries under a British legal system, based on English common law.[2] Further, the authors found the lowest levels of forecast errors for public utilities, followed by health care and consumer industries, and note this is consistent with previous studies.[3]

The first paper is provided as Attachment A to this response.

A subsequent version of the paper was presented in 2008, focused exclusively on 18 European countries. Once again the authors found the type of earnings to be the dominant factor in explaining forecast errors, followed by the country effect. They also found the public utilities sector to have the lowest absolute forecast errors.[4]

The second paper is provided as Attachment B to this response.

1 Coën et al, 2005, at 24.
2 Ibid, at 25.
3 Ibid, at 15-26.
4 Coën et al, 2008, at 16 and 26.

Research Paper
Factors Contributing to Financial Analyst Forecast Error
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The Relative Importance of Determinants of Financial Analysts' Forecasts Quality: A Reappraisal

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The Relative Importance of Determinants of Financial Analysts' Forecasts Quality: A Reappraisal

Abstract:
Using a different method than in earlier studies, we analyse the relative importance of country-, accounting-, industry-, and firm-specific factors in explaining the source of variation in the forecast errors made by financial analysts. Following Heston and Rouwenhorst (1994), we first estimate each factor with a dummy variable regression, and then decompose the variance of forecast errors into different effects. We find that industries explain little of cross-sectional variations in analysts' forecast errors of 18 developed countries examined over the 1990-2000 period. We document that the differences among countries, industrial sectors, accounting systems or analyst following offer a weak explanation for differences in forecast accuracy and forecast bias, while the type of earnings – profits or losses – and the variation of earnings– growth or fall – appear to be the two main explanation sources for the performance of financial analysts. Besides, we shed light on the contribution of legal systems and earnings opacity measures to explain financial analysts' forecasts quality.

The Relative Importance of Determinants of Financial Analysts' Forecasts Quality: A Reappraisal

A lot of work has been dedicated to the accuracy and quality of financial analysts' forecasts (hereafter referred to as *FAFs*). This research area has long focused largely on the U.S. market. Some of the most documented determinants of the quality of *FAFs* are the type of earnings – profits vs. losses, increases vs. decreases – (Dowen, 1996; Ciccone, 2001), the size of the firm (Brown *et al.*, 1987), the business activities of the firm (Dunn and Nathan, 1998), the economic situation (Chopra, 1998), the forecast horizon (Richardson et al., 1999), the industrial sectors (Brown, 1997), and the competence of analysts (Mikhail et al., 1997).

Most of these studies provide US evidence on the accuracy and quality of *FAFs,* and generally focus on one determinant. They do not allow the proper evaluation of the accuracy and quality of *FAFs* in different environments. Recently, some articles have taken an interest in *FAFs* around the world, and revealed significant differences in their respective accuracy levels (Hope, 2003; Ang and Ciccone, 2001; Chang *et al.*, 2000; Capstaff *et al.*, 1998). They try to explain the reasons for these differences, underscoring worldwide determinants of the quality of *FAFs*. Beyond the type of earnings effect largely documented in the U.S., they highlight the importance of country and industry effects.

The accounting, legal, and institutional environments are the most obvious country-related determinants of *FAFs'* accuracy. The most important determinant is probably the accounting dimension. According to numerous studies, the differences in accounting systems lead to significant differences in the quality and in the quantity of information available, making earnings forecasting more complex (Basu *et al.*, 1998).

Further, as pointed out by Bhattacharya et al. (2003) and Leuz *et al.* (2003), there are systematic differences in earnings management across countries around the world.

Some of international studies underscoring the differences in accounting systems do not take into consideration the significant differences that exist between industrial structures. Norms and accounting practices tend to vary from one sector to the next. For example, firms belonging to the natural resources sector may benefit from more choices to account for their costs, making their earnings more difficult to analyse and to forecast. In this case, the high number of such firms in a country may lead to significant errors in earnings forecasting. Differences in accounting systems may be interpreted to a greater extent as a sector effect rather than a simple country effect explaining variances in *FAFs* errors. Furthermore, with international harmonization in accounting, sector differences should appear to be greater than country differences.

Moreover, studies stressing the accounting factor tend to neglect firm-specific effects, such as the type of earnings – profits vs. losses, or increases vs. decreases (Hope, 2003; Huang and Jan, 1998) – or analyst following. As mentioned by Ang and Ciccone (2001), it seems easier to forecast profits than losses, and earnings increases rather than decreases. The larger the analyst coverage of the firm, the more accurate the *FAFs* would be (Alford and Berger, 1999).

As far as we know, no study has been conducted to analyse the relative importance of country-, accounting-, industry- or firm-specific effects in explaining the cross-sectional variance in *FAFs* errors. The question is nonetheless fundamental for analysts as for international investors. If country factors are not be the main determinants of forecasts errors, they do not stand as major obstacles to earnings forecasting. In this case, these findings would put into question the efforts led to improve and disclose financial information on markets around the world. Besides, the knowledge of these

predominant effects should lead financial analysts to concentrate their efforts on their analysis, and contribute to an improvement in the quality and accuracy of their forecasts. International investors, which have to choose a portfolio and decide to group equities by country or sector, also need to know whether earnings forecast errors are larger across countries or across industries.

Our contribution to the debate on the determinants of *FAFs'* accuracy is twofold. First, we use a more powerful methodology to separate the relative importance of each class of determinants. This approach differs in many respects from previous studies carried out at the international level. The few previous studies that analyse country effects on the quality of forecasts compare the moments and the distribution of errors. This conventional and traditional approach is open to criticism in so far as it is unable to deal simultaneously with many effects and to measure and quantify their relative extents.

Second, to simultaneously examine the relative importance of country-, accounting-, industry-, and firm-specific effects in explaining the quality of *FAFs*, we concentrate on a sample of 18 developed countries (excluding the US)[1] over the 1990-2000 period. Our sample includes (1) countries from Europe, North America and Australasia where international harmonization has been important during the last decade, (2) countries with sharply contrasted sectors (Energy in Canada, Finance and Banking in Singapore, Hong Kong and Switzerland), (3) countries with different accounting, legal and institutional systems, where the index of disclosure and the quality of financial information vary sharply. These different regions implemented significant financial and legal reforms in order to establish a certain level of trust among investors. This

[1] We have voluntarily excluded United States from our sample. The market capitalization of U.S. stands for more than 40% of the world market capitalization and the number of firms followed by financial analysts is enormous compared to the other countries. These stylized facts may significantly influence our results. To avoid this statistical and methodological problem, we have decided to restrict our sample to the developed countries mentioned.

evolving financial context offers the opportunity to analyse the evolution of the factors influencing the performance of financial analysts.

Section 1 presents and justifies our conceptual framework to test our hypotheses concerning the performance of analysts during the period. Section 2 describes the data source and forecast errors measures used in the analysis. The methodology is developed in section 3. The results are presented and analysed in section 4. In section 5, we summarize our main results and present the conclusions.

I. DETERMINANTS OF FAFS

We consider the quality of FAF results through four elements: 1) the relative facility of forecasting earnings, 2) the quantity of information available, 3) the quality of information, and 4) the financial analysts' ability to analyse this information. Recent studies led by Allen et al. (1999), Chang et al. (2000), Ang and Ciccone (2001), Black and Carnes (2002) or Hope (2003) among others, document that accounting, legal and economic systems tend to have a relative important impact on the quality of forecasts. These features hinge essentially on the second and third aforementioned determinants of *FAFs*. They may be included in the country effect which is one, but by no means, the only determinant of *FAFs*.

We examine two hypotheses. First, we analyze the relative importance of country-, industry-, and firm-specific effects (type of earnings, increase or decrease in earnings, analyst coverage) in explaining cross-sectional differences between *FAFEs*. Second, we test if differences in accounting and legal systems, in ownership concentration, as well as differences in terms of earnings management, also called opacity, can substitute for country effects.

A. COUNTRY-, INDUSTRY-, AND FIRM-SPECIFIC EFFECTS

1. Country Effects

Studies on many countries reveal sharp contrasts in the quality of *FAFs*. Chang et al. (2000) obtain an average size absolute forecast error of 25.5% for the 47 countries in their sample: from 2.3% for the U.S. to 71.2% for Slovaquia. Ang and Ciccone (2001), with a sample of 42 countries from 1988 to 1997, give another illustration of this important diversity of performance with an average absolute forecast error of 60% and a dispersion of 31%. The results of Capstaff et al. (1996) and Higgings (1998), for Europe, and Allen et al. (1997), Black and Carnes (2002) and Coën and Desfleurs (2004), for Asia, and for different time horizons, demonstrate that the performance of financial analysts across countries of a same geographic region may be very contrasted.

These numerous studies tend to confirm the existence and the preponderance of country effects. We may wonder what their sources are. As shown by Allen et al. (1999) and Ang and Ciccone (2001), the level of development, as convincing as it may seem, is not the most relevant explanation. In fact, the country effect has many origins which we must specify.

Some of the factors related to the country effect are macroeconomic. In their study on the Pacific Basin markets in the early 90s, Allen et al. (1999) observe that forecast errors are lower for the countries with higher growth rates. Riahi-Belkaoui (1998), for a sample of 14 countries, shows that the level of forecast accuracy is positively related to the associated economic risk. Black and Carnes (2002), focusing on 12 Asian markets, denote that the level of forecast errors is directly correlated with the Global Competitiveness Index.[2] Forecast errors would be lower in countries with high competition. Moreover, they add that forecasts are all the more accurate since the

[2] Published in *The Global Competitiveness Report*.

countries show a significant openness to foreign business and foreign direct investments. On the contrary, forecasts tend to be less accurate in countries with a high level of governmental intervention, with a high level of corruption, and with a less competitive environment. Following Chopra (1998), we may add that financial analysts are more accurate in an environment defined by a stable growth than in the presence of sharp acceleration or deceleration of the business cycle.

The legal and institutional environments may also have a significant influence on *FAFs*. Chang et al. (2000) reveal that forecast errors are significantly smaller in countries with common and English legal systems and which offer a high protection for minority shareholders.[3] Besides, the existing financing structure and its consequences on the disclosure of information may tend to influence the accuracy of financial analysts. The use of debt to finance operating activities decreases the number of players on the markets and may stem the disclosure of information. In countries with high levels of intermediation, the circulation of information between the borrower and the lender is more encouraged, often to the detriment of shareholders and analysts.

According to a growing body of literature, the features of the accounting and fiscal systems tend to have a significant influence. Hope (2003) shows that there is a positive relation between the level of information disclosure and the level of the accuracy of FAFs. The improvement of information should decrease the dispersion of forecast errors. Basu et al. (1998) underline the fact that forecast errors are smaller in an environment offering a vast range of accounting methods. Black and Carnes (2002), following Hofstede (1980, 1983) and Gray (1988), argue that the development of accounting systems is influenced by the idiosyncratic cultural features of different countries. *FAFs'* forecasts are more accurate since the accounting system has been

[3] According to Ang and Ciccone (2001) the relative importance of these factors may be minimized. They also demonstrate that the structure of financing is not a significant determinant.

marked by a British inheritance (Australia, New Zealand, Hong Kong, India, Indonesia, Malaysia, Pakistan and Singapore).

The country effects have many origins, and stand as major determinants of the quality of *FAFs*. It would however be a mistake to neglect other effects, such as industry, type of earnings, or analyst following.

2. Industry Effects

In most studies devoted to the accuracy of FAFs within a country, the diversity of the industrial structure is taken into account as a control variable (see O'Brien (1990, 1998), and Sinha, Brown and Das (1997), among others). Paradoxically, many international studies neglect this feature (see Black and Carnes (2002) for Asia, or Ang and Ciccone (2001) for a larger sample of countries). The industrial structure sharply differs from a country to the next. This contrast is particularly striking on the Asian markets. In Hong Kong and Singapore, financial services are preponderant while the natural resource sector is totally absent. Differences in the quality of *FAFs* attributed to country effects may therefore be due to differences in industrial structures, and it is therefore important to control for industry effects in explaining cross-sectional differences in quality.

There exists indeed a large body of empirical evidence of the importance of the industry effect. For Europe during the period going from 1987 to 1994, Capstaff et al. (2001) observe that the forecasts for the public utilities and the health care sectors are more accurate, but less so for the transportation and the consumer durables sectors. Bashar and Morris (1984) and Patz (1989) reveal that it is more difficult to forecast earnings for the heavy industry sector than for the consumer durables and non-durables sectors. Brown (1997) confirms this contrast in the U.S. where analysts demonstrate a

significant over-optimism in 11 out of 14 sectors. In Asia, the results of Jaggi and Jain (1998) prove that there are smaller forecast errors in the public service sectors than in the private industrial sectors. This observation can be attributed to the low earnings volatility in public service sectors. Despite the fact that this industry effect may not be significant over a long time horizon (Luttman and Silhan, 1995), and may be sensitive to the number of industries included in the sample (Patz, 1989), it could explain the superiority of FAFs on naive models (Wiedman, 1996; Brown et al., 1997; Coën and Desfleurs, 2004).

The influence of the industrial sector on financial analysts' performance may be related to the stability of firms. The earnings of firms evolving in stable sectors should be easier to forecast. On the other hand, sectors subject to external factors would be difficult to analyse. This is the case of the natural resources sector, where earnings are sensitive to the variability of prices.[4] According to Luttman and Silhan (1995), the level of competitiveness may affect earnings and the features of the information disclosed. To forecast earnings, analysts must consider the firm's strategy and its suitability with the evolution of competitiveness. As shown by Mc Arthur and Nystrom (1991), and Dess and Beard (1984), there is a sharp relationship between strategy and performance. Observing 52 industries, Dess and Beard underline the differences of strategies according to competitive environments. As suggested by Rivera (1991) and Katz et al. (2000), these differences in competitive environments may have repercussions on the ability of financial analysts to forecast the earnings of firms in contrasted sectors.

Accounting factors, already mentioned to justify the country effect, may also be interpreted as a sector or industry effect. As studied by DeFond and Hung (2003), the choice of accounting systems or methods available depends on the industry. For

[4] In the oil and mining sectors, DeFond and Hung (2003) consider that earnings are not appropriate for use in estimating the value of firms. Therefore, they suggest the use of cash flows from operations.

example, firms in the oil and mining sectors may use either the successful-effort method or the full-cost effort to account for exploration costs. Moreover, the level of information disclosure and transparency differs and has not the same evolution from one industry to another. For a sample of countries, including Asian emerging countries, Patel et al. (2002) encounter a 15% improvement in the level of disclosure from 1998 to 2000 for the industries sector, while the improvement reaches only 4% in the public service and information technology sectors. Such differences in evolution may explain the change seen in the quality of *FAFs* by sectors.

3. Firm-Specific Effects

While many studies on the determinants of the FAFs' quality focus almost exclusively on the different aspects of the country factor, especially differences in the accounting systems, industry factors and firm-specific factors are neglected. We concentrate on two firm-specific factors: the type of earnings (profits/losses, growth/fall) and analyst following.

Profits/Losses and Growth/Fall Effect

In the absence of any other motivations, a rational analyst should be able to forecast increases as well as decreases in earnings. Nevertheless, financial analysts may be constrained by different motivations or reasons to not maximize the accuracy of their forecasts. They tend to decrease their accuracy because of agency costs with their clients. To maintain good relationships with firms disclosing information, financial analysts are unwilling to forecast decreases in earnings. Conroy and Harris (1995) show that financial analysts who do not have to make buy recommendations, make more accurate forecasts, particularly for decreases in earnings. We may add that their task is

all the more complicated since firms are inclined to manipulate their financial statements (Hope, 2003) when earnings decline ('big baths'). The results reported by Loh and Mian (2002) reveal that firms in Singapore have taken advantage of the financial crisis in 1997 to withdraw some assets from their balance sheet, leading to a significant gap between reported and forecast earnings.

Financial analysts are often over-optimistic in cases of decreases in earnings. They indeed tend to under-react, and are not able to take into account all negative information in making their forecasts. According to Daniel et al. (1998), agents are overconfident in their private information, and face difficulties in assimilating public information in cases of bad news.

Moreover, as mentioned by Ang and Ciccone (2001), the type of earnings (profits vs. losses) should be a major determinant of the accuracy of *FAFs*. The over-optimism of financial analysts is more important when firms report losses, leading to significant forecast errors. This bias in accuracy may be the consequence of the financial analysts' behaviour and of information manipulations.

Analyst Following Effect

Alford and Berger (1999) suggest that a significant number of analysts following a firm should induce an increase in competitiveness and an improvement in the accuracy of *FAFs*. They document a strong positive relation between the size effect and the analyst following. Brown, Richardson and Schwager (1987), and Brown (1998) show that *FAFs* are more accurate and rational in the U.S. for large cap firms. Allen et al. (1997) also observe a negative relation between the size and forecast errors on Pacific Asian markets from 1989 to 1991. We expect a positive relation between the performance of analysts and the number of analysts following the same firm.

Although the results of Hope (2003), Ang and Ciccone (2001) and Chang et al. (2000) lead us to believe that the factors related to earnings type (profits or losses) are the most important in explaining the features of *FAFs*, studies on the determinants of forecast errors focus almost exclusively on the different aspects of the country effect (on the differences in the accounting systems).

B. LEGAL, OWNERSHIP CONCENTRATION AND OPACITY EFFECTS

To analyse more precisely the role of country factors in explaining the quality of financial analysts' forecast, we introduce two accounting measures; the accounting system or legal system (British, French, German, and Scandinavian) and the measures of earnings opacity. Moreover, we take into account the effect of ownership concentration. Thus we decompose the country factor in four effects: the pure country effect, the legal effect, the ownership effect, and the earnings opacity effect. Some recent studies have analysed the impact of earnings management through the notion of opacity (Bhattacharya *et al.* (2003), Leuz *et al.* (2003), and Hope (2003)). Analyzing financial statements from 34 countries for the period 1985-1998, Bhattacharya *et al.* shed light on three dimensions of reported earnings: earnings aggressiveness, loss avoidance, and earnings smoothing. Their results show that these three dimensions are associated with uninformative and opaque earnings. The three definitions of earnings opacity acknowledged by this very recent literature may be given as follows.

-1- Earnings aggressiveness measure;

Using accruals to measure earnings aggressiveness, they define it as the "tendency to delay the recognition of losses and speed the recognition of gains". According to Ball, Kothari and Robin (2000), the opposite of aggressiveness is indeed, accounting conservatism, which is the more timely incorporation of economic losses versus economic gains into accounting earnings to reduce information asymmetry.

Bhattacharya *et al.* show that accruals increase as earnings aggressiveness increases. Aggressive accounting is characterized by fewer negative accruals which capture economic losses, and more positive accruals which capture economic gains, increasing the overall level of accruals.

-2- Loss avoidance measure;

As mentioned by Burgstahler and Dichev (1997), and DeGeorge *et al.* (1999) many U.S. firms engage in earnings management to avoid reporting negative earnings. Their results demonstrate that incentives to report positive earnings exist for some firms. As underlined by Bhattacharya *et al.* (2003) "*such loss avoidance behavior obscures the relationship between earnings and economic performance, thus increasing earnings opacity*". They define the loss avoidance measure as the ratio of the number of firms with small positive earnings minus the number of firms with small negative earnings divided by their sum. The higher is this ratio, the higher is loss avoidance.

-3- Earnings smoothing measure;

As well acknowledged in the accounting literature, if accounting earnings are artificially smooth, they fail to depict the true swings in underlying performance, thus decreasing the informativeness of reported earnings and, hence, increasing earnings opacity. Bhattacharya *et al.* (2003) and Leuz *et al.* (2003) define an earnings smoothing measure as the correlation between the change in accruals and the change in cash flows, both scaled by lagged total assets. "*The more negative this correlation, the more likely it is that earnings smoothing is obscuring the variability in underlying economic performance, and the greater is the earnings opacity*".

In this context we assume that an increase of one of these earnings opacity measures should lead to an increase of *FAFs'* errors.

II. SAMPLE SELECTION AND VARIABLE DEFINITIONS

A. MEASURES OF ERRORS

We define *FAFEs* as the difference between forecasted earnings and the actual reported earnings, standardized by the absolute value of actual reported earnings. We examine two types of forecast error across countries. The first metric used is the absolute forecast error, $|FERE_t|$, which does not consider the direction, but only the magnitude of the error. The mean of the absolute forecast error provides summary information on accuracy. The second metric, *FERE*, considers the direction of the error. The mean of the signed forecast errors provides information on financial analysts' forecast bias. For each firm *i* and each fiscal year *t* (*t=1 to T*), we compute the forecast error at various points in time, from 1 to *h (h = 1 to H)* months prior the earnings report date. We therefore obtain *H×T FAFEs* per firm. The definitions of absolute forecast error and signed forecast errors are shown in equations (1) and (2) below.

$$\left|FERE_{i,h,t}\right| = \left|\frac{F_{i,h,t} - RE_{i,t}}{RE_{i,t}}\right| \quad (1)$$

$$FERE_{i,h,t} = \frac{F_{i,h,t} - RE_{i,t}}{\left|RE_{i,t}\right|} \quad (2)$$

where $RE_{i,t}$ and $F_{i,h,t}$ are respectively the actual earnings of firm *i* for fiscal year *t* and the consensus analysts' forecast of the firm's year *t* earnings made *h* months before earnings report date.

B. DATA

We obtain analysts' earnings forecasts from the international Institutional Brokers Estimate System (I/B/E/S) data base. We select eighteen countries in our sample: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong,

Italy, Japan, Netherlands, Norway, Singapore, Spain, Sweden, Switzerland and the United Kingdom. The sample period covers the fiscal years from 1991 to 2000. All the forecasts are of earnings per share for a current fiscal year, with I/B/E/S continuing to provide forecasts until a firm's annual financial results are announced. We compute forecast errors at several points in time – from one to nine months prior the earnings release date. The nine month horizon ensures that analysts know the previous year's earnings, when they make their forecasts. The mean forecast, where there are *at least three* analysts making earnings estimates, is used as the consensus forecast. All conclusions are similar if median forecasts are used instead of the mean forecasts.

Data have been adjusted to eliminate potential biased and/or extreme data. Extreme values on forecast errors may be caused by data errors or by transitory factors specific to a firm (for example takeovers, mergers and acquisitions or important restructuring). We use the truncations rule as developed by Brown et al. (1987a). Data are considered as extreme if they are off by 100%. In that case, they are eliminated from the sample. This choice is justified by the fact that we use simple OLS. To study the influence of this artificial truncation on results, we test using extreme data limited to 100%. We then eliminate extreme data from the sample using the dependent variable of each regression (absolute forecast error or forecast error with its sign): observations in the lower and in the higher percentiles are withdrawn.

Our sample includes 682178 observations from 1990 to 2001. After eliminating extreme data, our financial sample includes 595 826 observations from 1990 to 2001. The number of firms whose shares are covered by analysts varies during the decade, and differs from one country to another and from year to year. After eliminating forecasts made more than nine months before the end of the fiscal year, we obtain a

sample of 433204 observations but only 298099 forecasts made by at least three financial analysts. We then treat extreme data (we test using extreme data limited to 100%), which reduces our sample to 259599 forecasts.

Table 1 shows descriptive statistics for absolute forecast errors |FEREs| and forecast errors with their signs, FEREs, for each country and each sector. The average absolute error |FERE| is large, 19.19%, for the world ex US. This level of error is high and casts doubts on the effective accuracy of financial analysts. The forecast bias is positive and equal to 5.94%, which is consistent with the over-optimism hypothesis of financial forecasts.

[Please insert Table 1]

Table 1, Panel A illustrates the differences in forecast accuracy and forecast bias for the countries considered. Financial analysts tend to be more accurate in the United Kingdom, with an average (median) level of absolute error, |FERE| of 12.6% (6%), followed by Australia and Netherlands. Finland is the market with the highest absolute forecast error (26.4% and 17.9%), followed by Norway, and Italy. The forecast bias, FERE, is the lowest in Finland (average: 1.3%; median: -0.4%), followed by Sweden, and the United Kingdom. At the opposite, the forecast bias is the highest in Japan (average: 9.3%; median: 3.9%) followed by Hong Kong and Germany.

Panel B sheds light on the differences among sectors. We observe a significant contrast between the eleven industries. The average (median) level of absolute error, |FERE|, is less important in Public utilities (average: 13.1%; median, 5.9%), followed by Health care and Consumer Services. On the contrary, the average (median) level of absolute error, is more important in Energy (average: 24.1%; median, 15.5%), followed by Transportation and Basic Industries. Financial analysts are most accurate in the finance

sector and show a lower accuracy for the basic industries. The forecast bias, FERE, is lower in Public Utilities (average: 2.1%; median: 0%), Finance and Transportation, whereas, it is higher in Basic Industries (average: 8.5%; median, 2.7%), Technology and Consumer Non-durables.

These results are consistent with the previous literature and tend to improve it.

III. METHODOLOGY

To test both aforementioned hypotheses, we use and generalize a methodology initially developed by Heston and Rouwenhorst (1994), and Griffin and Karolyi (1998) to decompose financial returns in industry and country components. This two-step procedure allows us to analyse the relative importance of country (accounting), industry and firm-specific effects in explaining the cross-sectional variations in financial analysts' forecast errors (*FAFEs)*. In the first step, we estimate the model. In the second step, we decompose the variance to identify and measure the relative importance of each effect.

A. STEP 1: ESTIMATION OF COUNTRY, INDUSTRY, AND FIRM-SPECIFIC EFFECTS

We first define $FAFE_{i,h,,t}$ as the financial analysts' forecast error on reported earnings of firm i for horizon h and fiscal year t. Then, we regress the *FAFEs* on dummy variables standing for countries, industries, profits or losses, increases or decreases in earnings, and analyst following. Since our sample includes 18 countries and 11 industries, we define the following dummies: S_{ij} and C_{ik}. S_{ij} is equal to 1 if security i belongs to industry j ($j = 1,...,11$) and is 0 otherwise. C_{ik} is to equal 1 if security i belongs to country k ($k = 1,...,18$) and is 0 otherwise. We introduce the dummy, RE_{ig}, for the type of reported earnings to be forecast. RE_{i1} is equal to 1 if the reported earnings for

security *i* are positive, and is 0 otherwise. RE_{i2} is equal to 1 if the reported earnings for security *i* are negative, and is 0 otherwise. We add another series of dummies to take into account the direction of the earnings variations to be forecast, V_{if}. V_{i1} is equal to 1 if there is there is an increase in earnings, and is 0 otherwise. V_{i2} is equal to 1 if there is a decrease in earnings, and is 0 otherwise. We also introduce a dummy to take into account the size effect or number of analysts effect, N_{iy} ($y = 1, ..., 4$). N_{iy} is equal to 1 if security *i* is included in category *y*. We define four categories for all the securities in our sample: securities followed by three to five analysts, securities followed by six to nine analysts, securities followed by ten to fifteen analysts, and securities followed by sixteen analysts and more.

We use OLS to estimate the following model[5] for each fiscal year *t* and each horizon *h*:

$$FAFE_{i} = \alpha + \sum_{i=1}^{11} s_{j} S_{i,j} + \sum_{c=1}^{18} c_{k} C_{i,k} + \sum_{g=1}^{2} r_{g} RE_{i,g} + \sum_{f=1}^{2} v_{f} V_{i,f} + \sum_{y=1}^{4} \eta_{y} \mathrm{N}_{i,y} + e_{i} \qquad (3)$$

Because of perfect multicollinearity between the regressors, we cannot directly estimate equation (3). Following the method initiated by Heston and Rouwenhorst (1994), we impose, for each fiscal year *t* and each horizon *h*, restrictions to solve this over-identification problem.

$$\sum_{j=1}^{11} n_{j} s_{j} = 0 \qquad (4a)$$

$$\sum_{k=1}^{18} m_{k} c_{k} = 0 \qquad (4b)$$

$$\sum_{g=1}^{2} l_{g} r_{g} = 0 \qquad (4c)$$

[5] To simplify the notation subscripts related to forecast horizon *h* and fiscal year *t* have been neglected in this equation.

$$\sum_{f=1}^{2} w_f v_f = 0 \qquad (4d)$$

$$\sum_{y=1}^{4} z_y \eta_y = 0 \qquad (4e)$$

where n_j, m_k, l_g, w_f, and z_y stand respectively for the number of firms in industry j and in country k, the number of firms for which the type of reported earnings g (positive or negative) has encountered a variation f (increase or decrease), and the number of firms followed by a number of analysts belonging to category y.

These constraints make it easier to interpret the coefficients. Instead of arbitrarily choosing a country-, industry-, or firm-specific benchmark, the intercept $\hat{\alpha}$, stands as the average forecast error of our sample of developed countries, and each country-,industry-, or firm-specific coefficient ($\hat{c}_k$, $\hat{s}_j$, $\hat{r}_g$, $\hat{v}_f$, and $\hat{\eta}_y$) is the deviation relative to the benchmark. The pure industry forecast error $\hat{\alpha} + \hat{s}_j$ is the least-squares estimate of the forecast error on a geographically-diversified group of firms in the j^{th} industry. This forecast error is free of country- and firm-specific effects. Similarly, $\hat{\alpha} + \hat{c}_k$ is an estimate of the pure country forecast error on an industrially-diversified group of firms in the country, *k.* As previously, this forecast error is free of industry- or firm-specific effects.

Following the same methodology, we decompose the pure country effect in three distinct effects: legal systems, ownership concentration, and earnings opacity measures. We use the all summary measure of earnings management developed by Leuz *et al.* (2003). They define four earnings management measures (*smoothing reported operating earnings using accruals*, *smoothing and the correlation between changes in accounting accruals and operating cash flows, the magnitude of accruals, and small*

loss avoidance). For each measure, countries are ranked such that a higher score suggests a higher level of earnings management. Then they compute the aggregate earnings management score by averaging the country rankings for the four individual earnings management measures.

We introduce the dummy LE to take into account the legal system effect, LE_{il} ($l = 1, ..., 4$). LE_{il} is equal to 1 if security i is included in category l. We define four categories for all the securities in our sample: securities with British legal origin, securities with French legal origin, securities with German legal origin, and securities with Scandinavian legal origin. We use the measure of ownership developed by La Porta et al. (1998) to rank the countries in four categories from lower to higher level of ownership concentration, OC_{io} ($o = 1, ..., 4$). Then, using the measure of earnings opacity mentioned earlier, we rank the countries in five categories from lower to higher level of earnings management. Therefore, we introduce the dummy $E0_{iq}$ ($q = 1, ..., 5$) to take into account earnings opacity.

We substitute in equation (3) the country dummy variables by the legal and opacity dummy variables. We replace equation (4b) by the equations (4b'), (4b''), and (4b''')

$$\sum_{l=1}^{4} \gamma_l \lambda_l = 0 \qquad (4b')$$

$$\sum_{o=1}^{4} \kappa_o \chi_o = 0 \qquad (4b'')$$

$$\sum_{q=1}^{5} \mu_q \omega_q = 0 \qquad (4b''')$$

where γ_l,, κ_o , and μ_q stand respectively for the number of firms with legal origin l, the number of firms with ownership concentration measures belonging to category o, and the number of firms in country with earnings opacity measures belonging to category q.

Using the measures of earnings opacity introduced by Bhattacharya et al. (2003), we replace the dummy $E0_{iq}$ by AG_{iqa} ($qa = 1, ..., 5$), $L0_{iql}$ ($ql = 1, ..., 5$), SM_{iqs} ($qs = 1, ..., 5$), standing respectively for earnings aggressiveness measure, loss avoidance measure, and earnings smoothing measure. For each measure, we rank the countries in five categories and use the methodology described above.

B. STEP 2: ANALYSIS OF VARIANCE

We decompose the cross-sectional variance (VT) of forecast errors for our sample of developed countries to analyse the relative importance of the error determinants on the developed markets. Through the decomposition of (VT), we shed light on the proportion of variance caused by the country factors (VC/VT) (and then the legal origin, VLE/VT and earnings opacity, VEO/VT factors), the industry factors (VS/VT), the type of earnings and their evolution (VRE/VT and VV/VT, respectively), the number of analysts following a security (VN/VT), and the idiosyncratic features (VE/VT). We can underline the different sources of a potential explanation. The different components of the variance are computed for each fiscal year t and horizon h, as follows[6]:

$$\frac{VC_{h,t}}{VT_{h,t}} = \frac{Var(\sum_{k=1}^{18} \hat{c}_{k,h,t} C_k)}{VT_{h,t}} \quad (5a)$$

$$\frac{VS_{h,t}}{VT_{h,t}} = \frac{Var(\sum_{j=1}^{11} \hat{s}_{j,h,t} S_j)}{VT_{h,t}} \quad (5b)$$

$$\frac{VRE_{h,t}}{VT_{h,t}} = \frac{Var(\sum_{g=1}^{2} \hat{r}_{g,h,t} RE_{g,t})}{VT_{h,t}} \quad (5c)$$

[6] Observations are equally-weighted.

$$\frac{VV_{h,t}}{VT_{h,t}} = \frac{Var(\sum_{f=1}^{2} \hat{v}_{f,h,t} V_{f,t})}{VT_{h,t}} \quad (5d)$$

$$\frac{V\mathrm{N}_{h,t}}{VT_{h,t}} = \frac{Var(\sum_{y=1}^{4} \hat{\eta}_{y,h,t} \mathrm{N}_{y,h,t})}{VT_{t}} \quad (5e)$$

$$\frac{VE_{h,t}}{VT_{h,t}} = \frac{Var(e_{ih,t})}{VT_{h,t}} \quad (5f)$$

where $VT_{h,t} = VC_{h,t} + VS_{h,t} + VRE_{h,t} + VV_{h,t} + VN_{h,t} + VE_{h,t}$ is the total effect for fiscal year t and horizon h.[7]

We follow the same procedure for the legal origin, ownership concentration, and earnings opacity effects.

We decompose the total variance on the whole sample period (for each fiscal year t and analyse the evolution of each effect year by year) to underline the relative importance of each effect for the decade. We use a panel data analysis.

IV. EMPIRICAL RESULTS AND ANALYSIS

The analysis of the distribution of *FAFEs* reveals significant differences among countries and industries. What are the origins of these differences? Does the high number of analysts following equities explain this phenomenon, in countries where the forecasts are the most accurate or less biased? Is it due to the fact that these countries encounter industries where the earnings are easier to forecast with a greater degree of accuracy? An analysis of the variance of country effects, industry effects, types-of-earnings effects, and analyst following effects sheds light on the influence of each effect on the level of error and on the level of financial analysts' bias.

[7] The model offers an incomplete decomposition of the variance. As acknowledged in the literature, the covariance terms between country-, industry- and firm-specific effects are very small, and can be reasonably neglected (Heston and Rouwenhorst, 1994 and 1995; Griffin and Karolyi, 1998).

A. COUNTRY-, INDUSTRY- AND FIRM-SPECIFIC EFFECTS

STEP 1: ESTIMATION OF EFFECTS

Table 2A and 2B show the results of the first step of our methodology: the results of the regression of forecast errors, |*FERE*| and *FERE*, on dummies to capture the different effects, using equation (3) and constraints (4a) to (4e). The regression is run on the panel data ($T \times H$ observations by firms).

|*FEREs*|: Results from Table 2A on the relative importance of countries and industries are in line with those reported before. The adjusted R squared is 22.04%, and is much higher than those reported by other studies in the existing literature. We consequently focus on the types of earnings effects, and the analyst coverage effects[8]. Estimated coefficients reported in Table 2A show that |*FEREs*| are much more important when companies report losses than profits (25.92% vs -1.74%). When controlling for other effects, the mean absolute forecast error for companies reporting losses is consequently very large, 42.11%. Consistently also, they financial analysts tend to make more errors when earnings decrease then when earnings increase: +6.74% vs -3.84%. The total absolute forecast error is approximately 26% when companies report losses. As expected, the more important the analyst firm coverage, the smaller the absolute forecast errors. For firms followed by more than 15 analysts, the estimated coefficient is -3.17%, whereas for firms followed by less than 5 analysts the estimated coefficient is 2.53%.

[Please insert Table 2A]

[8] We have also analysed the forecast horizon effects. The results not reported here are available upon request. As expected, we observe a decreasing and monotonic relation between the average absolute error and the forecast horizon, as between the forecast bias and the forecast horizon.

FEREs: Results from Table 2B on the relative importance of countries and industries are in line with those reported in Table 1. The adjusted R squared is 25.50%, and as for the absolute forecast error model is much higher the ones reported by other studies in the existing literature. As for absolute forecast errors, we concentrate on the types of earnings effects, and the analyst coverage effects. Estimated coefficients reported in Table 2B show that while the forecast bias is low for companies reporting profits (-1.85%), it is very important for companies reporting losses (23.86%). When we control for other effects, the average forecast bias for companies reporting losses is huge, 30.10%. Financial analysts tend to be more positively biased when companies report earnings decreases (15.34%), than when reporting earnings increases (-8.64%). The total absolute forecast error is 21.32% when companies report losses. Unexpectedly, firms followed by 6 to 9 analysts post the less biased forecast, while the firms followed by 10 to 15 analysts post the most biased forecast.

[Please insert Table 2B]

STEP 2: DECOMPOSITION OF VARIANCE IN FORECAST ERRORS

The analysis of the decomposition of variances in forecast errors sheds light on the relative importance of each class of determinants. The variances of the different effects are reported in Tables 3A and 3B.

[Please insert Tables 3A and 3B]

|*FEREs*|: We show in Table 3A that the type of earnings, with almost 70% of the total explained effect is the most important determinant of the level of the accuracy of *FAFs* in the 18 considered developed countries. The type of reported earnings (profits or losses), and the reported earnings variation effect (earnings increases or earnings

decreases) respectively account for 40.18% and 28.66% of the variance of absolute forecast errors explained. The second determinant of *FAFs'* accuracy is the country incorporation, with 19.60%. Country effects largely dominate industry effects which is the less important factor (6%) with the number of analysts effect (5.6%). These results have significant consequences on the analysis and understanding of the behaviour of financial analysts. They tend to prove that the level of forecast accuracy is not primarily related to the quality and to the quantity of information disclosed. The country, industry and analysts following effects are not predominant. Rather, it is the level of complexity to forecast earnings that represents the main and preponderant effect on the level of forecast accuracy. Financial analysts make more accurate forecasts when the earnings increase and are positive, and have difficulties forecasting decreases and losses.

FEREs: We show in Table 3B that the type of earnings, with almost 90% of the total explained effect, is the most important determinant of the level of the signed forecast errors. The reported earnings variation effect (earnings increases or earnings decreases) and the type of reported earnings (profits or losses) respectively account for 64.38%, and 24.55% of the variance of forecast errors. We observe that the country effect explains very poorly the total variance (7.01%). The other determinants (industry-, and analyst coverage) count for almost nothing in the total explained effect.

B. Legal-, opacity-, Ownership-, Industry- and Firm-specific Effects

To analyse the impact of earnings management on FAF, we use the panel data of financial statements developed by Leuz et al. (2003) from the financial statements of 34 countries for the period 1985-1998. Following their approach, we measure four dimensions of reported earnings for each country as mentioned earlier. We rank the countries in five categories from lower to higher level of earnings management (Table

4A). We also rank countries in five categories using the three earnings opacity measures defined by Bhattacharya et al. (2003) (See Table 4B).

As we can see from Table 4A, there is a sharp contrast for the four measures of earnings opacity between the 18 countries of our sample. The same remark applies to Table 4B.

As mentioned earlier, we use the panel introduced by La Porta et al. (1998) to rank the countries in four categories from lower to higher level of ownership concentration. We also define four categories for legal systems.

[Please insert Tables 4A and 4B]

STEP 1: ESTIMATION OF EFFECTS

Table 5A and 5A', and 5B and 5B' report results relative to the estimation step, when we substitute country effect by legal, ownership concentration and opacity variables.

|*FEREs*|: The intercept is equal to 19.19% and the adjusted R squared is 21.39% when we focus on Leuz et al.'s (2003) measures of earnings opacity. These results are slightly the same as those with country effects. Considering Bhattacharya's measures, we obtain an intercept of 19.19% and an adjusted R squared of 21.87%. Variables that proxy for legal systems, ownership concentration and country opacity tend to obtain the same explaining power as dummy variables standing for the country of incorporation. The lowest forecast errors are observed for countries under a British legal system (-1.67%), while the highest forecast errors are observed for countries under a Scandinavian legal system (5.63%) or a German legal system (1.07%). Estimated coefficient is not significantly positive for countries under a French legal system. Let alone the countries identified as highly opaque, the relation between opacity and

forecast errors is positive. For the less opaque countries, the estimated coefficient is -1.4% while for the most opaque countries it is 1.27%. We focus now on earnings aggressiveness, loss avoidance and earnings smoothing. As expected, we may note a negative relationship between earnings aggressiveness and the |*FEREs*|, a positive one with loss avoidance, and finally a positive one with earnings smoothing. The results obtained from ownership concentration measures tend to confirm our expectations. The lowest forecast errors are observed for countries with low ownership concentration, while the highest forecast errors are observed for countries with high ownership concentration. We may add that the results for the type of earnings or analyst coverage are very consistent with our previous findings reported in Table 2A.

[Please insert Tables 5A and 5A']

FEREs: The intercept coefficient reported in Table 5B and 5B' are both 5.94%. The adjusted R squared are respectively 25.43% and 25.46% compared to 25.50% when country effects were considered. As for the absolute forecast errors, proxies for legal systems, ownership concentration and country opacity seem to explain as much of the variance in *FAF* errors as dummy variables standing for the country of incorporation. Contrary to the absolute forecast errors, the lowest estimated coefficient is posted by the countries adopting a Scandinavian legal system (-2.96% in Table 5B and -3.08% in Table 5B'). Countries under the French and German legal system have negative estimated coefficients. Unexpectedly countries under a British legal system post the highest forecast errors (0.69% in Table 5B and 2.03% in Table 5B'). Countries identified as transparent post the lowest estimated coefficients (-0.79% in Table 5A). For all other countries, the coefficient is positive underlining a positive relation between opacity and forecast errors.

[Please insert Tables 5B and 5B']

STEP 2: DECOMPOSITION OF VARIANCE IN FORECAST ERRORS

|*FEREs*|: We show in Tables 6A and 6A' that proxies for the type of legal system, the ownership concentration, and the opacity of country, stand for 17.28% of the total explained effect that is more than country effects (4.4%). The contribution is more striking when we consider the three measures of earnings opacity defined by Bhattacharya et al.(2003). The three proxies mentioned earlier explain 34.6% of the total effect. The variables standing for the opacity of the country stand for 6.7% (19.49% with Bhattacharya's measures) of the variance in *FAF* errors, followed by variables standing for the legal system with 7.8 % (and 8.68% in Table 6A'), and the variables for ownership concentration with 2.78% (and 6.43% in Table 6A'). We have to note that the predominant effect is still the variation of forecasted earnings with 8.27% in Table 6A.

[Please insert Tables 6A and 6A']

FEREs: Tables 6B and 6B' document that proxies for the type of legal system, and the opacity of country, and ownership concentration stand respectively for 10.02% and 30.89% of the total explained effect, that is much more than country effects (1.9%). The variables standing for the opacity of the country or the legal system stand respectively for 4.12% (17.38% in Table 6B') and 4.17% (8.51% in Table 6B') of the variance in *FAF* errors. Nevertheless, the variation of forecasted earnings effect is still the main effect to consider in understanding the performance of FAFs with 16.01% of the variance in forecast errors (and 12.31% in Table 6B').

[Please insert Tables 6B and 6B']

V CONCLUSION

We examine two hypotheses. Firstly, we analyse the relative importance of local, industrial and firm-specific factors in explaining the performance of *FAFs* on eighteen developed markets during the 1990-2000 period. We first document the importance of the differences in countries and industries in explaining the cross-sectional variance in *FAFs* errors. We then motivate the importance of the type of earnings – profits vs. losses; increases vs. Decreases – and analyst following as determinants of the quality of *FAFs*. Following a methodology initiated by Heston and Rouwenhorst (1994) for decomposing financial returns into country and industry effects, we adapt it to the analysis of *FAFs* errors. This framework allows us to propose a hierarchy of the determinants of the quality of *FAFs*, and to offer a better understanding of the differences existing among countries, account systems, earnings management measures, industries, and firm characteristics as determinants the performance of *FAFs*.

We analyse eighteen markets since they reveal different levels of development and sharp contrasts in industrial structures. We take into account the last decade marked by unprecedented financial crises. These crises induced a major volatility in earnings.

We document that the differences between countries, accounting systems, earnings management measures, industries, or coverage by analysts hardly account for the differences in forecast errors and biases. The type of earnings – profits vs. losses, and increases vs. decreases in earnings – are the main effects to consider in understanding the performance of *FAFs*. We conclude that it is neither the quantity nor the quality of information that determine the level of accuracy and the forecast bias, but the complexity to forecast earnings. Financial analysts face difficulties in forecasting losses and decreases in earnings. The different effects we examine account for only 20 to 30%

of the variance in forecast errors. Other effects must thus be considered. FAFs errors in these developed markets may be related to idiosyncratic features.

Secondly, to shed light on this point, we have chosen to study the role of accounting practices and thus decomposed the country effect in two accounting effects: legal system and earnings opacity. Our results tend to show that this accounting approach improves our understanding of the country effect and give a partial explanation of FAFs errors. We note a significant improvement of the variance in forecast errors. When we take into account legal systems and earnings opacity measures, we can explain 34% to 48% of the variance in forecast errors. The contribution of earnings opacity measures is striking.

The main conclusions we can draw from our results are that the debate between country and industry effects must be revised and reconsidered. Idiosyncratic features are the answer. Despite the contribution of legal system effect and earnings opacity effect firm-specific effects bring the most convincing explanation to FAFs errors whatever country and industry. We have restricted our approach to three specific effects: variation of forecasted earnings effect, type of forecasted earnings effect, and number of analysts effect. The two first are the most striking. It may be interesting to analyse specific earnings opacity effects.

Nevertheless, all results cast doubt on the real economic efficiency of financial analysts: their errors and the forecasts biases are still high. We leave this open question to future research. The accuracy and quality of financial analysts' forecast are still a puzzle.

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Table 1: Descriptive statistics of absolute forecast errors (|FEREs|, measure of financial analyst accuracy) and signed forecast errors (FEREs, measure of forecast bias) by country (panel A) and sector (Panel B)

Panel A: COUNTRIES	Number of observations		Mean		Median		Standard deviation		T-test, H0: mean=0	
	/FEREs/	*FEREs*	*/FEREs/*	*FEREs*	*/FEREs/*	*FEREs*	*/FEREs/*	*FEREs*	*/FEREs/*	*FEREs*
Australia	14 903	14 903	0.139	0.044	0.073	0.005	0.177	0.221	95.69**	24.55**
Austria	4 091	4 091	0.220	0.050	0.135	0.000	0.230	0.314	61.16**	10.26**
Belgium	4 221	4 221	0.186	0.033	0.109	0.006	0.205	0.275	58.94**	7.85**
Canada	26 217	26 217	0.232	0.082	0.133	0.015	0.250	0.331	150.13**	40.02**
Denmark	6 902	6 902	0.224	0.037	0.148	-0.004	0.228	0.318	81.73**	9.76**
Finland	3 702	3 702	0.264	0.013	0.179	-0.004	0.244	0.360	65.68**	2.19**
France	18 227	18 227	0.181	0.058	0.097	0.014	0.211	0.272	115.79**	28.96**
Germany	15 924	15 924	0.232	0.087	0.131	0.000	0.256	0.334	114.50**	33.01**
Hong Kong	11 684	11 684	0.190	0.088	0.098	0.024	0.225	0.282	91.35**	33.65**
Italy	8 414	8 414	0.249	0.081	0.157	0.021	0.250	0.344	91.17**	21.63**
Japan	40 760	40 760	0.243	0.093	0.153	0.039	0.240	0.329	203.71**	57.01**
Netherlands	11 069	11 069	0.142	0.035	0.059	-0.005	0.202	0.244	73.61**	15.11**
Norway	3 914	3 914	0.252	0.033	0.167	0.000	0.239	0.346	66.06**	5.96**
Singapore	8 958	8 958	0.195	0.067	0.119	0.020	0.212	0.280	87.00**	22.61**
Spain	7 877	7 877	0.176	0.068	0.091	0.017	0.211	0.267	74.00**	22.56**
Sweden	6 668	6 668	0.224	0.026	0.144	-0.004	0.226	0.317	80.82**	6.80**
Switzerland	9 997	9 997	0.188	0.046	0.107	0.005	0.218	0.284	85.95**	16.22**
United Kingdom	56 071	56 071	0.126	0.030	0.060	-0.008	0.172	0.211	173.07**	33.59**
18 countries	259 599	259 599	0.191	0.059	0.103	0.005	0.223	0.288	437.51**	104.88**

* T-test significant at 5%, ** T-test significant at 1%.

|*FERES*| are absolute forecast errors = $|(F_{i,h,t} - RE_{i,h,t}) / RE_{i,h,t}|$ and *FERE*s are signed forecast error = $(F_{i,h,t} - RE_{i,h,t}) / |RE_{i,h,t}|$. $RE_{i,t}$ is reported earnings per share of firm *i* for fiscal year *t*. $F_{i,h,t}$ = consensus forecasted earning per share of firm *i* for fiscal year *t*, with a forecast horizon of *h* months before earnings report. We use forecasts made from one to 9 months before earnings report date.

Panel B: SECTORS	Number of observations	Mean		Median		Standard deviation		T-test	
		/FEREs/	***FEREs***	*/FEREs/*	***FEREs***	*/FEREs/*	***FEREs***	*/FEREs/*	***FEREs***
Basic Industries	33 298	0.229	0.085	0.138	0.027	0.240	0.321	173.85**	48.47**
Capital goods	53 965	0.196	0.066	0.108	0.007	0.225	0.291	202.36**	52.47**
Consumer durables	7 203	0.212	0.061	0.121	0.011	0.234	0.310	77.04**	16.77**
Consumer non-durables	26 661	0.176	0.073	0.092	0.015	0.214	0.268	134.17**	44.27**
Consumer services	47 779	0.169	0.059	0.085	0.004	0.209	0.262	176.39**	49.20**
Energy	10 051	0.241	0.053	0.155	0.000	0.238	0.334	101.25**	15.92**
Finance	39 800	0.178	0.033	0.094	-0.003	0.212	0.275	166.93**	23.96**
Health care	9 447	0.151	0.041	0.077	0.000	0.192	0.241	76.22**	16.65**
Public utilities	8 967	0.131	0.021	0.059	0.000	0.179	0.221	69.35**	9.21**
Technology	13 356	0.221	0.077	0.125	0.003	0.241	0.318	106.20**	28.07**
Transportation	9 072	0.235	0.036	0.138	0.000	0.248	0.340	90.36**	10.13**

* T-test significant at 5%, ** T-test significant at 1%.

|*FEREs*| are absolute forecast errors = $|(F_{i,h,t} - RE_{i,h,t}) / RE_{i,h,t}|$ and *FERE*s are signed forecast error = $(F_{i,h,t} - RE_{i,h,t}) / |RE_{i,h,t}|$. $RE_{i,t}$ is reported earnings per share of firm *i* for fiscal year *t*. $F_{i,h,t}$ = consensus forecasted earning per share of firm *i* for fiscal year *t*, with a forecast horizon of *h* months before earnings report. We use forecasts made from one to 9 months before earnings report date.

Table 2A : OLS regressions of absolute forecast errors (|FEREs|) on country, industry, and firm specific factors using equation (3) and constraints (4a) to (4e)

Period: 1990-2000

Coefficients		Estim. Param.	Std. Error	T-test H0 : Coef. =0	ChiSq.
World Area	α	0.1919	0.0004	496,08**	245010,53**
Australia	c1	-0.0492	0.0016	-30,73**	1360,81**
Austria	c2	0.0204	0.0031	6,63**	37,16**
Belgium	c3	0.0074	0.0030	2,46**	6,27**
Canada	c4	0.0090	0.0012	7,33**	43,73**
Denmark	c5	0.0192	0.0024	8,15**	59,49**
Finland	c6	0.0656	0.0032	20,42**	286,97**
France	c7	-0.0007	0.0014	-0,49	0,26
Germany	c8	0.0423	0.0015	27,47**	582,14**
Hong Kong	c9	0.0324	0.0018	17,80**	302,05**
Italy	c10	0.0560	0.0021	26,27**	523,05**
Japan	c11	0.0233	0.0009	24,95**	502,04**
Netherlands	c12	-0.0268	0.0019	-14,47**	265,65**
Norway	c13	0.0401	0.0032	12,70**	126,41**
Singapore	c14	0.0302	0.0021	14,52**	218,63**
Spain	c15	0.0009	0.0022	0,42	0,19
Sweden	c16	0.0334	0.0024	14,00**	181,14**
Switzerland	c17	0.0105	0.0019	5,40**	28,26**
United Kingdom	c18	-0.0521	0.0007	-69,81**	6868,12**
Basic industries	s1	0.0176	0.0010	16,95**	248,95**
Capital goods	s2	-0.0014	0.0008	-1,85	3,36**
Consumer durables	s3	0.0104	0.0023	4,51**	18,34**
Consumer non-durables	s4	-0.0103	0.0012	-9,00**	91,90**
Consumer services	s5	-0.0070	0.0008	-8,53**	81,88**
Energy	s6	0.0520	0.0020	25,94**	552,83**
Finance	s7	-0.0040	0.0009	-4,35**	19,39**
Health care	s8	-0.0496	0.0020	-24,50**	743,80**
Public utilities	s9	-0.0493	0.0021	-23,82**	760,83**
Technology	s10	0.0183	0.0017	10,95**	107,87**
Transportation	s11	0.0201	0.0021	9,75**	72,90**
Positive Earnings: Profits	r1	-0.0174	0.0001	-156,04**	11581,86**
Negative Earnings: Losses	r2	0.2252	0.0014	156,04**	11581,86**
Increase in earnings	v1	-0.0380	0.0003	-127,52**	13100,79**
Decrease in earnings	v2	0.0674	0.0005	127,52**	13100,79**
Stocks followed by 3 to 5 analysts	η1	0.0253	0.0006	43,52**	1728,00**
Stocks followed by 6 to 9 analysts	η2	0.0044	0.0007	6,31**	38,42**
Stocks followed by 10 to 15 analysts	η3	-0.0102	0.0007	-13,70**	203,50**
Stocks followed by more than 15 analysts	η4	-0.0317	0.0008	-39,89**	1811,52**
Number of observations : 259,599					
Adjusted R^2 : 0.2204					

|*FEREs*| are absolute forecast errors = $|(F_{i,h,t} - RE_{i,h,t}) / RE_{i,h,t}|$. $RE_{i,t}$ is reported earnings per share of firm *i* for fiscal year *t*. $F_{i,h,t}$ = consensus forecasted earning per share of firm *i* for fiscal year *t*, with a forecast horizon of *h* months before earnings report. We use forecasts made from one to 9 months before earnings report date.

Table 2B : OLS regressions of signed forecast errors (FEREs) on country, industry, and firm specific factors using equation (3) and constraints (4a) to (4e)

NB: Period: 1990-2000

Coefficients		Estim. Param.	Std. Error	T-test H0 : coef. =0	ChiSq
World Area	α	0.0594	0.0005	121,70**	14757,10**
Australia	c1	-0.0019	0.0020	-0,95	1,32
Austria	c2	-0.0124	0.0039	-3,20**	8,57**
Belgium	c3	-0.0023	0.0038	-0,60	0,34
Canada	c4	0.0071	0.0016	4,56**	16,45**
Denmark	c5	-0.0328	0.0030	-11,03**	100,76**
Finland	c6	-0.0466	0.0041	-11,48**	84,89**
France	c7	0.0012	0.0018	0,65	0,45
Germany	c8	0.0090	0.0019	4,66**	16,86**
Hong Kong	c9	0.0515	0.0023	22,42**	530,76**
Italy	c10	0.0096	0.0027	3,58**	9,10**
Japan	c11	0.0032	0.0012	2,68**	5,68**
Netherlands	c12	-0.0065	0.0023	-2,78**	10,07**
Norway	c13	-0.0278	0.0040	-6,96**	32,64**
Singapore	c14	0.0243	0.0026	9,29**	92,34**
Spain	c15	0.0111	0.0028	3,98**	18,50**
Sweden	c16	-0.0296	0.0030	-9,84**	83,51**
Switzerland	c17	-0.0019	0.0024	-0,77	0,61
United Kingdom	c18	-0.0104	0.0009	-11,07**	182,44**
Basic industries	s1	-0.0046	0.0013	-3,50**	10,30**
Capital goods	s2	0.0050	0.0010	5,19**	26,71**
Consumer durables	s3	-0.0025	0.0029	-0,86	0,64
Consumer non-durables	s4	0.0178	0.0015	12,28**	180,32**
Consumer services	s5	0.0107	0.0010	10,33**	126,07**
Energy	s6	-0.0075	0.0025	-2,96**	6,61**
Finance	s7	-0.0138	0.0012	-11,77**	145,61**
Health care	s8	-0.0175	0.0026	-6,85**	53,15**
Public utilities	s9	-0.0267	0.0026	-10,20**	137,71**
Technology	s10	0.0164	0.0021	7,75**	53,41**
Transportation	s11	-0.0364	0.0026	-13,97**	140,84**
Positive Earnings: Profits	r1	-0.0185	0.0001	-131,00**	7057,45**
Negative Earnings: Losses	r2	0.2386	0.0018	131,00**	7057,45**
Increase in earnings	v1	-0.0864	0.0004	-229,56**	43671,00**
Decrease in earnings	v2	0.1530	0.0007	229,56**	43671,00**
Stocks followed by 3 to 5 analysts	η1	-0.0007	0.0007	-0,99	0,88
Stocks followed by 6 to 9 analysts	η2	-0.0024	0.0009	-2,75**	7,35**
Stocks followed by 10 to 15 analysts	η3	0.0020	0.0009	2,14*	5,04*
Stocks followed by more than 15 analysts	η4	0.0017	0.0010	1,73	3,46
Number of observations : 259,599					
Adjusted R^2 : 0.2550					

FEREs are signed forecast errors = $(F_{i,h,t} - RE_{i,h,t}) / | RE_{i,h,t} |$. $RE_{i,t}$ is reported earnings per share of firm *i* for fiscal year *t*. $F_{i,h,t}$ = consensus forecasted earning per share of firm *i* for fiscal year *t*, with a forecast horizon of *h* months before earnings report. We use forecasts made from one to 9 months before earnings report date.

Table 3A: Decomposition of absolute forecast errors' (|FEREs|) variance

/FEREs/	**1990-2000**	
	Variance	**%**
Pure country effect	0.0021	4.44
Pure industry effect	0.0006	1.36
" Type of forecasted earnings" effect	0.0043	9.10
"Variation of forecasted earnings" effect	0.0030	6.49
"Number of analysts" effect	0.0006	1.27
Idiosyncratic effects	0.0362	77.35
Total variance of forecast errors in absolute mean	0.0468	100.00

Table 3B: Decomposition of signed forecast errors' (FEREs) variance

FEREs	**1990-2000**	
	Variance	**%**
Pure country effect	0.0015	1.90
Pure industry effect	0.0008	0.98
" Type of forecasted earnings" effect	0.0053	6.65
"Variation of forecasted earnings" effect	0.0138	17.44
"Number of analysts" effect	0.0001	0.14
Idiosyncratic effects	0.0578	72.91
Total variance of forecast errors in absolute mean	0.0793	100.00

Table 4A: Ownership concentration, legal origin, and earnings opacity ranking of countries.

	Ownership Concentration [a]	OW1	OW2	OW3	OW4	Legal Origin [b]	LE1	LE2	LE3	LE4	Aggregate Earnings Management [c]	EO1	EO2	EO3	EO4
Australia	0,28	0	1	0	0	British	1	0	0	0	4,8	1	0	0	0
Austria	0,51	0	0	1	0	German	0	0	0	1	28,3	0	0	0	0
Belgium	0,62	0	0	0	1	French	0	1	0	0	19,5	0	0	1	0
Canada	0,24	1	0	0	0	British	1	0	0	0	5,3	1	0	0	0
Denmark	0,40	0	0	1	0	Scandinavian	0	0	1	0	16,0	0	1	0	0
Finland	0,34	0	1	0	0	Scandinavian	0	0	1	0	12,0	0	1	0	0
France	0,24	1	0	0	0	French	0	1	0	0	13,5	0	1	0	0
Germany	0,50	0	0	1	0	German	0	0	0	1	21,5	0	0	0	1
Hong Kong	0,54	0	0	0	1	British	1	0	0	0	19,5	0	0	1	0
Italy	0,60	0	0	0	1	French	0	1	0	0	24,8	0	0	0	0
Japan	0,13	1	0	0	0	German	0	0	0	1	20,5	0	0	0	1
Netherlands	0,31	0	1	0	0	French	0	1	0	0	16,5	0	1	0	0
Norway	0,31	0	1	0	0	Scandinavian	0	0	1	0	5,8	1	0	0	0
Singapore	0,53	0	0	0	1	British	1	0	0	0	21,6	0	0	0	1
Spain	0,50	0	0	1	0	French	0	1	0	0	18,6	0	0	1	0
Sweden	0,28	0	1	0	0	Scandinavian	0	0	1	0	6,8	1	0	0	0
Switzerland	0,48	0	0	1	0	German	0	0	0	1	22,0	0	0	0	0
United Kingdom	0,15	1	0	0	0	British	1	0	0	0	7,0	1	0	0	0

[a] The "Ownership Concentration" measures come from La Porta, Lopez-de-Silanes, Shleifer and Visny (1999). This country-level measure of ownership concentration is measured as the mean fraction of the firms' voting rights owned by the controlling shareholder.
[b] The "Legal Origin" variable indicates the origin of code law systems (La Porta, Lopez-de-Silanes, Shleifer and Visny, 1997).
[c] The "Aggregate Earnings Management" score is the average rank across four earnings management measures from Leuz, Nanda and Wysocki (2003). A higher score suggests a higher level of earnings management.

Table 4/B: Earnings opacity ranking of countries following Bhattacharya et al. (2003).

	Earnings Aggressiveness [d]	AG1	AG2	AG3	AG4	Loss Avoidance [e]	LO1	LO2	LO3	LO4	Earnings Smoothing [f]	SM1	SM2	SM3	SM4
Australia	-0,0213	0	0	0	1	-0,0462	1	0	0	0	-0,8237	0	0	0	1
Austria	-0,0373	0	1	0	0	0,5004	0	0	1	0	-0,8791	0	1	0	0
Belgium	-0,0547	1	0	0	0	0,3178	0	1	0	0	-0,8787	0	0	1	0
Canada	-0,0343	0	0	1	0	0,4503	0	0	1	0	-0,8178	0	0	0	1
Denmark	-0,0394	1	0	0	0	0,2674	1	0	0	0	-0,9127	1	0	0	0
Finland	-0,0327	0	0	1	0	0,6211	0	0	0	1	-0,8822	0	1	0	0
France	-0,0383	0	1	0	0	0,3764	0	1	0	0	-0,8655	0	0	1	0
Germany	-0,0414	1	0	0	0	0,5865	0	0	0	1	-0,8978	0	1	0	0
Hong Kong	-0,0119	0	0	0	1	0,1701	1	0	0	0	-0,8579	0	0	1	0
Italy	-0,0273	0	0	1	0	0,5053	0	0	1	0	-0,9253	1	0	0	0
Japan	-0,0125	0	0	0	1	0,6429	0	0	0	1	-0,9214	1	0	0	0
Netherlands	-0,0451	1	0	0	0	0,3780	0	1	0	0	-0,9172	1	0	0	0
Norway	-0,0379	0	1	0	0	0,1788	1	0	0	0	-0,7291	0	0	0	1
Singapore	-0,0253	0	0	0	1	0,4849	0	0	1	0	-0,8858	0	1	0	0
Spain	-0,0379	0	1	0	0	0,5141	0	0	1	0	-0,8558	0	0	1	0
Sweden	-0,0226	0	0	0	1	0,3401	0	1	0	0	-0,8453	0	0	0	1
Switzerland	-0,0396	1	0	0	0	0,5900	0	0	0	1	-0,8792	0	1	0	0
United Kingdom	-0,0292	0	0	1	0	0,3730	0	1	0	0	-0,8683	0	0	1	0

"Earnings Aggressiveness", "Loss Avoidance" and "Eanings Smoothing" measures come from Bhattacharya, Daouk and Welker (2003, table 1, page 655).

[d] Bhattacharya, Daouk and Welker (2003) "scale accruals by lagged total assets for each firm, determine its median in the cross-section of rims per country per year, and then average across time to obtain the "earnings aggressiveness" variable per country".

[e] Bhattacharya, Daouk and Welker (2003) "define firms with small positive positive (small negative) earnings as firm with net income scaled by lagged total assets between 0 and 1% (between 0 and -1%)". They "subtract the number of firms with small negative earnings from the number of firms with small positive earnings per country per year, divide this difference by the sum of the two, and then average this ratio across time to obtain the "loss avoidance" variable per country".

[f] Daouk and Welker (2003) "find the correlation between the change in accruals and the change in operating cash flows (both scaled by lagged total assets) in the cross-section of firms per country per year, and then average across time to obtain the "earnings smoothing" variable per country".

Table 5A : OLS regressions of absolute forecast errors (|FEREs|) on legal, opacity-, industry-,and firm specific factors using equation (3) and constraints (4a) to (4e)
(Earnings opacity measures of Leuz et al. (2003))
NB: Period: 1990-2000

Coefficients		Estim. Param.	Std. Error	T-test H0 : coef. =0	ChiSq
World Area	α	0.1919	0.0004	494.06**	242991.52**
British	l1	-0.0167	0.0015	-11.14**	117.63**
French	l2	0.0004	0.0013	0.28	0.07
Scandinavian	l3	0.0563	0.0019	29.50**	806.50**
German	l4	0.0107	0.0028	3.79**	14.04**
Opacity: 1 (low)	Op1	-0.0140	0.0021	-6.76**	41.80**
Opacity: 2	Op2	-0.0058	0.0016	-3.59**	12.82**
Opacity: 3	Op3	0.0038	0.0021	1.82	3.03
Opacity: 4	Op4	0.0207	0.0024	8.58**	72.80**
Opacity: 5 (high)	Op5	0.0127	0.0033	3.90**	13.43**
Ownership concentration (low)	ow1	-0.0030	0.0007	-4.04**	14.19**
Ownership concentration	ow2	-0.0133	0.0013	-10.61**	123.60**
Ownership concentration	ow3	-0.0044	0.0012	-3.78**	11.46**
Ownership concentration (high)	ow4	0.0347	0.0032	10.99**	114.54**
Basic industries	s1	0.0220	0.0010	21.49**	389.39**
Capital goods	s2	-0.0042	0.0008	-5.54**	30.25**
Consumer durables	s3	0.0091	0.0023	3.97**	14.22**
Consumer non-durables	s4	-0.0131	0.0011	-11.36**	146.52**
Consumer services	s5	-0.0088	0.0008	-10.69**	128.39**
Energy	s6	0.0693	0.0020	35.47**	1018.95**
Finance	s7	-0.0050	0.0009	-5.34**	29.35**
Health care	s8	-0.0503	0.0020	-24.78**	760.57**
Public utilities	s9	-0.0420	0.0021	-20.30**	569.08**
Technology	s10	0.0172	0.0017	10.27**	95.06**
Transportation	s11	0.0186	0.0021	9.06**	62.83**
Positive Earnings: Profits	r1	-0.0180	0.0001	-161.49**	12502.63**
Negative Earnings: Losses	r2	0.2324	0.0014	161.49**	12502.63**
Increase in earnings	v1	-0.0380	0.0003	-126.82**	12982.44**
Decrease in earnings	v2	0.0672	0.0005	126.82**	12982.44**
Stocks followed by 3 to 5 analysts	η1	0.0245	0.0006	42.22**	1623.20**
Stocks followed by 6 to 9 analysts	η2	0.0045	0.0007	6.48**	40.60**
Stocks followed by 10 to 15 analysts	η3	-0.0103	0.0007	-13.90**	209.46**
Stocks followed by more than 15 analysts	η4	-0.0305	0.0008	-39.30**	1777.50**
Number of observations : 259.599					
Adjusted R^2 : 0.2139					

|*FEREs*| are absolute forecast errors = $|(F_{i.h.t} - RE_{i.h.t}) / RE_{i.h.t}|$. $RE_{i.\ t}$ is reported earnings per share of firm *i* for fiscal year *t*. $F_{i.\ h.\ t}$ = consensus forecasted earning per share of firm *i* for fiscal year *t*. with a forecast horizon of *h* months before earnings report. We use forecasts made from one to 9 months before earnings report date.

Table 5B : OLS regressions of signed forecast errors (FEREs) on legal-, opacity-, industry- ,and firm specific factors using equation (3) and constraints (4a) to (4e)

NB: Period: 1990-2000

Coefficients		Estim. Param.	Std. Error	T-test H0 : coef. =0	ChiSq
World Area	α	0.0594	0.0005	121.65**	14740.41**
British	l1	0.0069	0.0019	3.65**	12.31**
French	l2	-0.0062	0.0016	-3.85**	13.66**
Scandinavian	l3	-0.0296	0.0024	-12.34**	135.80**
German	l4	0.0018	0.0035	0.51	0.26
Opacity: 1 (low)	Op1	-0.0079	0.0026	-3.02**	8.17**
Opacity: 2	Op2	0.0031	0.0020	1.54	2.37
Opacity: 3	Op3	0.0186	0.0026	7.02**	45.80**
Opacity: 4	Op4	0.0052	0.0030	1.72	2.92**
Opacity: 5 (high)	Op5	-0.0028	0.0041	-0.68	0.40
Ownership concentration (low)	ow1	-0.0027	0.0009	-2.95**	7.47**
Ownership concentration	ow2	-0.0010	0.0016	-0.61	0.41
Ownership concentration	ow3	-0.0017	0.0014	-1.18	1.11
Ownership concentration (high)	ow4	0.0151	0.0040	3.82**	13.68**
Basic industries	s1	-0.0040	0.0013	-3.09**	7.86**
Capital goods	s2	0.0043	0.0010	4.44**	19.56**
Consumer durables	s3	-0.0029	0.0029	-0.99	0.85
Consumer non-durables	s4	0.0168	0.0014	11.62**	161.52**
Consumer services	s5	0.0106	0.0010	10.21**	122.45**
Energy	s6	-0.0033	0.0025	-1.34	1.35
Finance	s7	-0.0138	0.0012	-11.81**	146.54**
Health care	s8	-0.0175	0.0026	-6.86**	53.52**
Public utilities	s9	-0.0251	0.0026	-9.66**	124.65**
Technology	s10	0.0162	0.0021	7.70**	52.63**
Transportation	s11	-0.0358	0.0026	-13.84**	136.93**
Positive Earnings: Profits	r1	-0.0186	0.0001	-132.98**	7249.61**
Negative Earnings: Losses	r2	0.2406	0.0018	132.98**	7249.61**
Increase in earnings	v1	-0.0865	0.0004	-229.78**	43786.30**
Decrease in earnings	v2	0.1531	0.0007	229.78**	43786.30**
Stocks followed by 3 to 5 analysts	η1	-0.0013	0.0007	-1.72	2.61
Stocks followed by 6 to 9 analysts	η2	-0.0027	0.0009	-3.09**	9.30**
Stocks followed by 10 to 15 analysts	η3	0.0019	0.0009	2.07*	4.68*
Stocks followed by more than 15 analysts	η4	0.0029	0.0010	2.96**	10.31**
Number of observations : 259,599					
Adjusted R^2 : 0.2543					

FEREs are absolute forecast errors = $(F_{i.h.t} - RE_{i.h.t}) / |RE_{i.h.t}|$. $RE_{i.t}$ is reported earnings per share of firm *i* for fiscal year *t*. $F_{i.h.t}$ = consensus forecasted earning per share of firm *i* for fiscal year *t*. with a forecast horizon of *h* months before earnings report. We use forecasts made from one to 9 months before earnings report date.

Table 6A: Decomposition of absolute forecast errors' (|FEREs|) variance

/FEREs/	1990-2000	
	Variance	**%**
"Legal" effect	0.0043	7.80
"Opacity" effect	0.0037	6.70
"Ownership concentration" effect	0.0015	2.78
Pure industry effect	0.0007	1.28
" Type of forecasted earnings" effect	0.0046	8.27
"Variation of forecasted earnings" effect	0.0031	5.54
"Number of analysts" effect	0.0006	1.00
Idiosyncratic effects	0.0367	66.63
Total variance of forecast errors in absolute mean	0.0551	100.00

Table 6B: Decomposition of signed forecast errors' (FEREs) variance

/FEREs/	1990-2000	
	Variance	**%**
"Legal" effect	0.0036	4.17
"Opacity" effect	0.0036	4.12
"Ownership concentration" effect	0.0015	1.73
Pure industry effect	0.0008	0.87
" Type of forecasted earnings" effect	0.0053	6.12
"Variation of forecasted earnings" effect	0.0139	16.01
"Number of analysts" effect	0.0001	0.12
Idiosyncratic effects	0.0581	66.86
Total variance of forecast errors in absolute mean	0.0870	100.00

NB: decomposition after 99 regressions (11 years x 9 horizons)

Table 5A': OLS regressions of absolute forecast errors (|FEREs|) on legal, opacity-, industry-,and firm specific factors using equation (3) and constraints (4a) to (4e)
(Earnings opacity measures of Bhattacharya et al. (2003))
NB: Period: 1990-2000

Coefficients		Estim. Param.	Std. Error	T-test H0 : coef. =0	ChiSq
World Area	α	0.1919	0.0004	495.55**	244520.78**
British	l1	-0.0361	0.0049	-7.42**	46.92**
French	l2	0.0178	0.0038	4.67**	18.71**
Scandinavian	l3	0.0624	0.0026	24.24**	484.65**
German	l4	0.0288	0.0056	5.13**	22.94**
Earnings aggressiveness: 1 (low)	eag1	0.0120	0.0026	4.57**	19.26**
Earnings aggressiveness: 2	eag2	-0.0107	0.0072	-1.49	1.82
Earnings aggressiveness: 3	eag3	-0.0017	0.0013	-1.28	1.44
Earnings aggressiveness: 4 (high)	eag4	-0.0006	0.0019	-0.31	0.08
Loss avoidance: 1 (low)	los1	0.0097	0.0058	1.68	2.45
Loss avoidance: 2	los2	-0.0277	0.0020	-14.11**	162.08**
Loss avoidance: 3	los3	0.0281	0.0055	5.16**	22.00**
Loss avoidance: 4 (high)	los4	0.0105	0.0053	2.00	3.40
Earnings smoothing: 1 (low)	smo1	-0.0221	0.0041	-5.37**	24.10**
Earnings smoothing: 2	smo2	0.0123	0.0035	3.51**	10.56**
Earnings smoothing: 3	smo3	0.0065	0.0035	1.85	2.86
Earnings smoothing: 4 (high)	smo4	0.0062	0.0035	1.78	2.54
Ownership concentration (low)	ow1	0.0090	0.0025	3.63**	10.89**
Ownership concentration	ow2	-0.0177	0.0024	-7.29**	48.47**
Ownership concentration	ow3	-0.0371	0.0051	-7.34**	45.30**
Ownership concentration (high)	ow4	0.0333	0.0054	6.21**	30.92**
Basic industries	s1	0.0165	0.0010	15.89**	218.80**
Capital goods	s2	-0.0012	0.0008	-1.60	2.53
Consumer durables	s3	0.0116	0.0023	5.05**	22.92**
Consumer non-durables	s4	-0.0101	0.0011	-8.81**	87.82**
Consumer services	s5	-0.0064	0.0008	-7.74**	67.41**
Energy	s6	0.0512	0.0020	25.49**	532.68**
Finance	s7	-0.0046	0.0009	-4.93**	24.82**
Health care	s8	-0.0493	0.0020	-24.33**	729.80**
Public utilities	s9	-0.0490	0.0021	-23.66**	754.30**
Technology	s10	0.0192	0.0017	11.49**	118.69**
Transportation	s11	0.0195	0.0021	9.44**	68.60**
Positive Earnings: Profits	r1	-0.0175	0.0001	-157.03**	11726.43**
Negative Earnings: Losses	r2	0.2267	0.0014	157.03**	11726.43**
Increase in earnings	v1	-0.0381	0.0003	-127.52**	13093.74**
Decrease in earnings	v2	0.0674	0.0005	127.52**	13093.74**
Stocks followed by 3 to 5 analysts	η1	0.0246	0.0006	42.26**	1630.20**
Stocks followed by 6 to 9 analysts	η2	0.0032	0.0007	4.71**	21.33**
Stocks followed by 10 to 15 analysts	η3	-0.0110	0.0007	-14.80**	237.74**
Stocks followed by more than 15 analysts	η4	-0.0286	0.0008	-36.44**	1516.80**
Number of observations : 259.599					
Adjusted R^2 : 0.2187					

|*FEREs*| are absolute forecast errors = $|(F_{i.h.t} - RE_{i.h.t}) / RE_{i.h.t}|$. $RE_{i.\,t}$ is reported earnings per share of firm *i* for fiscal year *t*. $F_{i.\,h.\,t}$ = consensus forecasted earning per share of firm *i* for fiscal year *t*. with a forecast horizon of *h* months before earnings report. We use forecasts made from one to 9 months before earnings report date.

Table 5B' : OLS regressions of signed forecast errors (FEREs) on legal-, opacity-, industry- ,and firm specific factors using equation (3) and constraints (4a) to (4e)
(Earnings opacity measures of Bhattacharya et al. (2003))
NB: Period: 1990-2000

Coefficients		Estim. Param.	Std. Error	T-test H0 : coef. =0	ChiSq
World Area	α	0.0594	0.0005	121.67**	14749.63**
British	l1	0.0203	0.0061	3.32**	8.89**
French	l2	-0.0104	0.0048	-2.16*	3.64*
Scandinavian	l3	-0.0308	0.0032	-9.50**	70.26**
German	l4	-0.0173	0.0071	-2.45*	5.06*
Earnings aggressiveness: 1 (low)	eag1	0.0083	0.0033	2.50*	5.54*
Earnings aggressiveness: 2	eag2	0.0245	0.0091	2.69**	5.47*
Earnings aggressiveness: 3	eag3	-0.0131	0.0017	-7.78**	51.40**
Earnings aggressiveness: 4 (high)	eag4	0.0000	0.0024	0.00	0.00
Loss avoidance: 1 (low)	los1	-0.0164	0.0073	-2.26*	4.19*
Loss avoidance: 2	los2	-0.0085	0.0025	-3.45**	9.23**
Loss avoidance: 3	los3	-0.0056	0.0069	-0.82	0.53
Loss avoidance: 4 (high)	los4	0.0248	0.0066	3.73**	11.27**
Earnings smoothing: 1 (low)	smo1	0.0047	0.0052	0.90	0.64
Earnings smoothing: 2	smo2	-0.0190	0.0044	-4.31**	14.86**
Earnings smoothing: 3	smo3	-0.0003	0.0044	-0.07	0.00
Earnings smoothing: 4 (high)	smo4	0.0102	0.0044	2.33*	4.12*
Ownership concentration (low)	ow1	-0.0073	0.0031	-2.36*	4.31*
Ownership concentration	ow2	-0.0084	0.0031	-2.72**	6.57**
Ownership concentration	ow3	0.0056	0.0064	0.88	0.63
Ownership concentration (high)	ow4	0.0337	0.0068	4.98**	18.40**
Basic industries	s1	-0.0054	0.0013	-4.15**	14.49**
Capital goods	s2	0.0052	0.0010	5.34**	28.21**
Consumer durables	s3	-0.0021	0.0029	-0.72	0.45
Consumer non-durables	s4	0.0179	0.0014	12.36**	182.55**
Consumer services	s5	0.0112	0.0010	10.78**	137.39**
Energy	s6	-0.0081	0.0025	-3.20**	7.75**
Finance	s7	-0.0141	0.0012	-12.02**	151.68**
Health care	s8	-0.0174	0.0026	-6.80**	52.34**
Public utilities	s9	-0.0264	0.0026	-10.10**	134.92**
Technology	s10	0.0171	0.0021	8.11**	58.40**
Transportation	s11	-0.0367	0.0026	-14.10**	143.38**
Positive Earnings: Profits	r1	-0.0185	0.0001	-131.57**	7111.00**
Negative Earnings: Losses	r2	0.2395	0.0018	131.57**	7111.00**
Increase in earnings	v1	-0.0864	0.0004	-229.53**	43638.29**
Decrease in earnings	v2	0.1530	0.0007	229.53**	43638.29**
Stocks followed by 3 to 5 analysts	η1	-0.0012	0.0007	-1.69	2.53
Stocks followed by 6 to 9 analysts	η2	-0.0031	0.0009	-3.52**	12.02**
Stocks followed by 10 to 15 analysts	η3	0.0015	0.0009	1.57	2.72
Stocks followed by more than 15 analysts	η4	0.0037	0.0010	3.78**	16.66**
Number of observations : 259.599					
Adjusted R^2 : 0.2546					

FEREs are absolute forecast errors = $(F_{i.h.t} - RE_{i.h.t}) / |RE_{i.h.t}|$. $RE_{i.t}$ is reported earnings per share of firm *i* for fiscal year *t*. $F_{i.h.t}$ = consensus forecasted earning per share of firm *i* for fiscal year *t*. with a forecast horizon of *h* months before earnings report. We use forecasts made from one to 9 months before earnings report date.

Table 6A': Decomposition of absolute forecast errors' (|FEREs|) variance

/FEREs/	1990-2000	
	Variance	**%**
"Legal" effect	0.0060	8.68
"Earnings aggressiveness" effect	0.0029	4.29
"Loss avoidance" effect	0.0061	8.87
"Earnings smoothing" effect	0.0044	6.33
"Ownership concentration" effect	0.0044	6.43
Pure industry effect	0.0006	0.91
" Type of forecasted earnings" effect	0.0043	6.26
"Variation of forecasted earnings" effect	0.0031	4.49
"Number of analysts" effect	0.0005	0.78
Idiosyncratic effects	0.0364	52.97
Total variance of forecast errors in absolute mean	0.0688	100.00

Table 6B' : Decomposition of signed forecast errors' (FEREs) variance

/FEREs/	1990-2000	
	Variance	**%**
"Legal" effect	0.0096	8.51
"Earnings aggressiveness" effect	0.0043	3.84
"Loss avoidance" effect	0.0086	7.59
"Earnings smoothing" effect	0.0067	5.95
"Ownership concentration" effect	0.0056	5.00
Pure industry effect	0.0008	0.70
" Type of forecasted earnings" effect	0.0053	4.69
"Variation of forecasted earnings" effect	0.0139	12.31
"Number of analysts" effect	0.0001	0.10
Idiosyncratic effects	0.0580	51.32
Total variance of forecast errors in absolute mean	0.1130	100.00

NB: decomposition after 99 regressions (11 years x 9 horizons)

Research Paper
Factors Contributing to Financial Analyst Forecast Error
(Focused on 18 European Countries)
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The Relative Importance of Forecast Accuracy Determinants Revisited: European Evidence

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Abstract:

We analyze earnings forecasting errors made by financial analysts for 18 European countries over the 1995-2006 period. We use the Heston-Rouwenhorst approach to unravel country-, industry-, and firm-specific effects as a source of variation in financial analysts' earnings forecast errors. We first estimate each effect with a dummy variable regression, and then decompose the variance of forecast errors into different effects. We provide evidence that the differences among countries, industrial sectors, or analyst following offer a weak explanation for differences in forecast errors. Country effects however largely dominate industry and analyst following effects on European stock markets. By contrast, the type of earnings – profits or losses – and variations in earnings – increases or decreases – play a significant role in the performance of financial analysts.

Keywords: Analysts' forecasts; Forecast accuracy; Industrial structure; Country factors; Firm-specific factors, European stock markets.

JEL classification: G11; G14; G15;

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The Relative Importance of Forecast Accuracy Determinants Revisited: European Evidence

Abstract:

We analyze earnings forecasting errors made by financial analysts for 18 European countries over the 1995-2006 period. We use the Heston-Rouwenhorst approach to unravel country-, industry-, and firm-specific effects as a source of variation in financial analysts' earnings forecast errors. We first estimate each effect with a dummy variable regression, and then decompose the variance of forecast errors into different effects. We provide evidence that the differences among countries, industrial sectors, or analyst following offer a weak explanation for differences in forecast errors. Country effects however largely dominate industry and analyst following effects on European stock markets. By contrast, the type of earnings – profits or losses – and variations in earnings – increases or decreases – play a significant role in the performance of financial analysts.

Keywords: Analysts' forecasts; Forecast accuracy; Industrial structure; Country factors; Firm-specific factors, European stock markets.

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The Relative Importance of Forecast Accuracy Determinants Revisited: European Evidence

1. Introduction

For more than twenty years, European stock markets have been experiencing important and significant financial and legal reforms, especially since 1992. Since the «Big Bang» in 1986, they have been characterized by a permanent and continuous integration. Legal and institutional barriers have been removed, and seem to belong to a distant past. Since the late 1990s, a continuous growing number of European firms has been adopting the International Financial Reporting Standards (IFRS) to disclose their performance to shareholders and investors.

In this context of financial integration and global accounting harmonization, and despite or because of recent financial scandals all around the world, earnings financial analysts' forecasts (hereafter referred to as *FAFs*) are more than ever a crucial topic for capital markets researchers and investors. As Acknowledged by Kothari (2001) «*almost all models of valuation either directly or indirectly use earnings forecast*»[1]. *FAFs'* accuracy is indeed an important input to capital budgeting and investment decisions.

Forecast accuracy is defined as the absolute earnings forecast error, and forecast bias as the relative earnings forecast error (profits vs. losses). Much work has been dedicated to the accuracy and bias, with research in the field focusing largely on the U.S. market. Among the most documented determinants of the accuracy and bias of *FAFs* are earnings type – profits vs. losses, increases vs. decreases – (Dowen, 1996; Ciccone, 2005), the business activities of the firm (Dunn and Nathan, 1998), the economic

[1] See Kothari (2001) for more details, and Fama and Miller (1972) (for discounted cash flow valuation models), Edwards and Bell (1961), Ohlson (1995) and Feltham and Ohlson (1995) (for residual income valuation models).

situation (Chopra, 1998), the forecast horizon (Richardson *et al*., 1999), the industrial sector (Brown, 1997), and the competence of analysts (Mikhail *et al*., 1997). Most of these studies provide U.S. evidence of the accuracy of *FAFs,* generally focusing on a single determinant. They do not allow a proper evaluation of the accuracy of *FAFs* in different environments. Since the early 2000s some articles have taken an interest in *FAFs* around the world, and shown significant differences in their respective accuracy levels (Hope, 2003; Ang and Ciccone, 2001; Chang *et al.*, 2000; Capstaff *et al.*, 1998). Studies led by Allen *et al*. (1999), Chang *et al*. (2000), Ang and Ciccone (2001), Black and Carnes (2001), among others, document that accounting, legal and economic systems tend to have an important impact on the accuracy of forecasts. The accounting, legal and institutional environments are the most obvious country-related determinants of the accuracy of *FAFs*. Beyond the type of earnings effect largely documented in the U.S., these studies highlight the importance of country and industry effects. Although Hope (2003) shows that firm-specific factors (profits vs. losses or increases vs. decreases) are the most important in explaining the characteristics of *FAFs*, international studies on the determinants of forecast errors focus almost exclusively on the different aspects of the country effect.[2]

Therefore, we intend to analyze the relative importance of country-, industry- and firm-specific effects in explaining the cross-sectional variance in *FAF* errors on European financial markets.[3] The question is nonetheless a fundamental one for financial analysts, international investors, and capital markets researchers. Cavaglia, Brightham, and Aked (2000) provide evidence that sector factors became more important determinants of the stock returns of developed countries in the late 1990s and early

[2] More specifically on the differences in accounting systems.
[3] Recently, Beckers et al. (2004) analyze the bias in European analyst's earnings forecasts, shedding a new light on country- and industry effects, but they ignore the analysis of the cross-sectional variance in *FAF* errors.

2000s. The international portfolios of developed stock markets could be structured in the near future along the sector dimension rather than along the traditional country dimension. Nevertheless, the relative importance of country vs industry factors is an important unsettled issue.[4] While Brooks and Del Negro (2004) argue that the rising importance of industry factors relative to country factors is a temporary phenomenon associated with the stock market fluctuations, Moerman (2008), focusing on Euro area stock markets, finds strong evidence that «*diversification over industries yields more efficient portfolios than diversification over countries*». Ferreira and Ferreira (2006) document that the dominance of the country effect has diminished, while the industry effect has increased on European stock markets.

The variations of *FAFs*' accuracy across European markets and industries motivate the three questions we attempt to answer in this paper. -1- Is the pure country-effect more important than the pure industry-effect in the explanation of *FAFs*' accuracy in Europe? -2- Are firm-specific effects more relevant to explain *FAFs*' accuracy on European stock markets? What is the evolution of the relative importance of country-, industry- and firm-specific effects in explaining the cross-sectional variance in *FAF* errors over the 1995-2006 period on these markets?

Our contribution to the debate on the determinants of the accuracy of *FAFs* (and indirectly on their impact on international stock returns) is threefold. First, we use a more powerful methodology to separate the relative importance of each class of determinants. This approach differs in many respects from previous studies carried out at the international level. The few previous studies that analyze country effects on the accuracy of forecasts compare the moments and the distribution of errors. This conventional and traditional approach is open to criticism insofar as it is unable to

[4] We may mention Carrieri et al. (2004) and especially Adjaoute and Danthine (2004), and Hargis and Mei (2006).

disentangle country-, industry-, and firm-specific effects, and to estimate their relative importance. Secondly, we concentrate on a sample of 18 European countries over the 1995-2006 period. Our sample includes (1) countries from the Euro-zone and outside, which have experienced significant international harmonization over the last 12 years, and (2) countries with contrasted sectors. Thirdly, all these regions have implemented significant financial and legal reforms in order to restore trust among investors. This evolving financial context offers the opportunity to analyze the evolution of the factors influencing the accuracy of *FAFs.*

Section 2 presents and justifies our conceptual framework for analyzing *FAFs* accuracy during the period. Section 3 describes the data source and forecast error measures used in the analysis. We describe the methodology employed in section 4, and present results in section 5. In section 6, we summarize our main results.

2. Determinants of FAF

To answer the three main questions mentioned in the previous section, we suggest two steps. First, we analyze the average relative importance of country-, industry-, and firm-specific effects (type of earnings, increase or decrease in earnings, analyst coverage) in explaining cross-sectional differences in *FAF* errors. Secondly, we scrutinize the evolution of the relative importance of each class of determinants in explaining variations across *FAF* errors.

2.1 Country-, Industry-, and Firm-specific Effects

2.1.1 Country effects

Studies on many countries show sharp contrasts in the accuracy of *FAFs*. Chang *et al*. (2000) obtain an average absolute forecast error of 25.5% for the 47 countries in their sample: from 2.3% for the U.S. to 71.2% for Slovakia. Ang and Ciccone (2001), with a

sample of 42 countries and covering the period from 1988 to 1997, give another illustration of this significant diversity of accuracy, with an average absolute forecast error of 60% and a dispersion of 31%. The results of Capstaff *et al*. (2001) and Higgings (1998), for Europe, and Allen *et al*. (1997), Black and Carnes (2001) and Coën and Desfleurs (2004), for Asia, and for different time horizons, demonstrate that the accuracy of financial analysts for countries of the same geographic region may be very contrasted.

These studies tend to confirm the existence and the important weight of country effects. We may wonder what their sources are. As shown by Allen *et al*. (1999), and Ang and Ciccone (2001), the level of development is not the most relevant explanation. The country effect has many origins. Some factors are macroeconomic. In their study on Pacific Basin markets in the early '90s, Allen *et al*. (1999) observe that forecast errors are lower for countries with higher growth rates. Riahi-Belkaoui (1998), for a sample of 14 countries, shows that the level of forecast accuracy is positively related to the associated economic risk. Black and Carnes (2002), focusing on 12 Asian markets, denote that the level of forecast errors is directly correlated with the Global Competitiveness Index published in *The Global Competitiveness Report*. Forecast errors would be lower in high-competition countries. Moreover, they add that forecasts are all the more accurate since such countries show a significant openness to foreign business and foreign direct investments. On the contrary, forecasts tend to be less accurate in countries with a high level of governmental intervention, with a high level of corruption, and with a less competitive environment. Following Chopra (1998), we may add that financial analysts are more accurate in an environment characterised by stable growth than in one experiencing a sharply accelerating or decelerating business cycle.

The legal and institutional environments may also have a significant influence on *FAFs*. Chang *et al*. (2000) show that there are significantly fewer forecast errors and that they are significantly smaller in countries with common English legal systems, offering a high protection for minority shareholders.[5] Furthermore, the financing structure and its consequences on the disclosure of information may tend to influence the accuracy of financial analysts. The use of debt to finance operating activities decreases the number of players in the markets, and may stem the disclosure of information. In countries with high levels of intermediation, the circulation of information between the borrower and the lender is more encouraged, often to the detriment of shareholders and analysts.

According to a growing body of literature, accounting and fiscal system characteristics tend to be quite influential. Hope (2003) shows that there is a positive relation between the level of information disclosure and the level of the accuracy of *FAFs*. An improvement of information quality should decrease the dispersion of forecast errors. Basu *et al.* (1998) underscore the fact that forecast errors are smaller in an environment offering a vast range of accounting methods. Black and Carnes (2002) argue that the development of accounting systems is influenced by the idiosyncratic cultural features of different countries. *FAFs* are more accurate since the accounting system has been marked by a British inheritance (Australia, New Zealand, Hong Kong, and Singapore).

Empirical evidence suggests analyzing other effects, such as industry-, and firm-specific effects.

2.1.2 Industry effects.

In most studies devoted to the accuracy of *FAFs* within a given country, the diversity of the industrial structure is taken into account as a control variable (see O'Brien (1998),

[5]Although these factors are not the most important, they are to be considered. See Ang and Ciccone (2001) for a discussion.

and Sinha, Brown and Das (1997), among others). Paradoxically, many international studies neglect this feature (see Black and Carnes (2002) for Asia, or Ang and Ciccone (2001) for a larger sample of countries). The industrial structure sharply differs from one country to the next. Differences in the accuracy and bias of *FAFs* attributable to country effects may therefore be due to differences in industrial structures, and it is therefore important to control for industry effects in explaining cross-sectional differences in accuracy and bias.

It exists indeed a large body of empirical evidence attesting to the importance of industry effects. For Europe during the period of 1987 to 1994, Capstaff *et al*. (2001) observe that forecasts for the public utilities and health care sectors are more accurate. By contrast, they are less accurate for the transportation and consumer durables sectors. Brown (1997) confirms these industry differences in the U.S., where analysts demonstrate a significant over-optimism in 11 out of 14 sectors. In Asia, the results of Jaggi and Jain (1998) show that there are smaller forecast errors in the public service sectors than in the private industrial sectors. They attribute this result to the low earnings volatility that exists in public service sectors.

The influence of the industrial sector on financial analysts' accuracy may be related to the stability of the firms in the sector. The earnings of firms evolving in stable sectors should tend to be easier to forecast, while sectors subject to external factors would tend to be difficult to analyze. This is the case of the natural resources sector, where earnings are sensitive to the variability of prices.[6] According to Luttman and Silhan (1995), the level of competitiveness may affect earnings and the characteristics of the disclosed information. To forecast earnings, analysts must consider a firm's strategy and its suitability with respect to the evolution of competitiveness. As suggested by Katz *et al*.

[6] In the oil and mining sectors, DeFond and Hung (2003) consider that earnings are not appropriate gauges for estimating firms' values. They suggest the use of cash flows from operations.

(2000), these differences in competitive environments may have repercussions on the ability of financial analysts to forecast the earnings of firms in contrasted sectors.

Accounting factors, already mentioned to justify the country effect, may also be interpreted to constitute a sector or industry effect. As studied by DeFond and Hung (2003), the choice of accounting systems or methods available depends on the industry. For example, firms in the oil and mining sectors may use either the successful-effort method or the full-cost effort to account for exploration costs. Moreover, the level of information disclosure and transparency differs, and evolves differently as we go from one industry to the next. For a sample of countries, including emerging Asian countries, Patel *et al.* (2002) note a 15% improvement in the level of disclosure from 1998 to 2000 for the industrial sector, while the improvement reaches only 4% in the public service and information technology sectors. Such differences in evolution may explain the variations observed in the accuracy and bias of *FAFs* by sectors.

2.1.3 Firm-specific effects

While many studies on the determinants of the accuracy and bias of *FAFs* focus almost exclusively on the different aspects of the country factor, especially differences in accounting systems, industry factors and firm-specific factors are neglected. Elton et al. (1984) show that firm-specific components are relevant to analyze the accuracy of *FAFs* and the diagnosis of errors. We concentrate on two firm-specific factors: earnings-specific factors (profits/losses, and earnings increases/decreases) and analyst following.

Profits/Losses and Increases/Decreases Effects

There is extensive evidence suggesting that *FAFs* tend to be often optimistic. Practice shows that it seems easier to forecast profits than losses and earnings increases than

earnings decreases. These stylized facts have led to many studies: incentive-based and cognitive-based explanations.

Lin and McNichols (1998), Michaely and Womack (1999), Dechow et al. (2000) and more recently Bradshaw et al. (2006) offer evidence that analysts have private incentive originating in business relationships or in their dependence on managers for information to compromise their objectivity and optimiscally bias their forecasts. Because of the compensation they receive for their service, «sell-side» analysts working for an investment banking firm (called affiliated analysts) tend to issue more optimistic forecasts than unaffiliated analysts. Besides, as pointed out by Lim (2001) and Das et al. (1998), the motivation to gain access to information from management could be an explanation of optimistic *FAFs,* especially when information asymmetry is high. Conroy and Harris (1995) show that financial analysts who do not have to make buy recommendations tend to make more accurate forecasts, particularly for earnings decreases. Gu and Wu (2003), and Basu and Markov (2004) argue that analysts exhibit linear loss functions and minimize mean absolute forecast error. Optimistic bias seems rational in presence of earnings skewness.[7]

According to Hope (2003) and Abarbanell and Lehavy (2003) management's incentive to take earnings «baths» could contribute to explain the observed optimistic bias in *FAFs*. The results reported by Loh and Mian (2002) indicate that firms in Singapore took advantage of the 1997 financial crisis to withdraw some assets from their balance sheets, leading to significant gaps between reported and forecast earnings.

An important literature is devoted to cognitive-bias explanations for analysts' optimism and is based on behavioural theories initiated by Tversky and Kahneman (1984). For example, Easterwood and Nutt (1999) demonstrate that financial analysts overreact to

[7] Clatworthy et al. (2006) offer an alternative and show that FAFs are consistent with asymmetric loss function.

good earnings information and underreact to bad earnings information. Capstaff et al. (1998) on forecasts in Germany, report that forecast errors are much smaller for earnings increases than for decreases. There is a small negative bias for increases but a large positive bias for earnings decreases. According to Daniel *et al.* (1998), analysts are overconfident in their private information, and revise imperfectly their anticipations especially after bad earnings information. As acknowledged by Kothari (2001) « *the source of asymmetry in the analysts' overreaction is not fully understood in the literature*» and is an unsettled issue.[8]

Moreover, as mentioned by Ang and Ciccone (2001), the type of earnings (profits vs. losses) should be a major determinant of the accuracy of *FAFs*.

Analyst Following Effect

Alford and Berger (1999) suggest that a significant number of analysts following a firm should induce an increase in competitiveness and an improvement in the accuracy of *FAFs*. They document a strong positive relation between the size effect and the analyst following. Brown (1998) shows that *FAFs* are more accurate and rational for large cap firms followed by an important number of analysts. We expect to see a positive relation between the accuracy of analysts and the number of analysts following a firm.

3. Sample selection and variable definitions

3.1 Measures of errors

We define a *FAF* error as the difference between forecast earnings and the actual reported earnings, standardized by the absolute value of actual reported earnings. We examine two types of forecast error across countries. The first metric used is the

[8] For other detailed explanations, see Kothari (2001), Brown (1998) for herd behaviour, and McNichols and O'Brien (1997) for selectivity of unfavourable forecasts.

absolute forecast error on reported earnings, |*FERE*|, which does not consider the direction, but only the magnitude of the error. The mean of the absolute forecast error provides summary information on accuracy. The second metric, *FERE*, considers the direction of the error. The mean of this metric provides information on the bias of *FAFs*. For each firm *i* and each fiscal year *t* (*t=1 to 12*), we compute the forecast error at various points in time, from 1 to *h (h = 1 to 9)* months prior the earnings report date. The nine-month horizon ensures that analysts know the previous year's earnings when making their forecasts. We therefore obtain *9×12 FAF* errors per firm (12 *FAF* errors per firm for each horizon). The definitions of |*FERE*| and *FERE* are shown in equations (1) and (2) below.

$$\left|FERE_{i,h,t}\right| = \left|\frac{FE_{i,h,t} - RE_{i,t}}{RE_{i,t}}\right| \quad \textbf{(1)}$$

$$FERE_{i,h,t} = \frac{FE_{i,h,t} - RE_{i,t}}{\left|RE_{i,t}\right|} \quad \textbf{(2)}$$

where $RE_{i,t}$ and $FE_{i,h,t}$ are respectively the reported (actual) earnings of firm *i* for fiscal year *t* and the consensus analysts' forecast of the firm's year *t* earnings made *h* months before the earnings report date.

3.2 Data

We obtain analysts' earnings forecasts from the international Institutional Brokers Estimate System (I/B/E/S) database. We select 18 countries in our sample: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom and three European eastern countries, Czech Republic, Hungary, and Poland. The sample period covers fiscal years 1995 to 2006. All forecasts are earnings per share forecasts for the current fiscal year,

with I/B/E/S continuing to provide forecasts until a firm's annual financial results are announced. We select earnings forecasts made from nine months to one month prior to the earnings report date. This horizon ensures that analysts have the past year's annual report, and thus the previous year's earnings figures, available to them when making their forecasts. We use the mean forecast as the consensus forecast, but impose the condition that *at least three* analysts follow the firm (Chang *et al.*, 2000). Data are then adjusted to eliminate potential biased and/or extreme situations. Extreme values in forecast errors may be caused by data errors or by transitory factors specific to a firm (for example takeovers, mergers and acquisitions or important restructurings). Following Capstaff *et al.* (1998), to prevent the results from becoming contaminated by outliers, all absolute forecast errors exceeding 100% are removed. After eliminating extreme data, our final sample includes 193215 forecasts. All conclusions are similar if median forecasts are used instead of mean forecasts.

Table 1 reports descriptive statistics on |*FEREs*| and *FEREs* for each country and for each industry. The average absolute error |*FERE*| is 16.3%, for the European countries, and is statistically significant at 1% percent level. This level of error is a stylized fact for all countries and casts doubts on the accuracy of financial analysts. The forecast bias, that is the average *FERE,* is positive, equal to 1.7% (statistically significant at 1%), which is consistent with the documented over-optimism bias of financial analysts' forecasts.

Table 1, Panel A illustrates the differences in forecast accuracy and forecast bias for the 18 countries. The absolute forecast error, |*FERE*| is the lowest in Ireland (average: 11.3%; median: 5.5%), followed by United Kingdom (average: 11.5%; median: 5.5%) and Netherlands (average: 13.4%; median: 5.3%). By contrast, the absolute forecast error is the highest in Norway (average: 23.8%; median: 14.1%), followed by Italy

(average: 22.1%; median: 14.3%), and Finland (average: 20.7%; median: 12.5%). The forecast bias is the lowest in Ireland (average: -1.8%; median: -2.1%), followed by Finland, and United Kingdom. At the opposite, the forecast bias is the highest in Germany (average: 6.3%; median: 0.0%) followed by Hungary, Poland and Czech Republic.

[Please insert Table 1]

Panel B sheds light on the differences among sectors. The absolute forecast error is lower for Public Utilities (average: 14.3%; median: 7.6%), Health care (average: 14.5%; median: 6.4%) and Consumer services (average: 15.0%; median: 7.0%), whereas it is higher in Technology (average: 22.4%; median: 12.2 %) and Transportation (average: 20.6%; median: 11.5%). The forecast bias is lower in Finance (average: 0%; median: -0.9 %), Public Utilities and Transportation, whereas, it is higher in Technology (average: 7%; median: 0.0%), Consumer Durables and Energy. These results are consistent with those reported by Capstaff et al. (2001) and Brown (1997).

[Please insert Figures 1A, 1B and 1C]

Figures 1A, 1B and 1C show the evolution of absolute forecast error per country and industry. For the sake of clarity, we only present four[9] of the 18 countries and four of the eleven industries, respectively. We observe sharp differences among countries. The accuracy is continuously lowest in the U.K. By contrast, the accuracy is very volatile in Sweden. While the evolution of the forecast accuracy in France shows a relatively smooth trend, it is more volatile in Germany. This figure is an illustration that *FAFs* seem definitely to be more accurate with common English legal systems, as suggested

[9] France, Germany, Sweden and U.K. one for each accounting legal system: French, German, Scandinavian and English accounting systems.

by Chang et al. (2000). To confirm this point, we report the evolution of the accuracy by accounting system (English, French, German and Scandinavian) for our sample European countries[10]. Significant disparities also exist among industries. Public Utilities are characterized by the lowest average forecast accuracy among all the industries; however, its forecast accuracy reaches 20% in 2002. The forecast accuracy for the Technology sector peaks at 27% in 2001 and 32% in 2002, whereas it was only 12% in 1995. The forecast accuracy for the Energy sector is volatile, witnessing the shocks of the period, while the evolution of the forecast accuracy for Finance exhibits a smooth trend.

4. Methodology

To answer our three aforementioned questions, we use a methodology initially developed by Heston and Rouwenhorst (1994) and Griffin and Karolyi (1998) to decompose financial returns in industry and country components. This two-step procedure allows us to analyze the relative importance of country-, industry- and firm-specific effects in explaining the cross-sectional variations in *FAF* errors. In the first step, we estimate the model, and in the second, we decompose the variance to identify and measure the relative importance of each effect.

4.1 Step 1: Estimation of country-, industry-, and firm-specific effects

We first define $|FERE_{i,h,,t}|$ as financial analysts' forecast error on reported earnings for firm *i* for horizon *h* and fiscal year *t.* Then, we regress the $|FEREs|$ on dummy variables standing for countries, industries, profits or losses, increases or decreases in earnings, and analyst following. Since our sample comprises 18 countries and 11 industries, we define the following dummies: S_{ij} and C_{ik}. S_{ij} is equal to 1 if security *i* belongs to

[10] The repartition is the following: English accounting system: United Kingdom, Ireland; French accounting system: Belgium, France, Greece, Italy, Netherlands, Portugal and Spain; German accounting system: Austria, Germany; Scandinavian accounting system: Denmark, Finland, Norway and Sweden. We have excluded eastern European countries.

industry j ($j = 1,...,11$) and is 0 otherwise. C_{ik} is equal to 1 if security i belongs to country k ($k = 1,...,18$) and is 0 otherwise. We introduce the dummy, RE_{ig}, for the type of reported earnings to be forecast. RE_{i1} is equal to 1 if the reported earnings for security i are positive, and is 0 otherwise. RE_{i2} is equal to 1 if the reported earnings for security i are negative, and is 0 otherwise. We add another series of dummies to take into account the direction of the variations of the earnings to be forecast, V_{if}. V_{i1} is equal to 1 if there is there is an increase in earnings, and is 0 otherwise; V_{i2} is equal to 1 if there is a decrease in earnings, and is 0 otherwise. We also introduce a dummy to take into account the size effect or number of analysts effect, N_{iy} ($y = 1, ..., 4$). N_{iy} is equal to 1 if security i is included in category y. We define four categories for all the securities in our sample: securities followed by three to five analysts, securities followed by six to nine analysts, securities followed by ten to fifteen analysts, and securities followed by sixteen or more analysts.

We use ordinary least squares (OLS) to estimate the following model[11]:

$$| FERE_i | = \alpha + \sum_{i=1}^{11} s_j S_{i,j} + \sum_{c=1}^{18} c_k C_{i,k} + \sum_{g=1}^{2} r_g RE_{i,g} + \sum_{f=1}^{2} v_f V_{i,f} + \sum_{y=1}^{4} \eta_y \mathrm{N}_{i,y} + e_i \quad \textbf{(3)}^{12}$$

Because of perfect multi-collinearity between the regressors, we cannot directly estimate equation (3). Following the method initiated by Heston and Rouwenhorst (1994), we impose, for each fiscal year t and each horizon h, restrictions to solve this over-identification problem.

$$\sum_{j=1}^{11} n_j s_j = 0 \; ; \; \sum_{k=1}^{18} m_k c_k = 0 \; ; \; \sum_{g=1}^{2} l_g r_g = 0 ; \; \sum_{f=1}^{2} w_f v_f = 0 ; \; \sum_{y=1}^{4} z_y \eta_y = 0 \qquad \textbf{(4.a,b,c,d,e)}$$

[11] To simplify the notation subscripts related to forecast horizon h and fiscal year t have not been reported in this equation.
[12] We apply the same methodology to the FAFs' bias, *FERE*.

where n_j, m_k, l_g, w_f, and z_y stand respectively for the number of firms in industry *j* and in country *k*, the number of firms for which the type of reported earnings *g* (positive or negative) has encountered a variation *f* (increase or decrease), and the number of firms followed by a number of analysts belonging to category *y*.[13]

These constraints make it easier to interpret the coefficients. Instead of arbitrarily choosing a country-, industry-, or firm-specific benchmark, the intercept $\hat{\alpha}$, stands as the average forecast error of our sample of developed countries, and each country-,industry-, or firm-specific coefficient ($\hat{c}_k, \hat{s}_j, \hat{r}_g, \hat{v}_f$, and $\hat{\eta}_y$) is the deviation relative to the benchmark. The pure industry forecast error $\hat{\alpha} + \hat{s}_j$ is the ordinary least-squares estimate of the forecast error on a geographically-diversified group of firms in the j^{th} industry. This forecast error is free of country- and firm-specific effects. Similarly, $\hat{\alpha} + \hat{c}_k$ is an estimate of the pure country forecast error on an industrially-diversified group of firms in the country, *k.* As before, this forecast error is free of industry- or firm-specific effects.

4.2 Step 2: Analysis of variance

We decompose the cross-sectional variance (*VT*)[14] of forecast errors for our sample of European countries to analyze the relative importance of the error determinants on the European stock markets. Through the decomposition of (*VT*), we shed light on the proportion of variance caused by country factors (*VC/VT*), by industry factors (*VS/VT*), by the type of earnings – profits or losses (*VRE/VT*)- and variations in earnings –

[13] We can make an analogy with Heston and Rouwenhorst (1994). We use here the number of firms in the different sub-samples, whereas Heston and Rouwenhorst use the value weights in industry j and country k in the European value-weighted markets, and the number of assets in industry j and country k in the European equally-weighted markets. The number of firms is relevant and appropriate in our context of |FEREs| because observations are equally-weighted.
[14] VT is an acronym for total variance: Variance and Total. VI: idiosyncratic variance.

increases or decreases(*VV/VT*) –, by the number of analysts following a security (*VN/VT*), and by the idiosyncratic features (*VI/VT*), where $VT_{h,t} = VC_{h,t} + VS_{h,t} + VRE_{h,t} + VV_{h,t} + VN_{h,t} + VI_{h,t}$ is the total effect for fiscal year *t* and horizon *h*.[15]

First, to assess the relative importance of each effect over the whole 12-years period, we decompose the total variance using panel data analysis over the 12 years, nine forecast horizons and number of firms analyzed. Secondly, we examine the evolution of the relative importance of each effect on a year-by-year basis, using panel data analysis over the nine forecast horizons and number of firms considered.

5. Empirical results and analysis

The analysis of the distribution of *FAF* errors shows significant differences among countries and industries. What are the origins of these differences? The decomposition of the cross-sectional variance of forecast errors into country effects, industry effects, earnings-specific effects, and analyst following effects sheds light on the influence of each effect on the level of error and on the level of financial analysts' bias.

5.1 Step 1: estimation of effects

Tables 2A and 2B show the results of the first step of our methodology: the results of the regression of forecast errors, |*FERE*| and *FERE*, on dummies to capture the different effects, using equation (3) and constraints (4a) to (4e). We report and comment the

[15] For example, the contribution of country effects to the total variance, for each fiscal year *t* and horizon *h*, is measured as follows: $VC_{h,t} / VT_{h,t} = Var(\sum_{k=1}^{18} \hat{c}_{k,h,t} C_k) / VT_{h,t}$. The model offers an incomplete decomposition of the variance. As acknowledged in the literature, the covariance terms between country-, industry- and firm-specific effects are very small, and can be reasonably neglected (Heston and Rouwenhorst, 1994 and 1995; Griffin and Karolyi, 1998). We proceed in a similar manner for the other components. Observations are equally-weighted.

results of the regression for *FAF* errors one month prior the earnings report date.[16] As expected, at this moment *FAFs* are more accurate and the bias is lower.

|***FEREs***|: Results from Table 2A on the relative importance of countries and industries are in line with those previously reported. As mentioned earlier, the intercept, $\hat{\alpha}$, stands as the average forecast error of our sample of 18 European countries. The adjusted R squared is 19.10%, and is consistent with the one reported by other studies in the existing literature (see Hope (2003)) when firm-specific effects are considered (without firm-specific effects adjusted R squared are lower). Thus, we focus on the types of earnings effects and on the analyst coverage effects. Estimated coefficients reported in Table 2A show that |*FEREs*| are much larger when companies report losses than when they report profits (17.6% vs. -1.7%). Consistently also, financial analysts tend to make larger errors when earnings decrease than when earnings increase: +4.6% vs. -2.1%. As expected, the more significant the analyst firm coverage, the smaller the absolute forecasting errors. For firms followed by more than 15 analysts, the estimated coefficient is -5.0%, whereas it is 3.2% for firms followed by less than 5 analysts, confirming the theory that more information should improve forecasts and consistent with Alford and Berger (1999).

[Please insert Table 2A]

FEREs: Results from Table 2B on the relative importance of countries and industries are in line with those reported in Table 1. The adjusted R squared is 18.17%. Estimated coefficients reported in Table 2 show that when we control for countries and industries, the forecast bias is low, and even negative (-1.8%) for companies reporting profits, whereas average forecasts suffer from over-optimism (1.6% for the intercept). By

[16] Results of the regressions 3 months, 6 months and 9 months prior the earnings report date lead to the same conclusions and are available upon request.

contrast, the forecast bias is very large and positive for companies reporting losses (19.0%). When we control for country and industry differences, we also observe this asymmetry in forecast biases for companies posting increases or decreases in earnings. For companies reporting increases in earnings, the forecast bias is negative (-5.3%), while for those reporting decreases in earnings, the forecast bias is positive (11.4%).

[Please insert Table 2B]

5.2 Step 2: Decomposition of variances in forecast errors

An analysis of the decomposition of variances in forecast errors sheds light on the relative importance of each class of determinants. The variances of the different effects are reported in Tables 3A and 3B.

|*FEREs*|: We show in table 3A that the sign (profits or losses) of reported earnings and the country effect respectively account for 35.79% and 24.47% of the explained cross-sectional variance of absolute forecasting errors (21.82% of total variance) (and thus 7.81% and 5.34% of the total variance). The third determinant, at 22.91% is the variation (increases or decreases) of reported earnings (5.00% of *VT*). Thus, country effects largely dominate industry effects, (6.14% and 1.34% of *VT*) and the number of analysts' effect (10.63% and 2.32% of *VT*). These results have significant consequences on the analysis and understanding of the behaviour of financial analysts. They tend to prove that earnings-specific factors represent much more important factors in explaining the magnitude of forecasting errors than the country or industry effects. Financial analysts make more accurate forecasts when earnings increase and are positive, and seem to have «*difficulties*» forecasting earnings decreases and losses or at least other motivations described in previous sections (see incentive-based and cognitive-based explanations).

[Please insert Table 3/A]

FEREs: We show in table 3B that, as in table 3A, the reported earnings variation effect (earnings increases or earnings decreases) and the type of reported earnings (profits or losses) are the most important determinants of the variation across forecasting errors. They account for 61.74% and 23.83% of the explained variance of forecast errors (24.88% of total variance) respectively (and for 15.36% and 5.93% of the total variance). We observe that the country effect accounts now only for a small portion of explained variance (6.75% and 1.68% of *VT*). Moreover, country effects do not significantly dominate industry effects (6.63% and 1.65% of *VT*). The analyst following effect is very low and negligible (1.05% and 0.26 of *VT*). These results have significant consequences on the analysis and understanding of the behaviour of financial analysts. They tend to prove that forecast errors are not primarily related to the country, industry and analysts following effects. For different motivations, financial analysts tend to incorrectly anticipate and/or report earnings losses and earnings decreases. These results may suggest that regulators should concentrate on loss firm reporting rather than concentrating on improving accounting regulations or the legal environment.

[Please insert Table 3/B]

In **Tables 4/A and 4/B**, we shed a new light on the annual evolution of the decomposition of the variance of *FAF* errors over the 12-years period. For absolute forecast errors, |*FEREs*|, the type of earnings – profits vs. losses – is generally the main driver in explaining the cross-sectional variation of earnings forecast errors, while the earnings variation is the second driver. However, this hierarchy is not always respected – the earnings variation effect dominates the type of earnings effect in 2001. The decrease of the pure country effect must be reported: from 5.51% for the 1995-2000

period to 2.65% for the 2001-2006 period. This decline coincides with the creation of the Euro zone in 2001. For forecast errors, *FEREs,* the earnings variation effect is systematically the main driver, peaking at more than four times the value of the type of earnings effect in 1998.

Country and industry effects are much lower. For absolute forecast errors, |*FEREs*|, country effects always dominate industry effects. Country effects represent 5.78% of the cross-sectional variance in earnings forecasts errors in 1995 and 4.61% in 2006, with a peak at 9.58% in 1998 (33.18% of explained variance). For forecast errors, *FEREs,* country effects represent 1.45% of the cross-sectional variance in earnings forecasts errors in 1995 and only 1.01% in 2006. They peak at 2.58% in 2004 (11.10% of explained variance). Industry effects dominate country effects, except in 1998, 2000, 2001 and more recently in 2005 and 2006 – 2.19% vs. 0.82% and 2.60% vs. 1.01% respectively. This change in hierarchy at the peak of the high tech bubble echoes the important empirical literature devoted to the analysis of stock returns (Cavaglia *et al*. (2000), Hargis and Mei (2006), among others). More interestingly, there is may be a weak turning point in the 2001-2006 period, as shown by our results. Another stylized fact for this long period of observation to be mentioned would be the increase in the idiosyncratic effect, from 75.79% in 1995 to 80.38% in 2006 for absolute forecast errors, standing for *FAFs'* accuracy, and from 73.71% in 1995 to 80.02% in 2006 for the forecast errors, standing for *FAFs'* bias. Unexplained variance has increased.

[Please insert Tables 4/A and 4/B]

To improve our understanding of *FAFs* we have suggested a decomposition of the cross-sectional variance in earnings forecast errors focusing on five effects: country, industry, type of reported earnings, reported earnings variation, and analyst following.

If the debate for country vs. industry diversification is unsettled, we show that the debate country vs. industry factors to explain *FAFs* is at least outdated: firm specific effects are the key but more efforts are to be done in this way.

6. Conclusion

In this paper, we attempt to answer three questions.-1- Is the pure country-effect more important than the pure industry-effect in the explanation of *FAFs*' accuracy and bias on European markets? -2- Are firm-specific effects more relevant to explain *FAFs*' accuracy and bias in Europe? What is the evolution of the relative importance of country-, industry- and firm-specific effects in explaining the cross-sectional variance in *FAF* errors over the 19950-2006 period on European markets? Thus, we define the absolute forecast error as *FAFs*' accuracy, |*FEREs*|**.** To analyze firm-specific effects, we focus on two firm-specific factors: earnings-specific factors (profits/losses, and earnings increases/decreases) and analyst following.

Following a methodology initiated by Heston and Rouwenhorst (1994) for decomposing financial returns into country and industry effects, we adapt it to the analysis of *FAF* errors. This framework allows us first to decompose the variances in forecast errors, second to propose a hierarchy of the determinants of the accuracy and bias of *FAFs*, and finally to provide a better understanding of the differences existing among countries, industries, and firm characteristics as determinants of the performance of *FAFs*. After the analysis of 224001 observations of *FAFs* on 18 European markets and 11 industries during the 1995-2006 period, we can give our answers.

First, we explore the dynamic of country vs. industry effects over the 12-years period, and underline sharp contrasts among the 18 countries and 11 industries our sample. We

show that pure country-effect dominates the pure-industry effect systematically for *FAFs*' accuracy. For *FAFs*' bias it seems too early to draw a definitive conclusion. Since 2000 the industry effects tend to dominate globally the country effects, except during the 2002-2004 period. Nevertheless, we cannot show whether the heightened importance of industry effect is an isolated artefact or a structural shift.

Second, we document that the differences between countries, industries, or coverage by analysts hardly account for the differences seen in forecast errors. The type of earnings – profits vs. losses, and the variations in earnings -increases vs. decreases in earnings– are the main effects to consider in understanding the accuracy and bias of *FAFs* in our framework.

Third, the type of earnings is generally the main driver in explaining the cross-sectional variation of earnings forecast errors, for *FAFs*' accuracy, while the country effects are the second driver over the 1995-2006 period. By contrast, the earnings variation effect is systematically the main driver, for *FAFs*' bias, followed by the type of earnings effect. Another stylized fact for this long period of observation to be mentioned is the constant increase in the idiosyncratic effect.

We can reasonably conclude that the debate country vs. industry factors to explain FAFs on developed markets is outdated. Firm-specific effects are the main relevant factors. This observation could incite regulators to concentrate on loss firm reporting on European financial markets. A real fire-wall between «sell-side» analysts and investment banking, and a strengthened regulation of management's incentive to take earnings «baths» could be first steps in this way. Moreover the idiosyncratic effect has been increasing during the period. It encompasses other firm-specific effects and

financial analysts' characteristics (qualification, reputation, skill…) we leave for future research.

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Table 1: Descriptive statistics of absolute forecast errors (|FEREs|, measure of financial analyst accuracy) and signed forecast errors (FEREs, measure of forecast bias) by country (panel A) and sector (Panel B)

NB: Period: 1995-2006, horizon=1

Panel A: COUNTRIES	Number of observations	Mean		Median		Standard deviation	
		/FEREs/	*FEREs*	*/FEREs/*	*FEREs*	*/FEREs/*	*FEREs*
Austria	395	0.182**	0.020	0.093	-0.013	0.220	0.285
Belgium	665	0.174**	0.022*	0.088	0.000	0.209	0.271
Czech Republic	140	0.190**	0.043	0.098	0.003	0.219	0.287
Denmark	779	0.176**	0.008	0.100	-0.019	0.201	0.267
Finland	893	0.207**	-0.010	0.125	-0.011	0.224	0.305
France	2,820	0.172**	0.024**	0.088	-0.004	0.206	0.268
Germany	2,530	0.206**	0.063**	0.109	0.000	0.237	0.308
Greece	930	0.203**	0.035**	0.131	0.000	0.213	0.292
Hungary	160	0.142**	0.052**	0.074	0.006	0.176	0.221
Ireland	404	0.113**	-0.018	0.055	-0.021	0.172	0.205
Italy	1,281	0.221**	0.028**	0.143	0.000	0.232	0.319
Netherlands	1,296	0.134**	0.006	0.053	-0.010	0.194	0.236
Norway	816	0.238**	0.015	0.141	-0.013	0.243	0.339
Poland	243	0.174**	0.050**	0.085	0.018	0.206	0.265
Portugal	312	0.200**	0.009	0.125	-0.021	0.216	0.294
Spain	1,029	0.138**	0.021**	0.063	0.000	0.187	0.232
Sweden	1,291	0.188**	0.021*	0.105	-0.003	0.208	0.280
United Kingdom	6,962	0.115**	-0.002	0.055	-0.019	0.161	0.198
18 countries	22,946	0.163**	0.017**	0.081	-0.009	0.204	0.260

* T-test significant at 5%, ** T-test significant at 1%. $|FERE_s|$ are absolute forecast errors = $|(FE_{i,h,t} - RE_{i,h,t}) / RE_{i,h,t}|$ and *FERE*s are signed forecast error = $(FE_{i,h,t} - RE_{i,h,t}) / |RE_{i,h,t}|$. $RE_{i,t}$ is reported earnings per share of firm i for fiscal year t. $FE_{i,h,t}$ = consensus forecasted earning per share of firm i for fiscal year t, with a forecast horizon of h months before earnings report..We use forecasts made from one to 9 months before earnings report date.

Panel B: SECTORS	Number of observations	Mean		Median		Standard deviation	
		/FEREs/	*FEREs*	*/FEREs/*	*FEREs*	*/FEREs/*	*FEREs*
Basic Industries	1,965	0.166**	0.027**	0.085	0.000	0.204	0.261
Capital goods	4,459	0.151**	0.017**	0.074	-0.013	0.192	0.244
Consumer durables	618	0.170**	0.048**	0.087	0.000	0.207	0.264
Consumer non-durables	2,567	0.152**	0.029**	0.070	-0.002	0.200	0.250
Consumer services	4,340	0.150**	0.018**	0.070	-0.010	0.199	0.248
Energy	594	0.181**	0.044**	0.094	0.000	0.212	0.275
Finance	3,731	0.164**	-0.035**	0.090	-0.029	0.194	0.252
Health care	1,119	0.145**	0.034**	0.064	0.000	0.188	0.235
Public utilities	813	0.143**	0.000	0.076	-0.009	0.183	0.232
Technology	2,020	0.224**	0.070**	0.122	0.000	0.245	0.325
Transportation	720	0.206**	0.000	0.115	-0.026	0.233	0.311

*** T-test significant at 5%, ** T-test significant at 1%. |*FEREs*| are absolute forecast errors = $|(FE_{i,h,t} - RE_{i,h,t}) / RE_{i,h,t}|$ and *FERE*s are signed forecast error = $(FE_{i,h,t} - RE_{i,h,t}) / |RE_{i,h,t}|$. $RE_{i,t}$ is reported earnings per share of firm *i* for fiscal year *t*. $FE_{i,h,t}$ = consensus forecasted earning per share of firm *i* for fiscal year *t*, with a forecast horizon of *h* months before earnings report.**

Table 2A: OLS regressions of absolute forecast errors (|FEREs|) on country, industry, and firm specific factors using equation (3) and constraints (4a) to (4e)

NB: Period: 1995-2006, horizon=1

Coefficients		Estim. Param.	Std. Error	T-test H0 : coef. =0	ChiSq
Europe Area	α	0.159	0.001	124.51**	16569.89**
Austria	c1	0.018	0.009	1.97	3.19
Belgium	c2	0.022	0.007	3.08**	8.57**
Denmark	c3	0.013	0.007	1.94	3.91
Finland	c4	0.043	0.006	7.07**	34.36**
France	c5	0.021	0.003	6.26**	38.85**
Germany	c6	0.035	0.004	9.68**	70.70**
Greece	c7	0.038	0.006	6.31**	32.18**
Ireland	c8	0.069	0.005	13.10**	131.36**
Italy	c9	-0.044	0.009	-5.07**	36.08**
Netherlands	c10	-0.005	0.005	-1.09	1.34
Norway	c11	0.046	0.006	7.07**	34.84**
Portugal	c12	0.044	0.010	4.22**	14.60**
Spain	c13	0.015	0.006	2.68**	8.27**
Sweden	c14	0.017	0.005	3.47**	11.10**
United Kingdom	c15	-0.045	0.002	-23.29**	679.77**
Czech Republic	c16	0.023	0.016	1.50	1.67
Hungary	c17	-0.001	0.015	-0.06	0.01
Poland	c18	0.018	0.012	1.49	2.00
Basic industries	s1	0.005	0.004	1.37	1.87
Capital goods	s2	-0.006	0.002	-2.36**	6.14*
Consumer durables	s3	0.004	0.007	0.52	0.27
Consumer non-durables	s4	-0.005	0.003	-1.44	2.28
Consumer services	s5	0.001	0.003	0.28	0.08
Energy	s6	0.026	0.008	3.46**	11.17**
Finance	s7	0.011	0.003	3.77**	14.35**
Health care	s8	-0.053	0.005	-9.73**	97.41**
Public utilities	s9	-0.014	0.006	-2.20*	5.29*
Technology	s10	0.009	0.004	2.18*	3.39
Transportation	s11	0.029	0.007	4.26**	14.24**
Positive Earnings: Profits	r1	-0.017	0.000	-41.65**	820.64**
Negative Earnings: Losses	r2	0.176	0.004	41.65**	820.64**
Increase in earnings	v1	-0.021	0.001	-25.21**	500.25**
Decrease in earnings	v2	0.046	0.002	25.21**	500.25**
Stocks followed by 3 to 5 analysts	η1	0.032	0.001	22.52**	477.29**
Stocks followed by 6 to 9 analysts	η2	-0.005	0.002	-2.55**	6.78**
Stocks followed by 10 to 15 analysts	η3	-0.028	0.003	-8.94**	104.80**
Stocks followed by more than 15 analysts	η4	-0.050	0.003	-18.21**	452.74**
Number of observations : 22,946					
Adjusted R^2 : 0.1910					

|*FEREs*| are absolute forecast errors = $|(FE_{i,h,t} - RE_{i,h,t}) / RE_{i,h,t}|$ $RE_{i,t}$ is reported earnings per share of firm *i* for fiscal year *t*. $FE_{i,h,t}$ = consensus forecasted earning per share of firm *i* for fiscal year *t*, with a forecast horizon of *h* months before earnings report. We use forecasts made one month before earnings report date.

Table 3A: Decomposition of signed forecast errors' (|FEREs|) variance

|FEREs|	1995-2006	
	Variance	**%**
Pure country effect	0.002	5.34%
Pure industry effect	0.001	1.34%
" Type of forecasted earnings" effect	0.004	7.81%
"Variation of forecasted earnings" effect	0.002	5.00%
"Number of analysts" effect	0.001	2.32%
Idiosyncratic effects	0.036	78.18%
Total variance of forecast errors in absolute mean	0.046	100.00%

Table 4A: Decomposition of signed forecast errors' (|FEREs|) variance by year

|FEREs|	**Pure country effect**	**Pure industry effect**	**" Type of forecasted earnings" effect**	**"Variation of forecasted earnings" effect**	**"Number of analysts" effect**	**Idio-syncratic effects**
1995	5.78%	0.92%	9.16%	7.10%	1.25%	75.79%
1996	5.71%	0.89%	9.61%	7.18%	2.89%	73.73%
1997	8.92%	1.59%	6.20%	4.19%	3.11%	75.99%
1998	9.58%	1.54%	8.11%	7.24%	2.40%	71.13%
1999	5.89%	1.66%	7.42%	4.69%	1.74%	78.61%
2000	4.22%	1.14%	6.10%	5.55%	2.42%	80.57%
2001	3.68%	1.33%	5.82%	8.30%	1.43%	79.45%
2002	4.38%	1.55%	11.77%	3.77%	1.42%	77.10%
2003	3.79%	1.00%	8.04%	2.12%	1.77%	83.27%
2004	3.45%	1.42%	4.61%	0.69%	3.54%	86.29%
2005	3.16%	1.33%	5.74%	2.56%	3.36%	83.84%
2006	4.61%	1.99%	7.05%	2.31%	3.66%	80.38%
1995-2000	5.51%	0.77%	7.74%	5.87%	2.07%	78.04%
2001-2006	2.65%	0.89%	7.91%	3.54%	2.13%	82.88%
1995-2006	5.34%	1.34%	7.81%	5.00%	2.32%	78.18%

|*FEREs*| are absolute forecast errors = $|(FE_{i.h.t} - RE_{i.h.t}) / RE_{i.h.t}|$. $RE_{i.\,t}$ is reported earnings per share of firm *i* for fiscal year *t*. $FE_{i.\,h.\,t}$ = consensus forecasted earning per share of firm *i* for fiscal year *t*. with a forecast horizon of *h* months before earnings report. We use forecasts made from one to 9 months before earnings report date. Only results for forecasts made with an horizon of one month are reported in the Table 1 because they are the most accurate.

Table 2B : OLS regressions of forecast errors (FEREs) on country, industry, and firm specific factors using equation (3) and constraints (4a) to (4e)

Period: 1995-2006, horizon=1

Coefficients		Estim. Param.	Std. Error	T-test H0 : Coef. =0	ChiSq.
Europe Area	α	0.016	0.002	9.79**	103.40**
Austria	c1	0.010	0.012	0.81	0.52
Belgium	c2	0.018	0.009	2.03*	3.66
Denmark	c3	-0.005	0.008	-0.61	0.36
Finland	c4	-0.041	0.008	-5.28**	19.18**
France	c5	0.008	0.004	1.78	3.14
Germany	c6	0.015	0.005	3.36**	8.65**
Greece	c7	0.024	0.008	3.15**	8.02**
Ireland	c8	0.019	0.007	2.82**	5.49**
Italy	c9	-0.001	0.011	-0.12	0.02
Netherlands	c10	-0.005	0.006	-0.80	0.76
Norway	c11	-0.020	0.008	-2.38*	3.60
Portugal	c12	0.008	0.013	0.61	0.32
Spain	c13	0.035	0.007	4.73**	27.59**
Sweden	c14	-0.012	0.006	-1.93	3.46
United Kingdom	c15	-0.012	0.002	-4.86**	30.19**
Czech Republic	c16	0.018	0.020	0.92	0.64
Hungary	c17	0.047	0.019	2.52*	9.61**
Poland	c18	0.041	0.015	2.73**	7.20**
Basic industries	s1	0.007	0.005	1.36	1.83
Capital goods	s2	0.009	0.003	2.84**	8.89**
Consumer durables	s3	0.026	0.009	2.75**	7.58**
Consumer non-durables	s4	0.018	0.004	4.07**	18.87**
Consumer services	s5	0.009	0.003	2.81**	8.49**
Energy	s6	0.032	0.010	3.34**	10.49**
Finance	s7	-0.036	0.004	-10.03**	102.46**
Health care	s8	-0.020	0.007	-2.85**	8.38**
Public utilities	s9	-0.034	0.008	-4.11**	18.46**
Technology	s10	0.012	0.005	2.25*	3.47
Transportation	s11	-0.020	0.009	-2.30*	3.86*
Positive Earnings: Profits	r1	-0.018	0.001	-35.02**	497.15**
Negative Earnings: Losses	r2	0.190	0.005	35.02**	497.15**
Increase in earnings	v1	-0.053	0.001	-48.09**	1813.19**
Decrease in earnings	v2	0.114	0.002	48.09**	1813.19**
Stocks followed by 3 to 5 analysts	η1	-0.003	0.002	-1.60	2.35
Stocks followed by 6 to 9 analysts	η2	0.001	0.003	0.31	0.10
Stocks followed by 10 to 15 analysts	η3	-0.002	0.004	-0.39	0.20
Stocks followed by more than 15 analysts	η4	0.007	0.004	2.01*	5.45*
Number of observations : 22,946					
Adjusted R^2 : 0.1817					

FEREs are signed forecast errors = $(FE_{i,h,t} - RE_{i,h,t}) / | RE_{i,h,t} |$. $RE_{i,t}$ is reported earnings per share of firm *i* for fiscal year *t*. $FE_{i,h,t}$ = consensus forecasted earning per share of firm *i* for fiscal year *t*, with a forecast horizon of *h* months before earnings report. We use forecasts made one month before earnings report date.

Table 3B: Decomposition of signed forecast errors' (FEREs) variance

FEREs	**1995-2006**	
	Variance	**%**
Pure country effect	0.001	1.68%
Pure industry effect	0.001	1.65%
" Type of forecasted earnings" effect	0.005	5.93%
"Variation of forecasted earnings" effect	0.012	15.36%
"Number of analysts" effect	0.000	0.26%
Idiosyncratic effects	0.061	75.12%
Total variance of forecast errors in absolute mean	0.081	100.00%

Table 4B: Decomposition of signed forecast errors' (FEREs) variance by year

FEREs	**Pure country effect**	**Pure industry effect**	**" Type of forecasted earnings" effect**	**"Variation of forecasted earnings" effect**	**"Number of analysts" effect**	**Idio-syncratic effects**
1995	1.45%	0.69%	6.36%	17.62%	0.18%	73.71%
1996	2.34%	0.86%	5.82%	18.51%	0.07%	72.41%
1997	0.90%	1.18%	5.63%	15.43%	0.23%	76.63%
1998	2.33%	2.45%	3.99%	17.10%	0.15%	73.98%
1999	2.03%	1.84%	4.68%	18.34%	0.13%	72.98%
2000	1.30%	3.10%	3.57%	15.98%	0.06%	75.98%
2001	1.39%	1.63%	4.89%	16.75%	0.07%	75.28%
2002	2.11%	1.20%	10.02%	13.14%	0.31%	73.22%
2003	1.61%	1.30%	6.30%	11.04%	0.24%	79.51%
2004	2.58%	1.00%	8.79%	9.94%	0.93%	76.76%
2005	0.82%	2.19%	3.58%	12.41%	0.79%	80.21%
2006	1.01%	2.60%	5.44%	10.66%	0.26%	80.02%
1995-2000	0.46%	1.00%	4.88%	17.37%	0.02%	76.27%
2001-2006	0.46%	0.94%	6.99%	13.76%	0.14%	77.71%
1995-2006	1.68%	1.65%	5.93%	15.36%	0.26%	75.12%

Figure 1A: Evolution of the forecast accuracy by country: 1995-2006

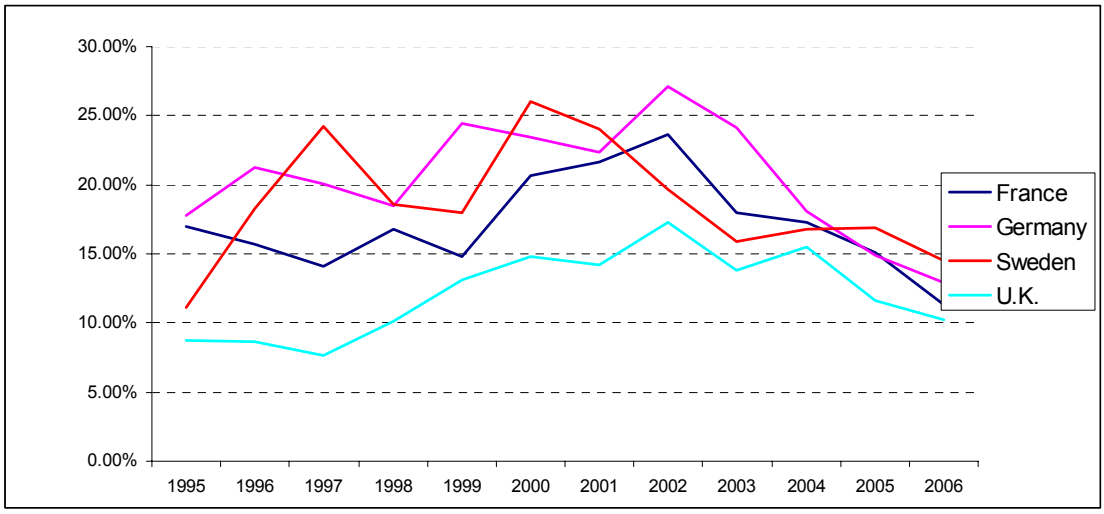

Figure 1B: Evolution of the forecast accuracy by accounting system: 1995-2006

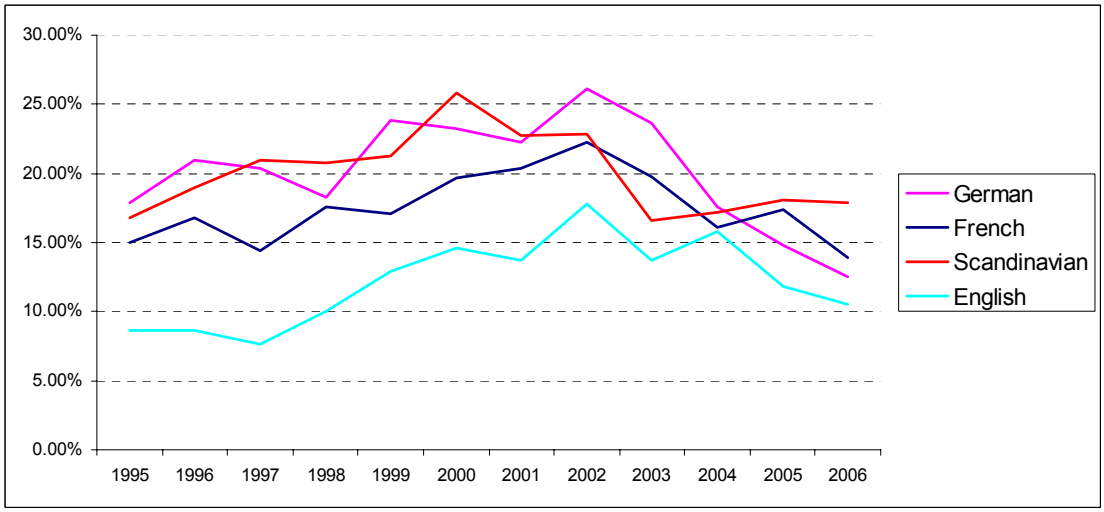

Figure 1/C: Evolution of the forecast accuracy by industry: 1995-2006