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Dispersion in Analysts' Forecasts and Stock Prices: An Empirical Test

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The aim of the paper is to study the dispersion phenomena among financial analysts' judgments and how this influences stock prices. To address this issue, the article has undertaken an empirical investigation of the relationship between expected earnings, as in financial analysts' forecasts, and stock prices. It considers the dispersion in analysts' forecast as a proxy of the security risk. As a matter of fact, the return volatility is the most accurate measure of risk, then, consistently, it is correct to consider the earnings' standard deviation relative to analysts' expectations as a measure of risk. It chose a regression model to test the research hypothesis and to confirm the inverse relationship between stock prices and the dispersion in analysts' forecasts in terms of expected earnings. The analysis was conducted on a sample of securities listed on the Eurostoxx 50®. The sample covers a period of six years, from 2002 to 2007, because it is supposed that after 2008, the securities price were strongly influenced by extra-economic factors. The result of the empirical test shows an inverse relationship between the price of the security and the dispersion among analysts' judgment: the broader the dispersion is, the higher the risk is, with a lowering effect on security price. So, this result seems to confirm that the dispersion in predictions could be considered as a proxy of risk. The outcome has some interesting managerial implications as the insight that strategic maneuvers undertaken to reduce the dispersion among analysts' forecasts have a positive impact on a security's price and, consequently, on the company market value.

Keywords: analysts' forecasts dispersion, stock risk, stock price, financial disclosure

Introduction

The aim of the paper is to study if dispersion in analysts' predictions has significant result in stock price movements. The article considers dispersion as a proxy for risk perceived by analysts. Therefore, up movements of dispersion are related to down movements in firm market value. The thesis is consistent with most previous studies on the topic. There are some authors who countervail the existence of a negative relationship between dispersion and stock price. Where information asymmetries are at the origin of the dispersion phenomena, if the hypothesis is verified, then, a strict relationship between the disclosure of information and the firm's market value is implied: the more effective the disclosure is; the less the dispersion in predictions with a positive impact on contemporaneous market value should be. The current research stands

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on earlier empirical findings. After the literature survey, it defines the hypothesis of an inverse relationship between dispersion in analysts' judgments and share price and tests it by adopting a linear regression model. This paper has four sections. The first section contains the literature survey. The second section explains the research hypothesis, model and methodology. Results are shown in the third section. Finally, conclusions are reported in the fourth section.

Literature Review

Considering each analyst's earnings forecasts for a single stock at any give date, then, it is possible to compute variations among opinions. For some stocks, the dispersions in analysts' opinions are rather huge. The evidence of divergence in estimates leads to two main questions: the first one is what causes those quite sensible differences in analysts' opinions; and the other one is how this phenomenon has impacts on security price and return. By definition, each forecast must be considered as reliable as another one, since it is not possible to have ex-ante knowledge of the forecasts' effective accuracy. When opinions diverge, the largest one is the magnitude of variations, then, the more likely differences in estimates can be considered as a signal of a perturbation in the market. As an example, a lack of consensus could have a reflection in terms of analysts' divergence of opinion (Barry & Jennings, 1992). The divergence phenomenon has been investigated by several studies with results that sometimes conflict each other. Among other factors, heterogeneity of expectations could be at the origin of a market perturbation. Investors' behavior is biased by the expectations, so investment direction is biased by the market sentiment. The influence of expectations results in securities price variation. Expectations vary according to subjective belief and opinions. Hence, the heterogeneous landscape of belief could alter the market equilibrium (Miller, 1977; Jarrow, 1980; Morris, 1996). However, the formation of expectations also depends on the availability of information and on the timing of new information arrival. Analysts' forecasts are one of the most important sources of information for investors. So, since analysts' forecasts influence investors' expectations, then, it is possible to gather that they indirectly contribute to influencing stock price variations. The relation between analysts' forecasts dispersion and stock price is somewhat controversial. However, the timing horizon of studies could affect empirical evidence. As a matter of fact, heterogeneity in analysts' forecasts can be verified both in a synchronic horizon and a diachronic one: the literature debate on the relation between forecasts dispersion and securities price could lead to contrasting results when different time horizons are taken into account, due to the different sources of information available in heterogeneous periods. As a result of this debate, event studies argue over the neutrality of the market momentum in the long run. Most authors found in their empirical tests a positive relation between an increased risk and a higher dispersion, but, on the opposite, other evidence shows that sometimes a higher dispersion could be associated with positive variation in stock price. So, one cause of divergence in research outcomes could be found both in the timing horizon taken into account and, consequently, in the use of different datasets to analyze the dispersion. Among others studies, some critical previous findings point out that the direction and the magnitude of the change in expectations' dispersion impact on stock price (L'Her & Suret, 1996); higher levels of dispersion are associated with a lower security price (Kazemi, 1991); the heterogeneity of expectations is a proxy for risk (Varian, 1989; Barry & Brown, 1985); the dispersion in analysts' earnings forecasts is a proxy for differences of opinion among analysts (Diether, Malloy, & Scherbina, 2002), or a proxy for uncertainty (Zhang, 2006; Barron & Stuerke, 1997), or a proxy for idiosyncratic parameter risk (Johnson, 2004). Growing levels of uncertainty increase the option value of the firm, but negatively influence contemporaneous

stock price (Johnson, 2004). Further, a high idiosyncratic risk is associated with more dispersion among earnings' forecasts (Barron, Stanford, & Yu, 2009). In the Johnson model (2004), there is a detailed explanation of the reason why this dispersion could be seen as a proxy of risk. The author's stance is that forecasts' dispersion is a proxy for non-systematic risk when the firm's underlying value is not observable. Hence, the model takes into account a distinction between fundamental and parameter risk and between priced and unpriced risk. In addition, it looks upon the difference between the existence of an exogenous risk for investors and the endogenous risk that reflects in a security's price. Regarding the insight of the dispersion as a proxy for uncertainty, in the Zhang model (2006), the dispersion is used as a proxy for information uncertainty. In the Barron-Stuerke model (1997), the authors refer to dispersion as a proxy for ex-ante uncertainty. However, there are some criticisms that affect the interpretation of dispersion as a proxy for uncertainty: dispersion is just one source of uncertainty and, at the same time, dispersion is not always due to uncertainty but could depend on several other factors. Hence, information asymmetry and uncertainty are two different factors that positively bias dispersion (Barron, Stanford, & Yu, 2009). The level of dispersion reflects both of them (Barry & Jennings, 1992; Abarbanell, Lanen, & Verrecchia, 1995). Almost by definition, information circulating in the market influences securities price. There are previous studies that showed evidence of the link between dispersion and financial disclosures (Swaminathan, 1991; Lang & Lundholm, 1996). Further, some previous findings make a connection between the dispersion and the release of interim reports: the arrival of new information could determine a surprise effect that leads to dispersion. So, consistent with Baron et al. model (2009), it is possible to distinguish, on the one hand, an ex-ante unsystematic uncertainty that increases the level of dispersion and is related to future returns; on the other hand, a change in information asymmetry that negatively affects contemporaneous stock returns. After the release of interim reports, analysts may revise their estimates (Stickel, 1989). This revision could induce both an immediate and a lagged reaction in stock price. Other studies reach slightly different conclusions: annual reports are more relevant than interim reports for analysts' forecasts and the dispersion among estimates (Cornell & Landsman, 1989). One explanation of those contrasting results could be the possibility of an artificially inflated dispersion after earnings release due to outdated forecasts (Brown & Han, 1992). The magnitude of the reaction could depend on the surprise effect. Although the positive relation between surprise and dispersion has some reliable empirical evidences, it remains quite difficult to explain in which manner this affects the magnitude of stock price reaction (Daley, Senkow, & Vigeland, 1988). The Barron-Stuerke model (1997) offers some elucidations on this point. The authors confirm the positive relation between surprise and dispersion, but they also find that the magnitude of price reaction becomes less related to surprise in the mean analyst forecast. The underlying topic of this debate relates to the value of information in dispersion. Information asymmetry causes dispersion and lowers future stock returns (Diether, Malloy, & Scherbina, 2002). Clearly, the source of information (dataset) used by analysts, biases their earnings forecasts (Morse, Stephan, & Stice, 1991; Brown, 1992). At the same time, different research outcomes are due to the heterogeneous source of information and measures used to validate theory models. Consistent with the above assumption of the effect of heterogeneous information on the level of dispersion among estimates, a reduction in information asymmetries among analysts could have a positive effect on stock price by reducing the dispersion in forecasts. However, this happens when investors' behaviors are strictly influenced by analysts' forecasts. When investors under react to the revision of estimates, because they rely on several other sources of information, the above positive relation could be disconfirmed (Zhang, 2006).

Research Hypotheses, Methodology, and Model

The aim of the current paper is to study the relation between dispersion in analysts' forecasts and securities price. The research model relies on the assumption that dispersion is a proxy for risk. As a matter of fact, volatility is a measure of risk by definition. Consistent with this general assumption, the article uses standard deviation to compute the dispersion of forecasts. In particular, it considers dispersion as a proxy for the risk perceived by analysts. Hence, the factors influencing analysts' opinions are the availability of critical information; the business risk; and the risk related to the firm's structure. Therefore, the research expects a positive relation between a lower degree of dispersion and the availability of critical information. When information is clear, effective, and timely, the uncertainty should be reduced, and the analysts' belief should be more homogeneous. The exposition to business risk depends on several factors, including, for instance, the possibility to experience a loss, rather than sales volume, input costs, competition and many others. When there is a high uncertainty over the future value of the above variables, dispersion should arise. Finally, the risk related to a firm's structure depends on the fixed to total costs ratio (fixed costs plus variable costs), and on the debt to equity ratio, because of its effect on financial burdens. In other words, the structural risk depends on the economic-financial leverage resulting from the combination of operational risk and financial risk (Hamada, 1972). Consistent with the propositions above, our model relies on the following hypothesis:

H1: There is an inverse relationship between the dispersion in analysts' earnings forecasts and the securities price.

The market value not only depends on risk, but also depends both on expected cash flow and earnings. Hence, our model takes into account:

Expected earnings each year for the next three years, computed as the annual mean value of analysts' forecasts;

Annual mean value of earnings dispersion for the next three years, computed as the annual standard deviation of analysts' forecasts.

The model tests the following relationship:

$$P_i = \alpha + \beta_1 AEF_i + \beta_2 SD_i + \varepsilon_i \quad (1)$$

where:

P_i is the effective price of the security i at the end of the year;

AEF_i is the mean value for analysts' earnings estimations relative to the security i and computed on the basin of data available at the end of the year for the next three years;

SD_i is the mean value for standard deviation of analysts' earnings forecasts relative to the security i and computed on the basin of data available at the end of the year for the next three years;

ε_i is the error.

The study considered a sample of listed companies to test our model. The dataset used in the current analysis includes all the Eurostoxx 50® companies except for RWE (because of a lack of information over some of the years included in the time range.) The index includes 50 European Blue-chip companies and provides a representation of supersector leaders in the Eurozone. The sample is consistent with the scenario assumption underlying most studies. As a matter of fact, Eurostoxx 50® companies usually have a high trading volume and a rather large number of analysts who are studying their dynamics. The time range considered in the analysis covers the period from 2003 to 2007. Since extra-economic factors influenced the market starting

from 2008, there years after 2008 were excluded from the test. The research used regression analysis, one for each of the five years with 49 observations for each year.

The Findings

The empirical test is consistent with the research hypothesis and the regression results confirm the inverse relationship stated in the model, for each of the years included in the time range. In particular, the test found that:

- There is a negative relationship between security price and analysts' forecast dispersion;
- Securities price and returns are directly interrelated.

For 2004, the regression outcome confirms the inverse relationship among variables, though, it has a low significance level. The test presents some limitations. The first limitation regards the length of the considered period. However, the choice is justified by the need to exclude extra-economic factors influencing the share price, as it happened after the 2007. In the chosen time range, the securities prices were mostly led by companies' fundamentals. One could accept that the 2007-2008 period was characterized by one of the worst crisis that was never experienced from 1929 so far. However, strangely, there was no huge price to earnings ratio increases, as usually happens before financial bubbles burst (Iannuzzi, Renzi, & Sancetta, 2009). Finally, the test could have used a wider sample, including other markets, except the Eurozone. Results for the regression analysis are shown in Table 1.

Table 1

Regression Analysis for the Years 2003, 2004, 2005, 2006, and 2007

	2003	2004	2005	2006	2007
Constant	6.154002**	6.486465**	9.167082***	7.952890***	10.365082***
	(2.519773)	(2.282069)	(3.259275)	(3.265962)	(2.946855)
Variables					
β_1 - AEF	10.192947***	11.070371***	12.105704***	16.876085***	14.585449***
	(9.821092)	(8.442320)	(6.532005)	(14.242171)	(9.300367)
β_2 - ASD	-8.379096**	-4.855344	-37.766145*	-77.398447***	-63.111833***
	(-2.300090)	(-0.701859)	(-1.956452)	(-6.309677)	(-2.946591)
R^2	0.783941	0.775480	0.786283	0.899475	0.859267
F	83.452207	79.440706	84.618723	205.798741	140.430372
N	49	49	49	49	49

Notes. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$; Source: I.B.E.S./Datastream.

Summary and Conclusions

To sum up, the empirical test on Eurostoxx 50® unveils that the standard deviation of analysts' earnings forecasts negatively affects securities price. Hence, the result seems to verify that dispersion in analysts' forecasts is a proxy for risk, as initially stated in our model. The findings pose some critical managerial implications, as the insight that strategies undertook to reduce dispersion have a positive impact on stock price and on a firm's market value. Decisions made in order to reduce information asymmetry could result in analysts' more homogeneous expectations and contribute an increase in the market value of the company. In conclusion, the results of the empirical test suggest that dispersion has a negative impact on contemporaneous stock price. On the one hand, this seems to disconfirm some previous findings that established a negative

relationship between stock returns and the dispersion of analysts' earnings forecasts. (Diether, Malloy, & Scherbina, 2002). On the other hand, our analysis also seems to reach the same conclusion of those authors above the theme of transparent and timely disclosure, though from a different perspective. We might expect that an effective disclosure could help to reduce dispersion among analysts' predictions with a positive effect on the market value.

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