

## The Effect of Earnings Projection Revisions on Stock Returns in Brazil

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**ABSTRACT:** This paper investigates the information content of analysts' earnings forecast revisions for Brazilian companies, defined as the ability to change stock prices. Using data from I/B/E/S and Economatica covering the period from 1995 through 2002, we find that forecast revisions that follow the consensus (herding behavior) provide small information content. A forecast revision is more informative when it deviates from the consensus, both in the case of good or bad news. *Momentum* is the main element to explain the behavior of stock returns in light of revised earnings forecasts. The results provide evidence that these revisions are largely based on previous stock performance. The findings are relevant, especially for those that use analysts' earnings forecasts in their valuation models, as well as portfolio managers and individual investors.

**Keywords:** earnings forecast revisions, stock returns, earnings per share, analysts.

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## 1. INTRODUCTION

**T**he rising importance of stock market analysts in Brazil is evidence of the growing importance of the capital market to the country's economy. When making decisions, many investors, fund managers and other market professionals rely on the projections and recommendations of analysts. As agents that propagate information, analysts play an important role in consolidating market expectations, and these expectations are the drivers of stock prices.

As they receive new information, analysts revise their projections. These revisions thus reflect the changes in expectations of a company's future performance. If revisions really have an informative role, then the stock prices should be influenced by them.

There can be many consequences of revised projections on the capital market. Besides fluctuations in returns, a share's liquidity and price volatility can be affected by revisions. Although these last two effects are interesting, this study concentrates only on stock prices.

Before undertaking a detailed study to analysts' revisions regarding Brazilian companies, it is necessary to define as rigorously as possible the types of forecast revisions. Depending on the intrinsic characteristics of each type of revision, it is possible to infer its effects on returns.

The rest of this article is organized as follows. First we discuss and classify revisions. Then we identify the market-adjusted return of these revisions for Brazilian companies, by tabulating the data by type of revision. We also carry out regressions to provide more robust conclusions.

## 2. REVIEW OF THE LITERATURE: ARE REVISED PROJECTIONS INFORMATIVE FOR THE MARKET?

As time passes and new information becomes available, analysts revise their projections. BROWN et al. (1987) showed that as the date approaches for announcement of company results, analysts' projections become more accurate. This is reasonable, since new information is being processed and uncertainty reduced.

Two facts that emerge from the international literature on earnings projection revisions are particularly interesting. First, these revisions are informative for the market, causing variations in securities prices. There is an immediate response of the market to revised projections, at the time they are released. Second, revisions seem to be incomplete in the short run. After a revision, the price variations continue in the same direction as the revision for a longer period.

Among the sources of evidence for these facts is the work of GIVOLY and LAKONISHOK (1980), the first to document a change in the behavior of stock returns after a revision in analysts' projections. LYS and SOHN (1990) found that analysts' projections are informative, even when they have been preceded by another forecast, or an announcement of recent earnings results by the firm. STICKEL (1991) demonstrated that firms whose consensus projections were revised upward had an abnormal price rise, which was maintained for three to twelve months.

These findings have been confirmed in subsequent studies, such as that of GLEASON and LEE (2003), who observed that revisions are informative not only in the period near the revision, but also over a longer term. This evidence appears to indicate that unlike previously believed, price adjustments in the market to new information are not just instantaneous.

GLEASON and LEE (2003) innovated by presenting a new instrument for evaluating revisions. The previous literature only examined the quantitative aspects, without considering qualitative ones. More than the magnitude, the differential qualities of a revision can have explanatory power about the market response. The authors stated that a revision will be more or less informative depending on whether it is innovating on or must imitating previous revisions (herding).

An interesting question is to check whether the market in some way responds to analysts' past performance. In other words, does the past accuracy of an analyst's projection revisions have any impact on the informative quality of his or her later ones? In this line, CLEMENT and TSE (2003) found that the market appears to disregard analysts' past performance. Investors appear to prefer to trust easily visible characteristics (such as the status of the brokerage house that employs the analyst) as proxies for accuracy than to try to identify more accurate analysts by examining their individual performance.

Studies of earnings projections in Brazil are still incipient. DA SILVA (1998) and FRANCO (2000) found that there is an optimistic bias in the projections of Brazilian analysts. Although relevant, this study did not find any relationship between the projections and the behavior of stock prices.

### 3. QUALIFYING THE PROJECTION REVISIONS AND FORMULATING THE HYPOTHESES

Various factors can explain the impact a determined revision will have on the market. Some of them are firm specific, others are associated with the particularities of the information environment and characteristics of firms or sectors in general.

Drawing our inspiration from the evaluation instrument proposed by GLEASON and LEE (2003), we defined some aspects that, by hypothesis, can have an impact on the informational effect of an earnings projection revision in the market.

#### 3.1 Magnitude of the revision (quantitative)

The effects of a revision should be associated with its magnitude. In both a revision projecting higher and lower earnings, the greater the difference between the previous and new projections, the greater will be the consequences on the stock price.

To measure the magnitude of a revision (MagRev), we looked at the difference between the earnings per share (EPS) projected in the new revision and the figure from the last forecast from the same analyst, measuring this difference in terms of the absolute value of the previous prediction.

Mathematically, the calculation of  $\text{MagRev}_{i,j,t}$  can be represented by the following relation:

$$\text{Mag Rev}_{i,j,t} = \frac{(\text{Pr } ev_{i,j,t}^{\text{new}} - \text{Pr } ev_{i,j,t}^{\text{old}})}{|\text{Pr } ev_{i,j,t}^{\text{old}}|}$$

where:  $\text{Pr } ev_{i,j,t}^{\text{new}}$  is the most recent predicted EPS (earnings per share) of analyst  $i$  for firm  $j$  in period  $t$  and  $\text{Pr } ev_{i,j,t}^{\text{old}}$  is the oldest EPS prediction of analyst  $i$  for firm  $j$  in period  $t$ .

It can be seen, then, that the value of  $\text{MagRev}_{i,j,t}$  will be positive for upward earnings revisions and negative for downwards revisions. Expressing the magnitude of the revision in terms of the absolute value of the previous forecast is a requirement to assure precisely

capturing the signal of the magnitude independent of whether the previous forecast was for a profit or loss.

### 3.2 Good and bad news and innovation of the analyst (qualitative)

A revision can be classified by other aspects besides direction and magnitude. Among these aspects are, for example, the nature of the news it transmits and the degree of the analyst's innovation.

Many revisions are only made because of a chain reaction. Analysts often tend to follow the behavior of others (herding behavior). Doing what everyone else is doing is a rational attitude by individuals in a context where they believe other agents might have more information.

In this respect, a revision that merely confirms what the market already knows can reasonably be classified on average as less informative than one that really brings novel news.

Revisions can basically bring good news (upward revisions) and bad news (downward revisions) to the market. However, if a revision accompanies what the market, on average, already knows, whether good or bad, it is not very informative.

In this context, an "informative" revision is one that stands out from the market in the positive sense (**G revision**) or negative sense (**B revision**). Positive or negative revisions that only repeat the previous consensus are not informative with respect to the previous ones. We call these **H revisions** (for herding).

Further regarding the qualitative aspect, another way to identify the informative content of a revision is by considering its level of innovation in light of what the analyst has stated in the past. If an analyst's previous forecast was relatively pessimistic for a company, that is, below the consensus, and the new forecast is above the consensus, we believe this revision is informative. We classify this type of revision as good innovative one (**GI revision**). It must be informative because it represents a sharp change of behavior, indicating that the analyst may well be aware of some fact causing him or her to change the previous opinion regarding the firm.

Similarly, if the analyst's earlier forecast was above the consensus and with a negative revision it becomes lower than the consensus, we classify this as a bad innovation (**BI revision**).

**Charts A and B of Figure 1** summarize the differences among the various types of projections. From an analytic standpoint, considering the varying informational nature of each of these revisions, by hypothesis we expect to see different returns among these types of revisions.

For those revisions that carry genuinely new information, we expect more substantial changes in returns than for those that simply repeat information that the market already knew.

### 3.3 Information environment

The general level of information about a determined firm influences the individual value of an analyst's revision. For those firms that are covered by several analysts, the price adjustment process is much faster. On the other hand, for firms that are followed by a smaller number of analysts, the new information will be processed by the market more slowly. Therefore, the firm's information environment can influence the information content of an individual revision.

### 3.4 Other characteristics of firms

Certain characteristics of firms can influence the magnitude of returns in response to a revision. Among the variables often cited in the literature as explaining returns, we focus on the following:

- 1) Price *momentum*, measured by the market-adjusted return for a period of four months preceding the revision;
- 2) Firm size, defined by the logarithm of the market value adjusted to prices of July 2003;
- 3) Price to book value of equity ratio, measured in relation to the end of the preceding fiscal year.

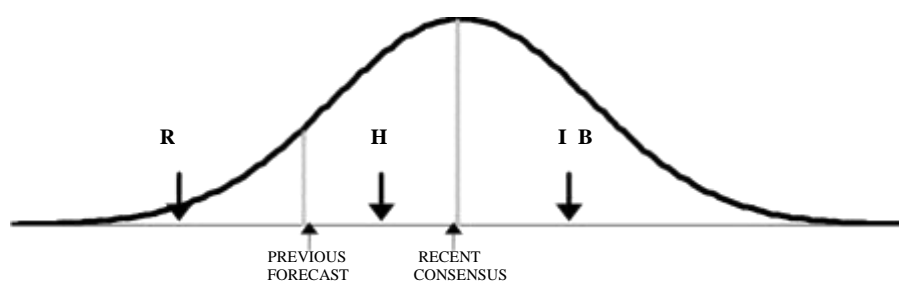


Figure 1 a: When the analyst's previous forecast is lower than the most recent consensus

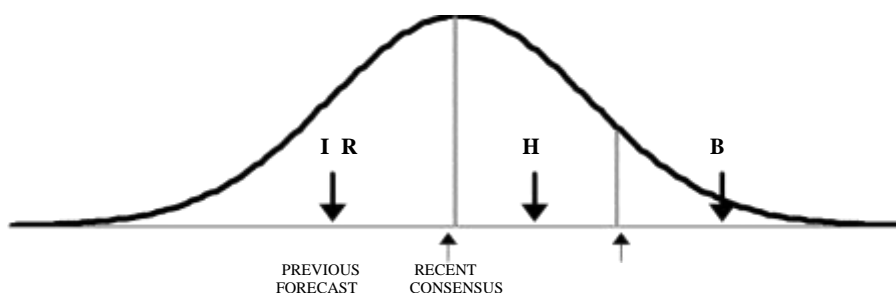


Figure 1 b: When the analyst's previous forecast is higher than the most recent consensus

#### Possible classifications for revisions:

**G – GOOD NEWS**

**B – BAD NEWS**

**H – ABSENCE OF NEW NEWS (HERDING)**

**BI – BAD INNOVATION / GI – GOOD INNOVATION**

**Figure 1:** Classification of analysts' earnings forecast revisions

Source: Adapted from Gleason and Lee (2003).

## 4. SAMPLE SELECTION AND RESEARCH METHODOLOGY

### 4.1. Sample selection criterion

To evaluate the informative potential of revisions, we collected information on the individual projections of analysts in the I/B/E/S database, identifying them by name or by the brokerage houses to which they are linked.

Our data cover the period from 1995 to 2002, focusing on analysts' revisions of EPS projections for the current year. This significantly restricted the sample size. We classified a forecast as a revision only when there was another forecast from the same analyst for the same firm in the same period. The analysts working as members of a team were included in the analysis, but those not identified were excluded.

To classify the revisions into types, we had to know the most recent consensus projections for each revision of an individual analyst. For this reason, we had to cross-reference the data on individual revisions with the most recent consensus to the revision date. The I/B/E/S system ascertains the consensus projections in the third week of every month. To obtain the data on the price *momentum*, firm size, price ratio and book value of equity, we used the Economatica system.

### 4.2. Determining the returns

To analyze the effects on returns, we gathered the daily stock price quotations from January 1995 to June 2003, adjusted by payment of earnings. In an effort to capture exactly the effects of analysts on the market, we chose the 120 most liquid stocks listed on the São Paulo Stock Exchange (Bovespa) in the period studied.

The lack of liquidity of a stock means the effects of a single transaction or event cannot be transferred in balanced form to the market prices. For companies with low liquidity, any event can mean the trading volume will suddenly spike in relation to the normal volume, triggering extreme price reactions in a short time frame, which may then be reverted.

For calculation of abnormal returns, we worked with market-adjusted returns, which are measured by the difference between the actual return computed and the return from the market as a whole in the same period. Our benchmark market return was the Ibovespa. We recognize, however, that this method has some inherent deficiencies, particularly the absence of treatment of risk. In the market-adjusted return, we assume that all companies have a *Beta* equal to 1.

As a consequence of the data selection parameters, from a total of over 35,000 projections, we reduced the sample to only 9,949 revisions. Some descriptive statistics are shown in Table 1.

**Table 1 – Descriptive statistics of the sample of analysts' projection revisions of Brazilian companies, 1995 to 2002**

	Núm. Firmas	Núm. Revisões	Número de Revisões por Firma			Média (%) da MagRev	
			Média	Mediana	D.P.	Down	Up
1995	74	1.278	17,27	16,00	8,72	-51,6%	38,2%
1996	73	971	13,30	11,00	10,27	-48,4%	41,2%
1997	77	1.462	18,99	16,00	13,90	-20,3%	23,6%
1998	88	1.241	14,10	10,00	13,04	-30,3%	36,0%
1999	77	845	10,97	9,00	8,86	-58,4%	78,2%
2000	71	1.225	17,25	14,00	13,76	-28,0%	24,2%
2001	70	1.654	23,63	18,50	20,01	-53,6%	40,1%
2002	60	773	12,88	12,00	8,12	-48,6%	37,4%
Total	106	9.449	86,69	61,00	77,06	-40,6%	38,9%

For better comprehension, we analyzed the market-adjusted returns in different windows:

Ret(-21,-3): market-adjusted return of -21 to -3 days from the revision date;

Ret(-2,-2): market-adjusted return of -2 to 2 days from the revision date;

Ret(3,21): market-adjusted return of 3 to 21 days from the revision date;

Ret(-2,60): market-adjusted return of -2 to 60 days from the revision date.

These are illustrated on the time line below:

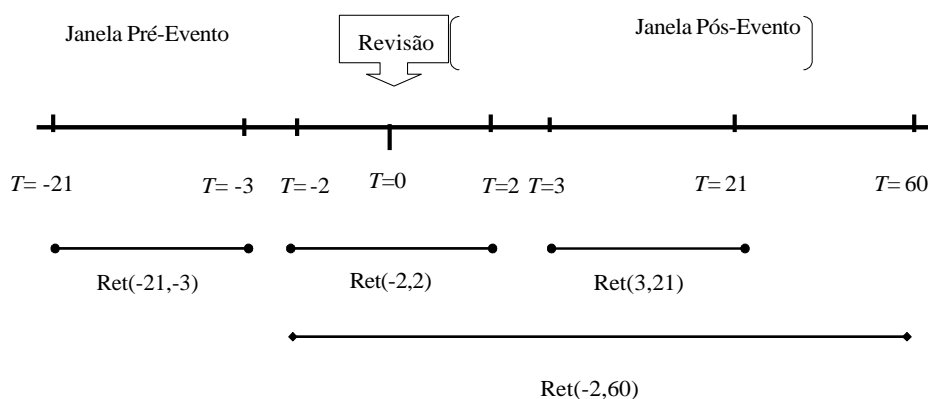


Figure 2: Time line of the returns around the revisions

The window for Ret(-2,2) seeks to capture the returns that occur in the days immediately around the revision. Since it is impossible to be absolutely certain whether the day indicated in the I/B/E/S system is the day when the revision actually began to circulate, we decided to expand the event window from two days before (-2) to two days after (2) the revision.

We investigated two other complementary windows: one going from 21 to 3 days before the revision (-21 to -3) and the other the same number of days after the revision (3 to 21). Finally, to ascertain the medium-term effect of a revision, we created a window running from two days before to 60 days after (-2 to 60), aiming to investigate whether the market-adjusted returns held up for a longer period.

## 5. RESULTS OF THE TABULAR CLASSIFICATION OF MARKET-ADJUSTED RETURNS FOR THE REVISIONS

As a first step in the investigation of the effects of revisions on returns, we created tables allowing easier visualization of the behavior of the market-adjusted returns for the different types of revisions during the study period.

### 5.1. Downward and upward revisions

The study indicated that downward revisions bring negative market-adjusted returns. **Table 2** shows that, in average terms, the market-adjusted returns were -5.05% on the days immediately around the revision [Ret(-2,2)] and -5.08% in the post-revision window [Ret(-3,21)]. In fact, the effects of such a revision remained for a longer period, as can be seen by the average of Ret(-2,60) of -5.14%. This negative trend held for all the years except 2002, when despite negative revisions, the market-adjusted return was positive and statistically significant for the shares studied.

The results were not as consistent for upward revisions. In general, we cannot claim that an increase in earnings projections causes a positive return. In the first years studied, from 1995 to 1998, upward revisions implied generally negative results. However, from 1999 to 2002, there was a positive and significant market-adjusted return in response to upward revisions.

To ascertain whether there really is a statistically significant difference in the returns for upward and downward revisions, we carried out a statistical test of differences of means (parametric) and found that in all the years except 1999 the difference between the returns to upward and downward revisions was positive and statistically significant.

Hence, we can state without hesitating that the revisions in general – both positive and negative – on average prompt a significant difference in returns, justifying the hypothesis that the revisions are informative, at least in relative terms.

### 5.2 Revisions with good and bad news and revisions that follow the consensus (herding)

By hypothesis, we believe that revisions that signal something new to the market are more informative than those that simply accompany the consensus. In this sense, after classifying the revisions into those bringing good and bad news and herding, we verified for each revision direction (upward and downward) the difference between the return to revisions bringing new information and those that merely followed the pack.

The empirical results demonstrate that the market really does differentiate revisions regarding the implicit news. In general, the revisions bringing bad news generate more negative returns than do those that, although bad, only follow the consensus. The difference is pronounced: -3.08% on average for Ret(-2,2) and -3.26% for Ret(3,21) for the most liquid firms.

Similarly, we found a significant positive difference of returns between the revisions bringing good news and those only following the consensus (herding). The return for the former was 2.35% greater in the Ret(-2,2) interval and 2.33% in Ret(3,21) for the liquid companies. This behavior was consistent in the majority of years, indicating it is relevant at the time of considering a revision to judge whether it brings new information or just follows the market, because the information content that the revision represents for the market depends on this aspect.

### 5.3 Revision as an innovation for the analyst

A revision that corresponds to a major change in an analyst's attitude, shifting from being relatively optimistic (in relation to the consensus) to being relatively pessimistic, or vice



versa, appears not to have a significant influence in the market in relation to other news of the same nature.

In general, the return with regard to innovative revisions was smaller in magnitude (in absolute value) than those for bad or good news that were not innovations.

#### **5.4. Are revisions responses to the evolution of the market?**

A point that particularly stands out in the results is that in general **the return in response to the revision event was already occurring in the same direction in the pre-revision period**. This fact appears to demonstrate that analysts of Brazilian companies, on average, tend to revise their projections when the market has already started to signal a certain direction of movement.

In other words, when a stock starts outperforming the market, it is probable analysts will announce an upward revision, and when a stock starts to perform below the market, it is probable that analysts will announce a downward revision.

**Table 2 – Comparison between the market-adjusted returns for analysts' earnings projection revisions classified by nature (up – down), news (good – bad) and level of innovation, for the 120 most liquid firms**

ANO	Retornos Médios	Revisões para Baixo (Down)						Revisões para Cima (UP)							
		Notícia Ruim "R"			Herding			Herding			Notícia Boa "B"			Total Up	Difer. Up-Down
		IR	R	Total "R"	H	Difer. R-H	Total Down	H	B	IB	Total "B"	Difer. B-H			
		(3)	(4)	(3)-(4)	(1)	(5)	(6)	(6)-(5)	(2)	(2) - (1)					
1995	Ret(-21,-3)	-19,04%	-18,25%	-18,63%	-11,98%	-6,65% ***	-17,26% ***	-10,39%	-7,54%	-8,81%	-8,26%	2,12%	-8,97% ***	8,29% ***	
	Ret(-2,2)	-18,99%	-18,55%	-18,76%	-12,48%	-6,28% ***	-17,47% ***	-11,03%	-8,19%	-8,91%	-8,60%	2,43%	-9,41% ***	8,06% ***	
	Ret(3,21)	-19,06%	-18,32%	-18,67%	-12,74%	-5,93% ***	-17,45% ***	-10,97%	-8,39%	-9,15%	-8,82%	2,15%	-9,54% ***	7,91% ***	
	Ret(-2,60)	-18,79%	-18,57%	-18,67%	-12,65%	-6,03% ***	-17,43% ***	-10,83%	-7,79%	-9,46%	-8,74%	2,09%	-9,43% ***	8,00% ***	
1996	Ret(-21,-3)	-14,45%	-14,43%	-14,44%	-8,86%	-5,58% **	-13,03% ***	-7,28%	0,42%	-2,73%	-1,43%	5,85% ***	-3,76% ***	9,27% ***	
	Ret(-2,2)	-14,78%	-14,31%	-14,56%	-9,36%	-5,20% **	-13,24% ***	-7,60%	0,42%	-2,88%	-1,52%	6,08% ***	-3,94% ***	9,30% ***	
	Ret(3,21)	-15,22%	-14,43%	-14,85%	-9,08%	-5,77% **	-13,39% ***	-7,88%	0,27%	-3,24%	-1,79%	6,08% ***	-4,22% ***	9,17% ***	
	Ret(-2,60)	-15,10%	-14,47%	-14,80%	-8,53%	-6,27% **	-13,21% ***	-8,24%	0,07%	-3,08%	-1,78%	6,46% ***	-4,35% ***	8,86% ***	
1997	Ret(-21,-3)	-7,85%	-11,37%	-9,00%	-10,34%	1,34%	-9,42% ***	-9,62%	-9,08%	-8,15%	-8,68%	0,94%	-9,03% ***	0,39%	
	Ret(-2,2)	-8,36%	-11,62%	-9,42%	-10,25%	0,82%	-9,68% ***	-8,94%	-8,73%	-8,77%	-8,74%	0,20%	-8,82% ***	0,87%	
	Ret(3,21)	-8,85%	-11,79%	-9,81%	-10,69%	0,88%	-10,09% ***	-9,49%	-9,36%	-8,91%	-9,17%	0,31%	-9,29% ***	0,80%	
	Ret(-2,60)	-8,55%	-11,77%	-9,60%	-11,30%	1,70%	-10,13% ***	-10,10%	-9,41%	-8,74%	-9,12%	0,97%	-9,49% ***	0,65%	
1998	Ret(-21,-3)	-6,56%	-10,20%	-8,20%	-7,96%	-0,23%	-8,13% ***	-4,06%	-3,70%	-1,12%	-2,65%	1,41%	-3,16% ***	4,97% ***	
	Ret(-2,2)	-6,33%	-9,79%	-7,88%	-8,36%	0,48%	-8,02% ***	-3,98%	-3,62%	-0,62%	-2,41%	1,57%	-2,97% ***	5,05% ***	
	Ret(3,21)	-5,92%	-9,06%	-7,33%	-7,02%	-0,32%	-7,24% ***	-3,80%	-3,20%	-1,32%	-2,44%	1,35%	-2,93% ***	4,31% ***	
	Ret(-2,60)	-6,42%	-9,37%	-7,75%	-6,77%	-0,98%	-7,46% ***	-4,48%	-3,32%	-2,30%	-2,91%	1,57%	-3,47% ***	3,99% ***	
1999	Ret(-21,-3)	4,64%	2,57%	3,67%	5,50%	-1,84%	4,18% ***	4,19%	7,73%	3,58%	5,48%	1,29%	4,99% ***	0,82%	
	Ret(-2,2)	3,73%	2,75%	3,27%	5,92%	-2,64%	4,01% ***	4,45%	7,83%	3,38%	5,41%	0,97%	5,05% ***	1,04%	
	Ret(3,21)	3,38%	2,20%	2,82%	5,97%	-3,15%	3,70% ***	4,10%	8,09%	2,94%	5,29%	1,19%	4,85% ***	1,15%	
	Ret(-2,60)	3,38%	2,27%	2,86%	5,13%	-2,27%	3,49% ***	3,21%	8,19%	2,30%	5,00%	1,78%	4,32% ***	0,84%	
2000	Ret(-21,-3)	2,28%	0,21%	1,25%	3,19%	-1,95%	1,83% **	2,12%	5,12%	4,61%	4,90%	2,78% **	3,86% ***	2,04% **	
	Ret(-2,2)	1,90%	0,35%	1,13%	3,35%	-2,22% *	1,79% **	2,13%	5,15%	4,83%	5,01%	2,88% **	3,94% ***	2,15% **	
	Ret(3,21)	1,22%	0,05%	0,64%	3,64%	-3,00% **	1,53% **	2,36%	5,58%	4,98%	5,33%	2,97% **	4,22% ***	2,69% **	
	Ret(-2,60)	1,36%	0,43%	0,90%	3,52%	-2,62% **	1,68% **	2,41%	5,65%	4,89%	5,33%	2,92% **	4,24% ***	2,56% **	
2001	Ret(-21,-3)	-1,12%	-3,47%	-2,13%	2,06%	-4,19% **	-0,89%	3,33%	4,71%	5,98%	5,19%	1,86%	4,55% ***	5,43% ***	
	Ret(-2,2)	-1,43%	-3,48%	-2,30%	2,04%	-4,34% **	-1,01%	3,41%	4,77%	6,54%	5,43%	2,02%	4,74% ***	5,75% ***	
	Ret(3,21)	-1,28%	-3,55%	-2,25%	1,75%	-4,01% **	-1,06%	3,44%	4,64%	6,48%	5,33%	1,89%	4,68% ***	5,74% ***	
	Ret(-2,60)	-1,40%	-3,50%	-2,30%	1,56%	-3,86% **	-1,15%	3,35%	4,59%	6,54%	5,32%	1,97%	4,64% ***	5,79% ***	
2002	Ret(-21,-3)	3,89%	2,88%	3,47%	5,19%	-1,72%	3,95% ***	4,73%	9,31%	8,69%	8,98%	4,24% *	7,40% ***	3,45% **	
	Ret(-2,2)	3,89%	3,24%	3,62%	5,74%	-2,11%	4,22% ***	5,10%	9,62%	8,79%	9,18%	4,08% *	7,66% ***	3,44% **	
	Ret(3,21)	4,11%	3,24%	3,75%	5,75%	-2,01%	4,31% ***	4,96%	9,20%	8,87%	9,02%	4,06% *	7,51% ***	3,20% **	
	Ret(-2,60)	3,82%	2,80%	3,39%	5,56%	-2,16%	4,00% ***	4,89%	9,39%	8,13%	8,72%	3,83% *	7,29% ***	3,29% **	
Total	Ret(-21,-3)	-4,89%	-6,93%	-5,80%	-2,82%	-2,98% ***	-4,96% ***	-1,53%	1,16%	0,47%	0,84%	2,38% ***	-0,02%	4,94% ***	
	Ret(-2,2)	-5,15%	-6,87%	-5,91%	-2,84%	-3,08% ***	-5,05% ***	-1,46%	1,21%	0,54%	0,90%	2,35% ***	0,04%	5,09% ***	
	Ret(3,21)	-5,29%	-6,88%	-5,99%	-2,73%	-3,26% ***	-5,08% ***	-1,54%	1,19%	0,34%	0,79%	2,33% ***	-0,06%	5,02% ***	
	Ret(-2,60)	-5,29%	-6,92%	-6,02%	-2,89%	-3,12% ***	-5,14% ***	-1,83%	1,23%	0,07%	0,69%	2,52% ***	-0,23%	4,91% ***	

Teste de T para Média e a Diferença - Significante : \*\*\* 1%, \*\* 5%, \* 10%

Notes: Ret(-t,t) – market-adjusted return in the period from -t to t days from the revision date

B – bad news

BI – bad news – innovation for the analyst

G – good news

GI – good news – innovation for the analyst

H – herding – follows the consensus

As discussed in this item, the data in tabular form bring many relevant insights about how the different types of revisions are received by the market. Nevertheless, though useful, this type of presentation does not permit identifying how the magnitude of the revisions and

the classification types together influence the market-adjusted returns. The next item contains analyses of multiple regressions, seeking to provide additional evidence.

## 6. ANALYSIS OF REGRESSIONS FOR ANALYSTS' EARNINGS PROJECTION REVISIONS

To ascertain the effects of the revisions on the market-adjusted returns controlled by aspects such as magnitude of the revision, nature of the news and firm-specific variables that can influence the results, we performed the following regressions:

$$\begin{aligned} \text{Re } t(-2, 2)_{i,jt} = & \beta_1 + \beta_2 \text{Mag Re } v_{i,jt} + \beta_3 \text{NEWS}_{i,jt} + \beta_4 \text{NEST}_{j,t} \\ & + \beta_5 \text{VMST}_{i,jt} + \beta_6 \text{VPAST}_{jt} + \beta_7 \text{MOMENTUM}_{j,t} + \varepsilon_{i,j,t} \end{aligned} \quad (1)$$

$$\begin{aligned} \text{Re } t(-2, 60)_{i,jt} = & \beta_1 + \beta_2 \text{Mag Re } v_{i,jt} + \beta_3 \text{NEWS}_{i,jt} + \beta_4 \text{NEST}_{j,t} \\ & + \beta_5 \text{VMST}_{i,jt} + \beta_6 \text{VPAST}_{jt} + \beta_7 \text{MOMENTUM}_{j,t} + \varepsilon_{i,j,t} \end{aligned} \quad (2)$$

where:

$\text{Re } t(-2,2)_{i,jt}$ : market-adjusted return of firm  $j$  in the period from -2 to 2 days of the revision of analyst  $i$ ;

$\text{Re } t(-2,60)_{i,jt}$ : market-adjusted return of firm  $j$  in the period from -2 to 60 days of the revision of analyst  $i$ ;

$\text{Mag Re } v_{i,jt}$ : magnitude of the revision (measured as defined previously) for firm  $j$  by analyst  $i$ ;

$\text{NEWS}_{i,jt}$ : variable that represents the qualitative content of the revision, with +1 for good news, 0 for herding (follows the consensus) and -1 for bad news;

$\text{NEST}_{j,t}$ : number of estimates (analysts) who participated in the last projection consensus for firm  $j$ . After subtracting the average from each of the observations, the total was then divided by the standard deviation of all the observations;

$\text{MV}_{i,jt}$ : logarithm of the market value of firm  $j$  measured at the end of period  $t-1$ . After subtracting the average from each of the observations, the total was then divided by the standard deviation of all the observations;

$\text{MVBV}_{j,t}$ : ratio between the market value and book value of equity of firm  $j$  at the end of period  $t-1$ . After subtracting the average from each of the observations, the total was then divided by the standard deviation of all the observations;

$\text{MOMENTUM}_{j,t}$ : market-adjusted return for a period four months beforehand, measured -3 days from the revision. After subtracting the average from each of the observations, the total was then divided by the standard deviation of all the observations;

The purpose of regression models (1) and (2) is to explain the behavior of the dependent variables, in these cases the returns around the revision date. The second model measures the medium-term effects.

The two aspects used to classify the revisions are introduced as independent variables: a) the quantitative aspect, with the magnitude of the revision ( $\text{MagRev}_{i,jt}$ ), and b) the qualitative aspect, with the nature of the news being transmitted with by revision ( $\text{NEWS}_{i,jt}$ ).

On the matter of the innovation that the revision represented for the analyst, because of the modest results presented in the tabular analysis, we decided not to consider this aspect in the regression. Also, because the differences between the “most liquid companies” and “all companies” were small, to be more objective we focused on only the most liquid ones.

For statistical control of the effects of specific circumstances of each firm that could also influence the returns, we included as control variables: (i) the number of analysts following each firm ( $NEST_{jt}$ ); (ii) the market value of each firm ( $MV_{jt}$ ); (iii) the market value to book value ratio ( $MVBV_{jt}$ ); and (iv) a variable to control whether the returns were due to positive or negative *momentum* in the market. The Pearson correlation matrix is in the following table:

Table 3 - Pearson correlation matrix between the characteristics of the firms, analysts' earnings forecast revisions and future returns

Variáveis	Ret(-2,2)	Ret(-2,60)	MagRev	NOT	NESST	VMST	VPAST	MOMENTUM
Ret(-2,2)	1	0,969 ***	0,032 ***	0,126 ***	-0,020 *	0,111 ***	0,030 **	0,977 ***
Ret(-2,60)		1	0,029 ***	0,124 ***	-0,017	0,118 ***	0,031 ***	0,945 ***
MagRev			1	0,037 ***	0,005	-0,022 *	-0,013	0,025 **
NOT				1	-0,007	0,059 ***	0,035 *	0,124 ***
NEST					1	0,528 ***	0,069 ***	-0,021 *
VMST						1	0,257 ***	0,106 ***
VPAST							1	0,023 *
MOMENTUM								1

\*\*\* Sig. 1%, \*\* Sig.5%, \* Sig. 10%

The correlations between the variables are significant, confirming that the future returns (after the revision) are positively correlated with the previous price *momentum*. The firm's market value (MV) and market value to book value ratio (MVBV) are also positively correlated with the returns.

As expected, the magnitude of the revision (MagRev) and the nature of the news (NEWS) in the revision are positively correlated with future returns. The number of analysts following the firm is negatively correlated with the return in the period of the revision, indicating that the greater the number of analysts providing coverage, the less will be the market-adjusted return.

**Table 4** presents the results of the regressions of Models A and B. We calculated the annual regressions and a combined regression with all the years, as presented in the regression of FAMA and MACBETH (1973), a classic model used in the finance and accounting literature.

Table 4 – Regressions of the market-adjusted returns on the characteristics of the firms and the revision, 1995 to 2002

Painel A: Retorno ajustado ao mercado - Ret(-2,2)								
Ano	(Constante)	MagRev	NOTICIA	NESST	VMST	VPAST	MOMENTUM	R <sup>2</sup> Ajust.
1995	-0,043 -23,64	-0,00147 -1,31	0,002 1,10	0,004 1,50	0,004 1,58	0,000 0,07	0,214 *** 101,80	0,944
1996	-0,038 -19,46	-0,00001 -0,01	0,001 0,73	-0,002 -0,89	0,004 ** 2,14	-0,002 -0,59	0,219 *** 138,17	0,946
1997	-0,041 -22,27	-0,00098 -0,52	0,004 * 1,78	0,001 0,57	0,001 0,32	0,008 * 1,92	0,212 *** 125,40	0,944
1998	-0,034 -13,92	0,00103 0,64	-0,002 -0,66	-0,003 -1,34	0,002 0,71	-0,001 -0,21	0,215 *** 117,40	0,943
1999	-0,033 -11,91	0,00003 *** 3,06	0,000 -0,02	-0,001 -0,27	-0,006 *** -2,42	0,008 1,25	0,213 *** 124,68	0,962
2000	-0,035 -21,45	0,00009 0,42	0,002 1,07	-0,003 -1,65	0,003 1,58	0,001 0,70	0,212 *** 111,17	0,926
2001	-0,033 -25,28	-0,00021 -0,72	0,002 1,57	0,000 -0,01	-0,001 -0,39	0,000 -0,39	0,217 *** 175,21	0,958
2002	-0,032 -13,49	-0,00014 -0,33	-0,001 -0,38	-0,001 -0,24	-0,001 -0,40	0,003 *** 3,29	0,217 *** 111,20	0,952
Combinada	-0,037 -67,66	0,00003 *** 3,31	0,001 * 1,82	-0,001 -1,50	0,002 ** 2,48	0,001 ** 2,36	0,217 *** 383,93	0,955
FMB (95-02)	-0,036 -50,73	-0,00021 -0,71	0,001 * 1,57	0,000 -0,56	0,001 1,00	0,002 * 1,85	0,215 *** 346,94	

Painel B: Retorno ajustado ao mercado - Ret(-2,60)								
Ano	(Constante)	MagRev	NOTICIA	NESST	VMST	VPAST	MOMENTUM	R <sup>2</sup> Ajust.
1995	-0,049 -17,56	-0,00408 ** -2,37	0,006 * 1,90	0,010 ** 2,37	0,005 1,24	-0,002 -0,30	0,201 *** 62,29	0,866
1996	-0,042 -13,96	-0,00024 -0,16	0,003 1,00	-0,002 -0,64	0,006 * 2,23	-0,005 -0,83	0,214 *** 89,69	0,929
1997	-0,045 -16,77	-0,00098 -0,36	0,003 0,83	0,003 0,94	0,005 1,58	0,013 ** 2,07	0,209 *** 84,10	0,888
1998	-0,031 -7,80	0,00189 0,72	-0,004 -0,87	-0,005 * -1,72	0,001 0,34	-0,001 -0,09	0,205 *** 68,10	0,847
1999	-0,035 -8,33	0,00002 1,57	0,001 0,17	-0,005 -1,46	-0,003 -0,70	0,002 0,18	0,202 *** 77,82	0,907
2000	-0,031 -12,80	0,00082 *** 2,58	0,004 * 1,87	-0,006 ** -2,25	0,004 1,35	0,001 0,65	0,198 *** 70,08	0,833
2001	-0,034 -16,42	0,00023 0,51	0,002 0,84	-0,003 -1,29	0,003 1,39	-0,001 -0,75	0,211 *** 108,99	0,898
2002	-0,029 -8,63	-0,00053 -0,87	0,000 -0,14	0,003 0,87	-0,004 -1,26	0,002 1,22	0,209 *** 73,98	0,898
Combinada	-0,038 -45,73	0,00002 * 1,72	0,002 1,53	-0,002 ** -2,00	0,005 *** 4,43	0,001 1,16	0,209 *** 241,00	0,894
FMB (95-02)	-0,037 -34,13	-0,00036 -0,81	0,002 * 1,63	-0,001 -0,62	0,002 ** 1,95	0,001 0,64	0,206 *** 219,06	

\*\*\* Sig. 1%, \*\* Sig. 5%, \* Sig. 10%

The results confirm that the most important variable to explain the post-revision returns is the price *momentum*. This is further evidence of the argument that analysts'

earnings forecast revisions of Brazilian firms can largely be explained by a trend already verified in the market.

Although not as significant as the results for the *momentum* variable, the type of news and magnitude of the revision had some explanatory power on the returns. The results for both **Panel A** and **Panel B** indicate the moderate importance of the qualitative aspect of revisions in explaining the returns. The magnitude of the revision appears to be more important to explain the returns in the period from -2 to 2 days around the revision.

The control variables were very important to explain the returns. The number of analysts following a particular firm and the market value to book value ratio were relevant to control other effects influencing the magnitude of future returns.

The models reinforce the importance of identifying qualitative aspects of revisions. The magnitude of the revision played a less important role when compared with other essential characteristics of the firm and the revision.

We stress the statistical robustness of the models estimated. Besides a satisfactory adjusted  $R^2$ , we carried out other statistical tests, although not shown in the tables, among them: (i) Jarque-Bera (JB) normality test, indicating that the residuals were normally distributed; (ii) Breusch-Godfrey (BG) test for autocorrelation of the residuals; and (iii) variance inflation factor (VIF) test, in which we found values near 5,000, which are high but still within acceptable levels, permitting ruling out the risk of serious problems of multicollinearity.

## 7. CONCLUSION

After reviewing the literature and constructing a theoretical framework, we carried out several empirical analyses to find the most relevant aspects of analysts' earnings projection revisions. The analyses reported in this article, performed with information taken from the Economatica and I/B/E/S databases, covering the period from 1995 to 2002, point to the following conclusions for Brazilian firms:

- 1) The revisions can be analyzed from two perspectives, one quantitative, accounting for the direction and magnitude of the revision, and the other qualitative, aiming to identify the originality of the news conveyed by the revision to the market. The empirical analyses demonstrate that these dimensions are relatively informative to the Brazilian market.
- 2) There is a positive and significant difference between the future returns associated with an upward revision and those associated with a downward revision. These results were found in nearly all the sample years, indicating that on average the change in returns to a positive earnings revision are greater than those to a negative revision.
- 3) When a revision simply follows the consensus (herding), it has a lower informative content. A revision is more informative when it stands out from the pack, both regarding good and bad news. Evidence in tabular form demonstrate that the difference between the average returns for revisions representing good and bad news are greater (in absolute terms) than the returns for revisions that only follow the consensus.
- 4) The degree of innovation that a revision represents for an analyst is not an informative element for the market. To be an innovation for an analyst, the revision must represent a relevant change in posture, with the analyst switching from being relatively optimistic (in relation to the consensus) to being relatively pessimistic, or vice versa.

- 5) *Momentum* is the main element that explains the return from the revisions. This result indicates that the revisions can be explained largely as a response to a share's previous market performance.

Among the implications of this study are that analysts' earnings projection revisions, *a priori*, should not be disregarded. They only need to be placed in context, to mine the ones that have conditions to be more informative to the market. Investors need to be aware that revisions that only follow the market consensus or trend are less informative.

From univariate analysis and multiple regression, we found that on average analysts display a certain degree of passiveness, whereby their revised projections are a reaction to the market performance of the stock covered. This phenomenon invariably restricts the informative power of revisions. A revised projection thus has limited additional explanatory power for future returns besides what was already known by the market.

Another important particularity observed is that although there are some specific features of the Brazilian market not found in international studies, in general the performance of analysts of Brazilian companies approaches that of their peers who analyze American and European companies. We noted some clearer differences in the market's reaction. While in the United States, the market in general responds in very balanced form to good and bad news, the Brazilian market appears to be more sensitive to bad news.

There are many possible extensions of this study. Some questions for future research are: What other consequences can be documented for analysts' projection revisions? How does the liquidity and volatility of a stock behave in response to revisions? We hope that this study is only an initial reflection so that future studies can shed more light on the questions addressed here for Brazil.

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