# IS EQUITY RESEARCH VALUABLE FOR INVESTORS? AN EMPIRICAL INVESTIGATION OF THE ITALIAN PECULIARITY

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**Abstract**

The main objective of this paper is to analyze the value of financial analysts' recommendations on Italian listed firms. Italy is an interesting case since analysts have to compulsory send their reports to the Stock Exchange Commission on the same day they are available to their private clients ("report date"). Then, reports are available to the public within a period of sixty days on the Stock Exchange website ("public access date"). Exploiting this regulatory peculiarity and the unique database formed directly analyzing analysts' reports, two distinct short-term event studies are performed finding a significant market reaction both in terms of volumes and returns around the report date. General implications for event study research design, highlighting some problems in commercial databases are also provided.

**Keywords**: analysts, recommendation changes, market efficiency, event study, regulation

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## 1. Introduction

The role of financial analysts is of primary relevance in reducing the costs associated with information asymmetry between listed companies and investors. Gathering and processing information, in fact, is not only costly, but also requires specialized skills. If analysts' researches convey new information, and therefore are valuable, then after the issuance of a report, one should observe a market reaction.

Several studies show that recommendation changes have greater impact on market prices compared with reiterations (Stickel, 1995; Womack, 1996; Francis and Soffler, 1997; Ivkovic and Jegadeesh, 2004).

A previous cross-country study on G-7 countries finds that this indeed the case, except for the Italian stock market (Jegadeesh and Kim, 2006). This evidence, based on commercial data, seems to suggest that in Italy analysts do not create value for investors. Under Italian regulation, however, analysts have to send their reports to the Italian Securities and Exchange Commission (Consob) on the same day they are available to their private clients [1]. Then, they have to submit them within sixty days to the Stock Exchange management company (Borsa Italiana S.p.A.) that immediately publish them on its website. Italy has been among European countries the first to impose specific transparency requirements on the equity research industry even before the adoption of the Sarbanes-Oxley Act (2002) in the U.S. and the Market Abuse Directive (2003) in Europe.

For the Italian case, thus, one should consider two dates: the date when the report is issued and only available to analysts' private clients ("report date"); the date when instead the report is published in the Stock Exchange website ("public access date") [2].

Commercial databases may indeed not include the "actual" report date, but an incorrect one (either corresponding to the public access date or to a date in between), thus biasing any inferences. The potential problems associated with inaccurate dates in the data provided and/or selection bias in commercial databases is well acknowledged in the literature as well as among practitioners (Orpurt, 2004; Ljunqvist *et al*., 2008). The research design used allows to overcome the potential distortion and correctly assess the information value embedded in analysts' recommendations changes. The peculiar Italian regulatory system *per se* does not necessarily leads to a greater market reaction following analysts' recommendation changes. However, it offers a practical framework to determine the correct event date. An investigation of whether national or regional regulations affect the efficiency of financial markets is in fact beyond the scope of our research.

If analysts' researches are valuable, investors should react at the report date, not at the public access date, since the information has already been incorporated into prices through the transactions of analysts' private clients.

Exploiting the Italian regulatory peculiarity, two distinct short-term event studies associated, respectively, with the "report date" and the "public access date" are performed. At the report date, positive (negative) abnormal returns for upgrades (downgrades) are found, while at the public access date a slightly significant market reaction occurs. This last evidence disappears, however, once Cumulative Abnormal Returns (CAR) is computed. Abnormal volumes are significant and relevant at the report date, and still significant but lower at the public access date. However, while at the report date the pattern followed by abnormal volumes clearly remarks the market reaction after report issuance (with the typical hump shape), around the public access date, abnormal volumes do not show any peaks. The structure of the paper is as follows: section 2 explains the methodology and the database used; section 3 comments the results, section 4 summarizes and concludes.

## 2. Database and Methodology

### *Database description*

The database used includes all the 22,194 reports available on the website of Borsa Italiana S.p.A., issued on companies listed on the Italian Stock Exchange, from September 1999 to July 2005. After eliminating reports that were double [3] or without recommendation, the final sample contains 14,633 reports issued by 60 brokerage firms on 233 companies. Since the analysis focuses on recommendation changes, only reports containing both current and previous ratings are considered, thus excluding 2,553 reports [see table I].

**[table I about here]**

A five-point scale is used where the ratings are classified as follows: 1 is "buy", 2 "add", 3 "hold", 4 "reduce", 5 "sell". Even thought the tendency is to converge to a three-point scale, in the period under investigation analysts usually referred to this five-point scale. It is worth noting that the percentage of upgrades is less than the one of downgrades, showing that analysts tend to revise with greater frequency their recommendations downward rather than upward, in line with previous studies (Ivkovic and Jegadeesh, 2004).

**[table II about here]**

### *Methodology*

In order to calculate average abnormal returns, a standard event-study methodology (Brown and Warner, 1980; 1985) is used, with the Market Model, and a three-day event window [-1; +1], both for the report and public access date.

For each stock, the excess return is estimated using the following procedure:

$$AR_{i,t} = R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{m,t} \quad (1)$$

where:

$AR_{i,t}$ security *i*'s excess return at time *t;*

$R_{i,t}$ ($R_{m,t}$) security *i*'s (market index's) return at time *t;*

$\hat{\alpha}_i$ and $\hat{\beta}$ OLS values from the estimation window.

Since the two events considered are often very close in time to each other, some adjustments are necessary.

As estimation window, the interval [-121; -2] is used with respect to the report date for both event studies. In fact, taking the 120 days preceding the public access date, one would incorporate the abnormal returns following the issuance of the report [see the Appendix for more details]. Averaging the abnormal returns ($AR_{i,t}$) corresponding to the recommendation changes ($i = 1, 2 \ldots N_t$), the mean abnormal return for time *t* ($\overline{AR_t}$) is obtained.

$$\overline{AR_t} = \frac{1}{N_t}\sum_{i=1}^{N_t} AR_{i,t} \quad (2)$$

Instead, to assess the overall effect of recommendation changes, the daily mean abnormal returns ($\overline{AR_t}$) is aggregated in the cumulative abnormal return ($CAR_{t,\tau}$), from day *t* to day $\tau$.

$$CAR_{t,\tau} = \sum_{t}^{\tau} \overline{AR_t} \quad (3)$$

Finally, to test the statistical significance of the results, both parametric (Brown and Warner, 1980; 1985) [4] and non-parametric tests (Corrado, 1989) are performed.

For abnormal volumes, a logarithmic transformation [5] of volumes proposed by Ajinkya and Jain (1989) is used.

$$V_{i,t} = \ln\left(1 + Vol_{i,t}\right) \quad (4)$$

where:

$Vol_{i,t}$ security *i*'s volume at time *t*;

$V_{i,t}$ security *i*'s volume logarithmic transformation.

The Abnormal Volume ($AV_{i,t}$), is calculated as the difference between the "volumes" of the stock *i* at time *t* ($V_{i,t}$) and an average over 120 days ($\overline{V}_{i,t}$).

$$AV_{i,t} = V_{i,t} - \overline{V}_{i,t} \quad (5)$$

Also for abnormal volumes, a three-day event window is used, for both the report and the public access date. However, different estimation windows for the report and public access date are used, due to the proximity in time of the two dates, as explained above. The basic assumptions are the following: for event study 1, the estimation windows [-2; -61] and [+2; +61] are taken with respect to the report date; while for event study 2, the estimation window [+2; +121] is used with reference to the public access date [see table A.1 in the Appendix]. Averaging the abnormal volumes corresponding to recommendation changes for the stocks included in the sample ($i = 1, 2 \ldots N_t$), one finally obtains the mean abnormal volume for time *t* ($\overline{AV_t}$).

$$\overline{AV_t} = \frac{1}{N_t}\sum_{i=1}^{N_t} AV_{i,t} \quad (6)$$

Using estimation windows that do not take into account the proximity of the two dates could lead to biased results.

In order to test the statistical significance of the results, both parametric and nonparametric tests are performed.

## 3. Results

### *Report vs. public access date*

While for the report date, data are available for the whole sample period, with regard to the second event study; the data on the exact public access date are available only from July 2004 (548 recommendations changes).

Figure A.1 in the Appendix shows the number of days between the report and the public access date and the relative frequency of occurrence. First, in some cases (8.57% of the total), there is no difference between the report and the public access date, i.e. they coincide. There is another peak in frequency after seven days (5.29% of the total), suggesting that several intermediaries wait about a week to send their report. The percentage of reports that complies with the regulation, i.e. published within sixty days from the report date, is instead about 67% of the total, highlighting that one third of reports are sent after the term allowed by law.

In order to evaluate separately the market reaction for the report and the public access date, at least the cases in which the two events coincide have to be excluded. However, since a market reaction is observed after the report date (four days for abnormal returns and six days for abnormal volumes), eight days have been excluded for prudential reasons, i.e. to be sure that is not taken into account the abnormal reaction following the report date [6].

### *Average abnormal returns*

At the report date, an excess return equal to 0.65% for upgrades is observed, and to -0.82% for downgrades, both statistically significant. In absolute terms, the market reaction for upgrades is lower than the one for downgrades, suggesting that the market reaction to bad news is stronger. The magnitude of market reaction in Italy is larger than that reported for other non-US countries by Jegadeesh and Kim (2006) [7]. This could suggest that the value of analysts' recommendation in Italy is larger.

**[table III about here]**

Theoretically, an immediate and exhaustive reaction in correspondence of the report date should be observed [8]. However, analysts' private clients are mostly institutional investors who may want to fraction their orders to avoid the price impact of a relevant transaction, partly explaining empirical evidences. Either significant abnormal returns prior to the report date are due to leakage of information, or to price-sensitive information released before it. While in the first case, there would be a violation of law, in the second one the market would just react to news such as earnings announcements. The market reaction at the public access date, instead, is slightly significant [see table IV] thus, this issue is further investigated aggregating average abnormal returns.

**[table IV about here]**

### *Cumulative abnormal returns*

In order to estimate the overall effect of the recommendation changes, aggregate daily average abnormal returns is aggregated computing Cumulative Abnormal Returns (CARs) on different time windows. The period [-6; +6] is divided in three main sub-periods: a three-day event window [-1; +1]; a five-day pre-event window [-6; -2], and a five-day post-event window [+2; +6].

For event study 1, CARs are significant both for upgrades (1.27%) and downgrades (-1.76%) on the three-day event window [see table V].

It is interesting to note that while in the five-day post-event window, CARs are significant only for downgrades (-0.67%), in the pre-event window they are not significant either for upgrades or for downgrades.

However, while for downgrades negative (even if not statistically significant) CAR is observed, the opposite applies for upgrade. This interesting pattern could have two different explanations. It could be that just before the report is issued, the stock under review becomes overvalued (undervalued) and possible targets for downgrades (upgrades), if its price increases (decreases). Another explanation is the "booster shoot" hypothesis (Michaely and Womack, 1999): analysts could deliberately upgrade those stocks with poor past performance, not because they are undervalued, but just to support their price, and please the management of the covered firm.

Enlarging the pre-event window, the results partly support this hypothesis: in fact, while on [-2; -6] the CAR is not statistically significant; on [-2; -10] for upgrades, we observe a significant negative CAR (-0.52%).

The results of event study 2, instead, show no significant CARs around the public access date, for both upgrades and downgrades [see table V].

**[table V about here]**

Since the results support the idea that the market reacts in terms of returns at the report date and not at the public access date, the analysis of the market reaction goes further only for event 1.

Prior evidence suggests that the short-term market reaction is associated with the strength of recommendation (Stickel, 1995; Francis and Soffler, 1997). Following Womack (1996), CAR are computed on a three-day event window for added-to-buy, added-to-sell, removed-from-buy and removed-from-sell [see table VI].

**[table VI about here]**

CARs for added-to-buy (1.82%) and added-to-sell (-2.15%) are larger in magnitude of, respectively, the ones for upgrades (1.27%) and for downgrades (-1.76%). In this regard, an added-to-sell has a higher market impact, in line with previous studies in the literature.

Consistent with the initial intuition, removed-from-buy recommendations record a negative market reaction (-1.31%) since they are unfavorable news. Removed-from-sell recommendations, instead, even though they are good news, have a negative, but not significant, impact (-0.49%).

### *Abnormal volumes*

At the report date (table VII), abnormal volumes for upgrades (part A) and for downgrades (part B), are respectively 32.43% and 43.94% greater than average, both statistically significant.

**[table VII about here]**

In line with previous studies, the market reaction in terms of volumes is greater for downgrades than for upgrades. This evidence can have two main explanations. First, usually the percentage of downgrades is smaller than the one for upgrades; thus, the impact for the former should be higher. Second, behavioral theories claim that people react more heavily to negative news, therefore increasing trading after a downgrade. The results seem to support the behavioral explanation, since the frequency of

downgrade is higher than the one of upgrades. For downgrades, the market reaction around the report date is relevant and long lasting, while for upgrades is small and not persisting.

At the public access date (table VIII), abnormal volumes are significant, however there is no peak at the public access date, suggesting that the real market reaction takes place at the report date. Cumulative abnormal returns are therefore compared with abnormal volumes, both for the report and public access date, trying to explain the patterns.

**[table VIII about here]**

### *Comparing cumulative abnormal returns and abnormal volumes*

A difference appears between the patterns followed by cumulative abnormal returns and abnormal volumes for the report and the public access date. Around the report date, for both upgrades (figure 3) and downgrades (figure 4) there is a strong price reaction (CARs) supported by abnormal volumes, definitely above average.

**[figure 3 and 4 about here]**

With regard to the public access date, instead, the picture is completely different: the pattern of CARs is quite flat, and the one for abnormal volumes is smooth, with no peak [figure 5 and 6]. This can be shown as an evidence that, even though around the public access date, there are some abnormal volumes; these are not strong enough to support significant CARs.

However, since with regard to public access date, just one year of observations is available, the results should be taken with caution. In other words, it is possible to find significant abnormal volumes due to small sample bias.

**[figure 5 and 6 about here]**

## 4. Conclusions

Given the role of financial analysts in reducing the costs associated with information asymmetry between listed companies and investors, this study verifies if the reports they produce are valuable and convey information to the market.

In particular, the analysis has focused on the impact of recommendation changes on prices and quantities of the stocks followed by analysts.

Using a database formed by collecting the reports directly from the Italian Stock Exchange website, the empirical evidences are in contrast with previous cross-country studies. There is a significant reaction at the "actual" report date, while following the mere publication of the reports on the website shows a weak and slightly significant reaction. Previous cross-country evidence finds no reaction to recommendation changes on the Italian market. This may occur because commercial databases do not contain the "actual" report date.

The Italian Regulation peculiarity has implications on a general research-design ground: considering regulatory issues may improve findings, mostly because of the possibility of an incorrect identification of the "event date". The results therefore highlight that in exploring cross-country differences in analysts' information value it is necessary to consider country-specific regulatory peculiarities. Furthermore, the findings suggest that the publication of the report on the Stock Exchange website does not convey any information, thus it has no value for investors. Therefore, it seems questionable to have such a peculiar regulation.

### *Notes*

1. See article 69 of the Consob Regulation no. 11971 (May, 14, 1999).
2. For a detailed description of these regulatory aspects, see Belcredi *et al*. (2003).
3. Sometimes the reports are identical apart from the language used (Italian or English), or they are just published twice in the website.
4. For a further robustness check, we also used the tests proposed by Boehmer *et al.* (1991).
5. Since the original distribution of the volumes is supposedly not normal, this is necessary to have a normal one. From now on, we use the term "volume" to refer to the natural logarithm.
6. We also performed other calculations just excluding the cases of coincidence of the two events, or using other differences within one week. The results are very similar.
7. Table 6, p. 288 of Jegadeesh and Kim (2006) reports for Italian firms at day 0 no significant market reactions following both upgrades (0.04%) and downgrades (-0.09%).
8. At most, one should consider the day following the report date, if the report is available to the analyst's private clients when the market is closed.

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## Appendix: Report and Public Access Date

**Table A.I.** Event window and Estimation window for Event Study 1 and 2

Column (1) shows the windows used to estimate the market model parameters, and the average volumes. Column (2) shows the event windows used to compute abnormal returns, and volumes. Estimation and event windows are showed for report date (event study 1), and public access date (event study 2).

| | **ABNORMAL RETURNS** | |
|---|---|---|
| | ESTIMATION WINDOW (1) | EVENT WINDOW (2) |
| EVENT STUDY 1 | [RD -2; RD -121] | [RD -1; RD +1] |
| EVENT STUDY 2 | [RD -2; RD -121] | [PAD -1; PAD +1] |
| | **ABNORMAL VOLUMES** | |
| | ESTIMATION WINDOW (1) | EVENT WINDOW (2) |
| EVENT STUDY 1 | [RD -2; RD -61 and RD +2; RD +61 ] | [RD -1; RD +1] |
| EVENT STUDY 2 | [PAD +2; PAD +121] | [PAD -1; PAD +1] |

RD = Report Date PAD = Public Access Date

**Figure A.1.** Number of days between the report and the public access date

The figure shows the number of days between the report and the public access date (horizontal axis) and the relative frequency of occurrence (vertical axis).

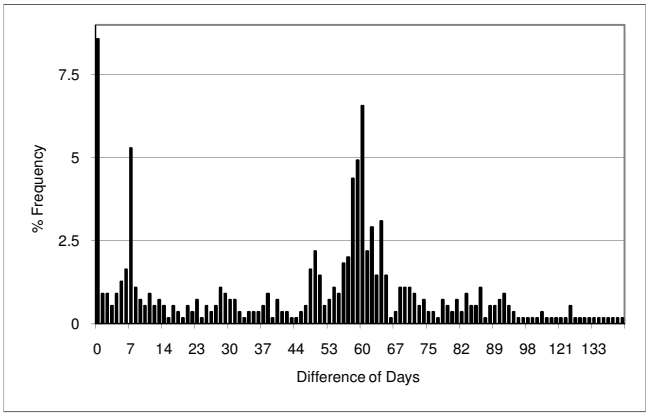


**Table I.** Basic description of the database

We extract the recommendations from research reports on Italian listed firms issued by financial analysts from September 1999 to July 2005, and publicly available on the Italian Stock Exchange web site. Part 1 shows the filter criteria used to obtain the final sample. Part 2 shows the numbers of recommendation changes, and reiteration.

| **Part A. Sample description** | |
|---|---|
| Total number of studies | 22,194 |
| Studies that are non-monographic, double, without rating | 5,008 |
| Total number of monographic studies with rating | 17,186 |
| Studies without previous rating | 2,553 |
| Total number of monographic studies that form the sample of observations | 14,633 |

| **Part B. Changes and Reiterations of Recommendations** | | |
|---|---|---|
| Recommendation | Number of reports | (%) |
| Unchanged | 12,328 | 84.25 |
| Upgrade | 1,098 | 7.50 |
| Downgrade | 1,207 | 8.25 |
| Total | 14,633 | 100 |

**Table II.** Matrix of changes of recommendation (percentages in brackets)

This table shows the number of recommendation changes, and reiterations. For example, the first row reports all changes from 2 ("add"), 3 ("hold"), 4 ("reduce"), 5 ("sell") to 1 ("buy"). The first column, instead, reports all changes from 1 ("buy") to 2 ("add"), 3 ("hold"), 4 ("reduce"), 5 ("sell"). Unchanged recommendations lie on the main diagonal.

| | Previous Rating | | | | | |
|---|---|---|---|---|---|---|
| Current Rating | Buy (1) | Add (2) | Hold (3) | Reduce (4) | Sell (5) | Total |
| Buy | 4,119 | 193 | 254 | 16 | 6 | 4,588 |
| (1) | (28.15) | (1.32) | (1.74) | (0.11) | (0.04) | (31.35) |
| Add | 185 | 2,795 | 382 | 50 | 1 | 3,413 |
| (2) | (1.26) | (19.10) | (2.61) | (0.34) | (0.01) | (23.32) |
| Hold | 325 | 392 | 4,444 | 143 | 40 | 5,344 |
| (3) | (2.22) | (2.68) | (30.37) | (0.98) | (0.27) | (36.52) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Reduce | 24 | 32 | 164 | 687 | 13 | 920 |
| (4) | (0.16) | (0.22) | (1.12) | (4.69) | (0.09) | (6.29) |
| Sell | 5 | 2 | 65 | 13 | 283 | 368 |
| (5) | (0.03) | (0.01) | (0.44) | (0.09) | (1.93) | (2.51) |
| Total | 4,658 | 3,414 | 5,309 | 909 | 343 | 14,633 |
| | (31.83) | (23.33) | (36.28) | (6.21) | (2.34) | (100) |

**Table III.** Average abnormal returns in correspondence of the report date

This table shows daily mean abnormal returns (ARs), and cumulative abnormal returns (CARs) around the report date for both upgrades, and downgrades. ARs are computed using the market model, and the criteria indicated in table A.1. CARs are obtained by aggregating mean abnormal returns over a [-10, +10] window centered on the report date. *t-statistics* and nonparametric rank test *T*-statistics are reported for ARs.

| ABNORMAL RETURN REPORT DATE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | UPGRADE | | | | | DOWNGRADE | | | | |
| T | AR | *t*-stat | | Nonparametric *T*-stat | CAR | AR | *t*-stat | | Nonparametric *T*-stat | | CAR |
| -10 | -0.0008 | -1.0630 | | 0.8208 | -0.0008 | 0.0012 | 1.7203 | * | -0.9671 | | 0.0012 |
| -9 | -0.0008 | -1.1268 | | 1.0241 | -0.0016 | -0.0003 | -0.4092 | | -0.5165 | | 0.0009 |
| -8 | -0.0002 | -0.3105 | | 0.0314 | -0.0019 | 0.0023 | 3.3250 | ** * | -2.3857 | ** | 0.0032 |
| -7 | -0.0021 | -2.7663 | ** * | 1.0335 | -0.0039 | -0.0005 | -0.6762 | | 0.2658 | | 0.0028 |
| -6 | -0.0007 | -0.9219 | | 0.2517 | -0.0046 | 0.0011 | 1.5307 | | -1.7399 | * | 0.0038 |
| -5 | -0.0007 | -0.8716 | | 0.0120 | -0.0053 | 0.0003 | 0.4943 | | -1.0807 | | 0.0042 |
| -4 | -0.0008 | -1.0436 | | -0.1111 | -0.0061 | -0.0006 | -0.8505 | | 0.3591 | | 0.0036 |
| -3 | -0.0008 | -1.0309 | | 0.1023 | -0.0069 | -0.0004 | -0.5072 | | -1.0181 | | 0.0032 |
| -2 | 0.0016 | 2.1427 | ** ** | -1.7567 | * ** | -0.0052 | -0.0007 | -1.0558 | ** | -0.3964 | | 0.0025 |
| -1 | 0.0029 | 3.9021 | * ** | -2.8896 | * ** | -0.0023 | -0.0044 | -6.2311 | * ** | 2.1503 | ** ** | -0.0019 |
| 0 | 0.0065 | 8.6316 | * ** | -6.2085 | * ** | 0.0042 | -0.0082 | -11.7013 | * ** | 5.6416 | * ** | -0.0100 |
| 1 | 0.0033 | 4.3985 | * | -3.3491 | * | 0.0075 | -0.0050 | -7.1795 | * ** | 4.3017 | * ** | -0.0151 |
| 2 | 0.0010 | 1.2713 | | -0.6901 | | 0.0084 | -0.0029 | -4.0732 | * | 2.7523 | * | -0.0179 |
| 3 | -0.0006 | -0.7400 | | 0.2136 | | 0.0079 | -0.0016 | -2.2783 | ** | 0.9153 | | -0.0195 |
| 4 | 0.0007 | 0.9655 | | -1.3775 | | 0.0086 | -0.0012 | -1.6691 | * | 0.1748 | | -0.0207 |
| 5 | 0.0004 | 0.5813 | | -0.5741 | | 0.0090 | -0.0008 | -1.1419 | | 0.1497 | | -0.0215 |
| 6 | -0.0008 | -1.0049 | | 0.6450 | | 0.0083 | -0.0003 | -0.4019 | | -0.5637 | | -0.0218 |
| 7 | -0.0002 | -0.2735 | | 0.0067 | | 0.0081 | -0.0005 | -0.7181 | | 0.7102 | | -0.0223 |
| 8 | 0.0009 | 1.1857 | | -1.4807 | | 0.0089 | -0.0005 | -0.7085 | | 0.1897 | | -0.0228 |
| 9 | -0.0006 | -0.8569 | | 0.1960 | | 0.0083 | -0.0005 | -0.7371 | | -0.2952 | | -0.0233 |
| 10 | 0.0000 | 0.0138 | | -0.3631 | | 0.0083 | 0.0000 | -0.0305 | | -0.4832 | | -0.0233 |

Statistical significance: * = 10%; ** = 5%; *** = 1%

**Table IV.** Average abnormal returns in correspondence of the public access date

This table shows daily mean abnormal returns (ARs), and cumulative abnormal returns (CARs) around the public access date for both upgrades, and downgrades. ARs are computed using the market model, and the criteria indicated in table A.1. CARs are obtained by aggregating mean abnormal returns over a [-10, +10] window centered on the public access date. *t*-statistics and nonparametric rank test *T*-statistics are reported for ARs.

| ABNORMAL RETURN PUBLIC ACCESS DATE DATE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | UPGRADE | | | | | DOWNGRADE | | | |
| T | AR | *t*-stat | | Nonparametric *T*-stat | CAR | AR | *t*-stat | Nonparametric *T*-stat | CAR |
| -10 | 0.0005 | 0.4656 | | -0.5585 | 0.0005 | -0.0004 | -0.3808 | 0.6787 | -0.0004 |
| -9 | 0.0001 | 0.0662 | | 0.6101 | 0.0005 | -0.0003 | -0.2876 | 1.0707 | -0.0007 |
| -8 | 0.0002 | 0.1463 | | 0.4429 | 0.0007 | -0.0011 | -1.1189 | 1.0579 | -0.0018 |
| -7 | 0.0020 | 1.9856 | * * | -1.2042 | 0.0027 | 0.0004 | 0.3953 | -1.0707 | -0.0014 |
| -6 | 0.0005 | 0.4586 | | 0.0854 | 0.0032 | -0.0003 | -0.3472 | 0.3067 | -0.0017 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| -5 | -0.0011 | -1.0516 | | 1.5066 | | 0.0021 | -0.0014 | -1.4204 | 1.5265 | -0.0031 |
| -4 | 0.0006 | 0.5485 | | -0.1192 | | 0.0027 | 0.0010 | 0.9914 | -0.4175 | -0.0021 |
| -3 | 0.0013 | 1.2822 | | -1.0139 | | 0.0040 | 0.0014 | 1.3902 | -0.2726 | -0.0008 |
| -2 | 0.0015 | 1.4707 | | -0.2953 | | 0.0055 | 0.0009 | 0.9578 | -1.8161 * | 0.0002 |
| -1 | -0.0005 | -0.4861 | | 0.0996 | | 0.0050 | 0.0016 | 1.5746 | -1.3305 | 0.0017 |
| 0 | 0.0018 | 1.7459 | * | -0.8627 | | 0.0068 | -0.0011 | -1.1131 | 1.7295 * | 0.0006 |
| 1 | 0.0007 | 0.7197 | | -0.3131 | | 0.0076 | -0.0015 | -1.4938 | 1.3958 | -0.0008 |
| 2 | 0.0022 | 2.1764 | * * | -2.3676 | * * | 0.0098 | -0.0013 | -1.2645 | 1.5265 | -0.0021 |
| 3 | 0.0001 | 0.1176 | | 0.6564 | | 0.0099 | 0.0009 | 0.9443 | -0.1548 | -0.0012 |
| 4 | -0.0006 | -0.5746 | | 1.7468 | * | 0.0094 | 0.0001 | 0.1165 | 0.5467 | -0.0010 |
| 5 | -0.0002 | -0.2111 | | 0.0694 | | 0.0091 | 0.0000 | -0.0394 | 0.2031 | -0.0011 |
| 6 | -0.0006 | -0.6101 | | 0.8093 | | 0.0085 | -0.0002 | -0.2291 | 0.6404 | -0.0013 |
| 7 | 0.0006 | 0.6019 | | -0.8147 | | 0.0091 | -0.0007 | -0.7269 | 0.6106 | -0.0020 |
| 8 | -0.0004 | -0.3639 | | 0.3291 | | 0.0088 | -0.0012 | -1.2043 | 0.8349 | -0.0032 |
| 9 | -0.0004 | -0.3497 | | 1.1331 | | 0.0084 | -0.0012 | -1.1740 | 0.5893 | -0.0044 |
| 10 | -0.0008 | -0.7277 | | 1.4052 | | 0.0076 | -0.0008 | -0.7878 | 0.3493 | -0.0052 |

Statistical significance: * = 10%; ** = 5%; *** = 1%

**Table V.** Cumulative Abnormal Returns for event study 1 and event study 2

Cumulative abnormal returns (CARs) are presented for three subsequent non-overlapping temporal windows. CARs are obtained by aggregating mean daily abnormal returns. The event date is alternatively the report date, or the public access date. *t*-statistics and statistical significance levels are reported.

| | | CAR | | | | | |
|---|---|---|---|---|---|---|---|
| | | Report date | | | Public access date | | |
| | | CAR | *t*-stat | SIGN | CAR | *t*-stat | SIGN |
| Upgrade | [-6; -2] | -0.0013 | -0.7227 | | 0.0028 | 1.2436 | |
| | [-1; +1] | 0.0127 | 11.4555 | *** | 0.0020 | 1.3686 | |
| | [+2; +6] | 0.0008 | 0.5530 | | 0.0009 | 0.3672 | |
| Downgrade | [-6; -2] | -0.0003 | -0.1341 | | 0.0016 | 0.8882 | |
| | [-1; +1] | -0.0176 | -13.4553 | *** | -0.0010 | -0.7519 | |
| | [+2; +6] | -0.0067 | -4.3376 | *** | -0.0005 | -0.2519 | |

Statistical significance: * = 10%; ** = 5%; *** = 1%

**Table VI.** Cumulative Abnormal Returns for added-to-buy/sell and removed-from-buy/sell

Cumulative abnormal returns (CARs) are presented for different categories of changes to and from extreme ratings. For downgrades, we report removed-from-buy, and added-to sell; for upgrades, added-to-buy, and removed-from-sell. CARs are obtained by aggregating mean daily abnormal returns over a three days window around the recommendation change. *t*-statistics and statistical significance levels are shown.

| | ADDED TO (REMOVED FROM) BUY & SELL | | |
|---|---|---|---|
| | CAR | *t*-stat | SIGN |
| Added to Buy | 0.0182 | 8.1223 | *** |
| Removed from Buy | -0.0131 | -7.7024 | *** |
| Added to Sell | -0.0215 | -3.0515 | *** |
| Removed from Sell | -0.0049 | -1.0237 | |

Statistical significance: * = 10%; ** = 5%; *** = 1%

**Table VII.** Average abnormal volumes in correspondence of the report date

This table shows daily mean abnormal volumes (AVs) around the report date for both upgrades, and downgrades. AVs are computed using the average volume estimated following the criteria indicated in table A.1. *t*-statistics and nonparametric rank test *T*-statistics are reported.

| ABNORMAL VOLUME REPORT DATE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | UPGRADE | | | | | DOWNGRADE | | | |
| T | AV | *t*-stat | | Nonparametric *T*-stat | | MEAN | *t*-stat | | Nonparametric *T*-stat | |
| -10 | 0.0017 | 0.0256 | | -0.3435 | | 0.0102 | 0.1259 | | -0.3685 | |
| -9 | 0.0119 | 0.1778 | | -0.4449 | | 0.0324 | 0.3993 | | -0.4794 | |
| -8 | 0.0038 | 0.0563 | | -0.3438 | | 0.0682 | 0.8398 | | -0.8858 | |
| -7 | 0.0313 | 0.4667 | | -0.6263 | | 0.0653 | 0.8043 | | -0.8228 | |
| -6 | 0.0518 | 0.7721 | | -1.0175 | | 0.1103 | 1.3578 | | -1.2896 | |
| -5 | 0.0690 | 1.0282 | | -1.0349 | | 0.1386 | 1.7063 | * | -1.5653 | |
| -4 | 0.0474 | 0.7055 | | -0.8412 | | 0.1717 | 2.1139 | ** | -1.9574 | * |
| -3 | 0.1172 | 1.7466 | * | -1.6446 | | 0.1855 | 2.2833 | ** | -1.9927 | ** |
| -2 | 0.1550 | 2.3095 | ** | -2.2601 | ** | 0.2313 | 2.8476 | *** | -2.3874 | ** |
| -1 | 0.2548 | 3.7972 | *** | -3.4348 | *** | 0.3339 | 4.1108 | *** | -3.2667 | *** |
| 0 | 0.3234 | 4.8179 | *** | -3.8860 | *** | 0.4394 | 5.4088 | *** | -4.2319 | *** |
| 1 | 0.2512 | 3.7434 | *** | -3.3494 | *** | 0.3248 | 3.9989 | *** | -3.3738 | *** |
| 2 | 0.1823 | 2.7164 | *** | -2.4828 | ** | 0.2555 | 3.1448 | *** | -2.9199 | *** |
| 3 | 0.1418 | 2.1125 | ** | -2.0431 | ** | 0.2084 | 2.5654 | ** | -2.4657 | ** |
| 4 | 0.1485 | 2.2125 | ** | -2.1596 | ** | 0.1756 | 2.1622 | ** | -2.0670 | ** |
| 5 | 0.1275 | 1.8998 | * | -1.8481 | * | 0.1619 | 1.9934 | ** | -1.9757 | ** |
| 6 | 0.1074 | 1.6006 | | -1.6336 | | 0.1503 | 1.8499 | * | -1.8640 | * |
| 7 | 0.1071 | 1.5960 | | -1.6324 | | 0.1103 | 1.3574 | | -1.4213 | |
| 8 | 0.1085 | 1.6164 | | -1.5826 | | 0.0785 | 0.9670 | | -1.2028 | |
| 9 | 0.0822 | 1.2241 | | -1.2233 | | 0.0454 | 0.5591 | | -0.7503 | |
| 10 | 0.0551 | 0.8207 | | -0.8782 | | 0.0584 | 0.7188 | | -0.9162 | |

Statistical significance: * = 10%; ** = 5%; *** = 1%

**Table VIII.** Average abnormal volumes in correspondence of the public access date

This table shows daily mean abnormal volumes (AVs) around the public access date for both upgrades, and downgrades. AVs are computed using the average volume estimated following the criteria indicated in table A.1. *t*-statistics and nonparametric rank test *T*-statistics.

| ABNORMAL VOLUME PUBLIC ACCESS DATE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | UPGRADE | | | | | DOWNGRADE | | | |
| T | AV | *t*-stat | | Nonparametric *T*-stat | | MEAN | *t*-stat | | Nonparametric *T*-stat | |
| -10 | 0.0572 | 0.9735 | | -1.2144 | | -0.0166 | -0.2636 | | -0.1524 | |
| -9 | -0.0132 | -0.2250 | | -0.3962 | | -0.0408 | -0.6492 | | 0.3692 | |
| -8 | -0.0932 | -1.5855 | | 1.4210 | | -0.0846 | -1.3452 | | 1.1384 | |
| -7 | 0.0671 | 1.1405 | | -0.9466 | | 0.0295 | 0.4692 | | -0.5914 | |
| -6 | 0.0825 | 1.4036 | | -1.8643 | * | 0.0698 | 1.1095 | | -1.4265 | |
| -5 | 0.0350 | 0.5962 | | -1.3232 | | 0.0657 | 1.0442 | | -1.1922 | |
| -4 | 0.1001 | 1.7024 | * | -2.1506 | * | 0.0893 | 1.4200 | | -1.6610 | * |
| -3 | 0.1453 | 2.4718 | ** | -2.4662 | * | 0.1307 | 2.0788 | * | -2.0327 | ** |
| -2 | 0.1270 | 2.1594 | ** | -1.9140 | * | 0.1239 | 1.9703 | * | -2.0115 | ** |
| -1 | 0.1434 | 2.4395 | ** | -2.5105 | * | 0.1460 | 2.3219 | * | -2.5955 | *** |
| 0 | 0.1245 | 2.1182 | ** | -1.8973 | * | 0.1378 | 2.1916 | * | -2.2568 | ** |
| 1 | 0.0734 | 1.2484 | | -1.6805 | * | 0.1068 | 1.6980 | * | -1.9218 | * |
| 2 | 0.1804 | 3.0692 | *** | -2.2517 | * | 0.0331 | 0.5263 | | -0.2886 | |
| 3 | 0.0884 | 1.5043 | | -1.4463 | | 0.0766 | 1.2176 | | -1.0240 | |
| 4 | 0.0485 | 0.8250 | | -0.5750 | | 0.0590 | 0.9377 | | -0.9487 | |
| 5 | 0.0822 | 1.3988 | | -1.1338 | | 0.1612 | 2.5631 | * | -2.2525 | ** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6 | 0.0391 | 0.6647 | -0.6862 | -0.0177 | -0.2811 | | -0.2064 | |
| 7 | 0.0397 | 0.6746 | -0.4176 | 0.0531 | 0.8438 | | -1.0999 | |
| 8 | 0.0235 | 0.4000 | -0.6324 | 0.0941 | 1.4974 | | -1.5939 | |
| 9 | 0.0178 | 0.3029 | -0.3821 | 0.1151 | 1.8312 | * | -2.3065 | ** |
| 10 | -0.0412 | -0.7013 | 0.8255 | 0.0901 | 1.4333 | | -1.9859 | ** |

Statistical significance: * = 10%; ** = 5%; *** = 1%

**Figure 1.** Cumulative Abnormal Returns (CARs) and Average Abnormal Volumes (AVs) around the report date in case of upgrade

This figure shows daily mean abnormal volumes (AVs), and cumulative abnormal returns (CARs) around the report date for upgrades. CARs are obtained by aggregating mean abnormal returns over a [-10, +10] window centered on the report date. AVs are computed using the average volume estimated following the criteria indicated in table A.1.

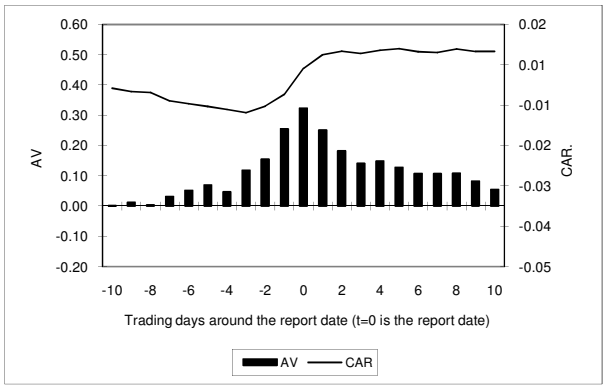


**Figure 2.** Cumulative Abnormal Returns (CARs) and Average Abnormal Volumes (AVs) around the report date in case of downgrade

This figure shows daily mean abnormal volumes (AVs), and cumulative abnormal returns (CARs) around the report date for downgrades. CARs are obtained by aggregating mean abnormal returns over a [-10, +10] window centered on the report date. AVs are computed using the average volume estimated following the criteria indicated in table A.1.

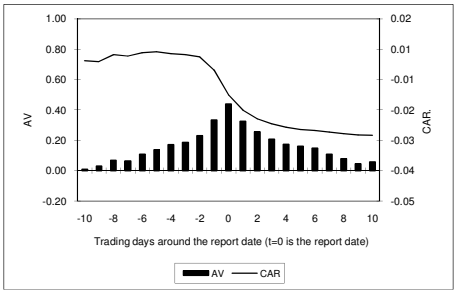

**Figure 3.** Cumulative Abnormal Returns (CARs) and Average Abnormal Volumes (AVs) around the public access date in case of upgrade

This figure shows daily mean abnormal volumes (AVs), and cumulative abnormal returns (CARs) around the public access date for upgrades. CARs are obtained by aggregating mean abnormal returns over a [-10, +10] window centered on the public access date. AVs are computed using the average volume estimated following the criteria indicated in table A.1.

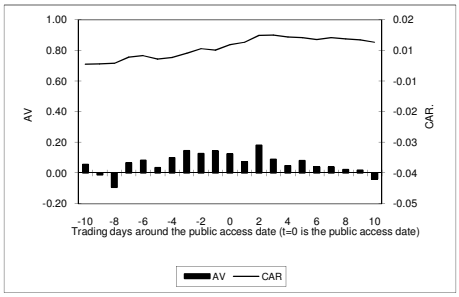


**Figure 4.** Cumulative Abnormal Returns (CARs) and Average Abnormal Volumes (AVs) around the public access date in case of downgrade

This figure shows daily mean abnormal volumes (AVs), and cumulative abnormal returns (CARs) around the public access date for downgrades. CARs are obtained by aggregating mean abnormal returns over a [-10, +10] window centered on the public access date. AVs are computed using the average volume estimated following the criteria indicated in table A.1.