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ABSTRACT

Corporate Governance (CG) has received increased attention from both policy-makers and boardrooms in the wake of a series of high-profile scandals involving the abuse of corporate power. As a result, firms are adopting and enhancing CG practices, often as part of a wider effort to improve perceptions of corporate social responsibility rather than simply enhancing investor returns.

The emerging literature suggests that improved corporate governance is better for shareholders. While a number of studies have found a *contemporaneous* correlation between firm performance and the quality of corporate governance (see Gompers, Ishii, and Metrick (2003), Bauer, Günster, and Otten (2004), Bebchuk, Cohen and Ferrell (2009)), we know of no empirical study attempting to examine the effect of managerial actions on corporate governance on subsequent firm performance. This paper attempts to address this gap in the literature by directly examining the relationship between *revisions* in corporate governance's scores and *subsequent* equity returns.

This article investigates this issue further by tracing the market reaction to changes in CG scores over a period of ten years (1999-2008) for the 200 companies included in the European index *Dow Jones Stoxx Large*. The data come from two purpose-built samples of equities of upward and downward revisions in CG scores.

This paper highlights four main findings. (1) The absence of post-event long-term over-performance is only robust for the upward revised companies in CG scores. (2) The robustness of long-term underperformance is confirmed for the downward revised companies in CG scores. (3) Upward revisions are followed by the uncertainty margin's (relative to the benchmark) stabilisation. (4) Downward revisions are followed by the uncertainty margin's (relative to the benchmark) reduction.

JEL classification: G14, G30

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I. Introduction

In recent years, corporate governance has received increased attention because of high-profile scandals involving abuse of corporate power and, in some cases, alleged criminal activity by corporate officers. The stock exchange crisis of 2000-2003 was due in part to the failure of failing governance at Enron, Worldcom Parmalat and others.

Legislators and regulators tend to address this type of crisis by the introduction of reforms aimed at "restoring confidence" between stakeholders. In the absence of a better solution to protect the interests of shareholders, does the reinforcement of corporate governance influence the short run perception of investors until impacting on corporate equity returns?

Many studies have found a *contemporaneous* correlation between firm performance[1] and the quality of corporate governance (see Gompers, Ishii, and Metrick (2003), Brown and Caylor, (2008), Bebchuk, Cohen and Ferrell (2009)). The existing literature has found that *levels* in corporate governance's scores are contemporaneously correlated with firm performance. However, none of these studies focus on investors' potential reaction to *changes* in corporate governance scores. This paper attempts to address the gap in the literature by directly examining the relationship between *revisions* in corporate governance's scores and *subsequent* equity returns. We do so by investigating the corporate governance (henceforth CG) scores provided by Vigeo, a respected European corporate social responsibility ratings agency, whilst tracking the impact of a series of events – changes in scores – in the financial market.

We begin by splitting the sample of equities according to changes in their CG scores, between those who experienced *upward* vs. *downward* revisions in CG scores. Each sub-sample is associated with a stream of future returns. Employing an event study analysis during the period 1999-2008, we measure the financial investors' reaction and test the relationship between revisions in CG scores and equity returns.

The empirical analysis enables us to test whether future equity abnormal returns are statistically significant for each sub-sample. We proceed to examine the abnormal returns in each of these sub-samples during two periods of 24 months around the event-month. In particular, we test the statistical significance for differences in abnormal returns *prior to* and *after* the event-month for the upward revisions sub-sample and for the downward revisions sub-sample.

We then examine the risk linked to the 2 sub-samples of revised CG scores companies through the drift between the relative volatility to the benchmark of the revised companies over an event window and the relative volatility to the benchmark at the event-month.

[1] To discuss the question of the measurement of the firm performance and corporate governance see Charreaux and Desbrières (1998).

To conclude, the evidence indicates significant negative abnormal returns for the downward revisions in CG scores sub-sample. We also find that following the event-month the margin of uncertainty relative to the benchmark is stabilized for the upward revisions and is reduced for the downward revisions in CG scores.

The remainder of this paper is organized as follows: The next section gives a brief overview of the financial literature on the relationship between corporate governance and firm performance. Section III describes our hypotheses. Section IV describes our sample, data sources and methodology. Section V presents the results of our empirical investigations on the relationship among corporate governance, stock returns and risks. The final section concludes with a summary and offers suggestions for future research.

II. Related Literature

In this brief survey of empirical research, we review the link between equity returns, firm performance and corporate governance. Those studies broadly distinguish three types of results concerning the sign of the relation (positive, negative or neutral).

Gompers, Ishii and Metrick (2003) show a positive relation between CG and investment performance by examining the relationship between corporate governance and long-term equity returns, firm value and accounting measures of performance. They use 24 measures of CG provided by Investor Responsibility Research Center (IRRC) on 1500 U.S. firms from 1990-1999 and analyse their financial impacts. They construct a “Governance Index” to proxy for the level of shareholders rights - a summary measure of corporate governance - based on the 24 measures of CG. They construct portfolios consisting of firms with numerous anti-takeover amendments ("Dictatorship Portfolio") and portfolios including firms with very few amendments ("Democracy Portfolio"). Subsequently, they examine the returns to holding a long position in the Democracy Portfolio and a short position in the Dictatorship Portfolio. This long-short strategy yields average returns of 8.5 percent per year. The authors determine that well-governed companies are also valued higher and their accounting statements show a better operating performance[2]. Their results clearly support the hypothesis that well-governed companies out-perform their poorly governed counterparts.

Drobetz, Schillhofer and Zimmermann (2004) analyze the impact of corporate governance on stock returns over the period 1998-2002 in Germany. Due to the fact that their corporate governance data are limited to one observation, March 2002, they assume constant historical ratings. To construct their sample, the authors sent out questionnaires to 253 German firms in different market segments and received answers from about 36% of these firms. In line with Gompers et al. (2003), Drobetz et al. (2004) also build factor portfolios consisting of well-governed versus poorly governed firms. After accounting for different factor exposures of the portfolios, their results show an annual excess return around 12 % to a corporate governance long-short strategy.

[2] The valuation is proxied by Tobin’s Q and their operational measures are net profit margin, return on equity and one-year sales growth.

Klapper and Love (2004) analyze the relationship between corporate governance and firm performance in Emerging markets. They use data on firm-level corporate governance rankings across 14 countries for only one year, 1999, on a sample of 335 firms. They find that companies with better governance and better disclosure standards exhibit higher Tobin's Qs[3].

Core, Guay and Rusticus (2005) examine the relationship between corporate governance investment performances. Like Gompers et al. (2003), they use 24 measures of CG provided by Investor Responsibility Research Center (IRRC) on U.S. firms from 1990 to 1999 and analyse their financial impacts. They find evidence that weak shareholder rights are associated with lower operating performance proxied by Return on Asset.

Philippon (2006) provides empirical evidence that badly governed firms have lower profit margins and are more cyclical than well governed firms. He builds a model where managers are prone to over-invest and where shareholders are more likely to tolerate such behaviour when times are good. His analysis explains the average profit differences as well as the cyclical behaviour of sales, employment and investment for firms with different governance qualities. His results suggest that governance conflicts could explain up to a third of aggregate volatility.

Extending the study of Gompers et al. (2003) to 2004, Bhagat and Bolton (2007) find that better governance is significantly positively correlated with better contemporaneous and subsequent operating performance

Chhaochharia and Laeven (2007) evaluate the impact of firm-level corporate governance provisions on the valuation of 2300 firms on 23 developed countries for the period 2003 through 2005. They use data source for corporate governance characteristics from Institutional Shareholder Service (ISS). They find a positive association between corporate governance and firm valuation. Despite the cost associated with improving corporate governance a one standard deviation increase in the difference between the firm-level governance score and the minimally accepted country-level governance is associated with an 8 % increase in Tobin's Q.

For the UK, Clacher, Doriye and Hillier (2008) study 63 firms of the FTSE 100 and the firms' characteristics are averages for each firm across the 2003 to 2005 time period. They find that the well-governed companies are associated with increased firm value proxied by Tobin's Q and operating performance proxied by Return on Asset as well as lower levels of capital expenditure.

Among the studies that find a negative relation between corporate governance and investment performance can be included that of Bauer, Günster, and Otten (2004). The authors use Deminor Corporate Governance Ratings for EMU and UK companies included in the FTSE Eurotop 300 index. Due to the fact that they have a limited history of corporate governance ratings available with only two years, 2000 and 2001, they assume constant historical ratings like Drobetz, Schillhofer and Zimmermann (2004). They find a significantly negative correlation between corporate

[3] Tobin's-Q is defined as the market value of assets (calculated as book value of assets minus book value of equity plus market value of equity) over book value of assets.

governance and firm performance proxied by Net Profit Margin and also by Return on Equity.

Bebchuk, Cohen and Ferrell (2009) examine which provisions matter among the 24 provisions of IRRC in the relation between corporate governance and investment performance. They identify six entrenching provisions that are negatively correlated with firm performance proxied by Tobin's Q, as well as with stock returns over the period 1990-2003 in the US.

Finally, some studies offer mixed answers about the relation between corporate governance and investment performance. Brown and Caylor (2006) build a governance index (Gov-Score) as of February 2003, which includes in total 51 governance factors provided by the Institutional Shareholders Service (ISS). Linking this index with firm valuation as measured by Tobin's Q, they find a significantly positive relation. When they look for the factors driving the relation between firm valuation and Gov-Sore they find only a small subset of provisions that are related to firm valuation.

Brown and Caylor (2008) more or less replicate their study, but they concentrate on the correlation between governance and the firms' operating performance proxied by Return on Assets and Return on Equity. They show that corporations with low scores in their corporate governance index have significantly lower ROA and ROE. Among the 51 provisions, they identify only 10 factors which show significantly positive correlations with at least one of the two performance measures.

Bassen, Prigge and Zöllner (2008) examine the impact of corporate governance in Germany from the individual provisions of the German Corporate Governance Code (GCGC). They find that for a sample of 100 large listed German companies, the compliance with GCGC at large is significantly and negatively associated with Tobin's Q. Individual analysis of eleven GCGC recommendations reveals that for three of them, there are not any correlations with performance measures. Four (four) components are significantly positively (negatively) associated with performance measures.

III. Development of hypotheses

This study investigates post-revisions in CG scores performance in Europe, using a sample comprised of scores provided by Vigeo covering the period 1999 to 2008. The scores are transformed in upward revisions and in downward revisions that could be hypothesised to influence post-revision returns.

To begin we investigate the two sub-samples of revisions for differences between the returns of the revised companies and the returns of the benchmark over the post-revision period, and test hypothesis 1a and hypothesis 1b.

Hypothesis 1a In the post-revision period, there is no difference between the returns of the upward revised companies and the benchmark, that is, the abnormal returns of the upward revised companies are not significantly different from zero.

Hypothesis 1b In the post-revision period, there is no difference between the returns of the downward revised companies and the benchmark, that is, the abnormal returns of the downward revised companies are not significantly different from zero.

If those hypotheses are rejected it suggests that investors take time to adjust to the information contained in upward and downward revisions. Alternatively, a finding of post-revisions underperformance could result from risk factors that are unknown to capital market researchers, but apparently known to practitioners. Besides, a finding of a statistically significant difference between returns of the post-upward and the post-downward revisions could suggest an asymmetry in the behaviour of the investors to the information conveyed by the revisions.

An examination of the performance of the revised companies *prior* the revision can act as a check on the robustness of the benchmark which is one reason for testing hypothesis 2a and 2b. The other reason is to test any evidence of similar abnormal returns between pre and post-revision periods. However, the confirmation of comparable abnormal returns before and after the revisions would suggest that the revisions do not contain any substantial information susceptible to modify the relative performance of the equities.

Hypothesis 2a In the pre-revision period, there is no difference between the returns of the upward revised companies and the benchmark, that is, the abnormal returns of the upward revised companies are not significantly different from zero.

Hypothesis 2b In the pre-revision period, there is no difference between the returns of the downward revised companies and the benchmark, that is, the abnormal returns of the downward revised companies are not significantly different from zero.

We continue by investigating the two sub-samples of revisions for changes in the spread between the risk of the revised companies and the risk of the benchmark over the post-revision period, and test hypothesis 3a and 3b.

Hypothesis 3a There is no difference between the relative volatility to the benchmark of the upward revised companies during the post-revision period and the relative volatility to the benchmark at the event-month, that is, the differential relative

benchmark volatility of the upward revised companies are not significantly different from zero.

Hypothesis 3b There is no difference between the relative volatility to the benchmark of the downward revised companies during the post-revision period and the relative volatility to the benchmark at the event-month, that is, the differential relative benchmark volatility of the downward revised companies are not significantly different from zero.

If these hypotheses are rejected it suggests that revisions modify the investors' perception of the risk relative to the benchmark of those companies. Otherwise, a finding of a tightening of the spread could result from reduction of the relative uncertainty on those equities.

Besides, an evidence of a statistically significant difference between the volatilities relative to the benchmark of the post-upward and the post-downward revisions could suggest an asymmetry in the behaviour of the investors as the information conveyed by the revisions is positive or negative.

An examination of the volatilities relative to the benchmark of the revised companies *prior to* the revision allows testing any evidence of similar differential relative benchmark volatility between pre and post-revisions periods. However, the confirmation of comparable differential relative benchmark volatility prior and after the revisions would suggest that the revisions do not contain any substantial information susceptible to modify the investors' perception about the risk relative to the benchmark of those equities.

Hypothesis 4a There is no difference between the relative volatility to the benchmark of the upward revised companies during the pre-revision period and the relative volatility to the benchmark at the event-month, that is, the differential relative benchmark volatility of the upward revised companies are not significantly different from zero.

Hypothesis 4b There is no difference between the relative volatility to the benchmark of the downward revised companies during the pre-revision period and the relative volatility to the benchmark at the event-month, that is, the differential relative benchmark volatility of the downward revised companies are not significantly different from zero.

III. Data and Research Method

Firm-level data on corporate governance score

Our source for corporate governance measures for firms is the Vigeo database. Vigeo is a major European supplier of extra-financial analysis. It assesses the degree to which companies take into account environmental, social, societal and corporate governance objectives.

Vigeo publishes for each company analysed a CG score that aggregates[4] the scores on 4 criteria of corporate governance: board of directors, audit & internal controls, shareholders and executive remuneration[5].

The CG score indicates the level of valuation of the *state* of Corporate Governance. This level is supposed to reflect the fact that the company adopts more or less good Governance practices. It is precisely this level indicator which has so far been very often used by academics and practitioners to study the relationship between the Corporate Governance and stock returns.

Table 1 presents summary statistics of CG scores. It reports the percentage of firms with corporate governance (CG) score provided by Vigeo among the 200 European firms included in the European Dow Jones Stoxx Large 200 index as of December 31, 2007, between 12/31/1999 and 12/31/2007. As reported in this table, at the end of 2000, nearly half of the companies are scored by the extra-financial analysts of Vigeo and at the end of 2003, 95 % of the sample of the 200 companies is scored. Sector reviews are done annually by Vigeo's analysts. They may modify the score of a firm at those dates but also at anytime through alerts. In general, the frequency of Vigeo's scores updates is 12 to 18 months.

In contrast to other studies we do not study the *level* but the score's *revision* to examine the relationship between CG and stock returns. Among the existing literature some studies have shown that *levels* in CG scores are contemporaneously correlated with firm performance. However, none of these studies focuses on the investors' potential reaction in the capital market associated with the *changes* in the CG scores. In our study, we are apart of this approach and instead examine the impact of changing governance practices from our own indicator review. This indicator of *revision* measures the improvement or, conversely, the degradation of governance practices within the company.

The revision is calculated as the difference between two consecutive CG scores

$$\mathrm{Rev}_{i,t} = \mathrm{Score}_{i,t} - \mathrm{Score}_{i,t-1}$$

[4] The weighting of the criteria that make up the aggregate Vigeo CG score is proprietary information.
[5] see Appendix A for the Vigeo's definitions about the 4 criteria.

where $\mathrm{Score}_{i,t}$ is the level of the CG score, on security *i* in month *t* and the CG scores are between 0 and 100. When $\mathrm{Rev}_{i,t}$ is positive (negative), it is an upward (downward) revision.

The second step in our empirical analysis is as follows. This sample of equities is then split between those that have experienced *upward* vs. *downward* revisions in CG scores. For each sub-sample, namely the upward revision sample and the downward revision sample we determine the future returns and test if such returns are statistically significant.

What type of revision to choose to examine its market impact?

What minimum level of revision to hold to represent a substantial change in governance practices? It seems to us that to meet this objective, rather than to fix to the revisions an arbitrary threshold marking their substantiality, it is better to retain a minimum number of revisions oriented in the same direction. Repeated upward or downward revisions reflect the growing conviction of the extra-financial analyst with respect to improvement or deterioration of the governance practices of the company. The totals of revised equities, equities revised upward and equities revised downward are shown in table 2.

It is clear that retaining a minimum of 3 revisions to reflect changing practices of governance seems a wise choice. Indeed, among the 200 European firms included in the European Dow Jones Stoxx Large 200 index as of December 31, 2007, 136 firms have been revised at least three times in the same direction over the 10 years studied. In addition, table 2 shows that about one third of the 200 firms have been upward revised at least 3 times (72 companies) and almost the same percentage has been downward revised at least 3 times (64 companies). Consequently, when we select the third revision as the event to examine its impact on subsequent stock returns we get a sufficient number of observations to test rigorously the relationship between CG changes and stock returns.

[Insert Table 1]
[Insert Table 2]

Firm-level data on returns

For our analysis we examine the 200 European firms included in the European *Dow Jones Stoxx Large 200* index. Those companies are the largest companies in terms of European market capitalisation over 18 European countries[6]. The sample consists of the 200 European firms included in the European *Dow Jones Stoxx Large 200* index as of December 31, 2007.

[6] The countries covered by the European DJ Stoxx indexes are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

The financial data we employ in our analysis are commonly used in academic research. The prices and the compounded total returns for the equities are obtained from different FactSet libraries.

For the analysis of this paper we match the Vigeo data to the FactSet Prices data by recording for each firm its International Securities Identification Number (ISIN Code).

Vigeo's historical database started to exhibit figures for European firms in 1999. Ultimately our sample of Vigeo's scores is a panel that includes data on over 200 firms for the period 1999 through 2007 with a total of 15,784 firm-month observations. We have 108 months of data on corporate governance scores for the examined period, so unlike many earlier studies we can create a panel dataset of firm-level CG scores that vary over time.

We use the FactSet historical databases to examine the financial data relative to the sample of the 200 European firms included in the European *Dow Jones Stoxx Large 200* index as of December 31, 2007. Ultimately our sample of compounded weekly total returns data is a panel that includes data on over 200 firms for the period between 12/31/1995 to 09/30/2008 with a total of 124,744 firm-week observations. We have 666 weeks of financial data for the examined period, so unlike many earlier studies we can examine the impact of changes in CG scores over a long period incorporating bullish and bearish markets. The weekly frequency of the financial data is useful to calculate rigorously the annual volatility of equity.

Buy and hold abnormal returns (BHARs) and cumulated abnormal returns (CARs) are the most commonly used methods of measuring stock market returns over a given period. Each has its appropriate uses. The CAR method involves the periodic rebalancing of portfolios that, as a practical investment strategy, would incur relatively high transactions costs that could significantly affect the returns available to investors. Barber and Lyon (1997) found that CARs were biased estimators of long-run abnormal returns and favoured the use of BHARs in tests designed to detect long-run abnormal stock returns. Kothari and Warner (1997) also recommended BHARs as the cumulating procedures in CARs lead to systematically positively biased abnormal returns. Other studies have favoured the use of CARs over BHARs. For example, Fama (1998), Mitchell and Stafford (2000), and Gompers and Lerner (2003) who argue that the BHAR approach can magnify underperformance as a consequence of compounding single period returns, and that the distributional properties and test statistics for CARs are better understood.

These arguments imply that the choice between the two methods is not straightforward. However, Gompers and Lerner (2003) advise that the choice between the two approaches should largely depend on the implicit trading strategy that is being assumed. Therefore, a BHR approach is deemed appropriate to this study to avoid the problems associated with frequent transactions, and to facilitate a measure of differential returns on equivalent risk assets.

The buy-and-hold abnormal return (BHAR) model and Benchmark construction

We define BHAR as the difference between an investor holding shares in a revised CG score company compared to what is expected from a broad asset-portfolio benchmark. All returns for both the event-firm's security and the benchmark are compounded over a *k*-holding period up to 24 months following the event. Analytically, the buy-and-hold return for security *i* is estimated as:

$$BHR_{i,k} = \prod_{t=1}^{k}\left[\left(1 + r_{i,t}\right)\right] - 1 \qquad (1)$$

where $BHR_{i,k}$ the buy-and-hold is return for security *i* for a holding period of $k = 1, 2, \ldots, 24$ months, and, $r_{i,t}$ is the total return[7] on security *i* in month *t*.

Also, in terms of the expected buy-and-hold returns of the set benchmark, we may adopt two different excess returns estimation procedures depending on the nature of the benchmark used. In the first method, buy-and-hold abnormal returns of the revised CG score companies are compared with the market proxy. As a market proxy, we may use in that case the current European *Dow Jones Stoxx Large 200* index. Analytically, the buy and hold returns (*BHR*) for an investor holding a well diversified market portfolio such as the *Dow Jones Stoxx Large 200* index are estimated as:

$$BHR_{M,k} = \prod_{t=1}^{k}\left[\left(1 + r_{M,t}\right)\right] - 1 \qquad (2)$$

where $BHR_{M,k}$ is the buy-and-hold return for the market and for a holding period of *k*-months, and, $r_{M,t}$ is the return of the index in month *t*. The excess performance of the revised CG score companies compared to market is calculated as the difference between (1) and (2)

$$BHAR_{i,k} = \left[\prod_{t=1}^{k}\left[\left(1 + r_{i,t}\right)\right] - 1\right] - \left[\prod_{t=1}^{k}\left[\left(1 + r_{M,t}\right)\right] - 1\right] \qquad (3)$$

Consequently, the average buy-and-hold abnormal returns (ABHAR) for N securities and for the *k*-months period following the event are estimates as:

$$ABHAR_{N,k} = \frac{1}{N}\sum_{i=1}^{N} BHAR_{i,k} \qquad (4)$$

Finally, we prefer a second method where the market proxy is a control benchmark designed specifically. This benchmark consists of the 200 equity members of the European *Dow Jones Stoxx Large 200* index, the December 31st 2007. At that date, all the 200 companies included in this index get a CG score provided by Vigeo. We have extracted from the Vigeo database the time series of the CG scores from 1999 to 2007 for all these 200 stocks. We prefer to keep this kind of benchmark with the same sample of stocks in all our study period than to take the current Dow Jones Stoxx Large 200 index for increasing the number of revised CG scores to examine. However, we identify a drawback if we have chosen the current

[7] Raw return plus dividend yield

index. On the period of nine years between 1999 and 2007 the constituents of the current index have changed several times. Precisely, the current index composition is reviewed quarterly in March, June, September and December. Numerous deletions and replacements of equities in the index would induce to shorten the depth of the time series of those concerned stocks. Therefore, this would seriously complicate a long run event study on revised CG scores.

To determine the average expected buy-and-hold returns of our benchmark we have equi-weighted the sample of 200 equities to reduce the impact of the "size effect". Its mathematical expression is the following:

$$ABHR_k = \frac{1}{n}\sum_{i=1}^{n}\left[\prod_{t=1}^{k}\left(1+r_{i,t}\right)-1\right] \qquad (5)$$

Therefore, the excess returns of the revised companies compared to the benchmark is calculated as the difference between (1) and (5), or

$$BHAR_{i,k} = \left[\prod_{t=1}^{k}\left[\left(1+r_{i,t}\right)\right]-1\right] - \left\{\frac{1}{n}\sum_{i=1}^{n}\left[\prod_{t=1}^{k}\left(1+r_{i,t}\right)-1\right]\right\} \quad (6)$$

Ultimately, the average buy-and-hold abnormal returns for N securities over the holding period *k* is mathematically defined as:

$$ABHAR_{N,k} = \frac{1}{N}\sum_{i=1}^{N} BHAR_{i,k} \qquad (7)$$

Risk Examination

We define RBV as the difference between the volatility of a sample of shares in revised CG score companies compared to the volatility of benchmark. Each month during the period 1999-2008, we measure for each stock the volatility from the standard deviation on the last 52 weeks. Thus we determine for each month *t*, the benchmark volatility $\sigma_{B,t}$ and the volatility of the sample of revised CG scores companies $\sigma_{S,t}$.

Analytically, the weekly volatility for security *i* is estimated as:

$$VOL_{w,i,t} = \sigma\left[r_{w,i,t}\right] = \sqrt{\frac{1}{52}\sum_{t=1}^{52}\left(r_{w,i,t-52} - \bar{r}_{w,i}\right)^2} \qquad (8)$$

where $VOL_{w,i,t}$ is the volatility of security *i* calculated on the last 52 weekly returns before week *t* , and, $r_{w,i,t}$ is the weekly total return on security *i* in week *t,* and $\bar{r}_{w,i}$ the rolling arithmetical mean of the total return on security *i* calculated on the 52 weekly returns.

$VOL_{i,t}$ is the annualized volatility for security *i* in week *t* is estimated as:

$$VOL_{i,t} = \sqrt{52} \cdot VOL_{w,i,t} \qquad (9)$$

Concerning our benchmark, we have to remember that we have equi-weighted the sample of 200 equities. Thus the weekly return for benchmark *B* is estimated as:

$$r_{w,B,t} = \frac{1}{n}\sum_{i=1}^{n} r_{w,i,t} \qquad (10)$$

where $r_{w,i,t}$ is the weekly return of security *i* in week *t* between 12/31/1995 and 12/31/2007 over the 200 European firms included in the European *Dow Jones Stoxx Large 200* index as of December 31, 2007.

Analytically, the weekly volatility for benchmark *B* is estimated as:

$$VOL_{w,B} = \sigma\left[r_{w,B}\right] = \sqrt{\frac{1}{52}\sum_{t=1}^{52}\left(r_{w,B,t-52} - \bar{r}_{w,B}\right)^2} \qquad (11)$$

where $VOL_{w,B,t}$ is the volatility of our benchmark *B* calculated on the last 52 weekly returns before week *t*, and, $r_{w,B,t}$ is the weekly total return on our benchmark *B* in week *t* and $\bar{r}_{w,B}$ the rolling arithmetical mean of the total return on benchmark *B* calculated on the 52 weekly returns.

$VOL_{B,t}$ is the annualized volatility for benchmark *B* in week *t* is estimated as:

$$VOL_{B,t} = \sqrt{52} \cdot VOL_{w,i,t} \qquad (12)$$

We define $RBV_{i,k}$, - Relative Benchmark Volatility - for security *i* in month *k,* as the difference between the volatility for security *i* and volatility for benchmark *B* in month *k*.

$$RBV_{i,k} = VOL_{i,k} - VOL_{B,k} \qquad (13)$$

This indicator allows to measure the spread between volatility for security *i* and volatility for benchmark *B* for each month *k* of the post-event period (k=1,2,…24). It points out if the security *i* is more risky or less risky than the benchmark *B* in month *k*. Consequently, $RBV_{i,0}$ is the Relative Benchmark Volatility for security *i* the month of the event.

If we find evidence of abnormal returns for the revised CG score security *i*, it is necessary to evaluate the risk linked to this security. More precisely it seems interesting to measure the drift of the spread between the volatility of the security and the volatility of the benchmark over a *k*-holding period up to 24 months following the

event. To calculate this spread we introduce $DRBV_{i,k}$, the Differential Relative Benchmark Volatility for security *i* in month *k,* and its expression is the following:

$$DRBV_{i,k} = RBV_{i,k} - RBV_{i,0} = \left(VOL_{i,k} - VOL_{B,k}\right) - \left(VOL_{i,0} - VOL_{B,0}\right) \qquad (14)$$

Thus, $RBV_{i,0}$ is our "anchor". It is the Relative Benchmark Volatility the month *0*, i.e. the month of the event. It gives us a reference to assess - from the event-month - the drift of the spread between the volatility of security *i* and the volatility of benchmark *B* on a holding period of *k*-months.

Ultimately, the average Differential Relative Benchmark Volatility for N securities over the holding period *k* is mathematically defined as:

$$ADRBV_{N,k} = \frac{1}{N}\sum_{i=1}^{N} DRBV_{i,k} \qquad (15)$$

Tests of Significance

To address the problem of positive skewness associated with the use of the BHAR methodology highlighted in earlier literature (Barber and Lyon, 1997; Kothari and Warner, 1997), apart from the assessment of the level of risk for revised CG score companies and benchmark all other statistical inferences in this study are calculated using the skewness adjusted *t-statistic* methodology introduced by Lyon et al. (1999). In detail, the t_{sa}-values for all $ABHAR_{N,k}$, are estimated as:

$$t_{sa} = \sqrt{n}\left(S + \frac{1}{3}\hat{\gamma}S^2 + \frac{1}{6n}\hat{\gamma}\right) \qquad (16)$$

where $S = \dfrac{\overline{ABHAR}}{\sigma\left(ABHAR\right)}$ and $\hat{\gamma} = \dfrac{\sum_{i=1}^{n}\left(ABHAR_{N,k} - \overline{ABHAR}\right)^3}{n\,\sigma\left(ABHAR\right)^3}$

To compare for each sample of revised CG scores companies, the abnormal returns before and after the event-month, we use the Two-Means Test. For example, this test allows us to determine whether two abnormal returns are statistically equals.

In detail, if we suppose we have two normally distributed but independent samples and their σ is known, the *t*-value relative of two samples of sizes N_1 and N_2 is estimated as:

$$t_{(\overline{X}_1-\overline{X}_2)} = \frac{\overline{X}_1 - \overline{X}_2 - \Delta}{\sqrt{\frac{\sigma_1^{\,2}}{N_1} + \frac{\sigma_2^{\,2}}{N_2}}} \qquad (17)$$

where $\overline{X}_1$ and $\overline{X}_2$ are the means (ABHAR) of the two samples, Δ is the hypothesized difference between the population means (0 if testing for equal means), σ_1 and σ_2 are the standard deviations of the two populations.

IV. Empirical results

Abnormal returns in the Post-Event Period

Table 3 reports the post-event long-term market performance for the upward revised companies (Panel A) and for the downward revised companies (Panel B) for period *k=1,2,…,24* months. Benchmark-excess returns are estimated as the difference of BHR for the CG scores revised companies compared to the performance of the benchmark.

[Insert Table 3]

According to table 3 panel A, during the two years following the event - the third revision - the market performance of the upward revised companies are around zero compared to the benchmark. In terms of statistical significances, the skewness adjusted t-statistics exhibit any significant figures during the 24 months period.

As illustrated in figure 1a the ABHARs are close to zero up around 24 months after the event. These results confirm the absence of long-term over or underperformance for the upward revised companies in CG scores in the post-event period. Therefore, *Hypothesis 1a* of no difference between post-event returns for upward revised companies compared to the benchmark returns is not rejected.

According to table 3 panel B, after the first year following the third revision, the stock market performance of the downward revised companies deteriorates. Compared to the benchmark, the market performance of the downward revised companies ranges from a level of -1.4 % reported for an investment holding period of twelve months and down to -5.9 % and -7.1 % reported at sixteen and twenty-three months following the third revision event. In terms of statistical significances, the skewness adjusted t-statistics for those two last abnormal returns (t_{sa}-values of -2.386 and -2.518 respectively) are both significant at five-percent level.

As illustrated in figure 1b the ABHARs show a declining trend on the 24 months after the event. These results confirm the robustness of the downward revised companies' long-term underperformance in post-event period. Therefore, *Hypothesis 1b* of no difference between post-event returns for downward revised companies compared to the benchmark returns is rejected.

At this stage of the study we may imagine that the event - the third downward revision in CG scores - is likely to contain information negatively impacting the stock returns over the next twenty-four months.

[Insert Figure 1a & Figure 1b]

Abnormal returns in the Pre-Event Period

Table 4 reports the pre-event long-term market performance for the upward revised companies (Panel A) and for the downward revised companies (Panel B) for period *k=-24,-23,…,0* months. Benchmark-excess returns are estimated as the difference of BHR for the CG scores revised companies compared to the performance of the benchmark.

[Insert Table 4]

According to table 4 panel A, during the two years preceding the event - the third revision - the market performance of the upward revised companies are around zero compared to the benchmark. In terms of statistical significances, the skewness adjusted *t-statistics* exhibit any significant figures during the pre-event period of 24 months.

As illustrated in the left part of figure 2a the ABHARs are close to zero up around 24 months before the event. These results confirm the absence of long-term over or underperformance for the upward revised companies in CG scores in pre-event period. Therefore, *Hypothesis 2a* of no difference between pre-event returns for upward revised companies compared to the benchmark returns is not rejected.

According to table 4 panel B, during the two years preceding the third revision, the stock market performance of the downward revised companies deteriorates. Compared to the benchmark, the market performance of the downward revised companies ranges from a minimum of -3.7 % reported for an investment holding period of five months and down to -8.5 % and -14.6 % reported at fifteen and twenty-four months preceding the event-month. In terms of statistical significances, the skewness adjusted *t-statistics* (t_{sa}-values of -2.936, -2.735 and -4.969 respectively) are both significant at one-percent level.

As illustrated in the left part of figure 2b the ABHARs show a declining trend over the 24 months prior the event. These results confirm the robustness of the downward revised companies' long-term underperformance in pre-event period. Therefore, *Hypothesis 2b* of no difference between pre-event performances for downward revised companies compared to the benchmark is rejected.

The statistical comparison of the abnormal returns *prior* and *after* the event-month is made through the Two-Means test. The comparison of the abnormal returns of the upward revised companies twenty-three months *before* the event-month and twenty-four months *after* the event-month exhibits any difference between them. In terms of statistical significances, with a level of 0.055 the Two-Means test *t-statistics* is not significant.

Figure 2a and 2b illustrate the ABHARs over the full 49-month period[8] and offer a comparison of the ABHAR *prior* and *after* the event-month.

[8] On the left part of the figures 2a and 2b, these are the ABHARs if shares are purchased at the end of the event-month and held through to month -24. On the right part of the figure 2a and 2b, these are the ABHARs if shares are purchased at the end of the event-month and held through to month +24.

As illustrated in figure 2a, the continuation of the absence of abnormal returns from the pre-event period to the post-event period suggests that upward revisions in CG scores do not contain any information which might change the stock returns relative to the benchmark returns.

The comparison of the abnormal returns of the downward revised companies twenty-five months *prior to* the event-month and twenty-four months *after* the event-month exhibits slight differences between them. In terms of statistical significances, with a level of 1.899, the Two-Means test *t-statistics* is significant at ten-percent level.

As illustrated in figure 2b, the evidence of abnormal returns for the downward revised companies on both pre and post-event period opens a debate. On one hand, one might suppose that the event (the third downward revision) provides a confirmation of the deterioration of corporate governance practices. Following that, the stocks go on underperforming the benchmark after the event-month. On the other hand, since the abnormal returns are negative before the event and stay negative after the event, one might suppose that the event does not add any new information. Consequently one might suppose that others factors are behind the underperformance that has already begun 24 months before the event-month.

[Insert Figure 2a & Figure 2b]

We find evidence that the absence of post-event long-term over-performance is only robust for the upward revised companies in CG scores. Moreover, we find evidence of significant negative abnormal returns for the downward revised companies in CG scores. Therefore, it is necessary to evaluate the risk linked to the two sub-samples of securities. More precisely it seems interesting to measure the drift between the relative volatility to the benchmark of the revised companies during the post-revision period and the relative volatility to the benchmark at the event-month. To measure the drift of this spread we calculate the Differential Relative Benchmark Volatility for the CG scores revised companies.

Differential Relative Benchmark Volatility in the Post-Event Period

Table 5 reports the post-event drift of the differential relative benchmark volatility for the upward revised companies (Panel A) and for the downward revised companies (Panel B) for period *k=0,1,2,…,24* months.

[Insert Table 5]

According to table 5 panel A, during the two years following the third revision, the differentials relative benchmark volatility of the upward revised companies are almost zero. In terms of statistical significances, the t-statistics exhibit any significant figures during the 24 months period.

As illustrated in figure 3a the ADRBVs are close to zero up around 24 months after the event. These results confirm the absence of long-term upward or downward drift between the relative volatility to the benchmark of the upward revised companies during the post-revision period and the relative volatility to the benchmark at the event-month. Therefore, *Hypothesis 3a* of no differential relative benchmark volatility of the upward revised companies is not rejected.

According to table 5 panel B, during the two years following the third revision, the differentials relative benchmark volatility of the downward revised companies are negative and decrease. Compared to the relative volatility to the benchmark at the event-month, the relative volatility to the benchmark of the downward revised companies ranges from a minimum of -0.566 reported for an investment holding of 2 months and down to -2.523 and -4.114 reported at twelve and twenty-two months following the event-month. In terms of statistical significances, the *t-statistics* are -1.965 and -2.611 both significant at respectively five and one-percent level. In terms of statistical significances, the *t-statistics* (*t*-values of -2.019, -1.965 and -2.611 respectively) are both significant at five-percent level for the first ones and at one-percent level for the last one.

As illustrated in figure 3b the ADRBVs show a declining trend over the 24 months after the event. These results confirm the robustness of long-term downward drift between the relative volatility to the benchmark of the downward revised companies during the post-revision period and the relative volatility to the benchmark at the event-month. Therefore, *Hypothesis 3b* of no differential relative benchmark volatility of the downward revised companies is rejected.

At this stage of the study it can be assumed that the event - the third upward revision in CG scores – may not contain information that drifts the differential relative benchmark volatility of the downward revised companies over the next twenty-four months.

Furthermore, we may imagine that the event - the third downward revision in CG scores - is likely to contain information that lessen the differential relative benchmark volatility of the downward revised companies over the next twenty-four months.

[Insert Figure 3a & Figure 3b]

Differential Relative Benchmark Volatility in the Pre-Event Period

Table 5 reports the post-event drift of the differential relative benchmark volatility for the upward revised companies (Panel A) and for the downward revised companies (Panel B) for period *k=-24,-23,…,0* months.

[Insert Table 6]

According to table 6 panel A, during the two years preceding the third revision, the differentials relative benchmark volatility of the upward revised companies are positive and decrease. Compared to the relative volatility to the benchmark at the event-month, the relative volatility to the benchmark of the upward revised companies ranges from a maximum of +7.666 reported for an investment holding of 24 months and down to +6.049 and +1.862 reported at eighteen and nine months preceding the event-month. In terms of statistical significances, the *t-statistics* (*t*-values of 4.716, 4.123 and 2.647 respectively) are both significant at one-percent level.

As illustrated in the left part of figure 4a the ADRBVs show positive levels but a declining trend over the 24 months prior the event. These results confirm the robustness of long-term downward drift between the relative volatility to the benchmark of the downward revised companies during the pre-revision period and the relative volatility to the benchmark at the event-month. Therefore, *Hypothesis 4a* of no differential relative benchmark volatility of the upward revised companies is rejected.

According to table 6 panel B, during the two years preceding the third revision, the differentials relative benchmark volatility of the downward revised companies are positive. Compared to the relative volatility to the benchmark at the event-month, the relative volatility to the benchmark of the upward revised companies ranges from a maximum of +4.041 reported for an investment holding of 24 months and down to +3.032 and +2.040 reported at twelve and two months preceding the event-month. In terms of statistical significances, the *t-statistics* (*t*-values of 2.503, 2.135 and 2.880 respectively) are both significant at five-percent level for the first ones and at one-percent level for the last one.

As illustrated in the left part of figure 4b the ADRBVs show positive levels but a downward trend over the 24 months prior the event. These results confirm the robustness of long-term downward drift between the relative volatility to the benchmark of the downward revised companies during the pre-revision period and the relative volatility to the benchmark at the event-month. Therefore, *Hypothesis 4b* of no differential relative benchmark volatility of the downward revised companies is rejected.

The statistical comparison of the differential relative benchmark volatility *prior* and *after* the event-month is made through the Two-Means test. The comparison of the differential relative benchmark volatility of the upward revised companies twenty-four months *before* the event-month and twenty-four months *after* the event-month exhibits a difference between them. In terms of statistical significances, with a level of 2.258 the Two-Means test *t-statistics* is significant at five-percent level.

The comparison of the differential relative benchmark volatility of the downward revised companies twenty-four months *prior to* the event-month and twenty-four months *after* the event-month exhibits a difference between them. In terms of statistical significances, with a level of 3.288, the Two-Means test *t-statistics* is significant at one-percent level. For both upward and downward revisions, the comparison of the DRBV exhibits significant differences prior and after the third revision.

Figure 4a and 4b illustrate the ADRBVs over the full 49-month period[9] and offer a comparison of the ADRBV *prior* and *after* the event-month.

[Insert Figure 4a & Figure 4b]

The differentials relative benchmark volatility of the revised companies significantly change their level depending the period around the event. As illustrated in figure 4a, they are positive in the pre-event period and stay around zero over the post-event period for the upward revised companies. In figure 4b, they are positive in the pre-event period and negative over the post-event period for the downward revised companies.

The sign change of the differentials from the pre to the post-event period indicates a *break* in the investors' perception of the relative risk to the benchmark.

For the upward revised companies their relative risk to the benchmark were higher over the 24 months prior the third revision than after. Following the third revision the level of relative risk to the benchmark is stabilized over the next twenty-four months.

For the downward revised companies the break is more pronounced. Their relative risk to the benchmark were higher over the 24 months prior the third revision than after. Following the third revision the level of relative risk to the benchmark falls over the next twenty-four months. This means that the margin of uncertainty relative to the benchmark has declined for the downward revised companies.

Finally, it appears that following the three revisions in the same direction, the *margin of uncertainty* relative to the benchmark is either stabilized or reduced. Therefore, one may no longer assume that this third revision does not add any new information.

These findings, when considered collectively, suggest that repeated revisions in CG scores companies contain information, and that stock market reacts only slowly to them. Clearly, this kind of extra-financial information may not be sufficiently exploited by the investors on the stock markets.

[9] On the left part of the figures 4a and 4b, these are the ADRBVs if shares are purchased at the end of the event-month and held through to month -24. On the right part of the figure 4a and 4b, these are the ADRBVs if shares are purchased at the end of the event-month and held through to month +24.

VI. Conclusion

In recent years, Corporate Governance has received increased attention because of scandals and their disastrous consequences on their company and their stakeholders. However, with few notable exceptions discussed above, the finance literature lacks empirical research on long-run performance studies especially focused on the relationship between *changes* in Corporate Governance scores and stock returns.

Our main findings document (1) evidence of absence of post-event long-term over-performance only for the upward revised companies in CG scores and (2) robustness of long-term underperformance for the downward revised companies in CG scores. Proof of abnormal returns raises the issue of risk linked to the 2 sub-samples of revised CG scores companies. Therefore, we examine the drift between the relative volatility to the benchmark of the revised companies over the post-event window and the relative volatility to the benchmark at the event-month. We find evidence that following the event-month the margin of uncertainty relative to the benchmark is stabilized for the upward revisions and is reduced for the downward revisions in CG scores.

These findings, when considered collectively, suggest that repeated revisions in CG scores companies contain information, and that stock market reacts only slowly to them. Clearly, this kind of extra-financial information may not be sufficiently exploited by the investors on the stock markets.

Our results contribute to our understanding of the relationship between governance changes and stock returns, and provide a basis for future work in several ways. The CG data that we have used for our study is a CG score that aggregates the scores on four criteria of corporate governance: board of directors, audit and internal controls, shareholders and executive remuneration. Each of those four criteria aggregates also scores on governance provisions[10]. It might be interesting to examine what factors affect the European stock market in terms of risk and returns. These results may lead to the construction of a new indicator, which aggregates factors that matter most to shareholders.

[10] See Appendix A

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Appendix A – Vigeo reference model and definitions of Corporate Governance Criteria

CG1.1 Board of directors
Definition
Enterprise commitment to set up a board of directors with capability to control upon and advise executives and to be held accountable to shareholders
Principle for action
A. Ensure that the board is able to exercise appropriate control over top management
B. Ensure that the board is held accountable to company shareholders

CG2.1 Audit and internal controls
Definition
Assesses the enterprise commitment to establish efficient systems for risk tracking and risk assessment and to ensure internal information of executives; assesses the extent to which this commitment is reflected in financial information provided to the public. The board of directors is responsible for objectivity and relevance of the system.
Principles for action
A. Ensure that financial information provided to the public is accurate and that company risks are appropriately managed
B. Ensure that an audit committee/function is in place to manage the issues above

CG3.1 Shareholders' rights
Definition
Assesses the enterprise commitment to ensure fair treatment of shareholders who should be able to actively exercise appropriate control over strategic decision making. Rights pertaining to shareholding and shareholders rights to participate in general meetings are of fundamental importance.
Principles for action
A. Ensure the fair and equal treatment of all shareholders and respect the principle of one share- one vote
B. Guarantee the right of shareholders to participate in the Annual General Meeting and to adopt resolutions
C. Promote and facilitate the exercise of voting rights

CG 4.1 Executive remuneration
Definition
Assesses enterprise commitment to use executives' remuneration as a tool to improve congruence between executives and shareholders interests.
Principles for action
Ensure that executive remuneration is used as a tool to align the interests of executives with those of company shareholders

Table 1

Corporate governance scores statistics

This table reports for each end of year the percentage of firms with corporate governance (CG) score provided by Vigeo among the 200 European firms included in the European Dow Jones Stoxx Large 200 index as of December 31, 2007

Year	Percentage of firms with CG scores
1999	41%
2000	48%
2001	59%
2002	69%
2003	95%
2004	96%
2005	99%
2006	99%
2007	100%

Table 2

Corporate governance revisions statistics

This table reports statistics on the number of upward and downward revisions in CG scores by equity from 1999 to 2007 among the 200 European firms included in the European Dow Jones Stoxx Large 200 index as of December 31, 2007. The figure at the intersection of the fourth row and second column shows that 136 equities have been revised at least three times. The figure at the intersection of the fourth row and the fourth column shows that 72 equities have been revised upwards at least three times. The figure at the intersection of the fourth row and sixth column shows that 64 equities have been revised downwards at least three times.

Number of Revsions (X)	Total of equities revised at least X times	Total of equities revised upward only X times	Total of equities revised upward at least X times	Total of equities revised downward only X times	Total of equities revised downward at least X times
1	365	50	189	68	176
2	247	67	139	44	108
3	**136**	49	**72**	34	**64**
4	53	20	23	25	30
5	8	3	3	5	5
6	0	0	0	0	0

Table 3

Average Buy-and-Hold Abnormal Returns for European Firms following the event-month on Corporate Governance scores

This table presents the difference in returns for revised in CG scores companies against the benchmark in the post-event period. In Panel A (Panel B), the sample under examination comprises 72 (64) equities which have been upward (downward) revised at least thrice among the 200 European firms included in the European Dow Jones Stoxx Large 200 index as of December 31, 2007. Buy-and-Hold Abnormal Returns are calculated on the period 1997-2008 and are defined as the difference in the change in wealth for investors that hold shares in a revised CG score company compared to the benchmark for an investment holding period of k=1,2,…,24 months following the event. To solve the problem of positive skewness present in the buy-and-hold methodology and associated with the comparison of individual securities' returns to those of broad benchmarks we adopt *t-statistic* calculated using the skewness-adjusted methodology introduced by Lyon et al. (1999). Significant levels are indicated by *, ** for 10 % and 5 % respectively.

Panel A : Post Upward Revision ABHAR

Month	μ	σ	t_{sa}	n
1	-0.5%	0.052	-0.741	72
2	-0.1%	0.075	-0.132	72
3	-0.5%	0.081	-0.488	72
4	-0.2%	0.099	-0.185	72
5	-0.8%	0.116	-0.552	72
6	0.5%	0.133	0.344	72
7	0.2%	0.128	0.154	72
8	-0.5%	0.136	-0.338	72
9	-0.9%	0.140	-0.530	72
10	-0.3%	0.165	-0.172	72
11	0.0%	0.187	0.004	72
12	0.4%	0.192	0.192	71
13	0.0%	0.211	0.012	71
14	1.4%	0.230	0.495	67
15	0.9%	0.245	0.298	66
16	-2.1%	0.249	-0.637	61
17	-1.7%	0.273	-0.448	60
18	-0.5%	0.293	-0.118	60
19	-0.2%	0.296	-0.041	58
20	-1.0%	0.301	-0.231	58
21	-4.2%	0.298	-0.934	56
22	-2.6%	0.358	-0.459	56
23	-2.7%	0.432	-0.337	55
24	-1.7%	0.498	-0.137	53

Panel B : Post Downward Revision ABHAR

Month	μ	σ	t_{sa}	n
1	0.1%	0.057	0.188	64
2	0.0%	0.087	0.012	64
3	0.3%	0.084	0.278	64
4	-0.3%	0.092	-0.240	64
5	-1.0%	0.111	-0.730	64
6	-1.8%	0.118	-1.207	64
7	-2.7%	0.120	-1.658*	64
8	-2.4%	0.128	-1.431	64
9	-2.8%	0.148	-1.463	64
10	-2.1%	0.162	-1.003	64
11	-0.9%	0.176	-0.374	64
12	-1.4%	0.167	-0.626	63
13	-2.2%	0.168	-0.997	63
14	-3.6%	0.167	-1.577	61
15	-3.6%	0.174	-1.429	59
16	-5.9%	0.168	-2.386**	57
17	-4.7%	0.169	-1.994**	57
18	-3.4%	0.186	-1.362	57
19	-2.2%	0.200	-0.791	54
20	-3.4%	0.192	-1.277	53
21	-5.1%	0.192	-1.918*	53
22	-6.8%	0.197	-2.412**	52
23	-7.1%	0.194	-2.518**	52
24	-6.6%	0.211	-2.166**	51

Figure 1a & Figure 1b

Average Buy-and-Hold Abnormal Returns for European Firms during the period of 24 months following the event-month on Corporate Governance scores

In Figure 1a, the sample comprises 72 equities which have been upward revised at least thrice in CG score and in Figure 1b, the sample comprises 64 equities which have been downward revised at least thrice in CG score, among the 200 European firms included in the European Dow Jones Stoxx Large 200 index as of December 31, 2007. ABHAR is the Average Buy-and-Hold Abnormal Returns of revised CG scores companies after the event-month. The Buy-and-Hold Abnormal Returns (BHAR) for security *i* over the holding period *k* are mathematically defined as

$$BHAR_{i,k} = \left[\prod_{t=1}^{k}\left[\left(1+r_{i,t}\right)\right]-1\right] - \left\{\frac{1}{n}\sum_{i=1}^{n}\left[\prod_{t=1}^{k}\left(1+r_{i,t}\right)-1\right]\right\}$$

Where $r_{i,t}$ is the total return in security *i* at month *t*.

Figure 1a

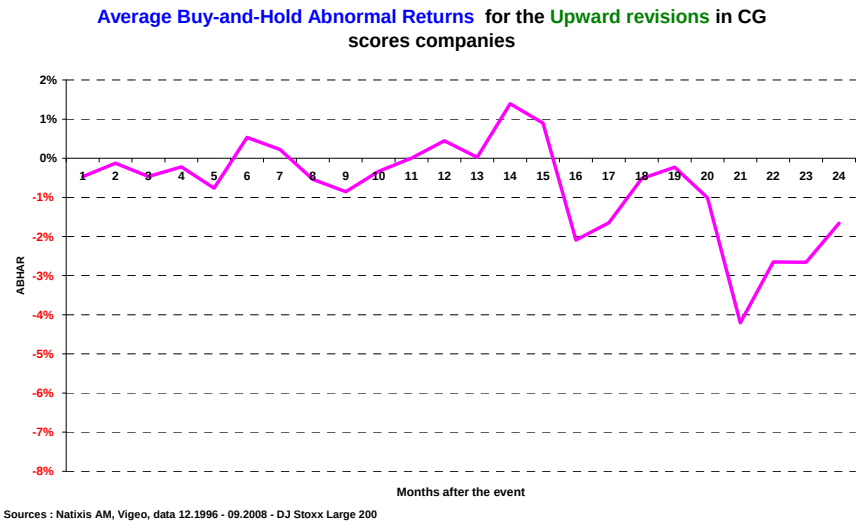


Figure 1b

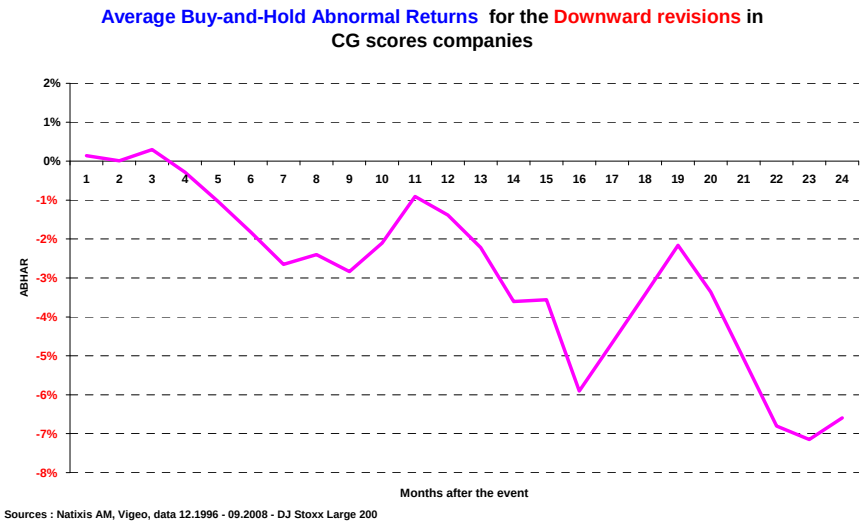


Table 4
Average Buy-and-Hold Abnormal Returns for European Firms preceding the event-month on Corporate Governance scores

This table presents the difference in returns for revised in CG scores companies against the benchmark in the pre-event period. In Panel A (Panel B), the sample under examination comprises 72 (64) equities which have been upward (downward) revised at least thrice among the 200 European firms included in the European Dow Jones Stoxx Large 200 index as of December 31, 2007. Buy-and-Hold Abnormal Returns are calculated on the period 1997-2008 and are defined as the difference in the change in wealth for investors that hold shares in a revised CG score company compared to the benchmark for an investment holding period of k=-24,-23,…,0 months prior to the event. Statistical inferences are calculated using the skewness adjusted *t-statistic* methodology introduced by Lyon et al. (1999). Significant levels are indicated by *, **, *** for 10 %, 5 % and 1 % respectively.

Panel A : Pre Upward Revision ABHAR

Month	μ	σ	t_{sa}	n
-24	-1.7%	0.258	-0.554	72
-23	-0.2%	0.269	-0.033	72
-22	2.4%	0.327	0.678	72
-21	1.5%	0.291	0.499	72
-20	-0.0%	0.268	0.024	72
-19	-0.5%	0.250	-0.153	72
-18	-1.5%	0.243	-0.497	72
-17	-0.4%	0.253	-0.115	72
-16	-1.1%	0.217	-0.407	72
-15	-0.5%	0.217	-0.192	72
-14	-1.0%	0.218	-0.369	72
-13	-1.5%	0.215	-0.538	72
-12	-1.3%	0.198	-0.515	72
-11	-1.5%	0.188	-0.643	72
-10	-0.8%	0.181	-0.366	72
-9	-0.4%	0.171	-0.151	72
-8	0.0%	0.160	0.018	72
-7	-0.6%	0.151	-0.314	72
-6	-1.2%	0.139	-0.718	72
-5	-0.2%	0.143	-0.105	72
-4	0.1%	0.130	0.044	72
-3	-0.1%	0.127	-0.071	72
-2	-0.1%	0.104	-0.035	72
-1	-1.0%	0.092	-0.903	72
0	-1.2%	0.071	-1.392	72

Panel B : Pre Downward Revision ABHAR

Month	μ	σ	t_{sa}	n
-24	-13.4%	0.248	-4.408***	64
-23	-14.6%	0.238	-4.969***	64
-22	-12.6%	0.276	-2.997***	64
-21	-13.9%	0.253	-3.711***	64
-20	-14.5%	0.219	-5.319***	64
-19	-14.8%	0.211	-5.714***	64
-18	-14.1%	0.205	-5.542***	64
-17	-11.4%	0.204	-4.576***	64
-16	-10.1%	0.211	-3.896***	64
-15	-8.5%	0.231	-2.735***	64
-14	-6.4%	0.261	-1.782*	64
-13	-4.0%	0.278	-1.048	64
-12	-0.1%	0.458	0.061	64
-11	-6.5%	0.233	-1.979**	64
-10	-5.6%	0.229	-1.602	64
-9	-3.2%	0.323	-0.595	64
-8	-6.2%	0.178	-1.990**	64
-7	-6.1%	0.134	-3.774***	64
-6	-4.9%	0.136	-2.886***	64
-5	-4.4%	0.112	-3.192***	64
-4	-3.7%	0.101	-2.936***	64
-3	-2.7%	0.110	-1.882*	64
-2	-1.7%	0.105	-1.251	64
-1	-1.3%	0.080	-1.279	64
0	-0.1%	0.077	-0.138	64

Figure 2a & Figure 2b

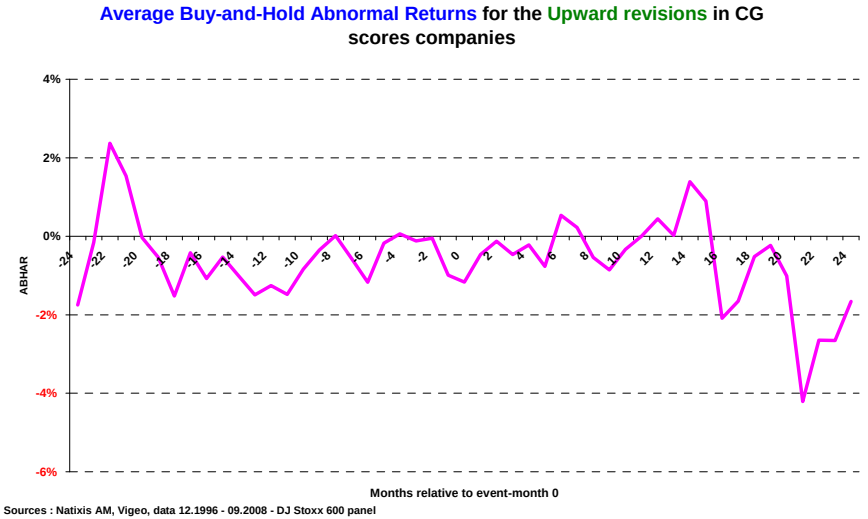
Average Buy-and-Hold Abnormal Returns for European Firms over the period of 24 months *prior to* and *after* the event-month on Corporate Governance scores over periods of 24 months

In Figure 2a, the sample comprises 72 equities which have been upward revised at least thrice in CG score prior to and after the event-month and in Figure 2b, the sample comprises 64 equities which have been downward revised at least thrice in CG score prior to and after the event-month, among the 200 European firms included in the European Dow Jones Stoxx Large 200 index as of December 31, 2007. ABHAR is the Average Buy-and-Hold Abnormal Returns of revised CG scores companies prior to and after the event-month. The Buy-and-Hold Abnormal Returns (BHAR) for security *i* over the holding period *k* are mathematically defined as

$$BHAR_{i,k} = \left[\prod_{t=1}^{k}\left[\left(1+r_{i,t}\right)\right]-1\right] - \left\{\frac{1}{n}\sum_{i=1}^{n}\left[\prod_{t=1}^{k}\left(1+r_{i,t}\right)-1\right]\right\}$$

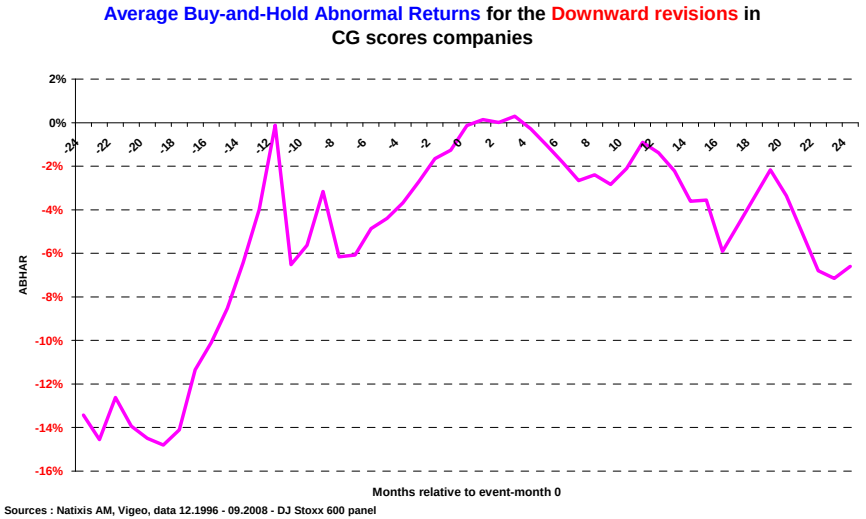
Where $r_{i,t}$ is the total return in security *i* at month *t*.

Figure 2a



Sources : Natixis AM, Vigeo, data 12.1996 - 09.2008 - DJ Stoxx 600 panel

Figure 2b



Sources : Natixis AM, Vigeo, data 12.1996 - 09.2008 - DJ Stoxx 600 panel

Table 5
Average Differential Relative Benchmark Volatility for European Firms following the event-month on Corporate Governance scores

This table presents the drift of the differential relative benchmark volatility for revised in CG scores companies over the post-event period. In Panel A (Panel B), the sample under examination comprises 72 (64) equities which have been upward (downward) revised at least thrice among the 200 European firms included in the European Dow Jones Stoxx Large 200 index as of December 31, 2007. The differentials relative benchmark volatility are calculated over the period 1997-2008 and are defined as difference between the relative volatility to the benchmark of the revised companies during the post-event period and the relative volatility to the benchmark at the event-month for an investment holding period of k=1,2,12,…,24 months following the event. Statistical inferences are computed using the standard *t-statistic* methodology. Significant levels are indicated by *, **, *** for 10 %, 5 % and 1 % respectively.

Panel A
Post Upward Revision Differential Relative Benchmark Volatility

Month	μ	σ	t	n
1	-0.026	1.390	-0.161	72
2	-0.040	1.842	-0.183	72
3	-0.224	2.237	-0.851	72
4	-0.167	2.501	-0.565	72
5	-0.240	2.805	-0.725	72
6	0.120	3.473	0.292	72
7	0.350	4.018	0.739	72
8	0.349	4.271	0.694	72
9	0.244	4.411	0.469	72
10	0.168	4.789	0.298	72
11	0.314	5.049	0.524	71
12	0.351	5.485	0.539	71
13	-0.100	4.957	-0.165	67
14	0.009	5.106	0.015	66
15	0.960	6.666	1.124	61
16	0.752	6.858	0.849	60
17	1.131	7.463	1.174	60
18	0.670	7.867	0.648	58
19	0.232	7.685	0.230	58
20	-0.037	7.700	-0.036	56
21	0.028	7.921	0.026	56
22	-0.104	7.896	-0.097	55
23	-0.017	8.132	-0.015	53
24	0.124	8.174	0.111	53

Panel B
Post Downward Revision Differential Relative Benchmark Volatility

Month	μ	σ	t	n
1	-0.191	1.548	-0.988	64
2	-0.566	2.242	-2.019**	64
3	-1.049	2.988	-2.809***	64
4	-1.360	3.980	-2.733***	64
5	-1.665	6.011	-2.216**	64
6	-1.590	6.585	-1.932*	64
7	-1.969	7.179	-2.194**	64
8	-2.216	8.896	-1.993**	64
9	-2.381	9.012	-2.114**	64
10	-2.249	9.359	-1.922*	64
11	-2.692	9.676	-2.208**	63
12	-2.523	10.194	-1.965**	63
13	-2.973	10.364	-2.240**	61
14	-3.233	10.336	-2.403**	59
15	-3.511	10.323	-2.568**	57
16	-3.487	10.349	-2.544**	57
17	-3.247	10.440	-2.348**	57
18	-3.940	10.773	-2.687***	54
19	-4.038	10.911	-2.694***	53
20	-3.904	10.952	-2.595***	53
21	-4.090	11.282	-2.614***	52
22	-4.114	11.362	-2.611***	52
23	-3.759	11.786	-2.277**	51
24	-3.510	11.661	-2.150**	51

Figure 3a & Figure 3b

Average Differential Relative Benchmark Volatility for European Firms during the period of 24 months following the event-month on Corporate Governance scores

In Figure 3a, the sample comprises 72 equities which have been upward revised at least thrice and in Figure 3b, the sample comprises 64 equities which have been downward revised at least thrice among the 200 European firms included in the European Dow Jones Stoxx Large 200 index as of December 31, 2007. ADRBV is the Average Differential Relative Benchmark Volatility (DRBV) of revised CG scores companies after the event-month. The Differential Relative Benchmark Volatility for security *i* in month *k,* is calculated as

$$DRBV_{i,k} = RBV_{i,k} - RBV_{i,0} = \left(VOL_{i,k} - VOL_{B,k}\right) - \left(VOL_{i,0} - VOL_{B,0}\right)$$

Where $VOL_{i,k}$ and $VOL_{B,k}$ are the annualized volatility for security *i* and for benchmark *B* in month *k* and $VOL_{i,0}$ and $VOL_{B,0}$ are the annualized volatility for security *i* and for benchmark *B* in the event-month.

Figure 3a

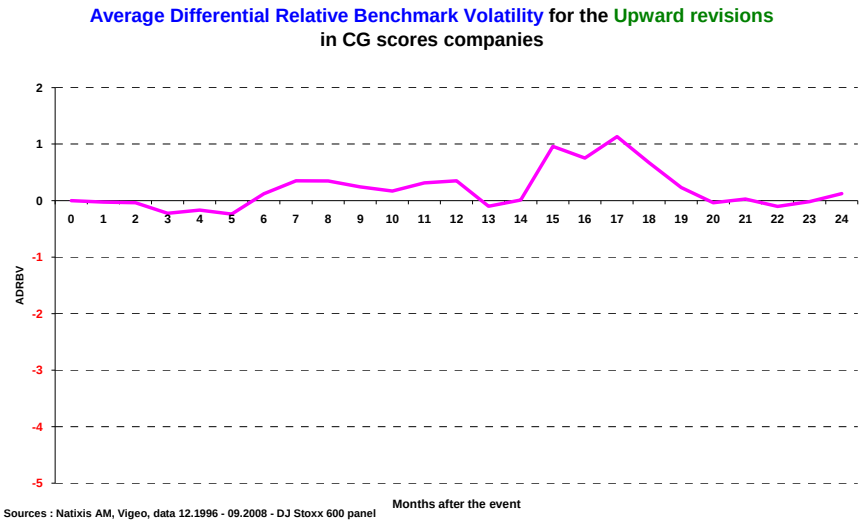


Figure 3b

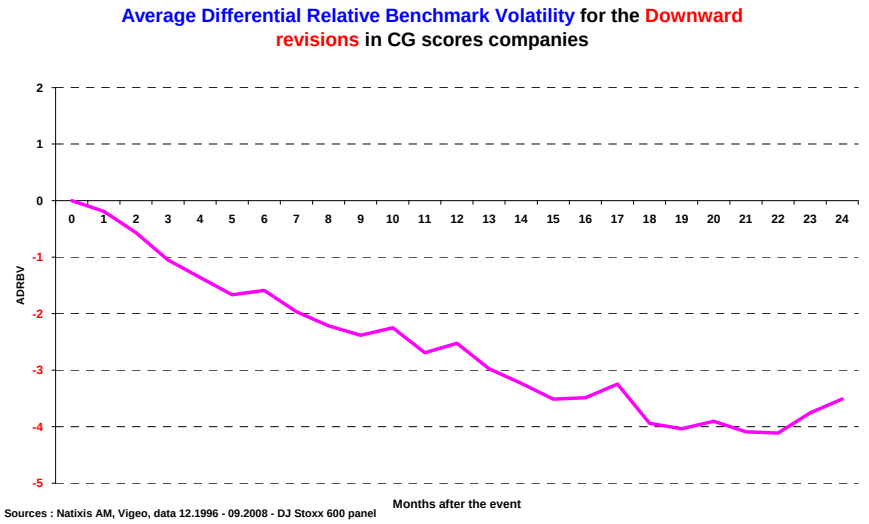


Table 6
Average Differential Relative Benchmark Volatility for European Firms preceding the event-month on Corporate Governance scores

This table presents the drift of the differential relative benchmark volatility for revised in CG scores companies over the pre-event period. In Panel A (Panel B), the sample under examination comprises 72 (64) equities which have been upward (downward) revised at least thrice in CG score among the 200 European firms included in the European Dow Jones Stoxx Large 200 index as of December 31, 2007. The differentials relative benchmark volatility are calculated over the period 1997-2008 and are defined as difference between the relative volatility to the benchmark of the revised companies during the pre-event period and the relative volatility to the benchmark at the event-month for an investment holding period of k=-24,-23,…,0 months preceding the event. Statistical inferences are computed using the standard *t-statistic* methodology. Significant levels are indicated by *, **, *** for 10 %, 5 % and 1 % respectively.

Panel A

Pre Upward Revision Differential Relative Benchmark Volatility

Month	μ	σ	t	n
-24	7.384	13.714	4.568***	72
-23	7.666	13.791	4.716***	72
-22	7.490	13.914	4.568***	72
-21	7.102	13.796	4.368***	72
-20	6.872	13.850	4.210***	72
-19	6.053	12.506	4.107***	72
-18	6.049	12.448	4.123***	72
-17	5.480	11.553	4.025***	72
-16	5.182	10.903	4.033***	72
-15	4.758	10.423	3.873***	72
-14	4.347	9.824	3.755***	72
-13	3.731	8.316	3.807***	72
-12	3.437	7.969	3.660***	72
-11	2.805	7.498	3.174***	72
-10	2.319	6.676	2.948***	72
-9	1.862	5.966	2.647***	72
-8	1.552	5.667	2.324**	72
-7	1.408	5.365	2.227**	72
-6	0.991	4.912	1.712*	72
-5	0.687	4.480	1.301	72
-4	0.407	3.409	1.012	72
-3	0.362	2.762	1.113	72
-2	0.334	2.195	1.290	72
-1	0.154	1.565	0.836	72
0	0.000	0.000		72

Panel B

Pre Downward Revision Differential Relative Benchmark Volatility

Month	μ	σ	t	n
-24	4.041	12.915	2.503**	64
-23	3.761	13.114	2.294**	64
-22	3.398	13.045	2.084**	64
-21	3.235	13.270	1.951*	64
-20	3.043	13.178	1.847*	64
-19	2.471	12.967	1.525	64
-18	2.481	12.445	1.595	64
-17	1.983	12.246	1.296	64
-16	1.896	12.044	1.260	64
-15	1.691	11.513	1.175	64
-14	2.182	11.261	1.550	64
-13	2.667	11.262	1.895*	64
-12	3.032	11.360	2.135**	64
-11	3.258	11.553	2.256**	64
-10	3.277	11.561	2.267**	64
-9	3.421	10.903	2.510**	64
-8	3.098	10.877	2.278**	64
-7	3.487	9.626	2.898***	64
-6	3.130	9.053	2.766***	64
-5	3.061	8.985	2.726***	64
-4	2.950	8.330	2.833***	64
-3	2.824	7.979	2.832***	64
-2	2.040	5.668	2.880***	64
-1	1.219	4.153	2.349**	64
0	0.000	0.000		64

Figure 4a & Figure 4b

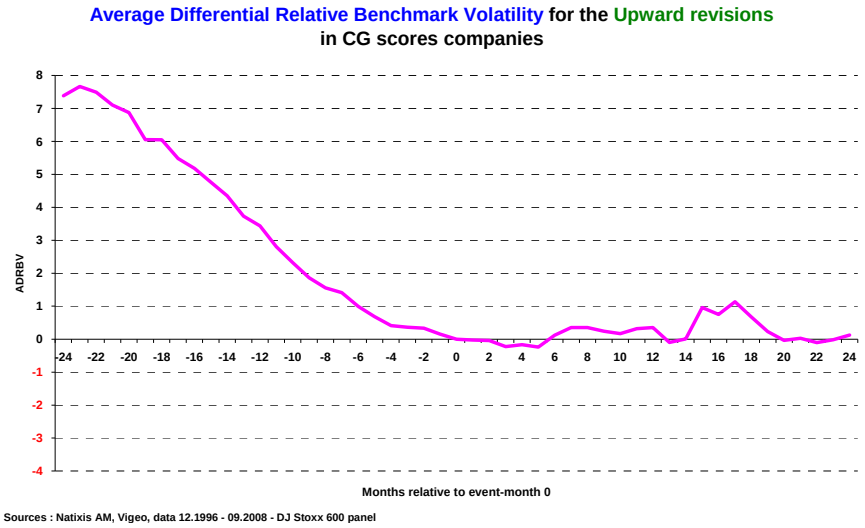
Average Differential Relative Benchmark Volatility for European Firms *prior to* and *after* the event-month on Corporate Governance scores over periods of 24 months

In Figure 4a, the sample comprises 72 equities which have been upward revised at least thrice in CG score and in Figure 4b, the sample comprises 64 equities which have been downward revised at least thrice in CG score, among the 200 European firms included in the European Dow Jones Stoxx Large 200 index as of December 31, 2007. ADRBV are the Average Differential Relative Benchmark Volatility (DRBV) of revised CG scores companies prior to and after the event-month. The Differential Relative Benchmark Volatility for security *i* in month *k,* is calculated as

$$DRBV_{i,k} = RBV_{i,k} - RBV_{i,0} = \left(VOL_{i,k} - VOL_{B,k}\right) - \left(VOL_{i,0} - VOL_{B,0}\right)$$

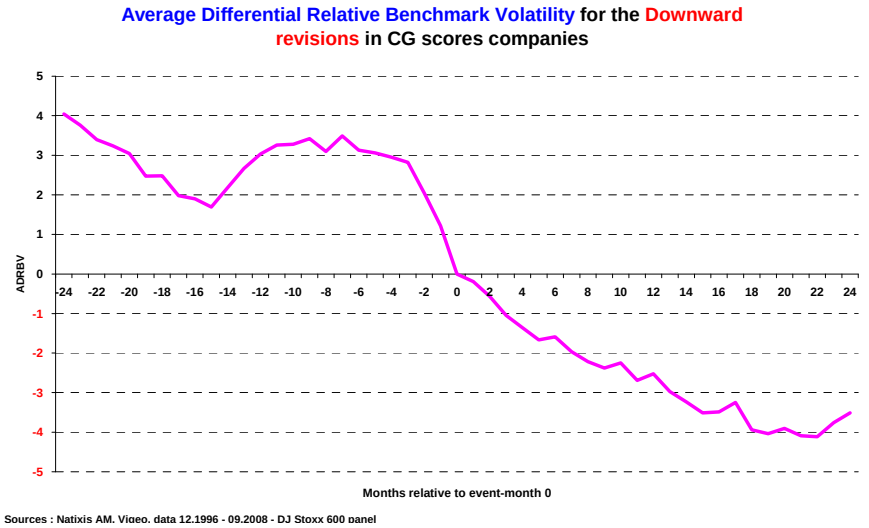
Where $VOL_{i,k}$ and $VOL_{B,k}$ are the annualized volatility for security *i* and for benchmark *B* in month *k* and $VOL_{i,0}$ and $VOL_{B,0}$ are the annualized volatility for security *i* and for benchmark *B* in the event-month.

Figure 4a



Sources : Natixis AM, Vigeo, data 12.1996 - 09.2008 - DJ Stoxx 600 panel

Figure 4b



Sources : Natixis AM, Vigeo, data 12.1996 - 09.2008 - DJ Stoxx 600 panel