Corporate disclosure, information uncertainty and investors' behavior: A test of the overconfidence effect on market reaction to goodwill write-offs

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Abstract:

This article examines the link between uncertainty and investors' reaction to goodwill write-offs (GWWOs) for a sample of French firms during the period 2001-2004 Our theoretical setting is derived from Daniel, Hirshleifer and Subrahmanyam (1998, hereafter DHS98) who posit that overconfidence leads to an overreaction to private information, followed by too little adjustments when the information becomes public and then a long adjustment which reduce slowly the mispricing in the long run. We consider three proxies for uncertainty – stock return volatility, analyst coverage and dispersion in analyst forecasts – and sort two samples of GWWOs according to the level of uncertainty. Our results confirm DHS98 model and, indirectly, that overconfidence is boosted by uncertainty. We identify a particular corporate event – here a bad signal: goodwill write-offs – and a particular context – high uncertainty – that fit DHS98 model, allowing private information prospecting, overconfidence in this information and arbitrage obstacles. Our tests confirm the overconfidence effect on investors' reaction: the high-uncertainty sample is characterized by strongly negative abnormal returns during the period preceding GWWOs announcement, associated with high volatility. At the announcement date, negative abnormal returns are observed in line with the self-attribution bias effect (the overreaction is strengthened by a confirming signal). The overreaction to private information is corrected in the long run, where we observe positive abnormal returns, creating a reversal. No abnormal returns are observed for the low-uncertainty sample.

This study offers interesting insights in two ways: (i) in the area of financial markets and efficiency, it provides a test of a major over- and under-reaction model, (ii) in the area of corporate finance and accounting, it helps to explain investors' reaction to corporate financial disclosure according to a theoretical approach of information process and inference.

keywords: behavioral finance, corporate voluntary disclosure

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The information policy of firms has been the subject of an important stream of literature focusing on management motives for voluntary disclosure, regulation and the role of auditors and intermediaries in the disclosure process, capital market consequences of corporate reporting and disclosure (Healy and Palepu [2001]). Understanding investors' response to new information is probably the main question assessed by managers facing disclosure decisions. There is substantial evidence of anomalies in market responses to corporate announcements. The behavioral finance literature has proposed two contradictory models of investors' behavior. In the first approach, investors overreact to information, leading to long-term reversals. In the second approach, investors underreact to information, leading to long-term returns continuation. Two phenomena underlie the mispricing story: agents (or some agents) are not fully rational and these agents can influence security price due to limits to arbitrage (« the two building blocks of behavioral finance », Barberis and Thaler [2002]). Irrationality leads to mispricing and its correction is costly and risky when limits to arbitrage occur, allowing mispricing survival[1]. Hirshleifer [2001] and Daniel, Hirshleifer and Subramanyam [1998, 2001] posit that uncertainty intensifies psychological biases. It also strengthens limits of arbitrage opportunities because homogenous classes of risk are harder to identify. Zhang [2006] shows that information uncertainty contributes to investors' underreaction to new information. Hence a paradoxical effect occurs: uncertainty creates a higher demand for corporate information but could emphasize mispricing. In a managerial point of view, understanding the process and the consequences of this effect is particularly important in voluntary disclosure decisions and in announcement timing.

In this paper we focus on investors' response to private and public information. We analyse investors' reaction to goodwill write-offs (hereafter GWWOs) according to the level of uncertainty prior to the announcement, for a sample of French firms during the period 2001-2004. Our theoretical setting is based on the overconfidence effect as formulated by Daniel, Hirshleifer and Subrahmanyam [1998, hereafter DHS98]. DHS98

[1] For the limits-to-arbitrage argument, see Shleifer and Vishny [1997].

model shows that overconfident investors overreact to their private information, leading to an underreaction when the information becomes public. When considering overconfidence in a dynamic way, in the sense that confirming news boost overconfidence, public information can increase overconfidence and intensify overreaction (i.e. mispricing continuation).

A GWWO announcement is typically a bad news that could be anticipated by an informed investor with expertise and research about the firm and the industry. It offers a relevant situation where informed and non-informed investors can co-exist, before a public announcement. Psychological literature suggests that individuals tend to be more overconfident in situations that require more judgement to evaluate. Experts are prone to overconfidence in particular when predictability is low and evidence is ambiguous (Griffin and Tversky [1992]). When uncertainty is high, agents tend to construct scenarios and are overconfident on their probability of success (or *planning fallacy* – Kahneman and Tversky [1979]). An important effect of uncertainty is a higher incentive to collect private information. As discussed in DHS98, individuals place too much weight on information they collect themselves and so tend to overestimate the precision of this information. A second important effect of uncertainty is in strengthening limits of arbitrage. Hirshleifer [2001, p.1539] points out that arbitrage is more difficult for risky securities because it supposes to detect mispricing and to anticipate what other investors have yet detected and then act upon it. Shleifer and Vishny [1997] argue that volatility makes arbitrage less attractive. This suggests that arbitrage could be harder when uncertainty is higher. Hence, uncertainty intensifies overconfidence and limits arbitrage ability[2].

We consider three proxies for uncertainty – stock return volatility, analyst coverage and dispersion in analyst forecasts – and sort two samples of GWWOs according to the level of uncertainty. If the stock market response to information is due to overconfidence, the price response will be in line with DHS98 predictions for high-uncertainty firms.

This study offers interesting insights in two ways: (i) in the area of financial markets and efficiency, it provides a test of a major over- and under-reaction model, (ii) in the

[2] A traditional limit of arbitrage is a low liquidity, but considering that overconfidence, and more generally heterogeneous beliefs, increase trading volume (Odean [1998]), this proxy for arbitrage limits is here irrelevant.

area of corporate finance and accounting, it helps to explain investors' reaction to corporate financial disclosure according to a theoretical approach of information process and inference.

The paper is organized as follows. Section 1 presents hypotheses according to DHS98 model. Section 2 describes the data set, the measurement of variables and the samples selection. Section 3 reports the empirical results.

1. Background, research design and hypotheses

Behavioral finance and market reaction to corporate announcements

Investors behavior and market anomalies are well documented in academic studies (see in particular three extensive surveys: Hirshleifer [2001], Daniel, Hirshleifer and Teoh [2001], and Barberis and Thaler [2002]). Based on cognitive biases in information processing, behavioral finance theories predicts positive and negative autocorrelations in stock returns, which is inconsistent with market efficiency. Most notable among such models that attempt to formalize investors' reaction to information are Barberis, Shleifer and Vishny [1998], DHS98 and Hong and Stein [1999]. The positive short-run correlation, known as momentum effect, is attributed to conservatism (inducing underreaction to new information). This slowly adjustment causes a long-run reversal causing negative long-run correlations. DHS98 proposes an alternative explanation based on overconfidence which provides a theoretical setting for understanding the effects of private vs. public information.

In DHS98 investors are overconfident and exhibit biased self-attribution. Overconfidence leads individuals to overestimate their own ability or knowledge. An overconfident investor is defined as the « one who overestimate the precision of his private information… He overestimates his ability to generate information, or to identify the significance of existing data that others neglect » [DHS98, p. 1841]. Moreover, he/she updates his/her own ability in a biased manner: the auto-attribution bias means that he/she attaches too much (little) significance to confirming (disconfirming) public information. These two biases have two consequences. Firstly, overconfident investors overreact to private information, i.e. prices move during a period preceding the public announcement and are on average partially reversed in the long run. During the overreaction period, overconfidence causes price to move away

from fundamentals, thereby causing excess price volatility, as in Odean [1998]. Overconfidence also leads to underweight the public signal, which tends to reduce volatility at the announcement date. Secondly, according to self-attribution bias, if public information confirms the private signal, confidence and overreaction are intensified when public news arrives and this is followed by a long-run correction. If not, confidence decreases by little or remains constant.

Corporate disclosure and value relevance of goodwill write-offs

According to Dumontier and Raffournier [2002], firms release more and more frequently voluntary information. In their European survey on accounting and capital markets, they point out several topics related to market response to accounting disclosure that remain highly relevant for future research, including empirical studies on [p. 127-128]: (i) investors' reaction to voluntary disclosure, in particular in fast-changing or high-intangible industries, characterized by a stronger information uncertainty, (ii) persistence of the post-announcement drift anomaly, in particular in small firms or in firms with little analyst coverage.

A firm which announces a GWWO reveals that its acquisitions have poor performance and hence reduce its asset value. Several studies report downward revision of expectations and negative abnormal returns on the announcement of goodwill impairment losses (Hirschey and Richardson [2003], Li et al. [2004], Ben and Heltzer [2006]). In their long-run event study, Hirshey and Richardson show negative cumulated abnormal returns during the pre- and the post-announcement period (year -1 and year +1) suggesting respectively a partial market anticipation and an underreaction at the announcement. The authors conclude that GWWOs convey relevant information to investors, but do not explain the double phenomenon of anticipation and underreaction to public information. In our article, we focus on this explanation.

A GWWO is a particularly interesting announcement in two ways: as a voluntary disclosure it conveys potentially important information about firm's prospects but as a result of an economic situation it can be anticipated by investors. Firstly, before the IFRS implementation in 2005, the impairment testing of goodwill was optional and the usual accounting principle was based on the 40-years amortization method. French regulation on goodwill amortization has changed during recent years. Before 2001, goodwill was amortized over a period not to exceed 40 years. Since 2005, with the IFRS

implementation, an annual impairment test is required, and an impairment loss is recognized if the goodwill exceeds fair value estimates. During the period 2001-2004, the 40-years amortization method is applied but firms can report a goodwill impairment loss as an "extraordinary depreciation". Hence, during this period, a GWWO is viewed as a voluntary disclosure, i.e. a deliberate accounting decision. Secondly, this kind of event could be anticipated with investigation because the impairment loss is the consequence of acquisitions poor performance. If uncertainty is high, this private information has a higher value because it gives the investor a trading advantage, creating incentives to investigate in information and strengthening an expertise sentiment. Overconfidence leads investors to perceive this advantage as greater than in an unbiased manner, and overconfidence is boosted with uncertainty and with expertise. Hence, we argue that uncertainty and its relationship with private information creates special conditions to isolate the overconfidence effect. Moreover, mispricing could only appear when arbitrage is limited, and uncertainty makes arbitrage less attractive.

So, considering that:

- high uncertainty produces higher overconfidence and stronger limits of arbitrage,
- goodwill impairment losses can be anticipated by investors as economic situations where firms are involved in weak performance acquisitions,
- high uncertainty leads to higher probability of investors' private information,

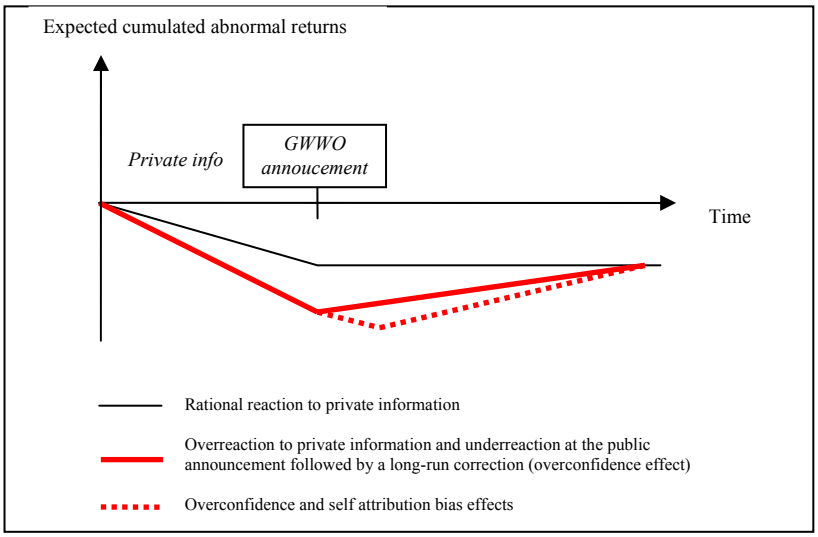
we propose to analyze market reaction to GWWOs announcements in line with DHS98 overconfidence effect, and we argue that this effect will be observed for firms with high information uncertainty.

Hypotheses:

- *For high-uncertainty firms, if investors are overconfident in their private information, negative abnormal returns will be observed prior to the GWWO announcement. A high volatility occurs during this period and is reduced at the announcement date. If self-attribution bias occurs, the overreaction will be intensified when the information becomes public. In both cases, it will be followed by a correction in the long run.*
- *For low-uncertainty firms, we expect no mispricing, i.e. no post-annoucement drift anomaly.*

The high-uncertainty hypothesis is illustrated in the following figure:

Hypothesis for high uncertainty sub-sample:
overreaction to private information and underreaction to public announcement



However, market reaction may be related to the magnitude of GWWO (Li et al. [2004]): we may observe that larger impairment losses produce higher negative abnormal returns. This effect could moderate the overconfidence effect, but we primarily expect a difference between high- and low-uncertainty sub-samples, and control for the effect of GWWO size.

2. Data, sample, and variable measures

From the database Lexis-Nexis, we have collected more than 800 newspaper releases mentioning words related to write-offs on the French market for the period 2001-2004. We then eliminate non goodwill write-offs and multiple events, and obtain 75 GWWOs announcements. After matching with I/B/E/S and Amadeus databases (respectively used for two proxies of uncertainty and firms and GWWOs size), 62 events remain in the sample.

Two sub-samples are sorted by uncertainty. We use three usual proxies for uncertainty: return volatility (VOL), analysts' coverage (NB or number of analysts supplying a forecast in a given month) and analyst forecasts dispersion (SD or standard deviation of forecasts in a given month). Volatility is estimated by standard deviation of raw returns

from 10 days to 250 days before the event date. Coverage and forecasts dispersion are extracted from the I/B/E/S summary database. These two variables vary across different months of a same year: coverage is higher and dispersion lower just before earnings announcement. So, we need a measure before the GWWO announcement (because GWWO can reduce uncertainty) but with respect to the homogeneity constraint due to different earnings release across firms. We use the earnings announcement preceding the GWWO announcement and extract NB and SD from the month prior to this earnings announcement. We exclude firms with less than three forecasts during this month.

From these three proxies we construct an uncertainty index. Each firm has been ranked among the whole sample for each uncertainty proxy. The index (noted UNCINDEX) is the equally weighted average of the three ranks. By construction, a low value of the index represents a high information uncertainty (high forecasts dispersion, low coverage, high return volatility). We exclude the median decile to limit ambiguous classification and split the sample into two groups: high (low) uncertainty group is composed of 28 (29) firms for which the value of the index is low (high). These two sub-samples are respectively noted high-U and low-U. Table 1 reports descriptive statistics about the global index and each uncertainty proxy.

[table 1 here]

An event study is conducted to investigate the market reaction to the write-off announcement. Stock prices are extracted from Euronext database. SBF250 index is used for assessing the market return. Short- and long-run returns are measured from the GWWO announcement date (date 0). For short-term performance we estimate market-model-adjusted abnormal returns. We calculate betas by using Scholes and Williams' approach[3] (to correct for biases arising from nonsynchronous trading) over an estimation period of 200 days, 30 days before the event date. For long-run performance, the market return (estimated by SBF250 index) is used as normal return. Buy-and-hold returns are calculated from 2 days to respectively 250 days after and before the event date. The description of variables and the notations are reported below.

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[3] At date t for each event i, abnormal returns are calculated with the market model regression: $AR_{it} = R_{it} - \alpha_i - \hat{\beta}_i^* R_{mt}$, with: $\hat{\beta}_i^* = (\hat{\beta}_i^{-1} + \hat{\beta}_i^0 + \hat{\beta}_i^{+1}) / (1 + 2\hat{\rho}_m)$.

- AR-1: abnormal return at the day -1 (AR at date 0 is not significant)
- BH250+ (BH250-): buy-and-hold returns calculated from 2 days to 250 days after (before) the event date,
- VOL250+ (VOL250-): standard deviation of returns from 10 days to 250 days after (before) the event date,
- WO/FA: Ratio of GWWO to net book value of fixed assets (book value is measured at the fiscal-end year of the event year, and data are extracted from Amadeus database),
- MV: Market value of equity at the last fiscal-end year of the observation period,
- UNCINDEX: Index value measuring the uncertainty context of each firm.

3. Empirical results

Table 2 reports descriptive statistics for the whole sample and the two sub-samples of French firms that announce a GWWO for the period 2001-2004.

[table 2 here]

The mean write-off represents 21,4% of fixed assets. The significantly higher mean relative to median is consistent with a few firms with very high amount of impairment losses, particularly in the high-U sub-sample. For the whole sample, abnormal returns at the announcement are negative (-1,57%) confirming value relevance of GWWOs and previous results. In the one-year period preceding the announcement, the market-adjusted cumulative average abnormal return (BH250-) for the overall sample is largely negative, confirming Hirshey and Richardson [2003] study. Such pre-announcement findings could be explained in two ways: managers choose to recognize impairment losses after a prolonged period of market underperformance, or investors anticipated the impairment loss prior to its actual recognition by companies. The most important result in table 1 is that returns for the whole sample are entirely driven by the high-U sub-sample. According to the uncertainty effect, the second explanation seems more plausible: a higher uncertainty induces a higher incentive to collect information and then a higher anticipation. We discuss the other explanation – uncertainty as a managerial motive for signaling – at the end of the article with the whole results.

However, these preliminary results do not confirm precisely the overconfidence effect which is primarily based on differences between the two sub-samples and the pre- and post- announcement periods. Moreover, they suggest that the main effect could be

produced by the GWWO magnitude considering the WO/FA difference between the two groups. For the whole sample the correlation coefficient between WO/FA and UNCINDEX is -0,36 (significant at 5% level) suggesting that GWWOs have been larger for the high-U group. In the next paragraphs, we analyze the overconfidence effect, then control for the GWWO size effect and discuss alternative explanations.

The overconfidence effect

According to our hypothesis, the overconfidence effect implies a mispricing before the announcement (with large negative abnormal returns), followed by a slow correction (large positive abnormal returns). For the low-uncertainty group, no mispricing is expected. So, the first test is driven by abnormal returns differences between the two groups (reported in table 3) and the second test by differences between the pre- and post-announcement periods (reported in table 4).

[table 3 here]

Abnormal returns differences between the two groups are significant as shown in Table 3 and in line with our hypothesis. Investors' overconfidence in their private information produces a strong mispricing difference during the pre-announcement period (-19,57%) which is reversed during the post-announcement period (+19,43%). The negative abnormal return difference observed at the announcement date (-4,03%) seems to confirm the effect of self-attribution bias. Moreover, control variables indicate that the abnormal returns differences between the two groups are related to uncertainty and are not related to GWWO size or firm size.

The most important effect of overconfidence is return reversal, but we also observe an important shift in volatility. Table 4 reports the evolution of returns and volatility over the pre- and post-announcement period. Results confirm the hypothesis: return reversal and volatility decrease are only (and strongly) observed for the high-U sub-sample. One year after the announcement, mispricing seems to persist (the reversal only partially balances the initial overreaction).

[table 4 here]

GWWO size effect

We hypothesize that investors' anticipation (and overreaction due to overconfidence) produces our results. But GWWOs size could explain investors' anticipation (BH250-)

if investors' investigation is driven by an initial intuition about firms' bad acquisition policy. GWWOs size could also causes abnormal returns at the announcement (AR-1). Moreover, if uncertainty boosts managers' hubris[4], impairment losses might be larger in the high-uncertainty sub-sample, reinforcing the magnitude of market reaction and the difference between the two sub-samples. Even if no intuition really supports the relationship between GWWOs size and long-run reversal that we observe, we test its effect as an alternative explanation. GWWOs could produce our results if larger GWWOs characterized the high-U sub-sample and if abnormal returns are related to GWWOs size.

Table 2 and 3 shows a larger WO/FA for high-U group (34,82% vs. 9,87%) but this difference is not significant. We also document (see above) a correlation between the uncertainty index (which defines the sub-samples) and WO/FA. Hence slight evidence supports the idea that large GWWOs occurs in high-U sub-sample. But if GWWO size affects our results we should observe a relationship between GWWO size and abnormal returns. To test this relationship we use the following regression for the whole sample and for each GWWO announcement *i* (omitting intercept):

$$AR_i = \beta_1 WO/FA_i + \beta_2 (WO/FA_i).U + \varepsilon_i$$

where abnormal returns AR are respectively AR-1, BH250- and BH250+ (three regressions) and U is a dummy variable which equals one for the high-U sub-sample and zero for the low-U sub-sample. If GWWO size determines abnormal returns for the whole sample or for the high-U sub-sample β_1 or β_2 should be significant. In particular β_2 should be negative for AR- and BH250-, and positive for BH250+. Table 5 reports results and shows no significance. Thus, there is no evidence that GWWOs size drives our results.

[table 5 here]

Uncertainty and managerial motives for GWWOs disclosure

In table 1 comments, we notice that the pre-annoucement negative abnormal returns could create a special situation where managers choose to recognize impairment losses

[4] The effects of managerial hubris on acquisitions policies have been tested by Malmendier and Tate (2003) who shows a higher propensity to undertake acquisitions (in particular diversified ones) and a negative relationship between hubris and abnormal returns.

after a prolonged period of market underperformance. Information uncertainty can create incentives for signaling and then it is possible that managers, observing mispricing, would decide to reveal their anticipation about firms' prospect. They observe underpricing due to investors' excessively bad anticipations and decide to signal correct prospects (i.e. bad prospects but not so bad). Our pre-announcement returns (BH250-) and volatility decrease for high-U group could support this story. But, if investors react in an unbiased manner, the mispricing should disappear at the announcement or, at least, during a short period after it. Moreover, if the GWWO is chosen as a signal by managers (for its ability to reveal correct prospects) and if investors rationally react upon it, we should observe a relationship between post-announcement returns and the magnitude of the write-off. Our results do not support the signaling argument.

Conclusion

This article examines the link between uncertainty and investors' reaction to goodwill write-offs. Our theoretical setting is derived from Daniel et al. [1998] who posit that overconfidence leads to an overreaction to private information, followed by too little adjustments when the information becomes public and then a long adjustment which reduce slowly the mispricing in the long run. Our results, firstly, confirm DHS98 model and, indirectly, that overconfidence is boosted by uncertainty. We identify a particular corporate event – here a bad signal: goodwill write-offs – and a particular context – high uncertainty – that fit DHS98 model, allowing private information prospecting, overconfidence in this information and arbitrage obstacles. Our tests confirm the overconfidence effect on investors' reaction: the high-uncertainty sample is characterized by strongly negative abnormal returns during the period preceding GWWOs announcement, associated with high volatility. At the announcement date, negative abnormal returns are observed in line with the self-attribution bias effect (the overreaction is strengthened by a confirming signal). The overreaction to private information is corrected in the long run, where we observe positive abnormal returns, creating a reversal. Secondly, our results show different market reactions to GWWOs according to the level of firm uncertainty and hence provides new insights about informativeness and timeliness of corporate voluntary disclosure. For our sample,

uncertainty explains the way and the speed with which accounting information is reflected in price. It indicates that uncertainty is an important factor in investors' perception of information that managers could take into account when revealing information in particular in timing decision.

REFERENCES

Barberis N., Thaler R. (2002), « A Survey of Behavioral Finance », NBER Working Paper No. W9222. http://ssrn.com/abstract=332266.

Bens D., Heltzer W. (2006), « The Information Content and Timeliness of Fair Value Accounting: Goodwill Write-offs before, during and after Implementation of SFAS 142 », working paper, University of Chicago.

Chan W., Frankel R., Kothari S. (2004), « Testing Behavioral Finance Theories Using Trends and Consistency in Financial Performance », *Journal of Accounting and Economics*, Vol. 38, p.3-50.

Daniel K., Hirshleifer D., Subrahmanyam A. (1998), « Overconfidence, Arbitrage, and Equilibrium Asset Pricing », *Journal of Finance*, Vol. 53-6, p.921-965.

Daniel K., Hirshleifer D., Subrahmanyam A. (2001), « Investor Psychology and Security Market Under- and Overreactions », *Journal of Finance*, Vol. 56-3, p.1839-1885.

Daniel K., Hirshleifer D., Teoh S. (2001), « Investor Psychology in Capital Markets: Evidence and Policy Implications », Dice Center Working Paper 2001-10. http://ssrn.com/abstract=278848.

Dumontier P., Raffornier B. (2002), « Accounting and Capital Markets: A Survey of the European Evidence », *European Accounting Review*, Vol. 11-1, p.119-151.

Griffin D., Tversky A. (1992), « The Weighing of Evidence and the Determinants of Overconfidence », *Cognitive Psychology*, Vol.24, p.411-435.

Healy P., Palepu K. (2001), « Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature», *Journal of Accounting and Economics*, Vol. 31, p.405-440.

Hirschey M., Richardson V. (2003), « Investor Underraction to Goodwill Write-Offs », *Financial Analysts Journal*, Vol. 59-6, p.75-84.

Hirshleifer D. (2001), « Investor Psychology and Asset Pricing », *Journal of Finance*, Vol. 56-4, p.1533-1916.

Kahneman D., Tversky A. (1979), « Intuitive Predictions: Biases and Corrective Procedures », *Studies in Management Science*, Vol.12, p.313-327.

Li Z., Shroff P., Venkataraman R. (2004), « Goodwill Impairment Loss: Causes and Consequences », AAA 2005 FARS Meeting Paper. http://ssrn.com/abstract=590908.

Malmendier U., Tate G. (2003), « Who Makes Acquisitions? CEO Overconfidence and the Market's Reaction », NBER Working Paper N°10813. http://faculty-gsb.stanford.edu/malmendier.

Odean T. (1998), « Volume, Volatility, Price, and Profit When All Traders Are Above Average », *Journal of Finance*, Vol. 53-6, p.1887-1934.

Shleifer A., Vishny R. (1997), « The Limits of Arbitrage », *Journal of Finance*, Vol. 52-1, p.35-55.

Zhang X. (2006), « Information Uncertainty and Stock Returns », *Journal of Finance*, Vol. 61-1, p.105-137.

Table 1: Samples – uncertainty groups description

SD represents standard deviation of analysts' forecasts and NB the number of analysts supplying a forecast. These data are extracted for the month prior to the earnings announcement preceding the GWWO disclosure. VOL250- is the standard deviation of the raw returns from 10 days to 250 days before the event date. UNCINDEX is the equally weighted average of the ranks of these three variables calculated for each firm. The median decile is excluded. A low value of UNINDEX represents a high information uncertainty.

	Mean	Median	Min	Max
Panel A: Whole sample (N = 62)				
SD	0,50	0,38	0,00	1,86
NB	18,68	17,50	2,00	39,00
VOL250-	3,58%	3,31%	0,90%	8,59%
UNCINDEX	33,30	33,33	6,67	53,67
Panel B: High uncertainty group (N = 28)				
SD	0,64	0,50	0,00	1,86
NB	14,50	13,50	2,00	39,00
VOL250-	4,65%	4,71%	2,41%	8,59%
UNCINDEX	23,99	24,50	6,67	32,33
Panel C: Low uncertainty group (N = 29)				
SD	0,32	0,29	0,03	0,93
NB	22,55	24,00	5,00	37,00
VOL250-	2,68%	2,63%	0,90%	4,66%
UNCINDEX	42,31	40,33	34,00	53,67

Table 2: Samples – descriptive statistics

Panel A, B, and C present statistics for respectively the whole sample (62 firms), the high uncertainty group (28 firms) and the low uncertainty group (29 firms). AR-1 represents abnormal return at the day -1, BH250+, the cumulative buy-and-hold returns calculated from 2 days to 250 days after the event date, BH250-, the cumulative buy-and-hold returns calculated from 2 days to 250 days before the event date, WO/FA, the amount of write-off over the fixed assets measured at the fiscal-end year of the event year, MV, the market value of the equity at the last fiscal-end year of the observation period, UNCINDEX, the information uncertainty index. The value of non parametric test is reported for the short run performance (Corrado test) and for the long run performance (Wilcoxon test). *, ** represent statistical significance respectively at the 10% and 5% level.

	Mean	Median	Non parametric test[a]	Min	Max
Panel A: Whole sample (N = 62)					
AR-1	-1,57%	-0,60%	-1,923*	-37,00%	13,87%
BH250-	-14,15%	-10,92%	-3,222**	-93,35%	54,45%
BH250+	6,60%	2,59%	1,062	-65,28%	145,62%
WO/FA	21,41%	4,64%		0,33%	316,13%
MV (million)	14 097 251	9 674 822		21 494	56 003 505
UNCINDEX	33,301	33,333		6,667	53,667
Panel B: High uncertainty group (N = 28)					
AR-1	-3,73%	-1,66%	-1,991**	-37,00%	11,46%
BH250-	-27,00%	-26,71%	-3,803**	-86,72%	23,35%
BH250+	16,96%	5,78%	1,093	-49,66%	145,62%
WO/FA	34,82%	5,16%		0,33%	316,13%
MV (million)	12 319 259	978 477		29 842	56 003 505
UNCINDEX	23,988	24,500		6,667	32,333
Panel C: Low uncertainty group (N = 29)					
AR-1	0,30%	-0,13%	-0,566	-10,33%	13,87%
BH250-	-7,43%	-2,63%	-0,854	-93,35%	46,87%
BH250+	-2,46%	2,22%	0,487	-65,28%	28,73%
WO/FA	9,87%	2,79%		0,45%	61,22%
MV (million)	16 665 894	11 093 516		21 494	39 390 392
UNCINDEX	42,310	40,333		34,000	53,667

[a] Parametric tests have been calculated for each sub-sample: Patell test for AR-1 and Student t test for BH250- and BH250+. They are equal to respectively for Panel A -2.01**/-3.62**/1.29, for Panel B -2.20**/-5.33**/1.64, for Panel C -0.81/-1.39/-0.63. They all confirm the non parametric tests.

Table 3: Differences in abnormal returns between high- and low-uncertainty groups

AR-1 represents abnormal return at the day -1, BH250+, the cumulative buy-and-hold returns calculated from 2 days to 250 days after the event date, BH250-, the cumulative buy-and-hold returns calculated from 2 days to 250 days before the event date, WO/FA, the amount of write-off over the fixed assets measured at the fiscal-end year of the event year, MV, the market value of the equity at the last fiscal-end year of the observation period, UNCINDEX, the information uncertainty index. *, ** represent statistical significance respectively at the 10% and 5% level.

	Differences between High- and Low-Uncertainty groups	Student t test	Mann-Whitney test
Panel A: short- and long-run abnormal returns			
AR-1	-4,03%	2,008**	1,336
BH250-	-19,57%	2,657**	2,857**
BH250+	19,43%	-1,782*	-1,165
Panel B: control variables			
WO/FA	24,96%	-1,562	-0,712
MV (million)	-4346635	0,946	2,426**
UNCINDEX	-18,322	10,867**	6,482**

Table 4: Shift in abnormal returns and volatility for the high- and low-uncertainty groups before and after the write-off announcement

BH250+ is the cumulative buy-and-hold returns calculated from 2 days to 250 days after the event date, BH250-, the cumulative buy-and-hold returns calculated from 2 days to 250 days before the event date, VOL250+, the standard deviation of the raw returns from 10 days to 250 days after the event date, VOL250-, the standard deviation of the raw returns from 10 days to 250 days before the event date. *, ** represent statistical significance respectively at the 10% and 5% level.

	Low-Uncertainty group	High-Uncertainty group
Panel A: Shift in long-run performance		
BH250-	-7,43%	-27,00%
BH250+	-2,46%	16,96%
Difference	4,97%	43,97%
Student t test	1,242	3,678**
Wilcoxon test	1,049	3,188**
Panel B: Shift in volatility		
VOL250-	3,00%	4,69%
VOL250+	2,76%	3,51%
Difference	-0,23%	-1,18%
Student t test	-0,729	-3,499**
Wilcoxon test	0,782	2,959**

Table 5: Regressions of abnormal returns on goodwill write-off size

AR-1 represents abnormal return at the day -1. BH250+ is the cumulative buy-and-hold returns calculated from 2 days to 250 days after the event date, and BH250-, the cumulative buy-and-hold returns calculated from 2 days to 250 days before the event date. WO/FA is the amount of write-off over the fixed assets measured at the fiscal-end year of the event year. U is a dummy variable which takes the value 1 when the firm belongs to the high-uncertainty group and 0 when it belongs to the low-uncertainty group. *t*-statistics are contained in parentheses. *F*-tests and p-value are presented in the bottom panel.

	Dependent variables		
	AR-1	BH250-	BH250+
WO/FA	0,106	-0,638	-0,078
	(1,52)	(-1,82)	(-0,16)
WO/FA×U	-0,112	0,529	0,184
	(-1,58)	(1,48)	(0,37)
R^2	0,048	0,101	0,023
F	1,266	2,852	0,594
p-value	(0,29)	(0,07)	(0,56)