



# Reputational damage of operational loss on the bond market: Evidence from the financial industry

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## ABSTRACT

We examine bond market reactions to the announcement of operational losses by financial companies. Thanks to the fact the corporate debt is senior to equity, we interpret the cumulated abnormal returns on the bond market of the companies having suffered those losses as a pure reputational impact of operational loss announcements. For a given operational loss, bond returns might be affected at up to three different periods: at the first press release date, when the company recognizes the loss itself and at the settlement date. These impacts hold stronger than for common stocks. We also study the effect of investors' knowledge of the loss amount, and show that the type of operational event and the proportion of the loss in the firm's market value influence the effect of the loss announcement. Cross-sectional analysis indicates that the abnormal return is mostly affected by market-based characteristics for the first press release date, while firm-related characteristics largely affect bond returns upon loss recognition.

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## 1. Introduction

In its January 2001 Consultative Package, the Basel Committee proposed for the first time its definition of the operational risk: *"The risk of losses resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk, but excludes strategic risk and reputational risk"* (Basel Committee on Banking Supervision, 2001). <sup>3</sup> Consequently, banks were not required to allocate regulatory capital to hedge reputational risk. However, in

the last decades, several operational loss events have caused market value losses much higher than the loss amount (see Ross, 1997; Dunne & Helliar, 2002).

Assessing the impact of operational losses on a firm's reputation, and its associated drop in economic value, is an uneasy task. Because the reputational damage coincides, at least partly, with the identification of a direct operational loss, it is necessary to precisely identify its extent in order to isolate the pure reputational effect. When the magnitude of the operational loss is known, its identification is immediate. But if there remains some uncertainty vis-à-vis the global amount of the loss – which is usually the case when the loss event is announced – then the stock price reaction mixes the direct (operational) and indirect (reputational) effects with unknown proportions. Disentangling these two effects is indeed less likely to be problematic with corporate debt. As stated by Gebhardt, Hvidkjaer, and Swaminathan (2002), bonds and stocks are different claims to the same underlying operating cash flows and are, therefore, affected by the same fundamental risks although to varying degrees. We consider that the use of a debt market allows us to better isolate the reputational damage due to events related to operational risk than the equity market. As shareholders' equity represents a residual claim on the economic value of the firm, it naturally experiences the first,

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<sup>3</sup> The final Basel II Accord features a limitative list of seven loss events that qualify as operational: Internal Fraud, External Fraud, Employment Practices and Workplace Safety, Clients, Products, and Business Practices, Damage to Physical Assets, Business Disruption and Systems Failures, and Execution, Delivery, and Process Management. Any indirect effect resulting from these events on the reputation of the financial institution is left out of the regulatory scope.

mechanical loss due to an operational event, whatever its magnitude and degree of certainty. Thus, although the return effect is likely to be much less pronounced on debt contracts, it is also presumably purely reputational. The hypothesis of a strong sensitivity of bond returns to adverse events tends to be confirmed by the only two event studies that analyze announcements that have the same (positive or negative) impact on both markets. Hand, Holthausen, and Leftwich (1992) examine the impact of bond rating agency downgrade and upgrade announcements on the stock and bond markets and find that the latter react only for downgrades, but more strongly than stock markets, which react significantly for both positive and negative events. DeFond and Zhang (2009) study the stock and bond market reactions on bad and good news earnings surprises, and also find that bond markets tend to react more strongly to bad news, while stock markets react more strongly to good news.

This paper represents, to our knowledge, the first study purely dedicated to the bond market reactions to the announcement of operational losses. So far, three articles have examined the reputational damage of operational losses in the financial industry, but all of them focus on the impact on the stock market. Cummins, Lewis, and Wei (2006) compare the impact of large operational loss announcements in listed US banks and insurance companies. Both types of companies experience significant negative price reactions and their market value drops by an amount exceeding their operational loss. de Fontnouvelle and Perry (2005) conduct an event study of operational loss announcements for banks listed on developed financial markets worldwide, and find that only the announcement date has a significant, negative impact on the price. Their explanatory variable is a “loss ratio”, defined as the ratio between the loss amount and the market capitalization of the firm. They interpret a market value loss greater than the operational loss announced as evidence of reputational damage. In the most closely related paper to ours, Gillet, Hübner, and Plunus (2010) assimilate operational losses to reputational losses, but their approach suffers from the fact that common equity is the most junior claim on the firm value, as discussed above.

We exploit a clean database of bonds issued by listed US financial companies having experienced a significant operational loss. We carry out an event study methodology in two steps. In the first stage, we study the abnormal bond returns around dates that may have an influence on the firm reputation. Three event dates could matter: the first press release, the recognition by the company, and the final settlement. We discriminate, for the first press release date,<sup>4</sup> the losses on the basis of the investors' knowledge of the real loss amount, the type of operational event and the proportion of the loss in the firm's market value. In the second stage, we perform a cross-sectional analysis with the aim to detect the determinants of the market reaction to the operational loss events.

Our results indicate that it is worthwhile to perform a distinct analysis on the bond market. We find economically as well as statistically different evidence from the one retrieved from the stock market analysis of similar events. In particular, the date of recognition of the loss by the company has a particular meaning for the bond market participants. As we can provide a “clean” reputational interpretation of abnormal bond returns, this sheds particular light on the informational content of firm disclosures of operational events in the financial sector.

Section 2 describes the sample construction and displays the descriptive statistics on the final sample and the methodology used for measuring the impact of operational losses on reputation. Section 3 presents the empirical results of our event study. In the last section (Section 4), a cross-sectional analysis is performed on the abnormal returns computed in Section 3.

## 2. Data and methodology

### 2.1. Data

We extract loss event from the Algo FIRST database provided by the Fitch Group. This resource provides ca. 10,000 case studies analyzing operational risk loss events. It supplies the loss size, the name of the company and its group, the country of the company, the event type, as well as complete explanation of the loss event.

In the context of our study, the criteria used to filter this data collection are the following:

- The company group is resident in the United States<sup>5</sup>;
- The company that suffers the loss belongs to the financial industry;
- The operational losses have to be higher than 10 million US dollars<sup>6</sup>;
- The loss has to be settled not earlier than January 1994;
- The company group<sup>7</sup> has to be publicly traded;
- The operational event causing the loss cannot be a “September 11th” event;
- The company group has at least one listed bond outstanding<sup>8</sup> issued at least a year before the first press release date regarding the event and with a maturity sufficiently long to cover the whole period until the settlement date. If several bonds fill these conditions, we retain the bond with the longest maturity<sup>9</sup>;
- A company experiencing two operational events within the same month has to be removed to avoid contamination.

Our sample is finally composed of the 71 largest losses having occurred between April 1994 and July 2006, in 41 US companies from 23 different company groups. Similar to Gillet et al. (2010), we adopt three event dates:

- The first press release date: this date is available through the source of Algo FIRST. This date is manually double-checked through the Nexis Lexus database and corrected if necessary. For each case study, the selected date corresponds to the first press release mentioning the operational loss event.
- The recognition by the company date: this date corresponds to an announcement of the loss (the event or the amount) by the company itself. This date, when available, is found in the complete description and history of the loss event, provided by Algo.
- The settlement date: this date, directly given by Algo, is the one on which all losses are materialized, that is, the loss is considered to be definite and all loss amounts are known.

To illustrate our date classification we provide below the description of an operational loss event suffered by Aon Corp.

A lawsuit filed against Aon Corp. alleges that Aon “devised, implemented, supervised and enforced” a scheme to conceal contingent commissions from its clients.

<sup>5</sup> As the European sample was too small, we decided to remove these observations from the analysis.

<sup>6</sup> This threshold is also used in (Cummins et al., 2006).

<sup>7</sup> For instance, the American General Corp. and the National Union Fire Insurance Company are two companies belonging to the group “American International Group Inc.”. The American International Group Inc. is publicly traded.

<sup>8</sup> We control for selection bias by checking the variation of average Price-to-Book Value, PTBV, between Gillet et al.'s (2010) US sample and our reduced sample due to the absence of “right” bonds. Our sample has a 5% lower average PTBV, but as it is proven to affect positively the abnormal return in Gillet et al. (2010), it should not affect our results.

<sup>9</sup> We justify the choice of bonds with the longest maturity on two dimensions: first, they are the most sensitive to a change in the yield to maturity thanks to their high duration, and so the reputational effect is most easily identifiable; and second, they are least likely to be affected by the shortening of the time-to-maturity from the first press release to the settlement date. This dimension is more important than the transaction costs issue emphasized by Edwards, Harris, and Piwowar (2007) as we only deal with publicly listed bonds.

<sup>4</sup> We do not create sub-samples for the other event dates due to a lack of data.

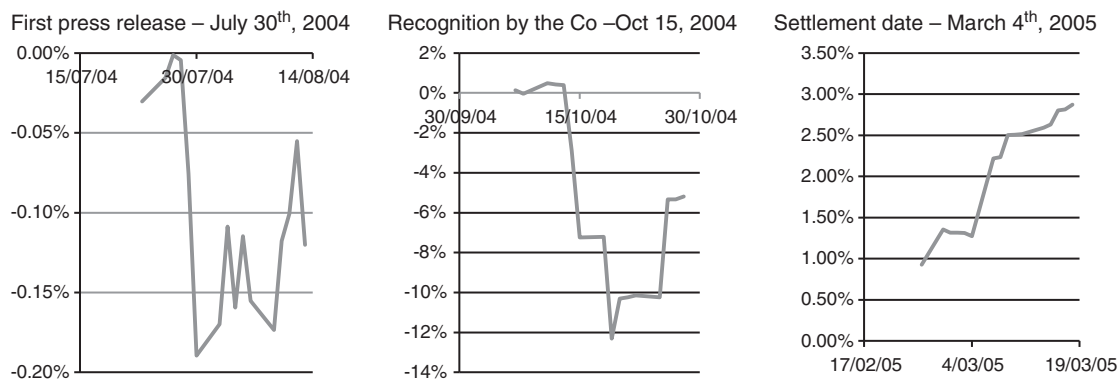


Fig. 1. Cumulated returns around the first press release date, the recognition by the company and the settlement date of the operational loss event for Aon Corp.

- On July 30th, 2004 the Wall Street Journal publish "Lawsuit Against Aon Is Cleared For National Class-Action Status,"
- On October 15, Aon indicated confidence in the propriety of its contingency fee arrangements, arguing that "compensation agreements between insurance companies and brokers are longstanding, common, and well-known practices in the insurance industry" and insisting that Aon had disclosed its fee arrangements in agreements, invoices, and statements posted on its website.
- Insurance broker Aon Corporation announced on March 4, 2005 that it had reached a \$190 million settlement related to the payment of contingent commissions with a group of Attorney Generals and Insurance Commissioners from the states of New York, Connecticut, and Illinois.

Fig. 1 illustrates the cumulated returns of a bond issued by Aon over the three listed dates.

If these dates were the same for a given loss, only the first event group is kept. On average, for our sample, there is a 29 weeks delay between the first press release and the settlement date.

Daily bond prices are obtained from Thomson Financial DataStream.<sup>10</sup> As suggested by Bessembinder, Kahle, Maxwell, and Xu (2009), we use dirty prices in order to take into account accrued interests. The returns for each bond  $i$  at time  $t$  are continuously compounded. Daily returns are computed on prices based on quotations but, since the operational events affect large financial corporations, these bonds are highly liquid; we have manually checked that there were daily transactions on these bonds at all times.

The market benchmark is the index "Barclays Capital US Corporate Investment Grade",<sup>11</sup> also extracted from the Thomson Financial DataStream.

In addition to the global sample, we create a set of sub-samples considered as relevant. For the first two event dates, we assign a dummy variable that partitioned the losses between *known* and *unknown* losses. An *unknown* loss means that the press release mentions a "big event loss" but gives no information on its size, or that the company confirms a loss but gives no information on its size. By definition, all loss amounts are known at the settlement date.

We also split the data in two sub-samples of equal size on the basis of relative loss size, i.e. the loss amount divided by the market value of the company.

Table 1 presents the characteristics of the sample and compares them to the sector's statistics. Column 2 gives the average market value of these companies on the 31st of December preceding the loss event and column 3 reports the average of those values for the financial sector. The average market value for the sector is provided by a DataStream index composed of 201 US financial institutions. The returns reported in columns 4 for the sample, and in column 5 for the index are computed on a 250 trading days' window, preceding 40 trading days the press date of the loss events.

Alphas and betas are derived from the market model using those two groups of 250 returns.

Statistics in Table 1 shows that the average market value of the companies of the sample is significantly higher than for the sector of financial institutions. The returns are on average slightly positive but close to zero and much more volatile than for the bond index. The average alpha is also slightly positive, and the average beta is quite aggressive.

Table 2 exhibits descriptive statistics around the 3 event dates corresponding to, respectively, the first press release date (Panel A), the recognition by the company date (Panel B) and the settlement date (Panel C). It also distinguishes the events whose loss amount is announced or not on the first two dates. This distinction is not made for the settlement date as, by definition, the loss amount is known on that date.

Table 2 shows that the average returns are positive after the first press release date, close to zero after the recognition date and negative after the settlement date. These data are computed on a window of 10 days after the event. The average loss whether the amount is known or not are of the same order for the first press release date,<sup>12</sup> although the extreme events are higher when the company recognizes its loss later than the announcement by the press. At first sight, we cannot see any significant differences between the known losses and unknown losses sub-samples.

## 2.2. Methodology

In order to measure the effect of the operational loss announcement on corporate reputation, we use a standard event study method with the single index market model.<sup>13</sup> Regardless of the number of dates associated to a given loss event (up to three different dates), the estimation period is a window of 250 trading days ending

<sup>10</sup> The use of the TRACE database, although recommended in the literature (see Bessembinder et al., 2009), is not applicable here as we use older data than its origin (July 1, 2002). Furthermore, as we only work on publicly traded debt, the issue of liquidity discussed by these authors can be considered as marginal.

<sup>11</sup> Barclays Capital US Corporate Investment Grade Index covers all publicly issued, fixed-rate, nonconvertible, investment-grade corporate debt. Issues are rated at least Baa by Moody's Investors Service or BBB by Standard & Poor's, if unrated by Moody's. Collateralized Mortgage Obligations (CMOs) are not included. Total return comprises price appreciation/depreciation and income as a percentage of the original investment. Indexes are rebalanced monthly by market capitalization. We refer to the event study of Altman, Gande, and Saunders (2004) who use Barclays Capital US Corporate Intermediate Bond Index as a benchmark. However, as all our bonds are noted by rating agencies, we use the Investment Grade rather than the Intermediate Index.

<sup>12</sup> We restrict the interpretation of the data to the samples displaying at least 10 observations.

<sup>13</sup> Altman et al. (2004) compare the "raw return", "mean-adjusted", "market-adjusted" and "Fama-French 3-factor model" measures for their bond event study and found that the different methodologies provided qualitatively similar results.

**Table 1**  
Descriptive statistics of the sample.

	Market value (in mil. \$)		Average returns		Alpha	Beta
	Sample	Sector	Bonds	Index*		
Mean	76,695	12,273	0.01%	0.00%	0.01%	1.49
Min	433	4,683	−10.71%	−1.24%	−0.04%	0.59
Max	259,710	15,229	9.94%	1.09%	0.09%	2.78

This table reports the comparative descriptive statistics of the sample versus the financial sector in the US. The index used for the returns computation is the Barclays Capital US Corporate Investment Grade. The alpha and beta represent, respectively, the intercept and the slope coefficients of the linear regression of each bond returns over the index.

40 days before the first press release date. Abnormal return for firm  $i$  on day  $t$  is defined as follows:

$$AR_{it} = R_{it} - \alpha_i - \beta_i R_{mt} \quad (1)$$

where  $R_{it}$  is the return on firm  $i$ 's selected bond on day  $t$  and  $R_{mt}$  the index return on day  $t$ , and coefficients  $\alpha_i$  and  $\beta_i$  are the coefficient estimated from an OLS regression of  $R_{it}$  on  $R_{mt}$  for the 250-day estimation period.

The average and cumulative average abnormal return for each day  $t$  are computed as follows:

$$\overline{AR}_t = \frac{1}{N} \left( \sum_{i=1}^N AR_{it} \right) \text{ and } CAR_T = \sum_{t=-20}^T \overline{AR}_t \quad (2)$$

where  $N$  is the number of events in the sample for the considered date.

We do not adjust the abnormal return to isolate the reputational effect of the loss. **The purely mechanical loss due to the operational event is first supported by the shareholders, as the equity bears the first loss. Indeed, on average, the operational loss is worth less than 1% of the market value of the firm's equity.** The abnormal return on the bond market is thus presumably due to a forward looking assessment on the firm credit risk. As the firm could be in trouble, there is an impact on the yield due to a potential increased credit risk and the price of the bond is affected. We therefore interpret the abnormal return as entirely due to the reputation loss.

We test the null hypothesis that the event has zero effect on the behavior of mean returns. For that purpose, like in the bond event study of Cook and Easterwood (1994), we perform the (Patell, 1976) variance adjustment of the variance as it is expected to increase due to prediction outside the estimation period. The variances of the abnormal returns for each stock are therefore multiplied by a factor  $C_{it}$ , whose value depends on time and security (see Campbell, Lo, & MacKinley, 1997 for details):

$$C_{it} = 1 + \frac{1}{T} + \frac{(R_{mt} - \bar{R}_m)^2}{\sum_{k=1}^T (R_{mk} - \bar{R}_m)^2} \quad (3)$$

where  $T$  is the length of the estimation period.

The  $t$  statistic for the cumulative normalized prediction error is:

$$W_{it} = \sum_{t=1}^L \frac{AR_{it}}{s_i \sqrt{LC_{it}}} \sim t(T-2) \quad (4)$$

where  $L$  is the number of day in the accumulation and  $s_i$  is the standard deviation of the residuals during the estimation period.

The distribution of  $W_{it}$  allows us to perform an asymptotically valid significance test. As they are assumed to be independent, it is

**Table 2**  
Descriptive statistics of the sample on the three event dates.

	Nb	Market value (in Mio)	Loss size (in Mio)			Average returns ( $t=0$ to 10)			
			Mean	Min	Max	Mean	Min	Max	SD
<i>Panel A – first press release date</i>									
Total	71	79,202	226	10	2650	0.02%	—	0.96%	0.30%
							1.77%		
Known losses	43	87,346	178	10	2650	0.01%	—	0.96%	0.30%
							1.77%		
Unknown losses	28	72,437	277	11	2160	0.04%	—	0.95%	0.30%
							1.07%		
<i>Panel B – recognition by the company date</i>									
Total	20	71,845	241	11	4000	0.00%	—	0.95%	0.29%
							0.75%		
Known losses	15	79,868	207	11	4000	0.00%	—	0.95%	0.27%
							0.75%		
Unknown losses	5	48,862	344	90	850	0.02%	—	0.90%	0.33%
							0.67%		
<i>Panel C – settlement date</i>									
Total	31	79,045	272	10	2160	—	—	0.81%	0.30%
						0.01%	1.13%		

This table reports the descriptive statistics of the sample around the three considered event dates: first press release, recognition by the company, and settlement. The distinction is made whether the amount of the loss is known or unknown to the market at the corresponding date. Figures in italics correspond to a subsample for which there is no sufficient data to perform statistical inference.

possible to form a normalized sum in accordance with the Lindeberg central limit theorem:

$$Z_{WL} = \frac{\sum_{i=1}^N W_{it}}{\left[ \sum_{i=1}^N \frac{T_i - 2}{T_i - 4} \right]^{1/2}} \quad (5)$$

If the Lindeberg condition is satisfied, the distribution of  $Z_{WL}$  asymptotically follows a standard Normal distribution,<sup>14</sup> and the statistics can provide either two- or one-sided tests of the following hypotheses:

**H0.** The expected value of  $W_{it}$  is equal to 0, versus

**H1.** The expected value of  $W_{it}$  is not equal to (is greater than/less than) 0.

### 3. Empirical results

To capture the loss of reputation due to operational losses announcement, we compute the cumulated abnormal returns on the bond market of the companies having suffered those losses. The methodology is described in the previous section.

We first test the whole sample on the three different event dates described in the Introduction, that is, the first press release date, the recognition by the company date and the settlement date.

Fig. 2 plots the average CAR on a window of 20 days before and after each of these three dates.

The cumulated abnormal returns in Fig. 2 decrease slowly starting 4 days before the first press release, and decrease more sharply on the 3 days following this date. Concerning the date of recognition by the company, the returns already decrease in the 10 days

<sup>14</sup> As other bond event studies also performed non parametrical statistical tests (see Bessembinder et al., 2009 for a list of bond event studies performing those tests), we cross-checked our results with the Wilcoxon signed rank test. Although the recognition sample lost significance, the results for the other samples were qualitatively similar (Results available upon request).



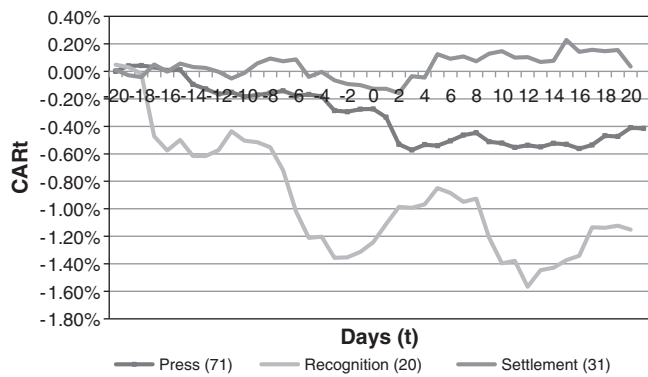


Fig. 2. Cumulated abnormal returns around the first press release date, the recognition by the company and the settlement date of the operational loss event.

preceding the date 0, and start to increase about 2 days before, until 5 days after, to start to decrease again during 8 days. Finally, the abnormal returns around the settlement date seems much more stable, although they seem to slightly decrease 6 days before the settlement until 2 days after and increase until the level zero and above, 2 days after the settlement. Table 3 presents the results of the significance test of those patterns.

The statistics of Table 3 that tend to confirm our observations is, for the first press release date, a significant CAR at a 99% degree of confidence over all windows, and for the recognition date, over all windows but the last one. As for the settlement date, the CARs are only significant and positive over the last window, that is for the 15 days following the event date.

As a robustness test, we check for any potential change in rating during the studied period, because these events might contaminate the data. Indeed, as stated by Hand et al. (1992), downgrade announcements have significant negative impact on excess bond returns. One company has suffered a downgrade a few days after the first press release date and a second one just before the recognition by the company date. Two other downgrades have occurred a few days before the date of the recognition by their respective companies. These events are removed from the database.

Fig. 3 and Table 4 present the same types of results, but after removing the contaminated data. The “clean” sample reduces to 70 events for the first press release date, 17 events for the recognition by the company date and 30 events for the settlement date.

Fig. 3 reveals that the previous decrease in the 20 to 10 days before the recognition by the company is most likely due to the downgrades of 20% of the companies in the sample. Indeed, once the downgraded companies are removed from the sample, the CARs do not decrease before date  $t = -10$ . The other curves display the same trend.

The statistics of Table 4 for the first press release date remains significant for the CAR at a 99% confidence level for the 15 days preceding the event, and at a 90% confidence level, on the  $-5$  to  $+10$  day window. Note that under the Wilcoxon signed ranked test, the CAR for the intermediate window is also significantly negative. CARs

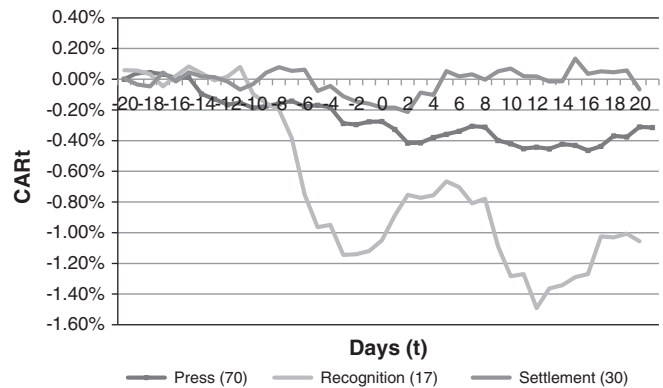


Fig. 3. Cumulated abnormal returns around the first press release date, the recognition by the company and the settlement date of the operational loss event after removing events coinciding with rating downgrades.

around the recognition date, on the other hand, are not significant anymore.

For the recognition by the company date, we can see that the significantly negative CAR for the 15 and 10 days before the recognition by the company become insignificant. This confirms that the significantly negative abnormal returns are primarily due to the companies having suffered the downgrades. However, the CARs are still significantly negative (99%) on the 10 days following the event starting 5 days before, or exactly on the event date.

The conclusions for the settlement date stay the same, as no downgrade comes out during these events. We can therefore already conclude that the three events have an impact on the reputation of the company, as they are all significant.

These results go in the same direction as those of Gillet et al. (2010) on the stock market, although they do not find significant results for the recognition date. This latter finding reinforces the point of view defended in this paper, according to which there is a stronger reputational impact to be expected, in terms of significance, on the bond market than on the stock exchange.

We further proceed with the clean sample. Due to the restricted number of observations, the analysis on sub-samples is only performed on the first press release date.

### 3.1. Sub-samples based on the knowledge of the loss amount

The first distinction is made on the basis of the knowledge of the loss amount. If the press release announces a loss but gives no information on the loss amount, the company is located in the “Unknown losses” sub-sample. Fig. 4 plots the cumulative abnormal returns for the two sub-samples around the first press release date.

The plots of Fig. 4 document a higher penalty when the market does not know the loss amount. Indeed, the cumulative abnormal return for the “Unknown losses” sub-sample goes down to almost  $-0.64\%$ , whereas its lower level for the “Known losses” sub-sample is  $-0.36\%$ .

Table 5 shows that this decrease is significantly negative at a 95% confidence level for both sub-samples, but only on the 15 day

Table 3  
Significance of cumulated abnormal returns for the full sample.

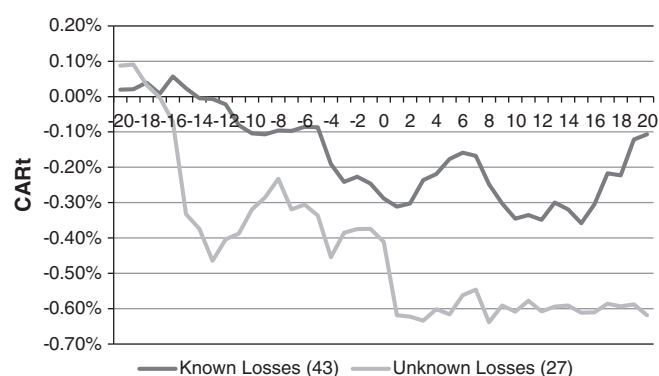
	#	$t = -15 + 1$	$t = -10 + 5$	$t = -5 + 10$	$t = 0 + 15$
Press date	71	$-5.55^{***}$	$-4.97^{***}$	$-4.11^{***}$	$-3.41^{***}$
Recognition	20	$-5.86^{***}$	$-5.38^{***}$	$-2.06^{**}$	0.21
Settlement	31	$-1.27$	0.52	1.03	$3.42^{***}$

This table reports the Student test statistics of the cumulated abnormal returns for the full sample around the three event dates: first press release, recognition by the company, and settlement. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% confidence levels, respectively.

Table 4  
Significance of cumulated abnormal returns for the truncated sample.

	#	$t = -15 + 1$	$t = -10 + 5$	$t = -5 + 10$	$t = 0 + 15$
Press date	70	$-2.48^{***}$	$-0.40$	$-1.30^{*}$	$-0.70$
Recognition	17	$-0.27$	0.36	$-3.61^{***}$	$-4.18^{***}$
Settlement	30	$-0.11$	1.12	1.25	$1.92^{**}$

This table reports the Student test statistics of the cumulated abnormal returns for the truncated sample, which is equal to the sample remaining after removal of events coinciding with rating downgrades, around the three event dates: first press release, recognition by the company, and settlement. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5% and 1% confidence levels, respectively.



**Fig. 4.** Cumulated abnormal returns around the first press release date, based on the knowledge of the loss amount.

window before the first press release. This observation might find a first explanation in some “insider” trading issue. The CAR is however also significantly negative on the day of the first day of the first press release for the Unknown losses sample, as expected from the plot of the series in Fig. 4.

### 3.2. Sub-samples based on the type of the loss event

The events contained in the sample are mainly due to clients, products and business practices (77%) and to internal fraud (11%). Fig. 5 displays the plots of the cumulative abnormal returns for both sub-samples.

Although Perry and de Fontnouvelle (2005) and Gillet et al. (2010) find a much stronger negative impact for the internal fraud event type, Fig. 5 does not display any obvious trend concerning the fraud event type. Indeed, in Table 6, only the “clients, products and business practices” event type causes significant negative abnormal returns. However, as there are only 10 observations for the fraud sample, we cannot draw any firm conclusion.

Both aforementioned studies conclude that shareholders seem to assign a greater reputational impact to events corresponding to a malevolent behavior because such events have a clear dedication to the pauperization of the company. Our evidence, although limited, indicates that debtholders dislike to a greater extent operational events that translate some kind of involuntary weakness of the financial institution.

A possible interpretation of our different finding is that, even though they do not entail any proactive attempt to expropriate the corporate stakeholders, the “clients, products and business practices” types of losses are indicative of a degradation of the intrinsic credit quality of the firm, which is reflected in its yield spread and thus in its bond valuation.

### 3.3. Sub-samples based on the relative size of the loss

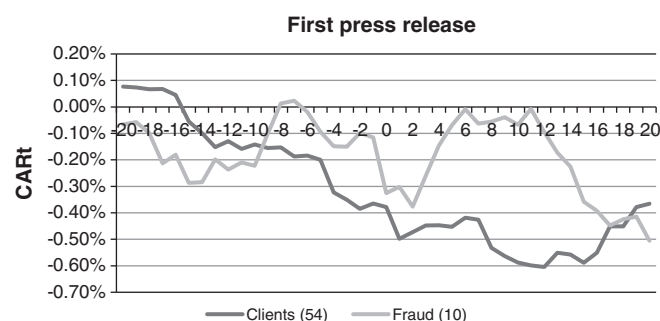
Our final decomposition of the sample is based on the relative size of the loss. Unlike the stock market, the bond market seems to assign

**Table 5**

Significance of cumulated abnormal returns around the first press release date for the sub-samples based on the knowledge of the loss amount.

Press	Nb	$t = -15 + 1$	$t = -10 - 5$	$t = -5 + 10$	$t = 0 + 15$	$t = 0 + 1$
Known	43	-1.67**	-0.78	-0.90	-0.26	-1.08
Unknown	27	-1.88**	-0.91	-0.97	-0.81	-1.89**

This table reports the Student test statistics of the cumulated abnormal returns for the truncated sample around the first press release date, where the observations are partitioned between known and unknown loss amounts. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% confidence levels, respectively.



**Fig. 5.** Cumulative abnormal returns around the first press release date, on the basis of the event type.

a penalty that is increasing in the size of the losses, as illustrated in Fig. 6. Indeed, Table 7 displays significant negative abnormal returns for the bigger relative losses, whereas there are not significantly different than zero for the small losses sample.

Although we could not investigate further for the recognition by the company date and the settlement date, the knowledge of the loss on the first press release date also seems to trigger a greater reputational damage when the loss is not known, although its significance is not higher on a statistical basis. However, the reputation of the company does not seem to be affected the same way by the type of the operational loss event and the relative size of the loss on the bond market. Whereas the stock market participants penalize financial corporations in a similar way regardless of the fact that the loss is small or large, the bond market seems to react consistently with the size of the loss. Moreover, we are not able to prove, like in Perry and de Fontnouvelle (2005) and Gillet et al. (2010), that internal fraud affects the reputation of the companies to a greater extent than the “clients, products and business practices” type of loss.

## 4. Cross-sectional analysis of bond market reaction to operational loss announcements

This section performs a cross-sectional analysis on the determinants of abnormal returns due to operational loss events. The abnormal returns observed in previous section might be influenced by firm-specific characteristics, event-related characteristics, or macro-economic factors.

We start with the firm-specific characteristics proposed by Fama and French (1993), i.e. firm size (proxied by the market value of its equity, expressed in \$ trillions) and its Price-to-Book ratio, commonly interpreted as a proxy for default risk, with lower value signaling distress. Indeed, Beck, Demirgüç-Kunt, and Ross (2006) and Uhde and Heimeshoff (2009) state that crises appear more likely in lower concentration markets. As we are working on the bond market, we also test the impact of the leverage of the companies on their bond performance (positively correlated to financial distress, as pointed out by Chernobai, Jorion, & Yu, 2008), as well as the level of liabilities

**Table 6**

Significance of cumulated abnormal returns around the first press release date for the sub-samples based on the event type of the loss.

Event Type	#	$t = -15 + 1$	$t = -10 + 5$	$t = -5 + 10$	$t = 0 + 15$	$t = 0 + 1$
CPBP	54	-3.21***	-1.73**	-1.87**	-0.79	-1.72**
Fraud	10	0.17	0.13	0.69	-0.27	-0.67

This table reports the Student test statistics of the cumulated abnormal returns for the truncated sample around the first press release date, where the observations are partitioned between events related to clients, products and business practices (CPBP) or fraud, whether internal or external. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% confidence levels, respectively.

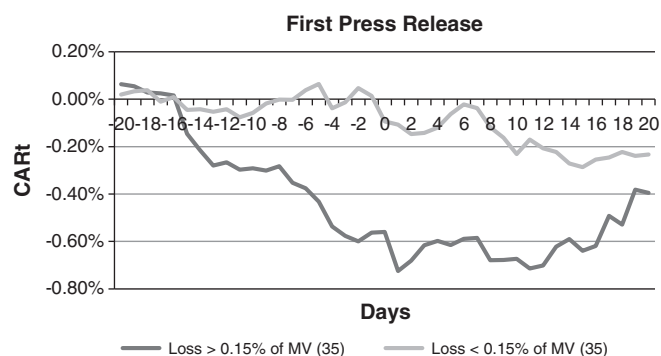


Fig. 6. Cumulative abnormal returns around the first press release date for the sub-samples based on the relative size of loss.

(expressed in \$ billions) as shown to be influent on the stock market performance in Gillet et al. (2010). Additionally, following Perry and de Fontnouvelle (2005), we study the role played by the governance G-index, as the authors find that market reacts stronger for firms with weak shareholders rights (higher value of G). Finally, we introduce a dummy variable for those firms that encountered a rating downgrade during the studied event.

Next, in order to detect the characteristics of the event that could help to explain the magnitude of the abnormal returns, we introduce the following variable in the regression:

- a dummy representing the losses due to internal fraud (as proven to affects more badly the stock market in Perry & de Fontnouvelle, 2005),
- the relative size of the loss (as computed in the previous section),
- the amount of time (in years) elapsed since the preceding event date.

Then, in order to remove market-wide influences that the financial firms are exposed to, we introduce several macro-economic variables reflecting market interest rate and credit risks: inflation, short-term interest rate (1-Month Certificate of Deposit), term-spread (difference between the 10-Year and 3-Month Treasury Constant Maturity Rate) and credit spread (difference between the Moody's Seasoned Baa Corporate Bond Yield and the Aaa one provided by the Board of Governors of the Federal Reserve System). Most of these variables are provided by the FRED<sup>15</sup> database. Finally, in order to take the timing effect into account, we introduce in the regression the return of the stock index (S&P 500) on the same time window as for the abnormal returns (see below).

To maximize the explanatory power of the cross-sectional model, we use a time window for which the cumulative abnormal return is significantly different from zero for the full sample and around the three event dates. We select the  $-4$  to  $10$  day time window, and perform our cross sectional analysis on the dependent variable CAR ( $-4, 10$ ).

As the abnormal returns are estimated rather than the observed, we carry a weighted least squares regression, taking for the weights the R-squared issued from the alphas and betas estimations on the 250 days before the first event window.

Table 8 presents our results for the first press release, the recognition by the company and the settlement samples, with and without macro-economic variables. The Price-to-Book Value, PTBV, which is traditionally a powerful explanatory variable for abnormal stock returns around operational events, does not seem to impact the abnormal returns on any event date. The amount of debt and their proportion in the firm value definitely impact the performance of bonds market on the three event dates. A high leverage has a negative

Table 7

Significance of cumulated abnormal returns around the first press release date for the sub-samples based on the relative size of loss.

Relative size of loss	#	$t = -15 + 1$	$t = -10 + 5$	$t = -5 + 10$	$t = 0 + 15$	$t = 0 + 1$
> 0.15% of MV	35	-3.62***	-1.46*	-1.54*	-0.37	-1.63*
< 0.15% of MV	35	0.12	-0.20	-0.30	-0.62	-1.23

This table reports the Student test statistics of the cumulated abnormal returns for the truncated sample around the first press release date, where the observations are partitioned between the relative size of loss (loss amount divided by market value) being higher or lower than 0.15% of the corresponding bank market value of equity. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% confidence levels, respectively.

impact on the performance of the bonds on the first press release and the settlement date, but it positively affects their performance on the recognition by the company date. However, the AR on the latter event is decreasing with the absolute level of debt.

The market reaction on the first announcement date (with the largest number of observations) mostly depends on information coming from rating agencies, as well as market-wide variables. At this point, firm-specific characteristics do not appear to play a significant role. Thus, upon this first announcement, the abnormal return is mostly driven by the market context, rather than intrinsic factors.

The influence of firm characteristics is much stronger for the abnormal return upon the recognition date. We observe a positive impact of size and leverage, but a negative one of the liabilities and G index variables. This might be interpreted as if large firms were less penalized than small ones when they recognize a loss by themselves. The negative sign of the liabilities variable indicates that this cushioning effect is mostly due to a large equity position. Our results for the G-index on the recognition date tend to confirm Perry and de Fontnouvelle's (2005) findings, i.e. the market reacts stronger for firms with weak shareholders rights.

As far as the event characteristics are concerned, the dummy variable for the event type does not influence any result and considerably lowers the explanatory power of the regression. It is therefore removed from the regression. The relative loss size, although significant in the previous section for the first press release, seems to only affect the AR on the recognition date. A big loss clearly negatively affects the reputation of the firm, when it announces it by itself. Finally, although it is negative and significant for the settlement date in Gillet et al. (2010), the delay does not seem to affect the cross-sectional bond performance.

When control variables are accounted for, the negative impact of the relative loss becomes significant for the first press release date, whereas the other variables significantly affecting the abnormal returns on the recognition date remain the same but with weaker significance. The stock index variable seems to indicate that a good market context have a stronger negative impact.

To summarize, we find evidence that the bond market reaction does not consider firm-specific characteristics at the moment of the announcement. Unlike for the stock market, the recognition date seems to trigger the most firm-sensitive market response. Together with the direct evidence gathered in the previous section, this shows that the reputational impact of operational loss events is very important when the company starts communicating, rather than when the market gets to learn the problem through a press article.

## 5. Conclusion

Our study is, to our knowledge, the first one dedicated to the bond market reactions to the announcement of operational loss. In order to capture the loss of reputation due to operational losses announcement, we compute the cumulated abnormal returns on the bond

<sup>15</sup> (<http://www.federalreserve.gov/>).

**Table 8**

Results of cross-sectional regression on the first press release cumulated announcement returns.

		First press release		Recognition by the company		Settlement	
Firm-specific characteristics	C	−0.006	0.009	0.053*	0.010	−0.001	0.031
	Firm size	−0.027	−0.012	0.298**	0.372*	−0.092	−0.034
	PTBV	0.001	0.001	0.008	0.007	0.004	0.002
	Liabilities	0.008	0.003	−0.073**	−0.076*	0.016	0.011
	Leverage	−0.0001*	−0.0001	0.001***	0.001*	−0.0003*	−0.0003*
	G index	0.000	0.000	−0.008***	−0.008**	0.001	0.002
	Rating change	−0.073***	−0.068***	−0.011	−0.008		
Event char.	Relative loss	−0.046	−0.102*	−2.375***	−2.210*	0.015	0.032
	Delay			0.006	0.002	−0.002	−0.004
Macro-economic variables	Inflation		−0.018***		0.021		−0.028
	STINT		0.012		0.413		−0.476
	Term spread		0.095		0.466		−0.511
	Credit spread		−1.443***		2.544		−1.910
	Stock index		−0.097***		0.444		−0.220**
Adj. R-squared	# Obs.	0.71	0.77	0.58	0.45	0.01	0.24
		69	69	20	20	31	31

This table reports the results of the cross-sectional regressions of cumulated abnormal returns on a set of firm-specific, of event-related, and of macroeconomic variables. The dependent variable is the cumulated abnormal return starting 4 days before until 10 days after the first press release date, denoted CAR (−4,10). PTBV stands for Price-to-Book Value. STINT stands for Short Term Interest rate. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% confidence levels, respectively.

market of the companies having suffered those losses. We have shown that although less pronounced than on the stock market, the bond price impact of reputational risk is significant, and lasts longer than the mere first press release as it extends to the recognition of the loss by the company, when applicable.

For one operational loss, the firm performance might be affected at up to three different periods, if the firm delays to confirm a press announcement, and to proceed to the settlement of this loss. Usually, the first two events encounter a negative effect; whereas the settlement, when made at a different time from the first press release and the recognition, display a positive effect, which might be explained by tax considerations.

The study also discriminates the losses on the basis of the investors' knowledge of the real loss amount, the type of operational event and the proportion of the loss in the firm's market value. We show that the knowledge of the real loss amount announced by the press tends to hinder the negative market reaction, as bondholders seem to appreciate transparency. From the event type discrimination, debtholders tend to penalize harder the involuntary weakness of the firms ("clients, products and business practices") contrary to the shareholders who typically assign a greater reputational impact to fraud events. Finally, the bond market seems to react consistently with the size of loss, whereas the stock market participants appear to penalize financial corporations in a similar way regardless of the fact that the loss is small or large.

The last section of our paper presents a cross sectional analysis, with a set of explanatory variables that is adapted to the bond market context. Our main findings are that a high leverage has a negative impact on the performance of the bonds on the first press release and the settlement date, whereas the absolute level of debt tends to affect the abnormal return on the recognition event. This analysis also allows us to identify the negative impact of the relative loss size on the recognition event.

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