HOW DO SHAREHOLDERS RESPOND TO LAYOFF ANNOUNCEMENTS? A META-ANALYSIS[◊]

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Layoff announcements often attract extensive media coverage. Beyond the newsworthiness of such events, is such a decision in any way correlated to the firm's stock market performance? In this paper, we offer a quantitative review of the literature related to this question. The core of the paper is a meta-analysis. We find that layoff announcements have an overall negative effect on stock prices, and this is true whatever the country, the time period or the type of firm considered. However, some factors may impact the stock market's reaction to such announcements. The reason for the layoff decision is among the most decisive factors and the market sanction will be more severe in the case of defensive layoffs (taken by firms facing difficulties) than for offensive layoffs (when they are part of a more general reorganization strategy).

Keywords: Downsizing, Redundancy, Corporate Governance, Event studies

JEL Codes: G14, J5.

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1. Introduction

Layoff announcements often make newspapers headlines and trigger off heated debates.[1] On one side, firm managers often stand accused of carrying out mass layoff where it has no economic necessity.[2] *Vox populi* tend to reproach firm managers of taking a short-term view with the only objective of boosting the firm's short-term gains on the stock exchange for the sole benefit of shareholders who could not care less about the firm's fundamentals. However, this presupposes that shareholders are mere myopic agents who disregard all economic fundamentals when they assess a firm's future prospects. On the other side, some experts on management and industrial organization issues are dedicated followers of the "small is beautiful" saying — which was very much in vogue in the 1980s. Womack *et al.* (1991), for instance, emphasize the importance of keeping production units small-sized, reactive and changeable, Neinstedt (1989) or Hendricks (1992) replaces downsizing with rightsizing on the assumption that layoffs cannot be but beneficial in all circumstances. The popularity of the "lean production" concept is also meaningful in that respect.

Over the past twenty years, more than forty empirical studies have looked into the impact of layoff announcements on firms' market capitalization. Those studies cover about 15,000 layoffs announcements over the 1970-2001 period in fourteen industrialized countries. All of them used the event study methodology. Although the technique is consistent throughout, each study concerns different samples, so it is rather difficult to attempt any summarizing of all this since one can only get diverging results. Worell, Davidson and Sharma (1991), Caves and Krepps (1993), Farber and Hallock (2004) for instance conclude to a negative market reaction, whereas Chatrah, Ramchander and Song (1995), Palmon, Sun and Tang (1997) or Collet (2002) come to the opposite conclusion. A large number of authors point out that market reaction can differ widely depending on the country, period of time, economic situation, and so on. It is then difficult to form a robust opinion.

[1] See, for instance, G. Anders, « Cost Cutters' Advice: Act Sooner, Don't Flinch », *The Wall Street Journal*, April 9, 2008.
[2] For a broad analysis about layoffs and downsizing, see Baumol, Blinder and Wolf (2003) and Farber (2003).

This paper resorts to meta-analysis to summarize all the empirical studies. Although meta-analysis is not much used in economics it can yield fruitful results. It offers a rigorous analysis framework which facilitates the reading of the abundance of empirical results. Meta-regressions provide a clear analysis of the characteristics relating to the sample or the methodology which bear the greatest impact on the results. Besides, meta-analysis overrides the inherent limitations of the qualitative survey — e.g., subjectivity, selection bias etc. This becomes of utmost importance when dealing with such a sensitive a topic as the present one.

The paper is organized as follows. Section 2 analyses the consequences that mass layoffs may have on firms. Section 3 looks into the investors' reactions, which depend on the signal sent to the market, which includes external elements such as the firm's public relations strategy on financial issues, the prevailing economic and social climate, etc. The question then becomes an empirical one and the core of the paper is a meta-analysis. Data and methodology are detailed in section 4. Section 5 presents and discusses the results. Section 6 concludes.

2. What do firms gain from layoff plans?

2.1 The reasons behind layoff plans

It is not possible to consider the consequences of a layoff plan independently from the reasons that prompted the firm to put it in place. These reasons fall into two broad categories: defensive (or reactive) layoffs and offensive (or proactive) layoffs.[3]

The first case is when a firm decreases its payroll after a fall in demand. The decision is not necessarily made at the very moment when the firm is under financial stress, nor even when it is overstaffed, but can simply be taken as a preemptive move. The decrease in demand can either be due to the firm itself — because of production overcapacity, a failed commercial strategy or if the firm cannot produce at competitive prices — or to some macro-economic reasons, such as a slowdown in growth. In all these situations, the layoffs can be described as "defensive" (or reactive). In general, defensive layoffs affect more than one, if not all, the company's sites or services.

[3] One can also considers some sociological and ideological reasons (see Blackburn, 1999).

Resorting to layoffs does not always constitute an aim in itself but can be part of the firm's more general reorganisation program (Ofek, 1993). These are called "offensive" (or proactive) layoffs. They usually target only a few services or sites. Most of the time, the firm will externalize one or more services.[4] A layoff plan as part of the firm's reorganization program is called for when: i) the firm then does not aim so much to reduce its payroll as to make it more adjustable; ii) the firm is seeking to improve its internal communications system, improve and shorten the decision-making process and reduce the number of management positions and that of duplicated jobs; iii) the firm wishes to refocus its activities on its most profitable sectors and therefore must close down the less profitable subsidiaries or modify the way they are organized; iv) the firm has found a means of reducing production costs. In other words, the firm will then use less work, less-skilled work or less costly work (through, for example, the delocalization of some productive sites to lower-wage countries).

2.2 Layoff costs

Whatever the reasons, firms always incur high costs in the layoff process.[5] Direct costs are the most obvious as, in all cases, procedures entail workers' compensation or reclassification, possibly also production reorganization and the hiring and training of new workers.

Further, the firm will most probably also have to deal with the negative impact of layoff plans on the morale of workers who then feel there has been a breach in the confidence contract which bound them to the firm (Rousseau, 1995; Rust *et al*., 2005).[6] It is likely that relations with workers and trade unions will become tenser, possibly on a long-term basis. Most of the time, it results in overall demotivation and/ or it creates a feeling of unfairness among workers, of increased job insecurity and stress, a decreased commitment to the firm's objectives and its management team, etc. all of which lead

[4] The managers may also find advantageous to lay off permanent contract workers and replace them — albeit sometimes by stint of twisting labour laws and regulations — with temporary contract workers or even agency workers as the extra cost incurred is made off by the net gain achieved in a more flexible manpower.

[5] Bentolila and Bertola (1990) consider that the costs incurred tend to keep the number of redundancies down — and thereby raise employment at macro-economic level — whereas Pfann and Palm (1993) conclude that the costs only slow down the firm's staff adjustment process.

[6] Some may argue that the workers who keep their jobs may seize new opportunities after the dismissal of their fellow workers and are therefore incited to become more efficient. Except if the layoff plan is combined with some wide-sweeping reform of the workers' pay structure — including the introduction of variable incentives into workers' pay, the generalized use of worker participation plans and stock options — we do not feel that this constitutes a convincing argument.

to lesser workers' loyalty. Payroll reduction is therefore often associated with productivity losses (Brockner *et al.*, 1987; Brockner *et al.*, 1992) which all add up to the original costs of the layoff plan. Although these indirect costs may be difficult to measure, they are not entirely ignored by investors and can therefore induce a negative reaction from the markets.

Corporate tensions sometimes lead to litigation since, in many countries, labour laws and regulations provide for workers' legal action. Even though workers rarely seek the direct annulment of a layoff plan — because the courts seldom oppose layoffs programs — they sometimes win a case on procedural or irregularity grounds. Whether successful or not, these legal procedures take a long time and are costly for firms.

Social disputes may arise when negotiations end up in deadlock. The cost of such disputes is often high for both the firm and its shareholders. Becker and Olson (1986), for example, have estimated that a strike involving over 1,000 workers may cost the firm an average of 80 million dollars (see also Ruback and Zimmerman, 1984; Kramer and Vasconcellos, 1996; Kramer and Hyclak, 2002).

Layoff plans may also affect the firm's brand image, and consequently damage future profits. Workers now readily turn to the media to call for the boycott of their firm. Although these campaigns are becoming more and more frequently used — especially in the U.S. — their actual efficiency remains hard to prove.

Finally, it must be added that layoffs plans carry risks not just for the firm but for its management team too. Although it seems that management pay is enhanced by layoff plans (Brookman, Chang and Rennie, 2005), at the same time, managers also become more likely to lose their jobs (Billger and Hallock, 2005). However research in that field remains patchy, so the results still need confirming.

3. How do investors perceive layoff announcements?

Firm's market capitalization reflects investors' anticipation of the firm's future profit prospects. Given the ambivalent impact on labour costs and firm's productive efficiency, one cannot really demand a one-way response to layoff announcements from financial markets. Because of this ambiguity, the context in which the layoff plan is announced, as well as the reasons given by the management for implementing it are of utmost importance. When announcing a layoffs plan, the firm usually has to

disclose information that was hitherto unknown to the public concerning, among other things, the firm's financial health, its perspectives or its determination to push through a certain number of reforms, etc. In other words, a layoff plan announcement is more like a signal sent by the firm to financial markets. The type of financial information passed on to the public when announcing a lay off plan is therefore essential in so far as it influences how markets will interpret it.

Markets will receive a positive signal when they consider that the firm is in good financial health and that the announcement is part of a wider reorganization program. The layoffs plan will then probably be interpreted as the proof that the firm is trying hard to become more efficient. This is referred to as the pure efficiency hypothesis (Lin and Rozeff, 1993).

Conversely, if the firm is in a more delicate situation, the markets will probably receive a negative signal because they will interpret this as the proof that the firm is facing real difficulties with lower growth and lower demand opportunities than anticipated (Worell, Davidson and Sharma, 1991). This is referred to as investment decline (Elayan and *al.*, 1998) or demand decrease hypothesis (Lin and Rozeff, 1993).

The signal effect plays an even more important role when one leaves aside the efficient market paradigm: if enough investors believe that shareholders usually benefit from layoffs, their reactions may be biased and the signal sent by a layoff announcement no longer needs any rational basis. The stock market price of the firm laying off staff will then increase simply because some investors — a large number of them — are convinced this is good news.

In sum, the overall effect of redundancies on shareholders' wealth depends on the accumulation of several factors, both objective (the firm's economic situation and its reasons for implementing the layoff plan) and subjective (how the markets perceive the firm's future prospects and how they interpret the signal sent by the firm concerning the layoffs plan). A layoff decision may increase the firm's profitability because of the consequent decrease in payroll costs and it can lead to improvements in overall efficiency through reorganization, but at the same time, layoffs can also have a negative impact on productivity if workers are demotivated. Organizing the different factors by importance and work out their net effect is obviously an empirical issue.

4. Methodology

This section first presents the sample of the studies selected (4.1). They all use the event studies technique which is briefly recalled (4.2). The principles of meta-analysis are then presented (4.3) and followed by a description of the variables used in this study (4.4).

4.1 The studies selected

We have reviewed 41 studies dated 1990 to 2006 which examine the financial markets' reaction to staff reduction announcements (see Table A in appendix). Over the period, the interest for the topic has never flagged: more than half of the studies are dated post 1997, one quarter post 2000. These studies span over three decades (1970-2001), they cover 14 countries and around a total of 15,000 announcements (it is likely that some announcements are reported twice or more in different studies).

To review the studies, we did a keyword search — e.g., "layoff", "lay-off", "downsizing", "redundancy", "reduction-in-force", "RIF", "plant closure", "restructuring" — in the major economic databases: JSTOR, Econlit, Science Direct, RepEc (IDEAS), NBER, CEPR and SSRN. After this first selection of papers relevant to our study, we systematically exploited their bibliographic references so as to complete our research and make sure that our review was as thorough as possible. To the studies closely related to layoff announcements we added those on site closures. However, we did not retain studies on delocalization schemes or abandoned projects — even though those types of programs most often also include redundancies — because those announcements convey multi-dimensional information whose effects can hardly be distinguished. No *a priori* filter was used concerning the date or type of publication. Out of the 41 studies selected, 32 are published in academic journals, 2 are colloquium proceedings, 6 are working papers and 1 is part of a collective publication.[7] For clarification purposes, we use abbreviated references in the rest of the paper, for example, Abraham and Kim (2004) is referred to as [**AK**]. Each study's full references can be found in the bibliography.[8]

4.2 The event studies technique

[7] There is also a PhD thesis by Nemec (1997), but we have been unable to have access to.

[8] Some of the selected studies are by the same authors and yet concerns close, but distinct samples at a several years interval: they are [**FH99**] and [**FH04**] as well as [**HMS01**] and [**HMS04**]. In both cases, the second study is the continuation of the first on an extended time period. As recommended by Stanley (2001), we considered both studies. Whatever, it does not change the results presented in this paper (tables are available on request).

All the studies considered use the event studies technique and our own approach is therefore consistent in so far as it avoids the pitfall of the main criticism addressed to meta-analysis, i.e. the "apples and oranges" confusion (Glass and *al.*, 1981).

The event studies technique rests on the postulate that financial markets immediately incorporates all the public information available — Fama's semi-strong efficiency hypothesis. According to this postulate, stock market capitalization constantly mirrors the actualized value of the firm's future anticipated profits, which allows for the assessment of the impact of any new information on these anticipations. The thrust of the event studies method comes from its being an assessment by very many investors whose very major activity consists in judging firms' decisions and the environment in which they operate, etc.

Although numerous improvements have been added since Fama and *al.* (1969), the basic principles have barely changed and its statistical properties are widely recognized (MacKinlay, 1997). Investors' reactions to new information — the announcement of a layoff plan, in our particular instance — can be simply measured by comparing the observed return with the theoretical return that would have occurred in the absence of the new event. The return differential is referred to as "abnormal return". The average effect can be derived by aggregating the return in the time and/ or space of the firms concerned. When the abnormal return is positive, it shows that the market has received the announcement favorably and it is the reverse in the case of a negative return.

4.3 The meta-analysis

Meta-analysis is an econometric technique used to survey the empirical literature. It is most particularly common in medicine and biology. It has been gradually more and more used in economics since the early 1990s — see Stanley (2001) for a formal presentation.[9]

Owing to meta-analysis, it becomes possible to summarize, aggregate and make comparable the empirical results from different studies. Each of the studies is original in so far as it bears on a different

[9] In the course of our research we came across a working paper on the relations between staff reductions and firm performance (Allouche, Laroche and Noël, 2006). This independent study from ours, adopted a different methodological approach. Besides, that initial sample comprised 27 studies (as opposed to 41 in ours) and the regressions concerned between 9 and 62 observations whereas we looked at between 165 and 434.

sample and period of time. It does not either use the same evaluation technique or the same explanatory variables. It is therefore always particularly awkward, if not impossible, to come to overall conclusions when one refers only to a qualitative review of the literature. With meta-analysis, in contrast, the differences between different studies' results can be considered and combined through a *ceteris paribus* reasoning. According to Glass, McGaw and Smith (1981), "the findings of multiple studies should be regarded as a complex data set, no more comprehensible without statistical analysis than would hundreds of data points in one study".

Compared to a purely qualitative journal, meta-analysis provides a common treatment for all the studies on a given topic, whereas the other academic summaries only consider a few papers since it is too difficult to synthesize the results from too many surveys. Finally, meta-analysis permits to focus on the specific characteristics that most influence results.

4.4 The variables

Usually, it is necessary to convert the results from different studies into a single metric measure. It was not required here since all the selected studies consider cumulative average abnormal returns (CAAR), which are perfectly comparable from one evaluation to the next. The event window results from an *ad hoc* decision and may vary from one study to the next. We mainly selected the CAAR for the [-1; +1] period as an explanatory variable. Our tests then comprise 165 observations for 34 studies (panel A). In order to maximize the number of observations, the CAARs calculated on the [-1; 0] and [0; +1] intervals are added. This then gives 228 observations for 34 studies (panel B). Finally, to serve as robustness tests, we build another 3 panels with calculated CAARs for the [-10; +1] and [-1; +10] and [-10; +10] intervals.

Nineteen explanatory variables have been retained (see table B in appendix for the usual descriptive statistics). Like Stanley and Jarrell (1998), we decided to keep a large number of variables, even though only a few of them will appear to have any significant impact.

Some authors focus on the change over time of the market reaction to layoff announcements ([**CRS**], [**FH04**] or [**MLC**]). So we introduce two dummies: *Period _80* = 1 when the middle of the period is within the 1980's decade, and 0 otherwise; *Period_90* = 1 when the middle of the period is

within the 1990's decade, and 0 otherwise; the 1970's decade becomes the reference period when taking these two variables into account.

Some analysts also propound the idea of some US, or more widely speaking, Anglo-American specificity concerning markets' reactions to layoffs announcements. This calls for the introduction of another dummy variable: *Non_Anglo* = 1, when the sample comprises non Anglo-American firms.

The great majority of studies seeking to explain stock markets' reactions concentrates on the reasons for layoff plans. As each study draws up its own list of reasons, we need to put up a reclassification structure to harmonize the different papers' categories. Thus, in some studies, profitable firms are opposed to those facing difficulties, while in others, the opposition is between firms for which layoffs plans are part of an overall reorganization program and those for which it is not. We simplify the issue by considering two possible attitudes for the firm, as is the case both in the theoretical and empirical academic literature: i) a proactive, or voluntarist attitude — although the firm is not facing financial difficulties, it resorts to reorganization and redundancies to become more efficient and more profitable; ii) a reactive attitude, which follows the tide of events — the firm reacts to changes in its environment (a fall in demand, financial problems etc.) and lays off workers under more or less high pressure.[10] The *Proactive* dummy variable = 1 when the sample comprises firms about which the authors of the studies think that they adopt a proactive attitude. The zero value corresponds to two different types of observations. It is used both for the samples of firms considered as "reactive" by the author of the study and for the samples that comprise firms for which no specific information is provided. Besides, the *Reactive* dummy variable = 1 when the sample comprises firms about which the authors of the study think they adopt a reactive attitude. As previously stated, the zero value implies that the firms in the sample adopt a proactive attitude or that no information is supplied about them.[11]

[10] The selection process is easier when the authors decide to make the distinction between two categories, although it is not always the case. [**HMMW**] is a telling example of the difficulties inherent in this type of reclassification exercise. The authors distinguish five reasons: loss-making activities, fall in demand, cost cutting, reorganization, plant closure. We put the first two items in the Reactive category, the following two in the Proactive category and we ignore the last.

[11] It must be noted that this type of classification exercise knows one limitation. Most studies rely on the press for their information on redundancy announcements. Yet, press articles may be influenced by the way markets receive the announcements. A journalist who learns about a negative (or a positive) market reaction will then be tempted to interpret the firm's attitude as defensive (or offensive). One solution to this problem consists in considering only the press announcements released before market reactions become known, although this would considerably decrease the number of events that can be exploited.

Furthermore, experts in firm strategy have pointed out that several variables may influence the markets' interpretation of layoff announcements. The following variables are worth mentioning:

- The size of the layoff: *Strong* = 1 when the sample comprises firms which announce a layoff plan involving a large number of workers, and 0 otherwise; *Low* = 1 when the sample comprises firms which announce a layoff plan involving a small number of workers, and 0 otherwise. It must again be noted that different authors adopt different criteria. For example [**ESMS**] or [**HMMW**] divide their initial sample into two parts on the basis of the layoff median rate; others decide on a *ad hoc* specific threshold — 12% for [**CD**] and 10% for [**HMS02]**, for example.
- The fact that there is one or several plans: one might argue that market would react well to action in a first-time redundancy plan, given that most of the time market will be aware of financial difficulties which a firm faces, and will react positively to action, whilst a second or subsequent round of redundancies are normally unexpected events and demonstrate either deteriorating economic conditions or poor management decisions first time, or both. *First* = 1 when the sample comprises firms which announce a layoff plan for the first time, and 0 otherwise; *Second* = 1 when the sample comprises firms which have already announced layoff plans, and 0 otherwise.
- The staff reduction mode: *Voluntary* = 1 when the sample comprises firms for which the percentage of workers' voluntary departures from the firm is high, and 0 otherwise; *No_voluntary* = 1 when the sample comprises firms for which the percentage of workers' voluntary departures from the firm is low or non-existent, and 0 otherwise — e.g. [**MLC**]. The *Temporary* and *Permanent* as well as the *Agreement* and *No_Agreement* variables are added to take account of the temporary or permanent nature of the staff reductions — e.g. [**FH04**], [**Lee**], [**LR**] — and of the existence or absence of an agreement with trade union workers — e.g. [**CD**].
- The type of workers concerned: *White_collar* = 1 when the layoff plan affects a large proportion of the executive workers, and 0 otherwise — e.g. [**CK**] or [**CMSY.**]
- *Closure* = 1 when the staff reduction announcement involves a site closure, and 0 otherwise — [**CK**] [**FH99**] [**FH04**] [**HMMW**] consider sub-samples for the firms concerned.
- *Provisions* = 1 when the firm announces that it is making financial provisions to complement the layoff plan, and 0 otherwise — e.g. [**CK**].

– We also add two extra variables relating not to the redundancies but to the studies. *Dum_WP* = 1 when the study has not been published in a peer-reviewed journal.[12] *Nb_event* is the number of events associated with each observation, as a means to test the existence of any particular bias that may affect the studies covering only few events.

Meta-analysis also requires the estimated standard deviation in addition to the average cumulative abnormal return. Some studies provide: i) the standard deviation directly, ii) the associated t-statistics, iii) just the significativity threshold, iv) no indication at all. For case ii), it is easy to recalculate the standard deviation. For case iii), when results are significant — at a 1%, 5% or 10% threshold — we use the maximum standard deviation compatible with the significativity threshold.[13] In sum, we have, for panel A, the standard deviation associated with 130 $CAAR_{[-1\ ;\ +1]}$ on 165.[14]

5. The financial markets' reaction to layoff announcements

5.1 The overall negative impact of layoff announcements

Layoff announcements have an overall negative impact on the stock price of the firms involved. The main methodological elements and results study by study are given in table A in appendix.

Let us first describe the main results for each study — the vote-counting method. For the time being, only the results for full samples are considered, i.e. combining both reactive and proactive firms. Out of the 41 studies reviewed, the average cumulative abnormal return over a three days period around the announcement ranges from –3.61 for [**CD**] and 1.68% for [**CC**]. In 14 out of 36 cases, the overall effect is significantly negative at a 10% threshold at least. In the other cases, the results are non-significant — or supplied without any further detail. No study comes up with a significantly positive $CAAR_{[-1\ ;+1]}$ for a sample combining reactive and proactive firms.

[12] The majority of observations — 50.9% — are drawn from working papers although they only make up 6 out of the 41 studies reviewed. As a rule, working papers have fewer constraints regarding the number of regressions presented.

[13] This is the case for eight CAAR; these implicit standard deviations are not used in the publication bias tests.

[14] Table D in appendix gives the details of the matrix of crossed correlations between variables. Except for couples Period_80 and Period_90 (= 0.79) as well as Dum_WP and Nb_event (= 0.60), no correlation is over 40% in absolute value. When the model is estimated without the Dum_WP variable, results are the same as those given below. The results can be obtained from the authors.

Let us now consider the overall results from these studies, including those from the sub-samples and let us weight the results with their respective specificities. We here follow the most common approach, namely that which weight each result with the inverse of its variance. Table 1 gives the weighted average of the average cumulative abnormal returns over the three days around the day of the announcement (panel A). This ranges between –0.185% and –0.225% depending on whether one uses an estimation with fixed or random effects for each study. In both cases, the reaction is significantly negative at the 1% level.[15]

Table 1. Weighted average of cumulative abnormal returns following layoff announcements

The average is weighted with the inverse of its variance. The estimate is based on panel A ($CAAR_{[-1\ ;\ +1]}$). Panel A comprises the 165 results from the 27 studies which report $CAARs_{[-1\ ;\ +1}$. See table A for the list of selected studies.

	Weighted average	95% confidence interval Inf.	Sup.	z stat	p value
Fixed effects	-0.185***	-0.212	-0.159	-13.877	0.000
Random effects	-0.225***	-0.279	-0.170	-8.034	0.000

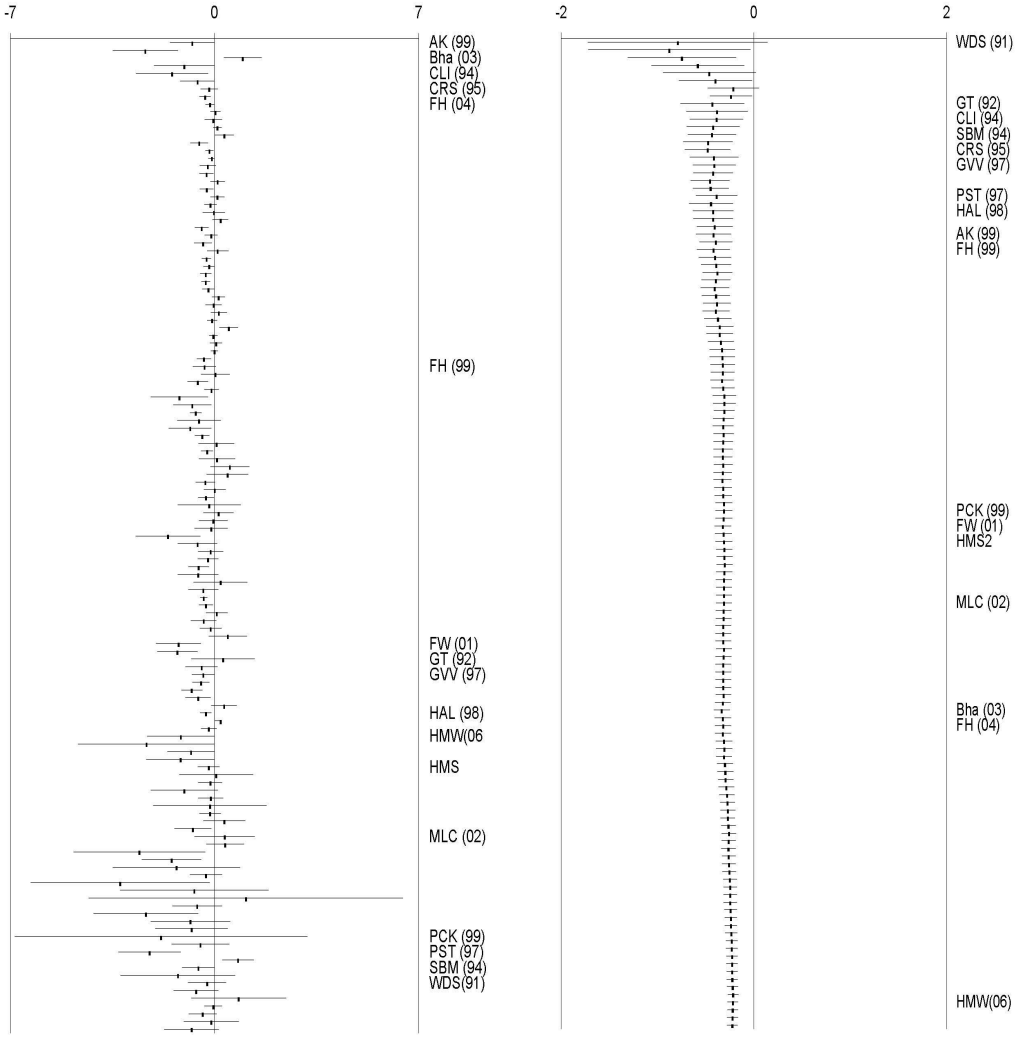
*, **, *** indicate significance at the 10%, 5% and 1% level, respectively.

Figure 1 represents two forest plots. Each corresponds to a $CAAR_{[-1\ ;\ +1]}$ and each line gives the corresponding standard variation. The reference of the study from which the result is drawn is also indicated. Only panel A is considered here. On the left of the figure, the studies are presented individually in alphabetical order. The overall stock markets' reaction to staff reductions is negative. It is significantly positive only in 3 out of 130 cases. More interestingly, the right-hand figure allows for the fine-tuning of the analysis through the different studies' cumulative results in the chronological order of publication with each study being weighted with the inverse of its variance. This cumulative forest plot clearly shows a negative reaction from investors. The studies published after 1999 no longer allow for a reduction in standard variation. However, more recent studies remain most valuable as long as they supply useful results for the understanding of the determinants of market reactions.

[15] The probability density presented in figure A in appendix — where the average abnormal returns are cumulated over a period of a maximum of 20 days around the announcement (so we have enough observations) confirms the previous results and reveals a left asymmetry in CAAR distribution.

Figure 1. *Forest Plot*: Stock market reaction to staff reductions

Each point of the forest plot represents the average cumulative abnormal return around a staff reduction announcement — $CAAR_{[-1\ ;\ +1]}$, panel A — and the line represents the corresponding standard variation. For each study, the reference of the associated paper or working paper is given in the top right-hand corner — See table A for the list of selected studies. They are arranged in alphabetical order on the left-hand side. Figures are arranged by the chronological order of publication in the right-hand side. Each new point corresponds to a new estimate and each study is weighted with the inverse of its variance.



5.2 The determinants of stock market reactions

In table 2, we consider panels A and B. In model (1), which serves as a benchmark, we only use time variables. In model (3) we use all the variables previously established. It is naturally to be expected that only a few of them will have a significant impact. In model (2), we only keep the significant variables, and to do so, we withdraw one by one the non-significant variables from model (3). Our estimates rely on the inclusion of random effects.[16]

The constant, which represents the cumulative average abnormal return on the day of the announcement for the reference category, varies from –0.64% to –1.74%. Yet, whatever the model or panel considered, the effect is significantly negative at a 1% threshold.

Meta-analysis suggests that the average market reaction subsides over time, while always remaining significantly negative. The coefficients associated to variables Period_80 and Period_90 are indeed always positive, with the value of the first always inferior to that of the second. It must be noted that four studies examine more specifically how market reactions evolved over time by considering different sub-periods: the effect is non significant in 1980 just as in 1987 for **[AMH].** For **[CRS]** the impact is non-significant from 1981 to 1983 and from 1984 to 1990, although positive in 1991-1992. **[FH99, FH04]** conclude that investors' reaction is becoming less and less negative, whereas **[MLC]** comes to the opposite conclusion. Our own results confirm those of **[FH99, FH04]**.

[16] The studies included in the meta-analysis are homogeneous — they are consistent both for the protocol and for the analysis method, as emphasized previously. It would then be possible to consider the fixed effects model. However, this would presuppose that there is only one underlying value for the observed effect and that the various results obtained would only be due to random sampling. So we prefer here to estimate random effects models which imply the existence of a population of effects distributed around the average. At any rate, when using the hypothesis of homogeneous studies, the estimation results for the random effects model are similar to that of fixed effects. It has been checked by using extra regressions, not presented here.

Table 2. The determinants of cumulative abnormal returns (meta-regressions)

Panel A comprises the 165 results from the 27 studies which report $CAARs_{[-1\ ;\ +1]}$. Panel B includes panel A, plus the observations associated to $CAARs_{[-1\ ;\ 0]}$ and $CAARs_{[0\ ;+1]}$, which brings the total number of observations to 228. See table A for the list of selected studies.

Panel A	**(1)**		**(2)**		**(3)**	
Constant	-0.637***	(0.202)	-1.252***	(0.204)	-1.467***	(0.234)
Period_80	0.047	(0.222)	0.386**	(0.190)	0.366*	(0.194)
Period_90	0.281	(0.234)	0.641***	(0.195)	0.570***	(0.205)
Proactive			0.721***	(0.171)	0.896***	(0.202)
Reactive			-0.991***	(0.198)	-0.846***	(0.224)
Closure			0.603**	(0.250)	0.771***	(0.266)
First			-0.507**	(0.258)	-0.416	(0.270)
No_voluntary			-0.956**	(0.414)	-0.725*	(0.434)
Provisions			-2.117***	(0.707)	-1.892***	(0.727)
Dum_wp			0.338**	(0.153)	0.306*	(0.164)
Nb_event			0.213**	(0.084)	0.323***	(0.103)
Non_Anglo					0.214	(0.184)
Strong					0.349	(0.288)
Low					0.285	(0.288)
Agreement					0.521	(0.736)
No_Agreement					0.502	(0.736)
Second					0.211	(0.271)
Temporary					0.346	(0.258)
Permanent					0.067	(0.241)
Voluntary					0.691	(0.437)
White_collar					0.325	(0.726)
R^2 adj.	0.017		0.411		0.440	
Nb. Obs. (studies)	165	(27)	165	(27)	165	(27)
Panel B	**(1)**		**(2)**		**(3)**	
Constant	-1.076***	(0.217)	-1.130***	(0.218)	-1.266***	(0.246)
Period_80	0.416**	(0.206)	0.431**	(0.178)	0.413**	(0.176)
Period_90	0.575***	(0.221)	0.582***	(0.190)	0.556***	(0.190)
Proactive			0.692***	(0.142)	0.807***	(0.161)
Reactive			-0.884***	(0.156)	-0.781***	(0.172)
Closure			0.400	(0.337)	0.469	(0.382)
First			-0.318	(0.205)	-0.239	(0.213)
No_voluntary			-0.635	(0.395)	-0.355	(0.402)
Provisions			-1.420**	(0.668)	-1.058	(0.671)
Dum_wp			0.071	(0.278)	0.020	(0.319)
Nb_event			0.060	(0.112)	0.100	(0.118)
Non_Anglo					0.315	(0.327)
Strong					0.158	(0.225)
Low					-0.015	(0.225)
Agreement					0.063	(0.405)
No_Agreement					0.001	(0.350)
Second					0.104	(0.214)
Temporary					0.247	(0.223)
Permanent					0.070	(0.191)
Voluntary					1.032**	(0.403)
White_collar					1.173*	(0.671)
R^2 adj.	0.010		0.284		0.261	
Nb. Obs. (Nb. studies)	228	(34)	228	(34)	228	(34)

*, **, *** indicate significance at the 10%, 5% and 1% level, respectively (standard deviations between parentheses). Regressions are based on the inclusion of random effects.

The type of country considered does not affect market reaction. The Non_Anglo variable is never significant. We have also introduced dummy variables by country, but none of them — taken as a whole or individually — is significant. These results do not confirm those of **[CD]** which is the only study that is based on a sample of firms from many different countries and which gets significant results for Anglo-American countries only. However, these results tend to go the way of a more detailed analysis of our sample. Besides, in Canada **[GVV, UAS]**, in Great-Britain **[Co, HMMW, MLC]** and in Japan **[Lee]**, market reaction to layoff announcements is negative on average and equivalent to that observed in the United States. In France, shareholders do not derive any advantage from staff reductions **[HMS04]**. In South Africa, market reaction is neither systematically positive not systematically negative **[Bha]**.

We have seen, at a theoretical level, that investors may well react very differently to layoff announcements depending on whether the measure is defensive or offensive. Most empirical studies have tried to take account of that possibility by either analyzing market reaction in different sub-samples or by examining the determinants of abnormal returns (see table C in appendix). Unsurprisingly, our meta-regressions confirm that the reasons given by firms or the context play an essential part in investors' reactions. The coefficients associated with the Reactive and Proactive variables are always significant at the 1% threshold. The first is negative — between –0.99% and –0.78% — which clearly shows that firms facing difficulties are more severely sanctioned by shareholders. The second is positive — between 0.69% and 0.90%. In other words, proactive firms — i.e. those which make it known that they intend to restructure and reorganize their firm — are less severely sanctioned.[17] Yet, does that automatically imply that firms with restructuring plans gain from laying off staff? Our studies tend to point to a negative answer. If model (2) and panel A are taken as an example, the average cumulative abnormal return for proactive firms is not significantly positive, whatever the time period.

We have previously been careful to attract attention on the difficulties inherent in creating Proactive and Reactive variables. These results can also be complemented by a qualitative analysis that

[17] It must be noted that all the studies except one (**[IA]**) show that reactive firms — those which resort to redundancies under the pressure of current financial difficulties — suffer from much more markedly reduced stock prices than proactive ones — those which use redundancies as part of more general reorganization strategy.

broadly confirms what has been stated above. Hence, the sanction is more severe when the firm's financial health is perceived as poor. **[WDS]** reveals, for example, that if the announcement occurs at a time when the firm is in financial distress, the cumulative abnormal return reaches –5.6%. By contrast, if the announcement is part of a restructuring and reorganization plan by the firm, the cumulative abnormal return is +3.6% for the reference period. Abnormal returns reach more negative levels when the firm's stock market price has been falling over several periods of time (**[LR]**), since redundancies caused by a fall in demand become more likely and the claim that the firm is seeking improved efficiency less credible.

Some features of staff reductions or the size of the layoff plan do not provide much information on the reasons for the layoffs. Investors remain nevertheless sensitive to such data as they help them to form some opinion as to the extent of the restructuring required or of the difficulties encountered. It is then no wonder that markets sanction more severely a firm's first layoff plan announcement than those that may follow. Accordingly, the coefficient is negative and significant for panel A and yet non-significant for panel B.

When the layoff plan includes the closure of a site or a factory **[SBM, GT]**, or production delocalization **[CDW]**, the firm's stock market price will fall less. With the exception of **[HMMW]**, studies show that market reaction is less severe when firms close down sites — abnormal return is non-significant for **[CMK, GT, SBM]**, the coefficients are non-significant or positive in table C, in appendix for **[CK, CGW, FH04]**. Meta-regressions show a positive and significant coefficient at a 5% threshold for panel A.

Investors are also wary of the announcements of provisions associated with redundancies, since they perceive them as the sign of high anticipated costs. The associated coefficient is negative and significant in panel A.

It is also to be expected that investors will sanction less severely firms that have included many voluntary worker departures in the layoffs plan — see **[MLC]**. The No_voluntary variable is significant and negative for panel A, whereas the Voluntary variable is positive, although only significant for panel B.

All the studies dealing with the topic suggest that staff reduction announcements have a greater impact when they are permanent rather than temporary **[CK, ESMS, FH99, Lee]**, or recurrent rather than exceptional **[GVV, WDS]**. However, these effects are never significant in our regressions.

According to the previous studies, the actual impact of the size of the layoff plan — which is measured as a percentage of the number of workers laid off out of the total payroll, or by the relative size of the plan — remains ambiguous. **[CK, CH, FW, GVV, Lee]** obtain a significantly negative coefficient, whereas **[Co, PCK]** get the opposed sign. The meta-analysis shows that the impact is in fact non-significant.

Among all these studies, **[CK]** must be considered separately because of the number of variables studied — presence of an agreement with a workers' trade union or not, redundancies affecting white-collar workers or not, etc. We have included these variables in our meta-analysis, yet it must be added that they are used in a few studies only. For **[CK]**, the impact of redundancies is more negative when blue-collar workers are hit than when white-collar workers are affected. It may come from the fact that efficiency gains are higher when the reorganization of clerical tasks is at stake rather than of production. When one considers the aggregate result of several sub-samples of firms, the effect is not significant — except for Model 3, panel B and at a 10% threshold only. Surprisingly, the impact of the existence of a deal between the firm and the trade unions is again, non-significant.

Other variables could not be included in our meta-regressions, most often because they are used by too few studies and/ or because the samples considered are too small. A qualitative review of the effects then becomes necessary.

- Markets react differently depending on whether the firm has a new leader — the reaction is more negative when firms have not changed leaders recently **[CH, CMSY]**. More precisely, the impact of the layoff announcements is significantly positive when the leader comes from outside the firm, non-significant when the new leader is an insider and negative when firms have kept the same leaders **[CH]**. It is indeed more likely that a recently appointed leader from outside the firm will find it easier to carry out extensive restructuring than a leader that has been entangled in the firm's problems for a longer period…

- The impact of redundancies is not as strongly negative in the case of capital-intensive manufacturing firms as it is for services firms whose value added is closely reliant on human capital **[ESMS]**.

- One may wonder whether a layoff plan by a given firm creates a transfer effect that benefits its competitors, or conversely, if it sends the markets a negative signal regarding the whole sector's growth opportunities. The results seem to be contradictory. The transfer effect is broadly negative for **[ST]** while positive for **[MAB] —** which studied the US banking sector — but non-significant for Bhabra, Bhabra and Boyle (2004). Yet the latter add that, when the layoff announcement is accompanied by the mention of losses incurred by the firm, the stock market capitalization of all the firms in the same sector falls significantly, whereas it increases significantly in the opposite case.[18]

- The financial markets' reaction also depends on economic prospects. Firms which dismiss workers in times of economic recession are more severely sanctioned by the market than firms which lay off staff in a period of economic growth **[Bha, ESMS, Lee, PST, GVV]**.[19]

We can close this presentation by adding that the characteristics proper to the studies themselves also seem to play a part. The Dum_WP and Nb_event variables are significant for panel A, yet not for panel B. This calls for a rigorous examination of the existence of a selection (or publication) bias.[20]

[18] In a rather counterintuitive manner, **[ESMS]** finds that investors tend to react more severely to redundancy announcements in the context of high performance by the firms relative to their sector. The authors explain that the announcements give the markets negative and unanticipated information regarding the hitherto overvalued growth opportunities for these firms. Conversely, redundancy announcements issued by firms viewed as poor performers would be rather perceived by markets as good news in so far as that may lead to reorganization and hence improved results. This explanation is however not totally convincing.

[19] Similarly, at macro-economic level, Boyd, Hu and Jagannathan (2005) show that worsening unemployment figures is considered by investors as rather good news in a favourable economic context and as bad news in times of economic stagnation.

[20] To test the robustness of our results, we first check that the average result is not derived from a single study. We estimate the investors' average reaction in a sample from which each individual study is gradually withdrawn. The examination of this forest plot in figure B in appendix shows that such is not the case. We present also results for three extra panels, where the CAAR are calculated for intervals [-10; +1], [-1; +10] and [-10; +10]. As the CAAR are calculated for a large diversity of intervals, we have systematically recalculated the daily abnormal returns by dividing the cumulative abnormal returns by the number of corresponding days. Moreover, we add another two exogenous variables: one for the first day used in the CAAR calculation and one for the interval length. Specific characteristics of the layoff plan — size, percentage of voluntary departures etc. — are no longer significant. By contrast, the time variables and the reasons for the plan — either proactive or reactive —are significant and have the expected algebraic sign. Results are provided in table E in appendix.

5.4 Selection bias

Given the delicate nature of our topic, it is interesting to establish the possibility of any selection bias. Selection biases may arise for various reasons (Stanley, 2005): it is easier to publish a study presenting significant results that confirm previous works, approve of the dominant trend or benefit from a high reputation effect etc. One usually makes the distinction between two types of selection bias: asymmetry (type I) and variation excess (type II).

5.4.1 Type I and type II selection bias

A graph is usually the simplest — and the most commonly used — method to detect the possibility of a selection bias. A funnel plot must be built with the effect value on the x-axis — in our case, the CAAR resulting from a staff reduction announcement — and a precision indicator on the y-axis — we use here the inverse of the standard variation associated to the CAAR. In the absence of a type I selection bias, the points on the graph must form a cloud of symmetrical points. If they do not, it shows that authors, publishers, referees etc. tend to favour results that point in a specific direction. Figure 2a represents the funnel plot built from panel A (the straight vertical line represents the average value, weighted with the inverse of the variance). The shape is weakly skewed rather asymmetrically to the left, which suggests the presence of a type I selection bias favouring a negative reaction to layoff plans on the part of investors.

In the absence of a type II selection bias, there should be no link between the coefficient given by a study and its standard variation. Conversely, in the presence of a selection bias, the published studies that have used only limited samples and which hence, have obviously wider standard variations must post higher coefficients in absolute value so as to make up for this situation — these higher coefficients can be obtained from the modification of the model's specification, for example.

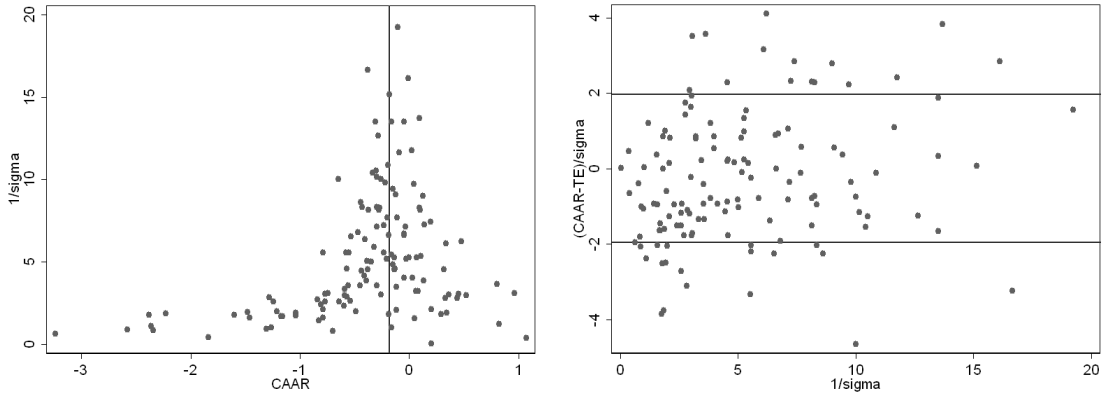
Like Stanley (2005), we use a Galbraith plot in order to detect the possibility of any variation excess. We no longer plot the observed effects values but instead, those of the reduced centred values: $(CAAR_i - TE) / \sigma_i$. where TE represents the « true » effect value, measured as the average weighted with the inverse of the variance with fixed effects, namely TE = -0.185.

In the absence of a type II selection bias, the absolute values must not be over 1.96 in more than 5% of cases. Yet, for panel A, these absolute values go over the 1.96 threshold in 33 out of 122 cases, which is way off the expected figure — see figure 2b. It therefore appears that for our topic, same as for very many others, the studies with significant results (one way or the other) tend to be over-represented.

Practical as they may be, these figures are subject to divergent interpretations. A more rigorous method of dealing with selection biases requires the use of econometric tests, such as FAT (funnel asymmetry test) and FAIVEHR (funnel asymmetry instrumental variable estimator heteroscedasticity robust).

Figure 2. Selection bias

The estimate is based on $CAAR_{[-1\ ;\ +1]}$ (panel A). See table A for the list of selected studies.



a) Funnel plot *b) Galbraith plot*

5.4.2 Meta-regressions and selection bias

Egger *et al.* (1997) propose a selection bias test based on the following econometric regression:

$$CAAR_i = \beta_1 + \beta_2\ \sigma_i + \varepsilon_i,$$

where $CAAR_i$ is the cumulative abnormal return for observation *i* and σ_i the associated standard variation. Since the explanatory variable in the equation is the standard variation, a heteroscedasticity problem arises. According to Stanley (2005), the problem can be solved by dividing the equation by the standard variation, which gives the following FAT equation:

$$t\text{-}stat_i = \beta_1\ (1\ /\ \sigma_i\ ) + \beta_2 + e_i \qquad (1)$$

This equation can be estimated by OLS. In the presence of selection bias, β_2 is significantly different from zero and its algebric sign indicates the bias direction.

The robust estimate can be obtained by instrumenting $(1 / \sigma_i)$ with the square root of the number of observations (the correlation is equal to 85% for our sample) and by using the White estimator. This gives the FAIVEHR equation.

For a more specific account of the type II selection bias (variation excess, without any *a priori* direction), the absolute value of the t-stat can be used as an endogenous variable as opposed to the t-stat value. In our case, if a selection bias exists, it can move both ways. Authors are indeed, *a priori*, as much tempted by results showing the investors' negative reaction — when firms are thought as reactive — as by results showing a positive reaction – when firms are thought as proactive. The following equation can then be tested:

$$| \text{t-stat}_i | = \beta_1 (1 / \sigma_i) + \beta_2 + u_i, \qquad (2)$$

In equation (1), the implicit hypothesis is that the « true » effect value is unique. In the absence of selection bias, $CAAR_i$ is only equal to β_1 (average effect) plus sampling hazard. Yet in the previous part, we highlighted a certain number of factors that influence significantly the markets' reaction to staff reduction announcements. Among other findings, we showed that the sample comprising reactive firms produced a different effect from that of the sample comprising proactive firms. Thus, it is possible to consider a third equation to which the Reactive and Proactive dummy variables are added.[21]

$$CAAR_i = \beta_1 + \beta_2 \sigma_i + \beta_3 \text{ Reactive} + \beta_4 \text{ Proactive} + \zeta_i,$$

This equation can be modified like (1) and the model to be estimated now becomes:

$$\text{t-stat}_i = \beta_1 (1 / \sigma_i) + \beta_2 + \beta_3 \text{ Reactive} + \beta_4 \text{ Proactive} + f_i, \qquad (3)$$

The results for these various estimates are presented in table 3 (only the studies in panel A that supply a standard deviation – that is 122 observations – are considered).

[21] The qualitative results are no different, when the other explanatory variables considered in the previous part are also added.

Table 3. Meta-regressions and selection bias

Model	Estimate	$\hat{\beta}_1$	$\hat{\beta}_2$	R^2
Eq. (1)	**FAT**	-0.104*** (0.039)	-0.631*** (0.266)	0.055
	FAIVEHR	-0.074 (0.075)	-0.796*** (0.296)	0.050
Eq. (2)	**FAT**	0.089*** (0.028)	1.216*** (0.189)	0.077
	FAIVEHR	0.075 (0.060)	1.294*** (0.335)	0.075
Eq. (3)	**FAT**	-0.089** (0.038)	-0.801*** (0.284)	0.231
	FAIVEHR	-0.048 (0.071)	-1.060*** (0.289)	0.224

FAT: *heteroscedasticity-consistent standard errors*. FAIVEHR: *heteroscedasticity-robust standard errors*. *, **, *** indicate significance at the 10%, 5% and 1% level, respectively (t-stats are between parentheses).

Whatever the model, constant $\hat{\beta}_2$ is statistically significant at the 1% threshold. It can therefore be concluded to the presence of a very clear bias towards the studies whose results are significant, which confirms the Galbraith plot. Besides, as the algebraic sign is negative in equations (1) and (3), the bias is towards obtaining results indicating a negative reaction to staff reduction announcements from the financial markets.

The average effect of $\hat{\beta}_1$ is significant and negative at the 5% threshold in the case of the FAT estimate, yet non-significant with FAIVEHR. In other words, once the selection bias has been corrected, it is not certain that, on average, layoffs announcements have any impact on the firms' market value. But, following Stanley (2005), estimates corrected from the selection bias are a delicate issue, and additional tests are needed to assess the existence of such an effect. The first one consists in using the coefficients estimated in equation (1) to correct the t-stats from the selection bias. The corrected t-stat values are then regressed on the inverse of the variance:

$$\text{t-stat}_i^c = \delta\,(1 / \sigma_i) + \varsigma_i,$$

A coefficient significantly different from zero shows that there is a genuine impact, as is the case here: 0.119 with a 0.043 standard variation.

As shown by Card and Krueger[22], the second test consists in regressing the log of the t-stat absolute value on the logarithm of the degree of freedom or of the number of observations:

$$\ln | \text{t-stat}_i | = \alpha_1 + \alpha_2 \ln (n) + \eta_i,$$

The law of large numbers indeed suggests that the absolute value of the test statistic increases with the number of observations. In the absence of selection bias, a significantly positive coefficient can be expected. According to this test, there exists an effect of layoff announcements on the firms' market value: coefficient α_2 is significantly different from zero at the 10% threshold — 0.115 with a 0.065 standard variation.

To sum up, the studies on the financial markets' reaction to layoffs announcements suffer from the selection biases mentioned — i.e. Types I and II. But it remains true that the financial markets' reaction is significant and negative, even after selection biases have been included and corrected.

6. Conclusion

The theoretical chain that connects redundancies and stock market prices is a complex structure, without any *a priori* determined effect. Our results show that, contrary to a widely received idea, layoffs announcements have an overall negative effect on stock market prices, and this remains true whatever the country, the period of time or the type of firm considered. However, some factors may ease as well as worsen the stock market's reaction to such announcements. The reason for the layoff decision is among the most decisive factors and the market sanction will be more severe in the case of defensive layoffs (taken by firms facing difficulties) than for offensive layoffs (when they are part of a more general reorganization strategy on the part of the firm).

It demands that investors be convinced that the layoff measures form an integral part of a more global strategy, that they are dictated by a reorganization program and are not just the sign of mere financial distress. Moreover, even when the firm vows to adopt a consistent and proactive policy, redundancies can be interpreted as evidence of unsuspected difficulties or lacklustre ambition and the

[22] Card and Krueger (1995) also recommend that only one estimate per study be considered — they call it the "preferred" estimate. It is indeed likely that, in the presence of a selection bias, only the most pregnant results are affected. We applied this approach and selected for each study the estimate relating to the most complete sample. Theses results are available on demand, yet they do not change our conclusions.

sheer admission it entirely lacks any sense direction. The financial markets' short-term reactions therefore constitute by no means a reflexive decision and the reasons for the layoffs remain, by contrast, most determinant.

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The codes in brackets refer to the summary tables and to the commentary.

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APPENDIX

Table A. Average cumulative abnormal returns after staff reductions

The table gives a summary of results of the events studies relating to the impact of staff reductions on stock market prices. The codes in the first column refer to the papers referenced in the bibliography. The second column gives the details concerning the selected sample: number of layoff announcements, when not stated otherwise (number of firms) {country, time period}. The third column gives the source for the staff reduction announcements (WSJ: *Wall Street Journal*, FT: *Financial Times*). The fourth column gives the number of sub-samples selected. The fifth column presents the CAAR[–1 ; +1] of the main estimate for each study and, in brackets, the associated standard variation or the test statistic. The last three columns present several other CAARs for the period given between brackets (the 0 date corresponds to the day of the announcement).

Study	Sample	Source for the event	#	CAAR % [-1; +1]	Other CAAR % [start; end]		
					end ≤ 0	end ≤ +10	end > +10
AK 2004	368 {U.S., 93-94}	WSJ. LexisNexis	1	0.77 (na)	–0.35 [–10; –1]	0.28 [0; +10] 0.65* [–10; +5]	
AMH 1990	87 (154) {U.S., 80}	WSJ	2	–0.55 (na)	–0.74 [–10; –3]	–0.86 [0; +2]	
	88 (102) {U.S., 87}		2	–0.15 (na)	–0.66 [–10; –3]	0.72 [0; +2]	
BCR 2005	311 {U.S., 93-99}	WSJ	1		0.80*** [–5; 0] 0.43*** [–1; 0]		
BMS 1990	286 *plant closures* {U.S., 80-84}	WSJ		–0.7 (na)			
Bha 2002	88 (88) {S. Africa, 80-97}	Reuters	1[a)]	–2.38*** (stat = -4.22)	–1.93*** [–1; 0]	–2.27* [–1; +10]	
			1[b)]	0.96*** (stat = 2.95)	0.74*** [–1; 0]	0.33 [–1; +10]	
BR 1998	64 (64) {U.S., 80-91}	WSJ. LexisNexis	1			–0.75*** [0]	6.87** [+1; +90] 12.12** [+1; +262] 25.00*** [+1; +500]
CC 2002	656 (365) {E.-U., 93-95}	WSJ. Challenger	2[a)]	–0.05 (na)	–0.14 [0]		
			2[b)]	1.68 (na)	0.71*** [0]		
CD 2001	336 {13 OECD, 00-01}	FT	27	–3.1 (na)	–1.8*** [–10; –3]	–3.6*** [–2; +2]	–4.7*** [–10; +10]
	247 {Anglo-Am.}		1		–2.7*** [–10; –3]	–4.4*** [–2; +2]	–6.7*** [–10; +10]
	89 {non Anglo-Am.}		1		–0.7 [–10; –3]	–1.5 [–2; +2]	0.9 [–10; +10]
CH 2002	380 (331) {U.S., 90-96}	WSJ	11		–1.00 [–1; 0]		
CK 1993	513 {U.S., 87-91}	WSJ	19	–0.88 (na)	–1.65** [–2; 0]	–0.45 [0; +3]	
Cli 1994	98 *plant closures* {U.S., 80-88}	WSJ	2[c)]	–1.04*** (stat = -2.4)	–0.32 [–5; 0]	–0.39* [0]	–0.46 [–5; +5]
CMK 1993	65 *plant closures* {U.S., 80-92(?)}	WSJ	1	–0.45 (na)	0.48 [–5; –1]	0.04 [+1; +5]	

Study	Sample	Source for the event	#	CAAR % [-1; +1]	Other CAAR % [start; end]		
					end ≤ 0	end ≤ +10	end > +10
CMSY 2001	349 (302) {U.S., 90-95}	WSJ	1		–17*** [–250; –2] –1.2*** [–1; 0]		[1; 250] 0.2
Co 2002	54 {G.-B., 90-99}	Extel. FT	4		–3.4** [–30; –1]	1.43*** [0; +1]	–0.43 [2; +30]
CRS 1995	35 {U.S., 81-83}	WSJ	1	–1.46 (na)		–1.21* [0; +1]	–2.70 [–10; +10]
	56 {U.S., 84-90}		1	–0.59 (na)		–0.76* [0; +1]	–3.06** [–10; +10]
	140 {U.S., 91-92}		1	0.12 (na)		0.38** [0; +1]	0.85 [–10; +10]
DID 1996	228 {U.S., 89-91}	WSJ	1		–1.3 [–1; 0]		
ESMS 1998	646 {U.S. 79-91}	WSJ	32	0.70 (na)	–1.42*** [–20; –2] –0.64*** [–1. 0]		0.51 [+2; +20]
FCD 1998	347 {U.S. 78-92}	WSJ	7		–6.29*** [–90; –2] –0.80*** [–1; 0]	–1.01*** [–5; +5]	4.19*** [+1; +90]
FH99 1999	3,878 (1,176) {U.S., 70-97}	WSJ	22	–0.38*** (0.06)			
	1,503 {U.S., 70-79}		22	–0.65*** (0.10)			
	1,491 {U.S., 80-89}		22	–0.26 ** (0.10)			
	884 {U.S., 90-97}		22	–0.11 (0.13)			
FH04 2004	4,273 (1,160) {U.S., 70-99}	WSJ	12	–0.10** (0.05)			
	1,529 {U.S., 70-79}		12	–0.28*** (0.08)			
	1,533 {U.S., 80-89}		12	–0.09 (0.09)			
	1,211 {U.S., 90-99}		12	0.12 (0.11)			
FW 2001	366 (366) {U.S., 90-97}	WSJ	1	–1.24*** (0.39)	0.38 [–10; –2]	0.84** [+2; +10]	
GT 1992	282 *plant closures* {U.S., 80-86}	WSJ	12	–0.45 (stat = -1.6)	0.11 [–10; –2] –0.58*** [–1; 0]	0.45 [+1; +10]	
GVV 1997	214 (84) {Can., 82-89}	CBCA	11	–0.47*** (stat = -3.17)	0.43 [–20; –2]		–0.18 [+2; +20]
Hal 1998	1,287 {U.S., 87-95}	WSJ	3	–0.3*** (stat = 3.04)	0.2 [–5; 0]	–0.5*** [0; +5]	–0.7*** [–10; +10]
HMMW 2006	332 (175) {G.B., 90-00}	FT. LexisNexis	10	–0.81** (na)	–9.49*** [–250; 0]		
HMS01 2001	142 {France, 92-98}	Les Echos. La Tribune	1[a)]	–0.44** (na)			
			1[b)]	0.21** (na)			

Study	Sample	Source for the event	#	CAAR % [-1; +1]	Other CAAR % [start; end]		
					end ≤ 0	end ≤ +10	end > +10
HMS04 2004	208 {France, 92-01}	Les Echos. La Tribune	17	–0.16 (stat = -0.87)	–0.06 [–1; 0]	0.44 [+2; +10]	
IA 1997	37 (37) {U.S., 85-90}	WSJ	3		–1.86*** [–5; 0] –0.77** [–1; 0]		
IS 1995	187 {U.S., 86-89}	WSJ	5		–0.3** [–1; 0]		
KHW 1994	132 *plant closures* {U.S., 84-87}	WSJ	2		–0.46 [0]		
Lee 1997	300 {U.S., 90-94} 58 {Jap., 90-94}	WSJ Japanese press	14 7			–1.78*** [–2; +2] –0.56** [–2; +2]	
LR 1993	1,038 (420) {U.S., 78-85}	WSJ	9[d)]	–1.56 (na)	–11.93*** [–200; 0] –0.85*** [–1; 0]		–5.61** [+1; +60]
MAB 1995	48 (48 banks) {U.S., 84-92}	LexisNexis. WSJ	8		0.01 [–5; –2] –0.88** [0]	0.09 [+1; +5]	
MLC 2002	88 {G.-B., 80-84} 147 {G.-B., 90-95}	The Times	7 7	–0.79 (stat = -1.25) –1.48*** (stat = 2.86)		–1.40** [–2; +2] –2.05*** [–2; +2]	
PCK 1999	170 {U.S., 89-93}	WSJ	1	–0.49* (stat = 0.97)	–7.23** [–50; 0] –1.09** [–1; 0]	–0.07 [+2; +10]	–0.99 [+2; +20]
PST 1997	140 {U.S., 82-90}	NY Times. WSJ	2[a)] 2[b)]	–2.23*** (stat = -4.10) 0.80*** (stat = 2.90)	–1.82*** [–1; 0] 0.60*** [–1; 0]	–2.12* [–1; +10] 0.28 [–1; +10]	
RF 1999	59 {G.-B., 94-97}	McCarthy	1[a)] 1[b)]	–0.01 (na) 1.35 (na)	–5.37 [–60; 0] 0.30 [–60; 0]	0.24 [+1; +10] 0.77 [+1; +10]	–1.73 [0; +60] –4.50 [0; +60]
SBM 1994	193 *plant closures* {U.S., 80-87}	WSJ	1	–0.56** (-2.00)		–0.49** [0; +1]	
ST 1998	144 (94) U.S., 82-90}	WSJ	2		–1.13*** [–1; 0]		
UAS 1995	137 (57) {Can., 89-92}	Globe & Mail	8		–0.60** [0]		
WDS 1991	194 {U.S., 79-87}	WSJ	10	–0.41* (stat = -1.70)	–0.45*** [–1] –2.15 [–90; –5]	–1.42*** [–5; +5]	0.96 [+1; +90]

*, **, *** indicate significance at the 10%, 5% and 1% level, respectively. na: not available. [a)] Reactive; [b)] Proactive; [c)] Notice Time Periods Greater than 60 Days; [d)] Permanent layoffs (salaried labor).

Table B. Descriptive statistics for the sample (Panels A and B)

Panel A comprises the 165 results from the 27 studies which report $CAARs_{[-1\ ;\ +1]}$. The standard deviation is only supplied for 130 observations. Panel B is built in the same way as panel A, with the addition of the observations associated to $CAARs_{[-1\ ;\ 0]}$ and $CAARs_{[0\ ;+1]}$, which brings the total number of observations to 228.

	Panel A: $CAAR_{[-1\ ;\ +1]}$				**Panel B**			
	Average	S.D.	Min	Max	Average	S.D.	Min	Max
CAAR	-0.516	0.883	-6.164	1.680	-0.522	0.882	-6.164	1.680
σ(CAAR)	0.526	1.958	0.052	22.222	0.969	7.010	0	95
Period_80	0.545	0.499	0	1	0.531	0.500	0	1
Period_90	0.339	0.475	0	1	0.386	0.488	0	1
Non_Anglo	0.170	0.377	0	1	0.211	0.409	0	1
Proactive	0.133	0.341	0	1	0.132	0.339	0	1
Reactive	0.091	0.288	0	1	0.105	0.308	0	1
Strong	0.048	0.215	0	1	0.048	0.215	0	1
Low	0.048	0.215	0	1	0.048	0.215	0	1
First	0.048	0.215	0	1	0.048	0.215	0	1
Second	0.048	0.215	0	1	0.048	0.215	0	1
Voluntary	0.018	0.134	0	1	0.013	0.114	0	1
Force_depart	0.018	0.134	0	1	0.013	0.114	0	1
Temporary	0.067	0.250	0	1	0.061	0.241	0	1
Permanent	0.073	0.260	0	1	0.110	0.313	0	1
Agreement	0.006	0.078	0	1	0.013	0.114	0	1
No_Agreement	0.006	0.078	0	1	0.018	0.132	0	1
White_collar	0.006	0.078	0	1	0.004	0.066	0	1
Closure	0.055	0.228	0	1	0.044	0.205	0	1
Provisions	0.006	0.078	0	1	0.004	0.066	0	1
Dum_WP	0.509	0.501	0	1	0.386	0.488	0	1
Nb_event	710	898	12	4,273	558	806	11	4,273

Table C. The determinants of stock market prices' reaction to a layoff announcement

	CC	**CGW**	**CH**	**CK**	**CMSY**	**Co**	**FH04**	**FW**	**HMMW**	**Lee** [b)]	**MLC** [c)]	**PCK**	**SBM** [d)]	**ST**
Nb. obs	250	447	380	512	349	50	4,273	294	318	223	147	136	193	371
Dep. variable. [a)]	[–1;+1]	[0;+1]	[0;+1]	[–2;0]	[0;+1]	[0;+1]	[–1;+1]	[–1;0]	[–1;+1]	[–2;+2]	[–2;+2]	[–1;0]	[–1;+1]	[–1;0]
Constant	0.016	0.02	–0.029*	–0.011**	–0.010	–0.005	–0.876**	–3.856**	–0.010	–0.02	0.02	n a.	-0.392.	–0.002
Size of the firm	–0.002		0.006***			–0.006*		0.560***	0.057			0.39**	-0.046	0.018
Reasons														
Proactive				0.009	0.0006		0.505***			–0.02**	0.04**			
Profit increase					0.0005									
Reactive		–2.36**	–0.023***	0.043**	–0.0213**	–0.011		–0.002	–0.020**			0.16*		
Cost reduction		1.90**			0.0052		0.257*		0.008					
Site closure		–0.08		0.010			0.354*		–0.018**					
Corporate office delocalization		0.74												
Site grouping		–1.64**												
Fusion				–0.004	–0.0060				–0.001					
CEO change			0.018***		0.0195**									
Modes														
% of dismised staff	–0.005		–0.087**	–0.182**	0.0314	0.0147*		–0.0955***		–0.11		0.16*	-10.5***	–0.001
(% of dismissed staff)²										–0.79**				
% of redund. > to the average							–0.203							
Voluntary departures				0.011							0.03*			
Temporary redundancies				–0.005			0.230			0.01				
White collars' layoffs				0.011*	0.0120									
Divers														
Provisions for layoffs.				–0.04										
Book to market ratio						0.000								
R^2	0.007	0.055	0.155	0.075	0.023	0.04	0.011	0.057	0.025	0.09	0.07	0.21	0.055	0.04

*, **, *** indicate significance at the 10%, 5% and 1% level, respectively. All models except **[CH]** (MCG) are based on ordinary least squares. Some variables have been omitted. [a)]: The explanatory variables are all CAARs. [b)]: Results have been reported for the United States only. [c)]: The results have been reported for 1990-1995. [d)]: Although the $CAAR_{[-5\ ;+5]}$ results have not been reported, the results are close.

Table D. Correlations matrix

	CAAR	Period_80	Period_90	Proactive	Reactive	First	Force_depart	Voluntary	Povisions	Dum_wp	Non_Anglo	Strong	Low	Agreement	No_Agreement	Second	Temporary	Permanent	Closure	Whie_collar
Period_80	-0.09	1.00																		
Period_90	0.13	-0.79	1.00																	
Proactive	0.28	0.04	-0.02	1.00																
Reactive	-0.34	-0.01	0.04	-0.06	1.00															
First	-0.08	-0.08	0.08	-0.09	-0.07	1.00														
Force_depart	-0.18	0.03	0.00	-0.05	-0.04	-0.03	1.00													
Voluntary	0.03	0.03	0.00	-0.05	-0.04	-0.03	-0.02	1.00												
Povisions	-0.22	0.07	-0.06	-0.03	-0.03	-0.02	-0.01	-0.01	1.00											
Dum_wp	0.27	-0.24	0.01	-0.01	-0.03	0.05	-0.14	-0.14	-0.08	1.00										
Non_Anglo	0.03	-0.27	0.39	0.06	0.14	0.05	-0.06	-0.06	-0.04	-0.11	1.00									
Strong	0.04	-0.02	0.02	-0.09	-0.07	-0.05	-0.03	-0.03	-0.02	0.05	0.12	1.00								
Low	0.03	-0.02	0.02	-0.09	-0.07	-0.05	-0.03	-0.03	-0.02	0.05	0.12	-0.05	1.00							
Agreement	0.03	-0.09	0.11	-0.03	-0.03	-0.02	-0.01	-0.01	-0.01	-0.08	0.17	-0.02	-0.02	1.00						
No_Agreement	0.03	-0.09	0.11	-0.03	-0.03	-0.02	-0.01	-0.01	-0.01	-0.08	0.17	-0.02	-0.02	-0.01	1.00					
Second	0.07	-0.08	0.08	-0.09	-0.07	-0.05	-0.03	-0.03	-0.02	0.05	0.05	-0.05	-0.05	-0.02	-0.02	1.00				
Temporary	-0.02	0.10	-0.09	-0.11	-0.09	-0.06	-0.04	-0.04	-0.02	-0.08	-0.12	-0.06	-0.06	-0.02	-0.02	-0.06	1.00			
Permanent	-0.08	0.12	-0.10	-0.11	-0.09	-0.06	-0.04	-0.04	-0.02	-0.10	-0.13	-0.06	-0.06	-0.02	-0.02	-0.06	-0.08	1.00		
Closure	0.08	0.06	0.00	0.06	0.11	-0.05	-0.03	-0.03	-0.02	-0.25	-0.11	-0.05	-0.05	-0.02	-0.02	-0.05	-0.06	-0.07	1.00	
White_collar	-0.02	0.07	-0.06	-0.03	-0.03	-0.02	-0.01	-0.01	-0.01	-0.08	-0.04	-0.02	-0.02	-0.01	-0.01	-0.02	-0.02	-0.02	-0.02	1.00
Nb_event	0.26	-0.03	-0.13	-0.23	-0.19	0.13	-0.08	-0.10	-0.05	0.60	-0.30	-0.10	-0.10	-0.06	-0.05	0.08	-0.15	-0.07	-0.16	-0.05

Figure A. Cumulative abnormal returns density

The figure represents the average abnormal returns density cumulated over a period of a maximum of 20 days around the announcement. See Table A for the list of the selected studies.

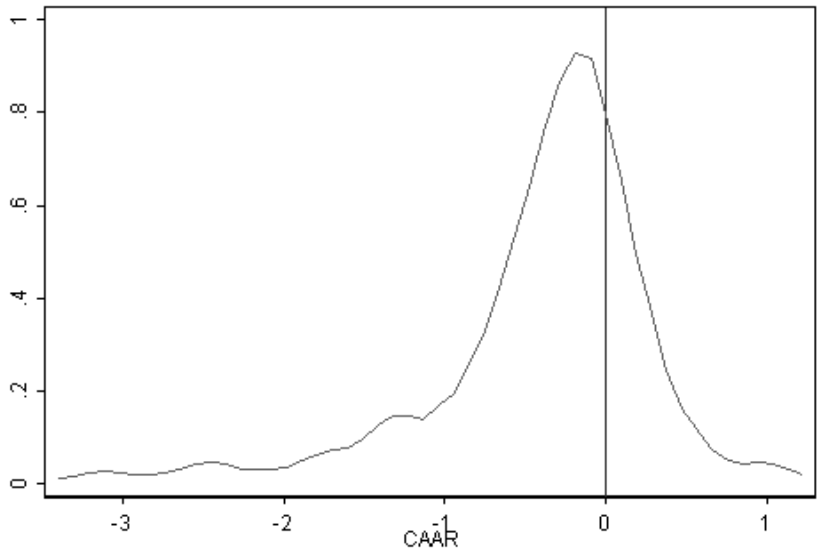

Figure B. Influence analysis

This forest plot represents the estimates and associated standard deviations for 121 cumulative observations out of 122 — each study is weighted with the inverse of its variance, i.e. each estimate is based on the total sample of observations minus one. The missing observation is referenced on the right hand-side. See figure 1 for individual results and table A for the list of selected studies.

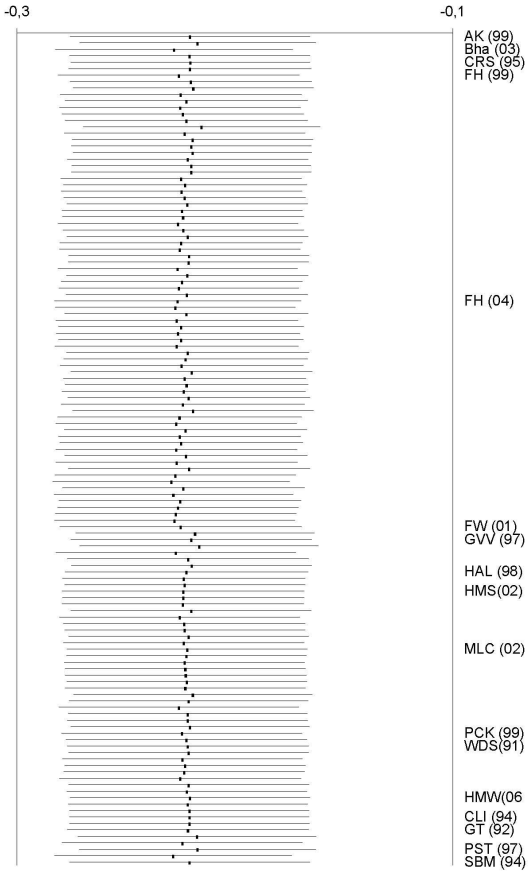

Table E. Robustness tests (meta-regressions)

This table presents meta-regressions results for three extra panels. For panels C, D and E the CAAR are calculated for intervals [-10; +1], [-1; +10] and [-10; +10], respectively. As the CAAR are calculated for a large diversity of intervals, we have systematically recalculated the daily abnormal returns by dividing the cumulative abnormal returns by the number of corresponding days.

Panels	**C**		**D**		**E**	
Constant	-0.551***	(0.175)	-0.753***	(0.188)	-0.591***	(0.150)
Period_80	0.177	(0.119)	0.182	(0.120)	0.195*	(0.106)
Period_90	0.255**	(0.128)	0.271**	(0.130)	0.222**	(0.111)
Proactive	0.371***	(0.092)	0.419***	(0.094)	0.309***	(0.066)
Reactive	-0.510***	(0.100)	-0.547***	(0.103)	-0.384***	(0.072)
First	-0.138	(0.131)	-0.145	(0.139)	-0.186**	(0.086)
No_voluntary	-0.298	(0.265)	-0.298	(0.267)	-0.174	(0.127)
Provisions	-0.673	(0.448)	-0.671	(0.453)	-0.661	(0.404)
Dum_wp	0.134	(0.228)	0.078	(0.226)	0.100	(0.223)
Closure	0.267	(0.274)	0.242	(0.276)	0.206	(0.270)
Nb_event	0.020	(0.076)	0.021	(0.077)	-0.002	(0.066)
CAAR_day1	0.104*	(0.056)	-0.012	(0.058)	0.015	(0.009)
CAAR_length	0.023	(0.020)	0.071	(0.092)	0.028***	(0.006)
R^2 adj.	0.275		0.244		0.204	
Nb.Obs. (studies)	266	(35)	258	(35)	434	(35)

*, **, *** indicate significance at the 10%, 5% and 1% level, respectively (standard variations are in brackets). The regression is based on the inclusion of random effects. See Table A for the list of selected studies.