

HOW DO SHAREHOLDERS RESPOND TO DOWNSIZING? A META-ANALYSIS

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Massive layoffs announcements often attract extensive media coverage. Beyond the newsworthiness of such events, is such a decision in any way correlated to the company's stock market performance? Do some firms resort to massive layoffs simply to please shareholders? In this paper, we offer a thorough review of the literature in an attempt to answer these questions. The core of the paper is a meta-analysis. We show that 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).

Key words: Massive layoffs, Downsizing, Corporate Social Responsibility, Socially Responsible Investing, Corporate Governance, Event studies

1. Introduction

Massive layoffs announcements often make newspapers headlines and trigger off heated debates which are frequently tainted with ideological considerations. Company managers, more particularly, often stand accused of carrying out redundancies where it has no economic necessity. Massive layoffs are more readily accepted when companies post poor results which call the firm's own survival into question. However, it is a totally different story when a firm displays all the signs of good health. It nevertheless remains true that companies tend to turn more and more regularly to redundancy plans as the first step in their downsizing policies (Baumol, Blinder and Wolf, 2003; Farber, 2003). Some will then accuse company 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. Yet, that is a judgment which runs contrary to all economic logic because it implies that shareholders are mere myopic, if not blind, agents who disregard all economic fundamentals when they assess a firm's future prospects.

Over the past twenty years, more than forty empirical studies have looked into the impact of massive layoffs on companies' market value. Those studies cover about 15,000 layoffs announcements over the 1970-2001 period in over a dozen industrialized countries. The method adopted is always that of event studies. 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) as well as others conclude to a negative market reaction, whereas Chatrah, Ramchander and Song (1995) or even Palmon, Sun and Tang (1997) come to the exactly opposite conclusion. It must be added that a large number of authors point out that market reaction can differ widely depending on which country, period of time or economic situation, etc. is considered. It is then difficult to form an accurate opinion.

This paper resorts to meta-analysis to summarize all the empirical studies. Although meta-analysis is as yet relatively rarely used in economics and management science, this synthesizing quantitative method of reading the existing literature can yield most fruitful results. It offers a rigorous analysis framework which facilitates the reading of the abundance of empirical results available. Meta-

regressions are particularly rich sources in so far as they allow a clear analysis of which among the characteristics relating to the sample or to the methodology selected bear the greatest impact on the conclusions. Besides, meta-analysis also allows to override the limitations — e.g., subjectivity, selection bias etc. — that dominate the qualitative literature. This becomes of utmost importance when dealing with such a sensitive a topic as the present one. And finally, meta-analysis helps to identify which future research developments appear the most promising.

The paper is organized as follows. Section 2 is a reminder of the consequences that redundancies may have on companies. Naturally, these consequences very much vary to the point of having sometimes contradictory effects. Whenever a firm warns that it will have to resort to massive layoffs, it is never easy to understand why. Section 3 looks into the investors' reactions, which depend less on the actual wording of the announcement as such but more on the type of 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 of an essentially empirical nature since it is about assessing how investors decipher layoffs announcements in the short term. The core of the paper is therefore a meta-analysis, whose data and methodology are given in section 4. Section 5 presents and discusses the results. Section 6 concludes.

2. What do companies gain from redundancy plans?

2.1. The reasons behind layoffs

It is not possible to consider the consequences of a layoff plan independently from the reasons that first prompted the company to put it in place. The reasons that may cause a firm to implement a layoff plan can be said to fall into three categories.¹

The first case is the most simple. The company may wish to decrease its payroll after a fall in demand. The redundancy 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 may indeed be caused by many reasons. It can either be due to the company itself

¹ See Pfann (2001) for a theoretical model. Following Blackburn (1999), we could also have added some sociological or ideological reasons.

— 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, for example. In all these situations, the layoffs can be described as “defensive” as they are meant to help the firm balance its costs with its anticipated or current decreasing profits. In general, this type of redundancy is “global” in reach since it indiscriminately affects more than one, if not all, of the company’s sites or services.

Resorting to a layoff procedure does not always constitute an aim in itself. It can also be the flexible means the firm needs so that it can adapt to fluctuating demand. The firm then does not aim so much to reduce its payroll as to make it more adjustable. Most of the time, the company will externalize one or more services. Many experts on management theories and industrial organization issues are therefore dedicated followers of the “small is beautiful” saying — which was very much in vogue in the 1980s. Thus, Womack *et al.* (1991) introduce the lean production concept and emphasize the importance of keeping production units small-sized, reactive and changeable. Other such highly normative management theories favouring supposedly value-creating redundancies could also be quoted, like in Neinstedt (1989) or Hendricks (1992) — who replaces downsizing with rightsizing on the assumption that laying off workers cannot be but beneficial in all circumstances... The firm may also find it 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.

Finally, the decision to resort to massive redundancies can also form part of the firm’s more general reorganisation program (Ofek, 1993). These are called “offensive” redundancies because they generally target only a few services or sites. A redundancy plan as part of the firm’s reorganization program is called for when: i) 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 (Carroll, 1994); ii) 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; iii) the firm has found a means of reducing production costs. In other words, the

company 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 Redundancy costs

Whatever their reasons for laying off workers, companies always incur high costs in the process.² Direct costs are the most obvious as, in all cases, redundancy procedures entail workers' compensation or reclassification, possibly also production reorganization and the hiring and training of new workers.

Besides, the company will most probably also have to deal with the negative impact of redundancy 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, 1985, 1995; Rust *et al.*, 2005).³ The company must be prepared to accept that from then on 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 to lesser workers' loyalty and hence flexibility. Payroll reduction is therefore often associated with productivity losses (Foulkes and Whitman, 1985; Brockner *et al.*, 1987; Brockner *et al.*, 1992; Baily, Bartelsman and Haltiwanger, 1996; Capelli, 2000) which all add up to the original costs of the redundancy 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 redundancy plan — because the courts seldom oppose layoffs programs — they sometimes win a

² It must be noted that 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 company's staff adjustment process.

³ It can also be argued 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 redundancy 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.

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 redundancy negotiations end up in deadlock (Fowker, 1998). 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 company an average of 80 million dollars (see also Ruback and Zimmerman, 1984; Kramer and Vasconcellos, 1996; Kramer and Hyclak, 2002).

Massive redundancy 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 company. 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 redundancy 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 redundancy plans?

A firm's market capitalization changes reflect investors' anticipation of the company's future profit prospects. If the expected ambivalent impact of redundancies on labour costs and the firm's productive efficiency is to be considered, one cannot really demand a one-way response to redundancy announcements from financial markets. Because of this ambiguity, the context in which the redundancy 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 general 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 redundancy 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 redundancy 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 company 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 demand opportunities than anticipated (Worell, Davidson and Sharma, 1991). This is referred to as investment decline (Elayan and *al.*, 1998) or demand decrease (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 in the convention by which shareholders usually benefit from layoffs by the firm, their reactions become biased and the signal sent by a redundancy 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. Paradoxically, the more negative noise is made around redundancies designed to please shareholders, the more widespread the knowledge of their existence becomes and consequently the potential belief in the convention becomes reinforced. This is an illustration of Keynes's intuition about self-fulfilling anticipations. Naturally, the existence of such a convention remains to be proven, yet it seems hardly probable because it is non-viable. As shown in the next section, the convention cannot be validated empirically.

In sum, the overall effect of redundancies on shareholders' wealth depends on the accumulation of several factors, both objective (the company's economic situation and its reasons for implementing the redundancy plan) and subjective (how the markets perceive the company's future prospects and how they interpret the signal sent by the firm concerning the layoffs plan). A redundancy decision may increase the company'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 because of worker demotivation and they may also cause a drop in

demand to the firm. 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 1996 to 2006 which examine the financial markets' reaction to staff reduction announcements — i.e. both redundancy plans and plants closures (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 in all 14 countries and around a total of 15,000 announcements.

To review the studies, we did a key-word search — e.g., “layoff”, “downsizing”, “Reduction-in-force”, “RIF”, “plant closure” “restructuring” — in the major economic databases like 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. No *a priori* filter was used concerning the date or type of publication. To the studies closely related to redundancy 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. 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.⁴ For

⁴ In the course of our bibliography search, we came across the not yet published PhD thesis by Nemeč (1997) which we have unfortunately been unable to have access to.

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.⁵

4.2 The event studies technique

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 levelled at 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 prices constantly mirror the actualized value of the company'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 companies' 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 more than widely recognized (MacKinlay, 1997). Investors' reactions to new information — the announcement of a redundancy 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 companies concerned. When the abnormal return is markedly positive, it shows that the market has received the announcement favorably and it is the reverse in the case of a negative return.

⁵ 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 have found it interesting to include both the first and second studies.

4.3 The meta-analysis

Meta-analysis is an econometric technique used in academic journals. 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.⁶

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 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. So, 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).

⁶ In the course of our research we came across a working paper on the relations between staff reductions and company 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.

In order to maximize the number of observations, the CAARs calculated on the [-1; 0] and [0; +1] interval 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 redundancy 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 yet another dummy variable: *Non_Anglo* = 1, when the sample comprises non Anglo-American companies.

The great majority of studies seeking to explain stock markets' reactions concentrates on the reasons for redundancy 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 companies are opposed to those facing difficulties, while in others, the opposition is between companies for which layoffs plans are part of an overall reorganization program and those for which it is not.⁷ We simplify the issue by considering two possible attitudes for the firm, as is the case both in the theoretical and empirical academic literature: a proactive, or voluntarist attitude — although the company is not facing financial difficulties, it resorts to reorganization and redundancies

⁷ The selection process becomes 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 decided to ignore the last.

to become more efficient and more profitable; 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. 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.⁸

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

- The size of the redundancy: *Strong_reduc* = 1 when the sample comprises companies which announce a redundancy plan involving a large number of workers, and 0 otherwise; *Low_reduc* = 1 when the sample comprises companies which announce a redundancy plan involving a small number of workers, and 0 otherwise. It must again be added that different authors adopt different criteria. For example [ESMS] or [HMMW] divide their initial sample into two parts on the basis of the redundancy 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: *First_redund* = 1 when the sample comprises firms which announce a redundancy plan for the first time, and 0 otherwise; *Second_redund* = 1 when the sample comprises firms which have already announced redundancy plans, and 0 otherwise.

⁸ 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 company’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.

- The staff reduction mode: *Volunt_depart* = 1 when the sample comprises firms for which the percentage of workers' voluntary departures from the company is high, and 0 otherwise; *No_volunt* = 1 when the sample comprises firms for which the percentage of workers' voluntary departures from the company is low or non-existent, and 0 otherwise — e.g. [MLC]. The *Temp_depart* and *Perm_depart* as well as the *TU* and *No_TU* 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_coll* = 1 when the redundancy 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 redundancy plan, and 0 otherwise — e.g. [CK].
- Finally, we also add two extra variables relating not to the redundancies but to the studies. *Dum_WP* = 1 when the study is a working paper, and 0 if it has been published in a peer-reviewed journal. *Nb_event* variable corresponds simply to 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- or z- 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.⁹ In sum, we have, for panel A, the standard deviation associated with 130 CAAR_[-1; +1] on 165. It must be noticed that the majority of observations — 50.9% — are drawn from working papers although they

⁹ This is the case for eight CAAR; these implicit standard deviations are not used in the publication bias tests.

only make up 6 out of the 41 studies reviewed. As a rule, working papers have fewer constraints regarding the number of regressions presented.

Table D in appendix gives the details of the matrix of crossed correlations between variables. It must be noted that, except for couples Period_80 and Period_90 (= 0.79) as well as Dumm_WP and Nb_event (=0.60), no correlation is over 40% in absolute value.¹⁰

5. The financial markets' reaction to layoff announcements

5.1 The overall negative impact of redundancy announcements

Redundancy announcements have an overall negative impact on the stock price of the companies 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. 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.

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

¹⁰ When the model is estimated without the Dumm_WP variable, results are the same as those given below. The results can be obtained from the authors.

uses an estimation with fixed or random effects for each study. In both cases, the reaction is significantly negative.¹¹

Table 1. Weighted average of cumulative abnormal returns

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

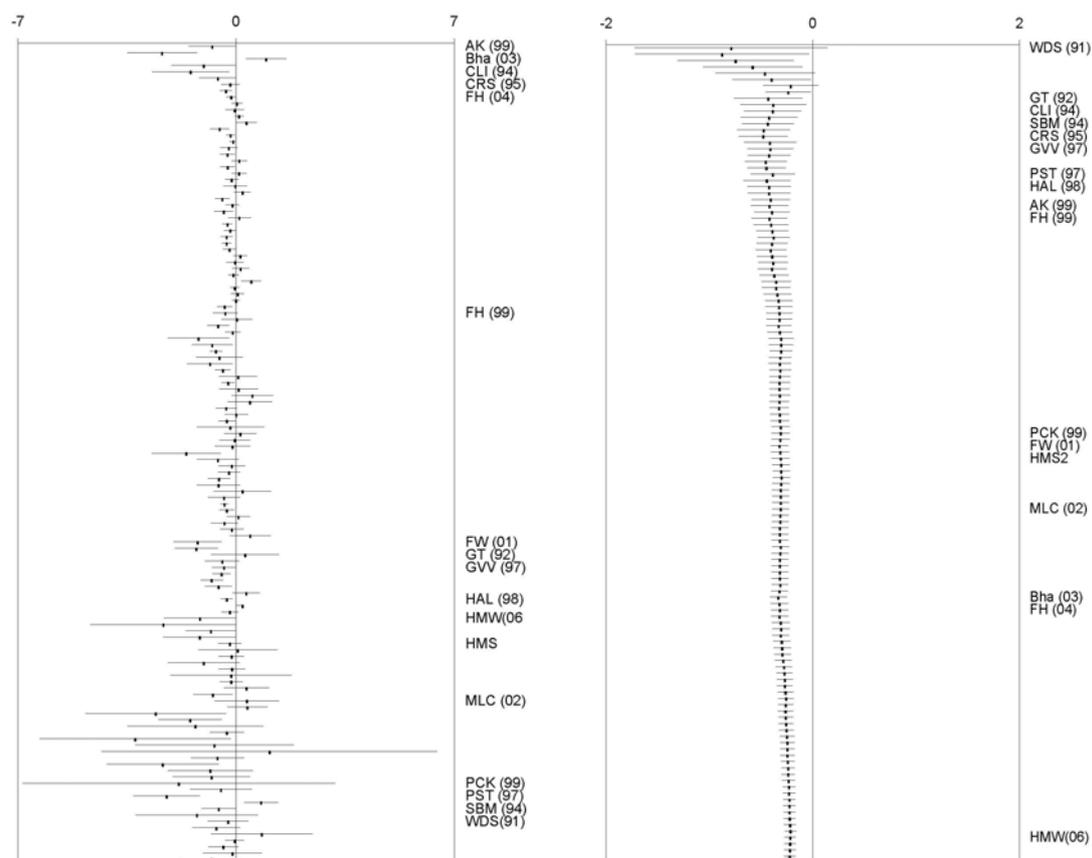
The average is weighted with the inverse of its variance. The estimate is based on $CAAR_{[-1; +1]}$ (panel A).

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 paper or working paper 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.

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.

¹¹ 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 (panel E, so we have enough observations) confirms the previous results and reveals a left asymmetry in CAAR distribution.



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).

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

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_redund			-0.507**	(0.258)	-0.416	(0.270)
No_volunt			-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_reduc					0.349	(0.288)
Low_reduc					0.285	(0.288)

TU			0.521	(0.736)		
No_TU			0.502	(0.736)		
Second_redund			0.211	(0.271)		
Temp_depart			0.346	(0.258)		
Perm_depart			0.067	(0.241)		
Volunt_depart			0.691	(0.437)		
White_coll			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_redund		-0.318 (0.205)	-0.239 (0.213)			
No_volunt		-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_reduc			0.158 (0.225)			
Low_reduc			-0.015 (0.225)			
TU			0.063 (0.405)			
No_TU			0.001 (0.350)			
Second_redund			0.104 (0.214)			
Temp_depart			0.247 (0.223)			
Perm_depart			0.070 (0.191)			
Volunt_depart			1.032** (0.403)			
White_coll			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. See table A for the list of selected studies.

Our estimates rely on the inclusion of random effects. 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 using 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.¹²

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% according to the various models. 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].

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 companies 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 redundancy 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 nor systematically negative [Bha].

We have seen, at a theoretical level, that investors may well react very differently to redundancy announcements depending on whether the measure is defensive or offensive. Most empirical studies

¹² It has been checked by using extra regressions, not presented here.

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 due to 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 companies 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 company — are less severely sanctioned.¹³ 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 companies is not significantly positive, whatever the time period.

The signal sent by the redundancy plan has therefore full impact, with either softening or amplifying effects depending on the company concerned. 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 which 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 company 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 company'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 company is seeking improved efficiency less credible.

Some features of staff reductions or the size of the redundancy plan do not provide much information on the reasons for the layoffs. Investors remain nevertheless sensitive to such data as they

¹³ 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.

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 redundancy 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 redundancy plan includes the closure of a site or a factory [**SBM, GT**], or production delocalization [**CGW**], the firm's stock market price will fall. 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_volunt variable is significant and negative for panel A, whereas the Volunt_depart 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 these studies, the actual impact of the size of the redundancy 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 show 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 companies have not changed leaders recently **[CH, CMSY]**. More precisely, the impact of the redundancy announcements is significantly positive when the leader comes from outside the firm, non-significant when the new leader is an insider and negative when companies have kept the same leaders **[CH]**. It is indeed more likely that a recently appointed leader from outside the company 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 of time...

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

- One may wonder whether a redundancy plan by a given company 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 redundancy announcement is accompanied by the mention of losses incurred by the company, the stock market

capitalization of all the firms in the same sector falls significantly, whereas it increases significantly in the opposite case.¹⁴

- 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].¹⁵

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 publication bias.¹⁶

5.4 Publication bias

Given the delicate nature of our topic, it is interesting to establish the possibility of any publication bias. Publication biases may arise for various reasons (Stanley, 2005): it is easier to publish a study presenting significant results which 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 publication bias: asymmetry (type I) and variation excess (type II).

¹⁴ 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 companies. 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.

¹⁵ 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.

¹⁶ 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 redundancy 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.

5.4.1 Type I and type II publication bias

A graph is usually the simplest — and the most commonly used — method to detect the possibility of a publication 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 publication 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 publication bias favouring a negative reaction to massive redundancy plans on the part of investors.

In the absence of a type II publication bias, there should be no link between the coefficient given by a study and its standard variation. Conversely, in the presence of a publication 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 « real » effect value, measured as the average weighted with the inverse of the variance with fixed effects, namely $TE = -0.185$.

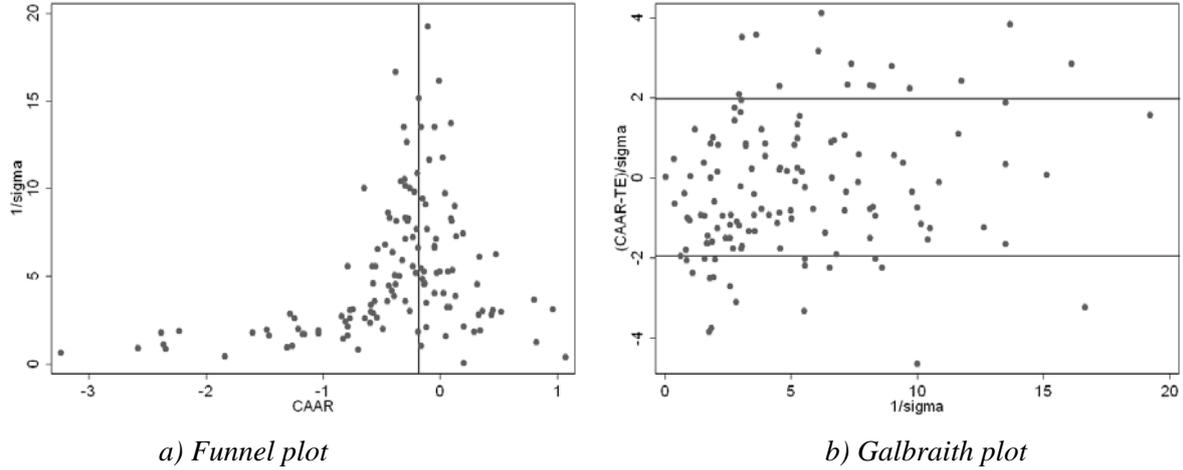
In the absence of a type II publication bias, the absolute values must not be over 1.96 in more than 5% of cases. Yet, for panel A, these absolute values go over the 1.96 threshold in 33 out of 122 cases, which is way off the expected figure — see figure 2b. It therefore appears that for our topic, same 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 publication biases requires the use of econometric tests, such as FAT (funnel

asymmetry test) and FAIVEHR (funnel asymmetry instrumental variable estimator heteroscedasticity robust).

Figure 2. Publication bias

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



5.4.2 Meta-regressions and publication bias

Egger *et al.* (1997) propose a publication 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 et 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:

$$t\text{-stat}_i = \beta_1 (1 / \sigma_i) + \beta_2 + e_i, \tag{1}$$

that can be estimated by OLS. In the presence of publication bias, β_2 is significantly different from zero and its algebraic 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 publication 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 publication 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:

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

In equation (1), the implicit hypothesis is that the « real » effect value is unique. In the absence of publication 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 which 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.¹⁷

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

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

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

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).

Table 3. Meta-regressions and publication 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

¹⁷ The qualitative results are no different, when the other explanatory variables considered in the previous part are also added.

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 publication bias has been corrected, it is not certain that, on average, massive layoffs announcements have any impact on the firms' market value. But, following Stanley (2005), estimates corrected from the publication 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 publication bias. The corrected t-stat values are then regressed on the inverse of the variance:

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

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

As shown by Card and Krueger¹⁸, 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:

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

¹⁸ 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. These results are available on demand, yet they do not change our conclusions.

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 redundancy 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 conclude, it must be said that the studies on the financial markets' reaction to layoffs announcements suffer from the publication biases mentioned — i.e. Types I and II. It nevertheless remains true that the financial markets' reaction is significant and negative, even after publication biases have been included and corrected.

6. Conclusion

It is clear that redundancy announcements by firms whose major economic indicators are positive may appear as unfair. They fuel the arguments of those who condemn the “dictatorship of markets”. This view conjures up a picture of the financial sphere as totally disconnected from the real world and entirely driven by its own logic, i.e. that of the constant fight of stock markets against employment. It must be added that this debate takes place within a more general climate of defiance vis-à-vis the financial markets. The financial sphere has indeed undergone several crises over the past few years (Enron, the dotcom bubble, and so on) which have all contributed to aggravate public fears. Even though these problems are real and serious enough and have rightly become the focus of attention, it would be equally unfair to blame the financial markets for all evils.

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 redundancy 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 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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