# Conflicts of Interest, Employment Decisions,

# and Debt Restructuring:

# Evidence from Spanish Firms in Financial Distress

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## Abstract

We examine the employment decisions of Spanish manufacturing firms in financial distress. Our sample comprises 4,566 firms operating during 1983-1994. We find that firms in distress reduce their employment significantly. These reductions are positively associated with asset sales, but cannot be fully explained by them. They are also negatively related to firm size and to firing costs. Our main finding, however, is that firms that restructure their debt in response to distress are more likely to reduce their employment. Employment falls as the firm's debt exposure is reduced, but also as a consequence of a bank debt restructuring involving exclusively an extension of maturity. These empirical findings provide a clear-cut quantitative illustration of the agency costs of debt emerging from stockholder-bondholder conflicts.

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# I. Introduction

A firm in financial distress may be forced to change its capital structure and redesign its business in order to avoid default. Business restructuring may involve asset sales, business divestitures, plant closings, management turnover, and employment reductions. Some of these changes are simply meant to raise cash and repay creditors, but many others do not have a major impact on the firm's current revenues and primarily affect its future profitability.

These last changes may be the by-product of debt restructuring. As Jensen and Meckling (1976) explained,[1] there is a fundamental conflict of interest between the firm's owners and its creditors --- the formers preferring riskier investment projects. The shareholders' risk appetite is increasing in the debt-equity ratio. Since a debt restructuring usually results in a lower debt-equity ratio, it may induce the firm to restructure its business. In addition, to the extent that financial distress may shift bargaining power from shareholders to creditors, the latter may successfully impose various operational changes as preconditions to restructure their claims.

In sum, the agency theory of debt developed by Jensen and Meckling suggests that for firms in financial distress a debt restructuring should lead to changes in production and, in particular, in their input allocation decisions. But, to what extent does the evidence validate this prediction?

In this paper, we address this question by examining the employment decisions of Spanish manufacturing firms in financial distress. A reduction in employment may lower the firm's costs in the short term, allowing the firm to repay some of its current debts. But most importantly, a change in employment affects the firm's production function and, consequently, its future profitability. Under highly plausible assumptions (see section III), a fall in employment will reduce profit volatility. Therefore, according to the agency theory of debt, we should expect to find a significant relationship between debt restructuring and employment cuts other things equal.

Indeed, we find that firms restructuring their debt in response to distress are more likely to reduce their employment. Employment falls as the firm's debt exposure is reduced, but also as a consequence of a bank debt restructuring involving exclusively an extension of maturity. The first effect is consistent with the prediction that a lower

debt-equity ratio should induce the firm to choose less risky projects. The second effect may simply indicate a change in the bargaining powers of shareholders and creditors, which is due to financial distress. Therefore, our paper provides a positive (albeit indirect) test of the agency theory of debt.

It seems logical to focus on firms experiencing sudden shocks leading to financial distress in order to test this theory. Sudden financial distress produces a severe disruption that may force the firm to reconsider both its capital structure and its business strategy. This allows us, as external observers to firms, to examine the causal relationship between these two types of decisions. This is particularly important since, as in many other existing studies, we use data from balance sheets. The capital structure reported in a firm's balance sheet is the result of a series of decisions over time, which may bear no relationship with the firm's current decisions.

In our analysis, we choose to focus on the employment decisions of firms, rather than on their other input choices. In particular, we will not analyze asset sales, which are certainly important operational actions often associated to financial distress. This is because a primary objective of asset sales is to raise cash to repay creditors and thus avoid any real restructuring.[2] Nonetheless, we will control for asset sales in our employment regressions to account for reductions in employment that are caused by these sales and are not due to debt restructuring.

Our sample of Spanish firms is particularly well suited for the purposes of this analysis. Our sample is selected from a panel of Spanish manufacturing firms constructed by the Bank of Spain. This is a rich database,[3] which is used by the Bank of Spain to monitor the impact of macroeconomic policy and credit conditions on Spanish non-financial firms. These firms have simple capital structures, often involving private debt (mainly bank debt) and equity only, which makes it relatively easy to model and investigate the use and abuse of debt.[4] Also, they have simple ownership structures: most of these firms are controlled by large shareholders, typically by families, so that

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[1] See also Fama and Miller (1972), Merton (1977) and Myers (1977) among others.

[2] Of course, layoffs reduce the total wage bill of the firm. But also revenues may be negatively affected and severance compensations may have to be paid. Thus, the net effect of an employment reduction on the firm's current cash flow is *a priori* undetermined. In any case, as we shall see in section IV.E, there is a statistically significant direct relationship between layoffs and debt restructuring. This is not true when we consider the relationship between asset sales and debt restructuring. (A formal test of this last result can be obtained from the authors upon request.)

[3] In 1994, this database comprised firms representing 21.6 % of the total value added by the non-financial sector in Spain, and 21 % of the labor force in this sector.

[4] The median firm in our sample has only bank debt and trade credit among its liabilities (see Panel A of Table 1).

ownership and control remain largely in the same hands. Finally, they operate in a labor market with high firing costs and unionized bargaining at the macroeconomic level (i.e. not responsive to specific firm's conditions) where, therefore, layoffs constitute non-trivial decisions, even for firms in financial distress.

In Spain, most financially distressed firms restructure through private workouts with creditors. The Spanish bankruptcy restructuring code (*Ley de Suspensión de Pagos*), which shares the pro-debtor bias of Chapter 11 of the US Bankruptcy Code, is highly inefficient: both firms with positive going concern value and their creditors try by all means to avoid formal bankruptcy. Indeed, few firms file for bankruptcy and the vast majority of those who enter formal bankruptcy are eventually liquidated, with creditors recovering a very small fraction of their claims. Creditors, including banks, are allowed to hold equity in firms, whether in financial distress or not. Yet, in practice, they do not often take equity in exchange for debt.[5] Most debt restructurings consist of a redefinition of the existing debt contracts, involving both debt reductions and extensions in maturity. Spanish firms find it easier to renegotiate with banks than with public debtholders. Renegotiating the terms and conditions of public debt requires, according with the Spanish corporation law (*Ley de Sociedades Anónimas*), a majority vote among bondholders and, consequently, it is both costly and subject to potential free-rider problems.

The paper is organized as follows. Section II discusses the related empirical literature. Section III presents our testable hypothesis. In section IV, we define the main variables of interest, describe how the sample of firms is selected and report the main features of the data. Section V contains the econometric analysis and presents our main empirical results. In section V.A, we present logit regressions of the probability that a firm in financial distress cuts its employment in a non-marginal way. We relate this probability to various real and financial characteristics of firms and, in particular, we focus on the effect on employment of debt reductions and of extensions in the maturity of debt. In these regressions, we control for both asset sales, which are shown to increase the probability of layoffs, and wage concessions, which in contrast reduce the likelihood of employment cuts. To the extent that the various operational and financial responses to financial distress are simultaneously determined, we conduct in section

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[5] Out of the 930 financially distress firms in our sample, in only 28 firms banks held an equity stake in the year previous to distress, and in only 7 firms banks increased their equity stakes during the year of distress.

V.B several tests (which involve the estimation of a series of multinomial logit models) to show that our results also hold true when the potential endogeneity of our main explanatory variables is explicitly taken into account. In section VI, we investigate the implications on firm operating performance of employment reductions following financial distress. Section VII concludes.

## II. Related empirical literature

Our paper is related to the extensive literature that has analyzed the financial and operational actions undertaken by firms in financial distress. For instance, John, Lang and Netter (1992) show that distressed firms often react by quickly reducing their labor force and, more generally, their unit labor costs. They also cut R&D expenditure, increase investment and reduce their leverage. DeAngelo and DeAngelo (1991) also document substantial layoffs (almost 2/3 of the work force) as part of the restructuring of the U.S. steel industry during the 1980's (a period of severe distress for the steel industry). Finally, Denis and Kruse (1998) find for a sample of U.S. Compustat firms that "approximately two-thirds of the firms either restructure their assets, layoff employees, or initiate major cost-cutting efforts."

Much of this literature has examined the relation between the firm's response to financial distress and its capital structure. Ofek (1993) finds that a firm's leverage has a positively and significant effect on the probability that some operational action will be taken in response to distress. Also, Asquith, Gertner and Scharfstein's (1994) main finding is that the firm's capital structure influences the actions taken by financially distressed firms in order to avoid bankruptcy.

Focusing on employment, Ofek (1993) finds that highly leveraged firms are more likely to lay off a substantial part of their labor force as well as restructure their debt. Also, Hanka (1998) finds a positive relationship between debt and employment reductions, and Sharpe (1994) reports a statistically and economically significant relationship between a firm's leverage and the cyclicality of its work force. Opler and Titman (1994) also show a relation between a firm's capital structure and employment responses to economic decline. More concretely, they find that employment growth is slower for highly leveraged firms and that leverage has a significantly stronger effect on employment during downturns. Finally, Kang and Shivdasani (1997) find that Japanese firms also lay off a substantial part of their work force in response to performance

declines. Yet, layoffs in Japan result in a smaller change in employment at the firm level than do layoffs in the U.S. (roughly speaking employment reductions amount to 5 % of the firm's workforce for their sample of Japanese firms whereas the corresponding figure for their sample of U.S. firms is 15 %).

Kang and Shivdasani (1997) also investigate the determinants of layoffs in Japanese firms experiencing a performance decline. Unlike Ofek (1993), Sharpe (1994) and Hanka (1998), they no find no significant relationship between layoffs and the firm's capital structure. Layoffs are more likely for large firms, who perform poorly and are controlled either by a main bank or a large blockholder.

We also find that a large proportion of Spanish firms in financial distress lay off a substantial part of their workforce. Furthermore, like Kang and Shivdasani (1997), we find no significant relationship between layoffs and debt. However, our paper differs from the previous literature in that we focus on the interplay between financial restructuring and employment reductions. We find that layoffs are significantly related to debt restructuring, i.e. to changes in the firm's capital structure. Of course, our analysis requires controlling for the firm's capital structure prior to distress, as well as to account for potential endogeneity problems, but this is not our main emphasis.

From a theoretical standpoint, we base the relation between financial restructuring and operational restructuring (layoffs) on the agency theory of debt that stresses the importance of shareholder-bondholder conflicts. In this respect, our paper provides a clear-cut quantitative illustration of the agency costs of debt arising from these conflicts of interest. Here, again, we are not the first to investigate the empirical validity of this theory. For instance, Kim and Maksimovic (1990) restate the agency problem of debt to derive testable implications concerning the effect of debt on the firm's input decisions. Consistently with this theory, they find that high levels of debt are associated with inefficient investment in capacity and an inadequate input mix. Agency problems have also been quantitatively analyzed using a contingent-claims approach (e.g. Brennan and Schwartz, 1984; Mello and Parsons, 1992; Leland, 1988) and, more recently, through numerical simulations (Parrino and Weisbach, 1999).

Yet, these last papers are only indirectly related to ours. We follow a different empirical strategy that centers on the link between financial and operational adjustments undertaken by firms in financial distress. If there is a shareholder-bondholder conflict of interest, then the theory predicts a positive interrelationship between these two kinds of restructuring. We find such relation between debt restructuring and employment

reductions for our sample and, therefore, provide a quantitative illustration of the often alleged importance of such conflicts.[6]

## III. Debt restructuring and employment

A firm is in financial distress if its cash flows are not sufficiently large to meet its current obligations.[7] Financial distress may involve financial restructuring between the firm, its creditors and shareholders, as well as operational actions, such as asset sales, plant closings and employment cuts. Some operational changes are aimed to raise cash and pay trade credits and interest expenses. But some others do not have a major impact on the firm's current revenues and mainly affect the firm's future revenue stream. These last changes may be closely linked to financial restructuring.

The different pay-off structures of debt and equity lead to a conflict of interest between the firm's owners and its creditors (see Jensen and Meckling, 1976). The firm's shareholders prefer projects involving higher risk, since they fully enjoy the project's upside potential and are usually protected against its downside. Its creditors, instead, prefer lower risk projects because they are limited on the upside and are fully exposed to the downside.

This conflict of interest may play a fundamental role in the resolution of financial distress when the distressed firm must change its capital structure to avoid default. In those circumstances, creditors may successfully demand that the debt-restructuring package involve a redefinition of the firm's operational characteristics for the post-distress period. On one hand, financial distress heightens creditors' incentives to interfere with the firm's operations since it makes bankruptcy more likely. In addition, financial distress raises the bargaining power of incumbent creditors vis-a-vis shareholders. Incumbent creditors acquire useful information about the firm's activities and prospects over time. Therefore, they are a cheaper source of funds than any other less informed outside investor is. If distress is severe, incumbent creditors may constitute the only source of external finance, thus making them pivotal for the firm's survival.

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[6] In this last respect, our paper is also related to Brown, James and Mooradian (1994), who investigate the role of creditor pressure in the sale of the assets.

[7] This definition is close to the definitions in Wruck (1990) and Ross, Westerfield and Jaffe (1996).

## A. A simple model [8]

When do creditors prefer less employment than shareholders do? To answer this question, suppose that the firm operates a production technology that yields X(N) units of output when N workers are employed. Let X'(N) > 0 and X''(N) < 0 for all N. That is, production exhibits decreasing returns to scale. Suppose, in addition, that the firm sells its output in a competitive product market at an uncertain price p > 0, which is distributed according with a distribution function F(p).[9] Workers are hired from a perfectly competitive labor market, where they can earn a reservation wage r > 0. If employed by the firm, they are paid a wage w > 0 in non-default states and have priority over all other claim-holders in case of default.[10] Furthermore, the firm has debt with face value B. Hence, firm's profits are given by pX(N) − wN − B, so that the variance of profits is equal to X(N)$^2$ Var(p). That is, projects involving more employment are naturally riskier in this simple setting.

Under these assumptions, we have that shareholders' choose employment $N_s$ the solution of:

$$E\{pX'(N) \mid p > p_s(N)\} = \partial(w(N)N)/\partial N \qquad (1)$$

and

$$w(N) [1 - F(p_c(N))] + E\{pX(N)/N \mid p < p_c(N)\} F(p_c(N)) = r, \qquad (2)$$

where E{.} denotes the expectations operator, $p_s(N)$ = (w(N)N + B)/X(N) and $p_c(N)$ = (w(N)N)/X(N). The LHS of equation (1) is the average marginal revenue from increasing employment N, where the average is taken across non-default states, i.e. for p > $p_s(N)$. The RHS is the marginal increase in total labor costs when raising N. Equation (2) implicitly defines the firm's wage profile $w_s(N)$. Given that wage claims are assumed senior to any other claim, workers are paid $w_s(N)$ whenever the firm's revenues exceed its wage bill (which occurs with probability [1 - F($p_c(N)$)]) and, otherwise, they are the residual claimants to the firm's revenues. Competition among

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[8] This is a variant of the well-known Jensen and Meckling (1976) model, and it is also related to Gertner and Scharfstein (1991) and Padilla and Requejo (1999).

[9] For technical reasons, we restrict attention to the set of distribution functions for which the second-order conditions of the maximization problems below are satisfied. A distribution function satisfying the required property is the uniform distribution, as it can be shown from the authors upon request.

[10] Indeed, in Spain, wages are senior to any other claim to the firm. They are said to enjoy a "super-privilege."

homogeneous workers ensures that in equilibrium $w_s(N)$ is such that the expected payoff from employment is equal to the reservation wage, $r$.[11] In equilibrium, the firm's wage is equal to $w_s = w_s(N_s)$.

From equations (1) and (2), it follows that:

**Proposition 1.** $\partial N_s / \partial B > 0$.

Proposition 1 is a variant of the "excessive risk taking" problem associated with limited liability (see Jensen and Meckling, 1976). Because of limited liability, shareholders take only into account non-default states (i.e. price realizations $p > p_s(N)$) in order to compute the average value of the marginal product of labor. As B increases, the threshold $p_s(N)$ increases for all N, which implies that, for given N, the average marginal product of labor for shareholders raises with B, whereas its marginal cost remains unchanged.

If creditors were in charge of employment, they would choose employment $N_c$ the solution of:

$$E\{pX'(N) \mid p_c(N) < p < p_s(N)\} = \partial(w(N)N)/\partial N \qquad (3)$$

and

$$w(N)\,[1 - F(p_c(N))] + E\{pX(N)/N \mid p < p_c(N)\}\,F(p_c(N)) = r. \qquad (4)$$

Equations (3) and (4) have the same interpretation than equations (1) and (2). Equation (4) defines the firm's wage profile in this case, which we denote by $w_c(N)$. The firm's equilibrium wage is now equal to $w_c = w_c(N_c)$.

From equations (2) and (4), it follows that $w_c(N) \equiv w_s(N) \equiv w(N) > r$ for all N, and that $w(N)$ is strictly increasing in N. As N increases, the probability of being paid the contractual wage falls (i.e. $[1 - F(p_c(N))]$ is decreasing in N). Workers, anticipating this, demand a higher wage. Therefore, the RHS of equations (1) and (3) are identical for all N: i.e. the marginal cost of labor is equal in both scenarios. However, we have that for all N:

$$E\{pX'(N) \mid p_c(N) < p < p_s(N)\} < E\{pX'(N) \mid p > p_s(N)\}. \qquad (5)$$

That is, the marginal return to increasing N for creditors is lower than the marginal return of employment for shareholders. This is because creditors only take into account

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[11] Propositions 1 and 2 below are proved in Appendix.

price realizations for which the value of labor productivity, $pX'(N)$, is lower, i.e. $p \in [p_c(N), p_s(N)]$. Hence, combining equations (1) to (5), we have that:

**Proposition 2.** (a) $N_s > N_c$ and (b) $w_s \equiv w(N_s) > w(N_c) \equiv w_c$.

Creditors choose less employment than shareholders do, because their income is fixed at B for high price realizations, when employment is highly valuable, while it is a function of N when its marginal productivity is worth less. Creditors' cautious policy regarding employment implies a lower probability of default and, consequently, lower wages in equilibrium.

*B. Testable hypothesis*

Propositions 1 and 2 give rise to our main testable hypothesis, namely that debt restructuring leads to employment reductions for firms in financial distress. Insofar as a debt restructuring involves a reduction in the firm's total debt exposure, Proposition 1 tells us that it should lead to significant employment reductions. In addition, as we argued above, creditors may only accept to restructure their claims if managers are willing to run the firm in a way that conforms better to creditors' preferences. Within the context of our formal model, Proposition 2 suggests that such a shift in preferences would result in less employment and lower wages.

Therefore, our hypothesis would be validated for our sample of Spanish firms if substantial employment cuts were found to be positively and significantly related to both debt reductions and extensions in maturity. In fact, an extension in the maturity of debt, even when it involves no change in the face value of debt, may effectively constitute a debt reduction from the viewpoint of shareholders, at least as long as they discount the future. If discounting is moderate, though, a positive relationship between employment cuts and extensions in debt maturity would indicate a change in the firm's objective function.

Our simple model assumes wage flexibility. In our setting, this implies that wages fall when employment falls. Consequently, the reduction in employment resulting from a debt restructuring will be partly compensated by a reduction in the cost of labor. If, instead, wages did not adjust to employment, the reductions in employment

caused by a debt restructuring would be even larger. It is, therefore, important to control for labor market characteristics that proxy for wage flexibility, as well as to account for the existence of negotiated wage reductions, when testing our hypothesis.

The following sections are devoted to testing our hypothesis.

# IV. Variables, sample selection, and data description

## A. Main Variables

Our definition of financial distress is based on an interest coverage ratio, consistently with Asquith, Gertner and Scharfstein (1994) and other related papers. A firm's interest coverage ratio is equal to the ratio of its earnings before interests, taxes and amortization (EBITA) to its reported interest expenses. In any given year, a firm is classified as financially distressed if this ratio decreases significantly. That is, if it falls from a value larger than or equal to 2 to a value smaller than or equal to 1. We denote as $t = 0$ the pre-distress period, when the firm's interest coverage ratio is larger than 2. $t = 1$ is the period of financial distress, i.e. the period when the coverage ratio falls below 1, and $t = 2$ denotes the post-distress period.[12] This selection procedure identifies those firms that run into financial problems unexpectedly, as opposed to those other firms that get distressed after a long-lasting period of decline. Sudden financial distress may force the firm to restructure financially and also to undertake various operational actions. This simultaneous reorganization of the firm's financial and production structure will allow us to test the hypothesis discussed in the previous section.

Regarding the employment decisions of firms, we will distinguish between firms that lay off 10 percent or more of their labor force and firms that either increase employment or do not cut it by as much. Therefore, we will construct a dummy variable, LAYOFFS, that takes a value of 1 if the firm cuts its labor force by 10 % or more, and 0 otherwise. This is consistent with the previous literature (see, for example, Ofek, 1993) and it is done in order to make sure that these employment reductions

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[12] This definition of financial distress is related, but not identical to the definitions used by Ofek (1993) and Asquith, Gertner and Scharfstein (1994). Ofek considers that a firm is in financial distress if its market value from $t = 0$ to $t = 1$ decreases significantly. We cannot refer to this measure since a large part of our sample comprises unquoted firms, and data on market capitalization for quoted firms is not available. Asquith, Gertner and Scharfstein employ a coverage ratio similar to ours, but they focus only on firms with severe liquidity problems.

constitute non-marginal responses to financial distress, rather than marginal adjustments to a changing environment.

A debt restructuring involves a reduction in debt payments and/or an extension of maturity. To capture a reduction in total debt payments we use two different dummy variables. The first dummy, TOTAL DEBT REDUCTION, takes the value of 1 if the ratio of the book value of total debt to the book value of total assets falls from $t = 0$ to $t = 1$, and it is 0 otherwise. The second dummy variable, BANK DEBT REDUCTION, takes the value of 1 if the book value of bank debt decreases from $t = 0$ to $t = 1$, and it is 0 otherwise. We will say that a firm's debt maturity is extended when there is a simultaneous reduction in the firm's short-term debt and an increase in its long-term debt. As standard, debt due in a year or less is termed as short-term debt, while debt with longer maturity is defined as long-term debt. In our empirical analysis below, we will only consider extensions of maturity involving bank debt.[13] For this purpose, we construct a dummy variable, BANK DEBT EXTENSION, which is equal to 1 when the firm's bank debt maturity is extended.

Arguably, firms that sell part of their assets are more prone to reduce employment. In order to control for this effect, we introduce a dummy variable, ASSET SALES, that is equal to 1 if the firm is reducing its gross fixed assets by 10 % or more from $t = 0$ to $t = 1$, and it is 0 otherwise. The reason for this discretization is identical to that used in defining the variable LAYOFFS. Finally, because wage concessions may be a substitute for layoffs from the viewpoint of the distressed firm and its financial creditors, we define a dummy variable, WAGE CONCESSIONS, that equals 1 if the ratio of labor costs to employment falls in the distress period and it is 0, otherwise. [14]

## B. Sample selection

The sample has been set up using a database provided by the Bank of Spain that contains the balance sheets and profit and loss accounts of 7,846 Spanish firms for the

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[13] Indeed, we find no relationship whatsoever between employment and extending the maturity of public debt. This may be due to the small number of firms that extend the maturity of public debt in our sample: out of 930 financially distressed firms, only 21 firms extend the maturity of public debt, whereas 98 firms extend the maturity of their bank debt, 270 firms reduce the total public debt and 361 firms reduce their bank debt.

[14] DeAngelo and DeAngelo (1991) argue that wage concessions are easier to achieve if the firm lays off a substantial part of its workforce. That is, layoffs cause wage concessions. Our results below are

period 1983-1994. This database also reports information on employment for all these firms. For each firm in the sample, there is complete information for at least four consecutive years. Firms in this database are not selected by random sampling procedures, but they voluntarily report their information to the Bank of Spain. The sample includes mainly large manufacturing corporations (enjoying limited liability). Medium- and small-sized firms, as well as non-manufacturing firms, are misrepresented in the sample.[15]

We do not incorporate utilities or state-owned firms in the sample. The sample does not include firms that were taken over or firms that divested part of their lines of business during the sampling period. Also, firms that changed their lines of business from one sector to another are excluded from the analysis. Their inclusion in the final sample would make it more difficult to interpret our results, because they may operate drastically different technologies over time. In order to explain the effect of debt restructuring on layoffs, firms with no interest expenses are also excluded from the sample.

Due to these exclusions and other purely technical data constraints, we construct an intermediate sample of 4,566 firms from which to select the final sample of financially distressed firms. Most observations in this intermediate sample belong to the period 1987-1990, to the sectors "Food, beverage and tobacco" and "Automobile: spare parts and maintenance". The resulting final sample consists of 930 observations of firms in financial distress. A subset of this sample, 120 observations, corresponds to 60 firms that were found twice as financially distressed during the reference period. (We only allow a firm to be classified twice as financially distressed if it remains in the sample at least 8 years. This is done to eliminate those firms with a very unstable pattern of earnings.) Most distressed observations belong to the 1989-1993 period and to the sector "Automobile: spare parts and maintenance".

## C. Data description

Panel A in Table 1 reports summary statistics of the main characteristics of our intermediate sample of 4,566 Spanish firms. We split the sample into two groups. The

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inconsistent with this interpretation and point out to a relation of substitutability between these two events.

first group includes 930 financially distressed firms whereas the second includes 3636 non-distressed firms. Then, we present and compare the sample means and the sample medians of the reported variables for each of the two groups described. To ensure that the results reflect pervasive phenomena rather than scattered outliers, all variables used in this study are winsorized at both the upper and lower 1 % tails. That is, values outside the 1$^{st}$ or 99$^{th}$ percentile are set equal to the 1$^{st}$ or 99$^{th}$ percentile. All nominal variables are denoted in Spanish currency (Ptas), and deflated using the 1986 Spanish GDP Price Index.

We include three kinds of variables in this Panel:

(a) Real variables, such as total sales, total assets, employment, the ratio of temporary workers in the labor pool,[16] the unit labor costs, the capital-labor ratio, and the changes in gross fixed assets and employment from the pre-distress period;

(b) The interest coverage ratio for the pre-distress, distress and post-distress periods; and, finally,

(c) Financial variables, such as the total debt over total assets ratio - including and excluding trade credit -, the total bank debt to total debt ratio (excluding trade credit), the ratios of interest expenses to total assets and interest expenses to total debt (excluding trade credit), the current assets to current liabilities ratio (or liquidity ratio), and the change of this last ratio from the pre-distress period.

From this Panel we can reach the following conclusions. The median firm in financial distress appears to be smaller than its non-distressed counterpart. In fact, the medians of both total sales and total assets are significantly smaller for distressed firms. Yet, the means of sales and assets are statistically equal for both groups of firms. So, size comparisons must be taken with caution.

Instead, the mean and median of the proportion of temporary workers for financially distressed firms is significantly smaller than for firms that do not experience financial distress. In addition, unit labor costs are also significantly higher for financially distressed firms.

Comparing the mean and median of the capital-labor ratio of the two groups of firms, we see that this ratio is significantly lower for financially distressed firms at t = 0.

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[15] For further description of the original database, see "Resultados Anuales de las Empresas No Financieras", Banco de España (Central de Balances), 1994.

[16] In European labor markets, temporary workers are those hired for a fixed time period and not entitled to severance payments.

Interestingly, the gross fixed assets of the median firm experiencing financial distress fall from t = 0 to t = 1, whereas this is not the case for other firms.

The median firm, whether or not in financial distress, does not change employment. On average, both kinds of firms increase their labor force, but financially distressed firms do so to a lesser extent.

The median of the interest coverage ratio at t = 0 is significantly higher for financially distressed firms. (The comparison using means has the same sign but it is not statistically significant.) Even though, our selection procedure implies that firms in the distressed pool have an interest coverage ratio of 2 or more at t = 0, it is still remarkable that this ratio is significantly larger for firms in financial distress than for non-distressed firms. This suggests that firms selected as distressed were not under performing prior to distress and, consequently, that our selection procedure successfully singles out those firms that run into financial problems unexpectedly.

There are significant differences between the capital structure of financially distressed firms and non-distressed firms. Distressed firms are less leveraged but have an approximately equal proportion of bank debt over total debt exposure (excluding trade credit). Regarding the cost of capital, the evidence presented in Panel A of Table 1 is mixed. Both the mean and median of the interest expenses to total assets ratio are significantly smaller for financially distressed firms. In contrast, the comparison of the interest expenses to total debt (excluding trade credit) ratio for both kinds of firms is ambiguous. The mean of this last ratio is significantly larger for distressed firms, but the median is significantly smaller.

Finally, the liquidity ratio at t = 0 is significantly larger for firms experiencing financial distress. Again, this indicates that financial distress occurred suddenly and unexpectedly. Also, this ratio experiences a reduction from t = 0 to t = 1 for the sub sample of financially distressed firms.

To summarize, Panel A of Table 1 shows that financially distressed firms were performing quite well prior to distress, but experienced a substantial performance decline from t = 0 and t = 1. They were somewhat smaller than their non-distressed counterparts, were relatively more labor intensive, and possessed a less flexible and more costly labor force. Finally, they were less leveraged than non-distressed firms.

In Panel B of Table 1, we describe how the firms in our final sample reacted to financial distress. A substantial proportion restructures debt: 32 % experienced a reduction in their total debt exposure, 39 % a reduction in bank debt, and 11 % an

extension in the maturity of bank debt. Regarding operational actions, we have that 11 % sold 10 % or more of their assets, 47 % negotiated wage cuts, and 21 % reduced employment by 10 % or more.

Kang and Shivdasani (1997) analyze the operational responses to performance declines for a sample of Japanese firms and a sample of U.S. firms. They find that for their sample Japanese firms experiencing financial distress: 4 % sell assets, 17 % reduce employment, and 5.4 % negotiate pay cuts. Likewise, they find that for their sample of U.S. firms: 36.8 % sell assets, 31.6 % reduce their workforce, and 6.1 % negotiate pay cuts. Comparing these results to those in Panel B of Table 1 is complicated because of the various differences in the definition of variables. Yet, two conclusions emerge. First, Spanish firms' operational responses to distress are similar to those of their Japanese and U.S. counterparts. Second, concerning employment, Spanish firms appear to be less prone to cut employment than U.S. firms, but more than Japanese firms. This may simply reflect the different degrees of flexibility of their respective labor markets.

## D. Sources of financial distress

As pointed out by Asquith, Gertner and Scharfstein (1994), firms may experience financial distress for three different reasons: (i) a high interest expense, (ii) a poor operating performance relative to other companies in the industry, and (iii) an industry downturn. In order to assess the relative importance of these factors in causing financial distress, we make the following calculations:

1) *Leverage effect*: the increase in cash flow (defined as EBITA less interest expense) at $t = 1$ had the firm the same ratio of interest expense to total assets as the median firm in its sector.

2) *Firm operating performance effect*: the increase in cash flow at $t = 1$ had the firm the same ratio of EBITA to total assets as the median firm in its sector.

3) *Industry operating performance effect*: the increase in cash flow at $t = 1$ had the firm the same ratio of EBITA to total assets relative to its sector, but the sector did as well as it did at $t = 0$.

To evaluate the relative importance of each factor for a given firm, we divide its cash flow change attributable to each factor by its total cash flow change. Table 2 shows that the firm operating performance factor is the most important one in causing financial

distress: poor firm operating performance is the first cause of distress for 886 firms (out of 930 financially distressed firms) and accounts for 96.12 % of the shortfall in firms' cash flows. The other two factors are much less important: leverage is the primary cause of distress for 42 firms and poor industry performance is the first cause of distress for only 2 firms in our sample. Thus, our sample of financially distressed firms mainly suffers from economic distress and only 42 firms are in financial distress for exclusively financial reasons.[17]

This is consistent with the descriptive results in Panel A of Table 1, showing that financially distressed firms are less indebted and at a lower cost than non-distressed firms. Firms experiencing financial distress in our sample are labor intensive, pay high wages and face large firing costs. Consequently, there are greatly exposed to economic problems, such as a decline in the demand for their products.

## E. Contingency analysis

Before we undertake a multivariate analysis of the employment implications of debt restructuring for our sample of financially distressed firms, we conduct a series of contingency analyses to better understand the statistical relationship between layoffs and the other main variables of interest (described in section IV.A.). That is, we test whether the proportion of firms that lay off 10 percent or more of their labor force increases or decreases as a result of financial distress, or when distressed firms restructure their debt, or sell part of their assets, or negotiate wage concessions. This preliminary statistical analysis will guide us in the formulation and interpretation of the multivariate regression models described in the next section.

Table 3 presents the results of our contingency analyses. In Panel A, we report the contingency table for LAYOFFS and financial distress, where it can be observed that the proportion of firms cutting employment (i.e. firms for which the variable LAYOFFS takes a value of 1) is significantly larger for firms in distress than for non-distressed firms. These percentages are 21.40 % and 14.03 %, respectively. Thus, the evidence seems to confirm our claim that financial distress may trigger substantial reductions in employment.

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[17] These results are in line with obtained by Asquith, Gertner and Scharfstein (1994), who also find that their sample financially distressed firms "suffered principally from economic distress."

In Panel B, we present three contingency tables to study the statistical relationship between the variable LAYOFFS and our three dummies for debt restructuring: TOTAL DEBT REDUCTION, BANK DEBT REDUCTION and BANK DEBT EXTENSION. We find that there is a statistically significant association between LAYOFSS and both TOTAL DEBT REDUCTION and BANK DEBT REDUCTION. That is, the proportion of firms cutting employment by 10 % or more is significantly larger at firms whose debt is reduced from t = 0 to t = 1. This is not the case if we, instead, relate LAYOFFS with the variable BANK DEBT EXTENSION. Yet, if we look at Panel C, we observe that an extension in the maturity of bank debt leads to a significantly larger proportion of firms firing 10 % or more of their labor force, when we condition on the sub-sample of firms that experience a reduction in their total debt. This, however, is not true if instead we condition on the sub-sample of firms that reduce their bank debt or on firms whose total debt exposure is not reduced.

Finally, Panel D shows two contingency tables relating the variable LAYOFFS with our dummies ASSET SALES and WAGE CONCESSIONS. We find that the proportion of firms reducing employment by 10 % or more is significantly larger for firms whose gross fixed assets fall by 10 % or more (i.e. the dummy ASSET SALES takes a value of 1). It seems, therefore, that there is some complementarity between employment reductions and asset sales.[18] But, as we saw in the previous panels, assets sales are not the only variable with a significant relationship to layoffs.

In contrast, the proportion of firms reducing employment by 10 % or more is significantly smaller for firms that negotiate a reduction in its unit labor costs (i.e. the dummy WAGE CONCESSIONS takes a value of 1). Wage concessions appear to be a substitute for employment reductions from the viewpoint of firms in distress.

## V. Regression analysis

### A. Univariate logit regressions

Table 4 presents logit regressions (with robust standard errors) of the probability that a firm in financial distress cuts its employment by 10 % or more (LAYOFFS) on our

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[18] Kang and Shivdasani (1997) also report a positive relationship between layoffs and asset sales for their sample of Japanese firms.

main explanatory variables: the three proxies for debt restructuring (TOTAL DEBT REDUCTION, BANK DEBT REDUCTION and BANK DEBT EXTENSION), the dummy ASSET SALES, and the dummy WAGE CONCESSIONS. In these regressions, we introduce various real and financial controls, as well as a time and sector control. These regressions are conducted on our final sample of 930 financially distressed firms.

In Columns 1 and 2 of Table 4, we just introduce our main explanatory variables as regressors. But since the variables TOTAL DEBT REDUCTION and BANK DEBT REDUCTION are highly correlated, we introduce them separately in Columns 1 and 2 respectively. The results confirm the contingency analysis developed in the previous section. Employment cuts of 10 % or more are (significantly) more likely for distressed firms selling assets and for firms that do not obtain wage concessions from their workers. Most importantly, we find that the three debt restructuring dummies (TOTAL DEBT REDUCTION, BANK DEBT REDUCTION and BANK DEBT EXTENSION) have a positive and highly significant effect on the probability of substantial reductions in employment.

In Columns 3 and 4, we repeat the analysis of the previous two equations, but we include two additional variables controlling for the firms' capital structure (as proxied by the total debt to total assets ratio), and the cost of capital (measured by the ratio of interest expenses to total debt) at t = 0. The results for our main explanatory variables remain unchanged. In addition, we observe that the probability of a non-marginal employment reduction is significantly larger, the larger is the cost of capital. However, it appears that more leveraged firms do not necessarily adjust employment more. (These results are unchanged when we introduce these two controls separately. They also remain unchanged when we replace the total debt to total assets ratio with alternative measures of firm's leverage, such as the ratio of short-term debt to total assets, the ratio of long-term debt to total assets and the ratio of short-term debt to total debt.) [19]

Finally, Columns 5 and 6 present the results of logit regressions like those in the previous columns but including other (real) controls, such as the proportion of temporary workers in the labor force, the capital-labor ratio, the log of total assets, and the return on assets at t = 0. In addition, we include the control variable SECTOR AND

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[19] These results are in sharp contrast to Ofek's (1993). He finds a positive and statistically significant relationship between a firm's leverage and the probability of substantial layoffs. Other papers finding a positive relation between leverage and employment at the firm level are Sharpe (1994),and Hanka (1998), to cite just a few. In contrast, Kang and Shivdasani (1997) do not find any relationship between layoffs and leverage for a sample of Japanese firms experiencing performance declines.

TIME which, for each observation, is equal to the percentage of firms reducing employment by 10 % or more in the same year and the same sector. This percentage is calculated using our intermediate sample, which comprises both financially distressed and non-distressed firms.

Introducing these new controls does not affect the sign and significance of the variables included in previous columns. Thus, the evidence presented so far qualitatively validates the predictions of the agency costs theory described in section III.

To evaluate the quantitative importance of the impact of the debt restructuring dummies on employment and, consequently, of the agency costs of debt, we present in Panel A of Table 5 the changes in the odd ratios associated with a shift from 0 to 1 in the value of each of these dummies. This is a standard measure that is, by construction, invariant to the values taken by the remaining controls. The odd ratio is defined as the ratio of the probability of an employment reduction involving 10 % or more of the labor force (that is, $Pr\{LAYOFFS = 1\}$) to its complement probability ($Pr\{LAYOFFS = 0\}$). The numbers reported in Panel A of Table 5 are equal to the odd ratio when the corresponding dummy takes the value of 1 divided by the odd ratio when it is 0. All these numbers exceed 1, which simply reflects that all debt-restructuring dummies have a positive impact on the likelihood of employment reductions. Furthermore, we observe that bank debt extensions appear to have a quantitatively more important impact on the employment decisions of distressed firms than debt reductions. Finally, the changes in the odd ratios associated with changes in the debt restructuring dummies can be compared with the change in the odd ratio between firms in financial distress and non-distressed firms. From Panel A in Table 3, we have that this last ratio is equal to 1.67. Thus, the impact on employment of our debt restructuring variables is, at least, of a similar order of magnitude than the impact of financial distress.

An alternative way of quantifying the impact of a debt restructuring on employment is to consider how the estimated probability of substantial layoffs changes in response to our debt restructuring proxies for the median firm in our sample of financially distressed firms (see Panel A of Table 1). This is reported in Panel B of Table 5. There, we observe that the probability of reducing employment by 10 % or more for the median firm when it is not involved in a debt restructuring is approximately 20%. This probability raises up to 26% if there is a bank debt reduction, 31% if the firm experiences a total debt reduction and to more than 31% if there is a bank debt extension. Thus, the impact on employment of a debt restructuring appears to

be quite large. Also, in line with our previous results using odd ratios, bank debt extensions have a larger effect on employment than debt reductions do.

Focusing on the new control variables introduced in Columns 5 and 6 of Table 4, we have that the probability of substantial reductions in employment following financial distress is significantly larger for firms with a higher proportion of temporary workers. Of course, this is because in Spain temporary workers are not entitled to severance payments. These payments, which are necessarily incurred when firing fixed-term employees, are very high (in fact they rank among the highest for OECD countries). A larger proportion of temporary workers thus implies a more "flexible" labor force.

Size also affects the probability of reducing employment in response to financial distress: it has a significantly negative effect.[20] In Columns 5 and 6, size is measured by the log of total assets. In an unreported regression, we have replaced the log of net fixed assets (or tangible assets) for the log of assets. The result remains unchanged: an increase in tangible assets has a significant negative impact on the probability of layoffs. This last result admits an alternative interpretation, however. Tangible assets are by and large collateralizable. Therefore, a firm with more tangible assets is a better risk from the point of view of its creditors, who may accept to restructure their claims in exchange of collateral without conditioning on operational actions such as layoffs.

We also control for performance, measured by the return on assets (ROA). As it could be expected, substantial layoffs are more likely for firms who perform relatively worse, even within the subset of distressed firms. Similar results are obtained if we use an alternative measure of operating performance: the ratio of EBITA to total assets.[21]

Furthermore, Columns 5 and 6 control for time and sector. This control is statistically significant and, hence, it is important to take it into account. We replicated all regressions in Table 4 including both time dummies and sector dummies. The sign and significance of the variables in Table 4 remain unchanged. We also run our regressions with some regressors expressed as the deviation from the industry median for that year.[22] Again, nothing of substance changes.

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[20] This contrasts with the results of Ofek (1993) and Kang and Shivdasani (1997), where size is found to be positively correlated with the incidence of layoffs. This relation is significant for the Japanese firms studied by Kang and Shivdasani (1997), but not significant for the U.S. sample of firms considered by Ofek.

[21] Kand and Shivdasani (1997) obtain similar results. Ofek (1993) also finds a negative relationship between layoffs and performance, but it is not statistically significant.

[22] This transformation is done for all regressors, except the dummy variables for which it would not be meaningful.

For all regressions in Table 4, we calculated the Hosmer-Lemeshow goodness-of-fit test. The test shows that the regressions in the first two columns do not adjust very well to the data. In contrast, the test is met satisfactorily for the regressions reported in Columns 3 to 6, where we control for the real and financial characteristics of firms. That is, we cannot reject the null hypothesis that the models in Columns 3 to 6 described the data appropriately.

## B. Endogeneity problems

A potential problem with the regressions in Table 4 is that the dummy variables TOTAL DEBT REDUCTION, BANK DEBT REDUCTION, BANK DEBT EXTENSION, ASSET SALES, and WAGE CONCESSIONS may all be endogenous. For example, the theoretical analysis in section III indicates that both employment and wages are endogenously determined. If employment was hard to adjust because of, for instance, high firing costs, then the distressed firm would be compelled to negotiate wage reductions or else go bankrupt. A similar problem may arise with the other explanatory dummy variables. In this subsection, we show that, although these endogeneity problems constitute a legitimate concern, they have no bearing on our empirical results.

We tackle the possible endogeneity of WAGE CONCESSIONS by substituting the ratio of labor costs to employment at $t = 0$ for this dummy. Indeed, these two variables have a significantly positive correlation. Not surprisingly, as we can see from Table 6, the ratio of labor costs to employment at $t = 0$ has a significantly negative impact on the probability of layoffs. This is the same qualitative impact than WAGE CONCESSIONS had. Furthermore, and most importantly, all our other results remain unchanged.

Unfortunately, coping with the potential endogeneity of the remaining dummy variables is not so simple. ASSET SALES are not correlated with the log of assets at $t = 0$, and there is no other variable in our data set that *a priori* may constitute a good proxy for it. Similarly, it is unclear how one could meaningfully proxy the debt restructuring dummies with lagged variables of the firm's capital structure. Consequently, we will adopt the following econometric strategy.

First, we estimate a bivariate logit for the joint probability of LAYOFFS and TOTAL DEBT REDUCTION for a sub-sample of financially distressed firms with no asset sales and enjoying no bank debt extension. Obviously, estimating the joint probability takes care of the possible endogeneity of the two events: LAYOFFS and TOTAL DEBT REDUCTION. Furthermore, by focusing on this sub-sample we can successfully control for ASSET SALES and BANK DEBT EXTENSION. The bivariate logit is estimated as a multinomial logit model (see Amemiya, 1985), using the same external controls as in Table 6.

This estimation strategy allows us to calculate, for firms in this sub-sample, both the conditional probability of an employment reduction of 10 % or more given that the firm experiences a total debt reduction, and the corresponding conditional probability when the firm's total debt is not reduced. This comparison tells us what is the impact of a total debt reduction on the employment decisions of firms in distress, once possible endogeneity problems are controlled for.

From Panel A in Table 7, we have that the conditional probability of an employment reduction of 10 % or more given that the firm experiences a total debt reduction is equal to 25 %, whereas the corresponding conditional probability when the firm's total debt is not reduced is just 16 %. The difference between these two probabilities is significant at the 1 % level.

Similarly, we estimate a bivariate logit for the joint probability of LAYOFFS and BANK DEBT REDUCTION for a sub-sample of financially distressed firms with no asset sales and undergoing no bank debt extension. We then calculate the conditional probability of an employment reduction of 10 % or more given that the firm experiences a bank debt reduction, which is equal to 23 %, and the corresponding conditional probability when the firm's bank debt is not reduced, which equals 15 %. (See Panel B in Table 7.) This difference is also significant at the 1 % level. Thus, the effect of a bank debt reduction on the employment decisions of firms in distress, even when controlling for endogeneity, remains large.

Finally, we repeat the same procedure to evaluate the impact of a bank debt extension on employment for financially distressed firms. The only difference is that, in this case, to estimate the joint probability of LAYOFFS and BANK DEBT EXTENSION, we condition on the sub-sample of distressed firms with no assets sales and experiencing no debt reductions. From Panel C in Table 7, we have that the conditional probability of an employment reduction of 10 % or more given that the firm

experiences a bank debt extension is equal to 16 %, whereas the corresponding conditional probability when the maturity of the firm's bank debt is not extended is just 13%. The difference between these two probabilities is again significant at the 1% level. So, bank debt extensions have a large and significant effect on the employment decisions of firms in distress, even controlling for endogeneity. Yet, in contrast with the univariate regression analysis above, its quantitative impact is less than that of debt reductions.

## VI. The impact of layoffs on operating performance

So far, we have found evidence of a relationship between debt restructuring and layoffs for firms in financial distress. A related question is the extent to which layoffs and debt restructuring actions improve operating performance for firms experiencing financial problems. In what follows, we address this question by analyzing the change (from $t = 1$ to $t = 2$ and from $t = 1$ to $t = 3$) in three measures of operating performance: return on assets (ROA), the interest coverage ratio (i.e. the ratio of EBITA to interest expense), and the ratio of EBITA to total assets. More precisely, for each distressed firm we calculate each of these measures at $t = 1$, $t = 2$ and $t = 3$ relative to the corresponding value for the median firm in its sector in that year. Then, we use these calculations to evaluate the change in operating performance relative to sector and time.

As a benchmark for comparison we take the average change in these measures for the group of distressed firms that do not adjust employment significantly. We, then, compare this benchmark to the average change in the operating performance measures for the subset of distressed firms that (a) cut employment, (b) cut employment and reduce their total debt, (c) reduce employment and their bank debt, and finally, (d) reduce employment and extend the maturity of bank debt.

The results of this analysis are shown in Table 8. First, we observe that there is a (relative) improvement in operating performance for our financially distressed firms. This is true irrespective of how we measure performance and of the precise actions undertaken in response to financial distress. These changes may appear to be very large in size, but one should keep in mind that the firms in our sample experienced declines in their interest coverage ratio of more than 100 % from $t = 0$ to $t = 1$. Indeed, in an

unreported Table, we find that while these firms perform better than the industry median in periods t = -1 and t = 0, they do worse than the industry in periods 1, 2 and 3.

Most importantly, as a general rule, there does not appear to be any significant difference in operating performance between firms that do not adjust employment and firms that cut employment substantially and/or restructure financially. The only exception to this statement can be found in Column 3 of Panel A and Columns 2 and 3 of Panel B. In Column 3 of Panel A, we have that distressed firms that cut employment and reduce bank debt exhibit superior performance with respect to the benchmark group when we restrict attention to the interest coverage ratio and the ratio of EBITA to total assets. A similar result is obtained in Column 3 of Panel B when, instead, we focus on ROA and the interest coverage ratio. Finally, in Column 2 of Panel B, we observe that distressed firms cutting employment and experiencing a total debt reduction perform better than those that do not adjust employment when using the interest coverage ratio. Notice that employment cuts are only associated to superior performance for firms that see their (bank or total) debt reduced.[23] [24]

## A. Interpreting the evidence

Under the assumptions of the simple model developed in section III, the optimal employment level $N^*$ is such that $E\{pX'(N^*)\} = \partial(w(N^*)N^*)/\partial N$, where $w(N^*)$ is determined using equation (2) above. Therefore, efficient hiring requires equalizing the marginal cost of increased employment to its (unconditional) average marginal revenue. It is immediate from this last equation and equations (1) and (3) above that $N_c < N^* < N_s$. That is, relative to the first-best level, shareholders tend to hire in excess, whereas creditors employ too few workers. Furthermore, it is easy to see that as the face value of debt B falls, shareholders' employment choice $N_s$ converges to the optimal employment level $N^*$.

Hence, the model predicts that a debt restructuring that consists of a significant reduction in the debt-equity ratio would lead to improved performance, at least insofar

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[23] The results on operating performance in Table 8 remain largely unchanged even if we correct for normal mean reversion in operating performance measures (see Barber and Lyon, 1996, and Denis and Kruse, 1998).

[24] The international evidence on the impact of layoffs on operating performance is mixed. Denis and Kruse (1998) find no significant effect of employment reduction on stock prices for their sample of US Compustat firms. In contrast, for a sample of Japanese firms in distress, Kang and Shivdasani (1997) find that layoffs lead to improved performance.

as shareholders retained control of the employment decisions. However, if creditors successfully imposed their preferences on employment by conditioning the debt restructuring on operational actions, we might switch from over-employment to under-employment with no clear-cut prediction on performance.

In conclusion, using the model in section III, we could interpret the evidence on the evolution of operating performance as suggesting that the employment reductions undertaken by our sample of distressed firms could have been imposed by creditors as part of the restructuring deal. Under this interpretation, the changes in the level of employment might simply reflect a change in the preferences under which employment is decided and not a move towards greater efficiency. Further research is needed to discriminate between this theory and other alternative explanations, but this exceeds the scope of this paper.

## VII. Conclusion

We have presented clear-cut evidence that debt restructuring triggers substantial employment reductions in financially distressed firms. Employment falls as the firm's debt exposure is reduced, but also as a result of extensions in the maturity of debt. The first effect is consistent with the prediction of the agency theory of debt that a lower debt-equity ratio should lead to the choice of less risky projects. The second effect is also consistent with this theory and it may reflect the change in the bargaining power of shareholders and creditors resulting from financial distress.

These empirical results are derived for a sample of 4,566 Spanish manufacturing firms for the period 1983-1994. This sample is set up using a database provided by the Bank of Spain containing the balance sheets and profit and loss accounts of 7,846 Spanish firms for this period. This is a rich database, which is used by the bank of Spain to monitor the impact of macroeconomic policy and of credit conditions on the Spanish non-financial sector. Our sample is well suited for the purposes of our analysis. These firms have simple capital structures, often involving only bank debt and equity, which makes it simple to analyze the agency costs of debt. In these firms, ownership and control rests in the same hands. In addition, they hire from a highly rigid labor market, where adjustments in employment represent non-trivial decisions, even for firms in financial distress.

# Appendix

Proof of Proposition 1: Given that we restricted attention to F(.) functions for which second-order conditions are satisfied, and since $\partial(w_s(N)N)/\partial N$ is independent of B, it is enough to show that:

$$\partial E\{pX'(N) \mid p > p_s(N)\}/\partial B =$$

$$-(\partial p_s(N)/\partial B) [p_s(N)X'(N) - \partial(w_s(N)N)/\partial N]f(p_s(N)) > 0,$$

which follows since, for all N, we have that:

(i) $\partial p_s(N)/\partial B > 0$,

(ii) $[p_s(N)X'(N) - \partial(w_s(N)N)/\partial N] < 0$, and

(iii) $f(p) = \partial F(p)/\partial p > 0$, for all p.


Proof of Proposition 2: First, since $w_c(N) \equiv w_s(N) \equiv w(N)$, we have that $\partial(w_s(N)N)/\partial N$ $\equiv \partial(w_c(N)N)/\partial N$. Hence, it follows from the inequality in (5) that

$$E\{pX'(N_s) \mid p_c(N_s) < p < p_s(N_s)\} < \partial(w_c(N_s)N_s)/\partial N.$$

Given our restrictions on the set of feasible distribution functions, it follows that $N_c < N_s$. Then, from equations (2) and (4) it is immediate that $w_s \equiv w(N_s) > w(N_c) \equiv w_c$.

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# Table 1
## Data description

This sample has been set up using a database provided by the Bank of Spain. We exclude from the sample utilities, state-owned firms, firms that were taken over, firms that divested part of their lines of business, firms that changed their lines of business from one sector to another or firms with no interest expenses. The definition of financial distress is based on an interest coverage ratio (EBITA/interest expenses). EBITA denotes earnings before interest, taxes and amortization. We denote as t = 0 the pre-distress period; t = 1 is the period of financial distress; t = 2 denotes the post-distress period. All variables are winsorized at both the upper and lower 1% tails. All nominal variables are denoted in Spanish currency (in millions of Pesetas), and deflated using the 1986 Spanish GDP Price Index.

### Panel A
### Summary statistics for a sample of 4,566 Spanish firms (1983-1994)

| | Mean | | Test of Means [b] | Median | | Test of Medians [c] |
|---|---|---|---|---|---|---|
| | Financial distress | No financial distress | p-value | Financial distress | No financial distress | p-value |
| **Real Variables** | | | | | | |
| Total sales (t=0) | 2,711.15 | 2,666.47 | 0.83 | 643.50 | 799.00 | 0.00 |
| Total assets (t=0) | 2,621.11 | 2,375.25 | 0.28 | 493.00 | 576.00 | 0.00 |
| Employment (t=0) | 166.12 | 158.72 | 0.54 | 45.50 | 51.00 | 0.11 |
| Temporary workers/Employment (t=0) | 0.09 | 0.11 | 0.00 | 0.00 | 0.01 | 0.01 |
| Labor costs/ Employment (t=0) | 2.45 | 2.34 | 0.00 | 2.28 | 2.18 | 0.00 |
| Net Fixed assets/Employment (t=0) | 3.07 | 3.43 | 0.04 | 1.39 | 1.73 | 0.00 |
| Change in employment from t=0 to t=1 (%) | 0.12 | 2.87 | 0.00 | 0.00 | 0.00 | 0.00 |
| Change in gross fixed assets from t=0 to t=1 (%) | 4.89 | 7.07 | 0.02 | -2.12 | 0.06 | 0.00 |
| | | | | | | |
| **Interest Coverage Ratio** | | | | | | |
| EBITA/Interest expenses (t=0) | 6.27 | 6.19 | 0.82 | 3.25 | 2.70 | 0.00 |
| EBITA/Interest expenses (t=1) | -0.43 | 6.60 | 0.00 | 0.03 | 2.89 | 0.00 |
| EBITA/Interest expenses (t=2) | 2.04 | 6.68 | 0.00 | 1.24 | 2.87 | 0.00 |
| | | | | | | |
| **Financial Variables** | | | | | | |
| Total debt [a] /Total assets [a] (t=0) | 0.30 | 0.39 | 0.00 | 0.28 | 0.39 | 0.00 |
| Total debt/Total assets (t=0) | 0.53 | 0.60 | 0.00 | 0.53 | 0.62 | 0.00 |
| Total bank debt/Total debt [a] (t=0) | 0.82 | 0.86 | 0.00 | 1.00 | 1.00 | 0.00 |
| Interest expenses/ Total assets (t=0) | 0.04 | 0.05 | 0.00 | 0.03 | 0.04 | 0.00 |
| Interest expenses/ Total debt [a] (t=0) | 0.29 | 0.27 | 0.09 | 0.16 | 0.17 | 0.05 |
| Liquidity ratio (t=0) | 1.85 | 1.55 | 0.00 | 1.50 | 1.30 | 0.00 |
| Change in liquidity ratio from t=0 to t=1 (%) | -4.93 | 7.15 | 0.00 | -10.25 | 2.16 | 0.00 |
| | | | | | | |
| **Number of observations** | 930 | 33,372 | | 930 | 33,372 | |

Notes:
[a] Trade credit not included.
[b] t-test for significant differences of the means of the distressed and non-distressed groups of firms.
[c] test for the hypothesis that both independent samples (distressed firms and non-distressed firms) are from populations with the same distribution using the Mann-Whitney two-sample statistic.

# Table 1
## Data description (cont.)

### Panel B
### Responses to financial distress
### for a sample of 930 Spanish financially distressed firms

The dummy TOTAL DEBT REDUCTION takes the value of 1 if the ratio of the book value of total debt to the book value of total assets falls from $t = 0$ to $t = 1$, and it is 0 otherwise. The dummy variable BANK DEBT REDUCTION takes the value of 1 if the book value of bank debt decreases from $t = 0$ to $t = 1$, and it is 0 otherwise. The dummy variable BANK DEBT EXTENSION is equal to 1 when the firm's bank debt maturity is extended. The dummy variable ASSET SALES is equal to 1 if the firm is reducing its gross fixed assets by 10 % or more from $t = 0$ to $t = 1$, and it is 0 otherwise. The dummy variable WAGE CONCESSIONS equals 1 if the ratio of labor costs to employment falls in the distress period and it is 0, otherwise. The dummy variable LAYOFFS takes a value of 1 if the firm cuts its labor force by 10 % or more, and 0 otherwise

| Response to financial distress | Number of occurrences | Rate of occurrences (%)[a] |
|---|---|---|
| **Debt restructuring** | | |
| Total debt reduction | 298 | 32 |
| Bank debt reduction | 361 | 39 |
| Bank debt extension | 98 | 11 |
| | | |
| **Operational actions** | | |
| Asset sales | 98 | 11 |
| Wage concessions | 437 | 47 |
| Layoffs | 199 | 21 |

Note:
[a] The rate of occurrence is the ratio between the number of occurrences of a certain response to financial distress and the number of observations in the sample (930).

# Table 2

## Normalized sources of financial distress

Following Asquith, Gertner and Scharfstein (1994), normalized sources of financial distress are calculated dividing the cash flow change attributable to each factor (leverage, firm operating performance, industry operating performance) by the total cash flow change. The sample of 930 financially distressed firms has been set up using a database provided by the Bank of Spain. The definition of financial distress is based on an interest coverage ratio (EBITA/interest expenses). EBITA denotes earnings before interest, taxes and amortization. We exclude from the sample utilities, state-owned firms, firms that were taken over, firms that divested part of their lines of business, firms that changed their lines of business from one sector to another or firms with no interest expenses. All variables are winsorized at both the upper and lower 1% tails. All nominal variables are denoted in Spanish currency (in millions of Pesetas), and deflated using the 1986 Spanish GDP Price Index.

| Factor | Mean | Standard Deviation | Number of firms with primary cause |
|---|---|---|---|
| Leverage | -0.0004 | 0.3208 | 42 |
| Firm operating performance | 0.9612 | 0.4124 | 886 |
| Industry operating performance | 0.0392 | 0.2089 | 2 |

| Number of observations | 930 |
|---|---|

# Table 3
# Contingency analysis

The sample has been set up using a database provided by the Bank of Spain. We exclude from the sample utilities, state-owned firms, firms that were taken over, firms that divested part of their lines of business, firms that changed their lines of business from one sector to another or firms with no interest expenses. The definition of financial distress is based on an interest coverage ratio (EBITA/interest expenses). EBITA denotes earnings before interest, taxes and amortization. All variables are winsorized at both the upper and lower 1% tails. All nominal variables are denoted in Spanish currency (in millions of Pesetas), and deflated using the 1986 Spanish GDP Price Index.

## Panel A
## Layoffs and financial distress for a sample of 4,566 Spanish firms (1983-1994)

| Frequencies (%) | No Financial Distress | Financial Distress | Total sample |
|---|---|---|---|
| No Layoffs | 85.97 | 78.60 | 85.74 |
| Layoffs | 14.03 | 21.40 | 14.26 |
| $N^b$ | 28,761 | 930 | 29,691 |
| Pearson [c] | | 40.00  (0.00)[a] | |

Notes:
[a] p-value is shown in parenthesis
[b] Total number of observations
[c] Pearson's $\chi^2$ for the hypothesis that layoffs and financial distress are statistically independent

## Panel B
## Layoffs and debt restructuring for a sample of 930 Spanish financially distressed firms

| Frecuencies (%) | No total debt reduction | Total debt reduction | No bank debt reduction | bank debt reduction | No bank debt extension | Bank debt extension | Total |
|---|---|---|---|---|---|---|---|
| No Layoffs | 81.01 | 73.49 | 82.28 | 75.90 | 79.21 | 73.47 | 78.60 |
| Layoffs | 18.99 | 26.51 | 17.72 | 24.10 | 20.79 | 26.53 | 21.40 |
| $N^b$ | 632 | 298 | 429 | 361 | 832 | 98 | 930 |
| Pearson[c] | 6.81  (0.00)[a] | | 4.87 (0.02)[a] | | 1.71  (0.19)[a] | | |

Notes:
[a] p-value is shown in parenthesis.
[b] Total number of observations
[c] Pearson's $\chi^2$ for the hypothesis that layoffs and debt restructuring proxies are statistically independent.

# Table 3
## Contingency analysis (cont.)

### Panel C
### Bank debt extension, total debt reduction and layoffs
### for a sample of 930 Spanish financially distressed firms

| LAYOFFS Frecuencies (%) | No total debt reduction | Total debt reduction | Pearson [d] |
|---|---|---|---|
| No bank debt extension | 18.75 | 25.00 | 4.34 (0.03) [a] |
| $N^b$ | 560 | 272 | |
| Bank debt extension | 20.83 | 42.30 | 4.51 (0.03) [a] |
| $N^b$ | 72 | 26 | |
| Pearson [c] | 0.18 (0.67) [a] | 3.64 (0.05) [a] | |

Notes:
[a] p-value is shown in parenthesis
[b] Total number of observations
[c] Pearson's $\chi^2$ for the hypothesis that layoffs and bank debt extension are statistically independent.
[d] Pearson's $\chi^2$ for the hypothesis that layoffs and total debt reduction are statistically independent.

### Panel D
### Layoffs, asset sales, and wage concessions for a sample of
### 930 Spanish financially distressed firms

| Frecuencies (%) | No asset sales | Asset sales | No wage concessions | Wage concessions | Total |
|---|---|---|---|---|---|
| No Layoffs | 80.00 | 66.33 | 67.75 | 90.85 | 78.60 |
| Layoffs | 20.00 | 33.67 | 32.25 | 9.15 | 21.40 |
| $N^b$ | 825 | 98 | 493 | 437 | 930 |
| Pearson [c] | 9.71 (0.00) [a] | | 73.48 (0.00) [a] | | |

Notes:
[a] p-value is shown in parenthesis
[b] Total number of observations
[c] Pearson's $\chi^2$ for the hypothesis that layoffs and asset sales and layoffs and wage concessions are statistically independent.

# Table 4
## Determinants of layoffs: logit regressions for a sample of 930 Spanish financially distressed firms

The dependent variable is a dummy variable (LAYOFFS) that takes the value of 1 if the firm cuts its labor force by 10% or more, and 0 otherwise. The sample of 930 financially distressed firms has been set up using a database provided by the Bank of Spain. The definition of financial distress is based on an interest coverage ratio (EBITA/interest expenses). EBITA denotes earnings before interest, taxes and amortization. We denote as t = 0 the pre-distress period. We exclude from the sample utilities, state-owned firms, firms that were taken over, firms that divested part of their lines of business, firms that changed their lines of business from one sector to another or firms with no interest expenses. All variables are winsorized at both the upper and lower 1% tails. All nominal variables are denoted in Spanish currency (in millions of Pesetas), and deflated using the 1986 Spanish GDP Price Index.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **Main variables** | | | | | | |
| Total debt reduction | $0.52^{***}$ | | $0.54^{***}$ | | $0.58^{***}$ | |
| | (0.18) | | (0.19) | | (0.20) | |
| Bank debt reduction | | $0.39^{**}$ | | $0.41^{**}$ | | $0.42^{**}$ |
| | | (0.18) | | (0.19) | | (0.19) |
| Bank debt extension | $0.58^{**}$ | $0.58^{**}$ | $0.61^{**}$ | $0.63^{**}$ | $0.70^{**}$ | $0.70^{**}$ |
| | (0.27) | (0.27) | (0.27) | (0.28) | (0.29) | (0.29) |
| Asset sales | $1.00^{***}$ | $0.96^{***}$ | $0.98^{***}$ | $0.97^{***}$ | $1.15^{***}$ | $1.12^{***}$ |
| | (0.25) | (0.27) | (0.27) | (0.28) | (0.28) | (0.29) |
| Wage concessions | $-1.69^{***}$ | $-1.47^{***}$ | $-1.59^{***}$ | $-1.49^{***}$ | $-1.60^{***}$ | $-1.50^{***}$ |
| | (0.20) | (0.21) | (0.21) | (0.21) | (0.21) | (0.22) |
| **Financial control variables (t = 0)** | | | | | | |
| Total debt/Total assets | | | 0.57 | 0.69 | 0.12 | 0.22 |
| | | | (0.45) | (0.50) | (0.49) | (0.54) |
| Interest Expenses/Total debt [a] | | | $0.48^{***}$ | $0.65^{***}$ | $0.34^{*}$ | $0.50^{**}$ |
| | | | (0.18) | (0.22) | (0.20) | (0.25) |
| **Real control variables (t = 0)** | | | | | | |
| Temporary workers/Employment | | | | | $2.00^{***}$ | $2.01^{***}$ |
| | | | | | (0.51) | (0.55) |
| Fixed net assets/Employment | | | | | -0.01 | -0.02 |
| | | | | | (0.02) | (0.02) |
| Log of total assets | | | | | $-0.21^{***}$ | $-0.17^{***}$ |
| | | | | | (0.06) | (0.06) |
| Return on assets (ROA) | | | | | $-3.24^{*}$ | -3.03 |
| | | | | | (1.90) | (1.91) |
| Sector and time control [b] | | | | | $2.52^{*}$ | $2.49^{*}$ |
| | | | | | (1.42) | (1.48) |
| Intercept | $-1.07^{***}$ | $-1.18^{***}$ | $-1.55^{***}$ | $-1.74^{***}$ | -0.44 | -0.88 |
| | (0.12) | (0.15) | (0.29) | (0.32) | (0.56) | (0.59) |
| **Number of observations** | 923 | 786 | 846 | 786 | 846 | 786 |
| **Hosmer-Lemeshow goodness of fit test [c]** | 21.7 [0.01] | 18.7 [0.04] | 846.0 [0.42] | 781.1 [0.47] | 813.2 [0.69] | 747.7 [0.74] |

*** Significant at 1%; ** Significant at 5%; *Significant at 10%; Robust standard errors are shown in parenthesis.
[a] Trade credit not included; [b] This variable, for each observation, is equal to the percentage of firms reducing employment by 10% or more in the same year and in the same sector (intermediate sample of 4566 firms). [c] p-value is shown in square brackets.

# Table 5
## The quantitative impact of debt restructuring
## on the probability of layoffs

The variable LAYOFFS takes the value of 1 if the firm cuts its labor force by 10% or more, and 0 otherwise. The sample of 930 financially distressed firms has been set up using a database provided by the Bank of Spain. The definition of financial distress is based on an interest coverage ratio (EBITA/interest expenses). EBITA denotes earnings before interest, taxes and amortization. We exclude from the sample utilities, state-owned firms, firms that were taken over, firms that divested part of their lines of business, firms that changed their lines of business from one sector to another or firms with no interest expenses. All variables are winsorized at both the upper and lower 1% tails. All nominal variables are denoted in Spanish currency (in millions of Pesetas), and deflated using the 1986 Spanish GDP Price Index.

## Panel A
### The change in the odd ratio in response to debt restructuring

The odd ratio is defined as the ratio of the probability of an employment reduction involving 10 % or more of the labor force (that is, Pr{LAYOFFS = 1}) to its complement probability (Pr{LAYOFFS = 0}). In this Panel, we present the change in the odd ratio associated with a shift from 0 to 1 in the value of each of the debt restructuring dummies. To calculate each odd ratio we use Columns (5) and (6) of Table 4.

| | Corresponding Columns in Table 4 used to compute the odd ratio | |
| --- | --- | --- |
| | (5) Change in the odd ratio | (6) Change in the odd ratio |
| **Main variables** | | |
| Total debt reduction | 1.78 | |
| Bank debt reduction | | 1.52 |
| Bank debt extension | 2.01 | 2.01 |

## Panel B
### The estimated probability of layoffs for the median firm
### in the sample of 930 Spanish financially distressed firms

The median firm in the sample of 930 Spanish distressed firms does not sale assets, does not make wage concessions, and has the median value for all the control variables used in Columns (5) and (6) of Table 4.

| | Corresponding Columns in Table 4 used to compute estimated probability of layoffs | |
| --- | --- | --- |
| | (5) Estimated probability of layoffs for the median firm (%) | (6) Estimated probability of layoffs for the median firm (%) |
| No Total debt reduction & No Bank debt extension | 19.96 | |
| **Total debt reduction** & No Bank debt extension | 30.79 | |
| No Total debt reduction & **Bank debt extension** | 33.44 | |
| No Bank debt reduction & No Bank debt extension | | 18.76 |
| **Bank debt reduction** & No Bank debt extension | | 25.99 |
| No Bank debt reduction & **Bank debt extension** | | 31.71 |

# Table 6
## Endogeneity problems (I): logit regressions for a sample of 930 Spanish financially distressed firms

The dependent variable is a dummy variable (LAYOFFS) that takes the value of 1 if the firm cuts its labor force by 10% or more, and 0 otherwise. The sample of 930 financially distressed firms has been set up using a database provided by the Bank of Spain. The definition of financial distress is based on an interest coverage ratio (EBITA/interest expenses). EBITA denotes earnings before interest, taxes and amortization. We denote as t = 0 the pre-distress period. We exclude from the sample utilities, state-owned firms, firms that were taken over, firms that divested part of their lines of business, firms that changed their lines of business from one sector to another or firms with no interest expenses. All variables are winsorized at both the upper and lower 1% tails. All nominal variables are denoted in Spanish currency (in millions of Pesetas), and deflated using the 1986 Spanish GDP Price Index.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **Main variables** | | | | | | |
| Total debt reduction | 0.49*** | | 0.53*** | | 0.51*** | |
| | (0.17) | | (0.18) | | (0.19) | |
| Bank debt reduction | | 0.38** | | 0.41** | | 0.41** |
| | | (0.18) | | (0.18) | | (0.19) |
| Bank debt extension | 0.35 | 0.38 | 0.41* | 0.44* | 0.52** | 0.53** |
| | (0.25) | (0.26) | (0.26) | (0.26) | (0.26) | (0.27) |
| Asset sales | 0.68*** | 0.63** | 0.63** | 0.63** | 0.81*** | 0.80*** |
| | (0.24) | (0.26) | (0.26) | (0.26) | (0.27) | (0.27) |
| Labor costs/ Employment | -0.30*** | -0.35*** | -0.38*** | -0.33*** | -0.28** | -0.25** |
| | (0.10) | (0.11) | (0.10) | (0.11) | (0.11) | (0.12) |
| **Financial control variables (t = 0)** | | | | | | |
| Total debt/Total assets | | | 0.26 | 0.41 | -0.09 | 0.03 |
| | | | (0.43) | (0.47) | (0.46) | (0.50) |
| Interest Expenses/Total debt [a] | | | 0.46*** | 0.60*** | 0.38** | 0.51** |
| | | | (0.17) | (0.23) | (0.18) | (0.24) |
| **Real control variables (t = 0)** | | | | | | |
| Temporary workers/Employment | | | | | 2.06*** | 1.99*** |
| | | | | | (0.49) | (0.51) |
| Fixed net assets/Employment | | | | | -0.01 | -0.02 |
| | | | | | (0.02) | (0.02) |
| Log of total assets | | | | | -0.13** | -0.10* |
| | | | | | (0.06) | (0.06) |
| Return on assets (ROA) | | | | | -2.83* | -2.69 |
| | | | | | (1.76) | (1.81) |
| Sector and time control [b] | | | | | 2.62** | 2.53* |
| | | | | | (1.33) | (1.40) |
| Intercept | -0.89*** | -0.85*** | -1.00*** | -1.30*** | -0.74 | -1.11** |
| | (0.25) | (0.29) | (0.36) | (0.40) | (0.52) | (0.55) |
| **Number of observations** | 923 | 786 | 846 | 786 | 846 | 786 |
| **Hosmer-Lemeshow goodness-of-fit test [c]** | 869.3 [0.60] | 748.3 [0.65] | 839.2 [0.49] | 775.6 [0.52] | 833.6 [0.49] | 763.2 [0.60] |

*** Significant at 1%; ** Significant at 5%; *Significant at 10%; Robust standard errors are shown in parenthesis.
[a] Trade credit not included; [b] This variable, for each observation, is equal to the percentage of firms reducing employment by 10 % or more in the same year and in the same sector (intermediate sample of 4566 firms). [c] p-value is shown in square brackets.

# Table 7
## Endogeneity problems (II)

The variable LAYOFFS takes the value of 1 if the firm cuts its labor force by 10% or more, and 0 otherwise. The sample of 930 financially distressed firms has been set up using a database provided by the Bank of Spain. The definition of financial distress is based on an interest coverage ratio (EBITA/interest expenses). EBITA denotes earnings before interest, taxes and amortization. We exclude from the sample utilities, state-owned firms, firms that were taken over, firms that divested part of their lines of business, firms that changed their lines of business from one sector to another or firms with no interest expenses. All variables are winsorized at both the upper and lower 1% tails. All nominal variables are denoted in Spanish currency (in millions of Pesetas), and deflated using the 1986 Spanish GDP Price Index.

## Panel A
## The estimated probability of layoffs conditional on a total debt reduction for a sub-sample of financially distressed firms with no asset sales and enjoying no bank debt extension.

We estimate a bivariate logit for the joint probability of LAYOFFS and TOTAL DEBT REDUCTION for a sub-sample of financially distressed firms with no asset sales and enjoying no bank debt extension. This bivariate logit is estimated as a multinomial logit model (see Amemiya, 1985), using the same external controls as in Table 6. This estimation strategy allows us to calculate, for firms in this sub-sample, both the conditional probability of layoffs given that the firm experiences a total debt reduction, and the corresponding conditional probability when the firm's total debt is not reduced.

| | Probability of layoffs conditional on: [a] |
|---|---|
| Total debt reduction | 25.84 |
| NO Total debt reduction | 16.60 |
| Number of observations | 667 |
| Test of Means [b] | 30.73 (0.00) |

Notes:

[a] Sample mean (%)

[b] t-test for significant differences of the probability of layoffs given that the firm experiences a total debt reduction and the probability of layoffs given that the firm's total debt is not reduced. p-value is shown in parenthesis.

# Table 7
## Endogeneity problems (II) (cont.)

### Panel B
### The estimated probability of layoffs conditional on a bank debt reduction for a sub-sample of financially distressed firms with no asset sales and enjoying no bank debt extension.

We estimate a bivariate logit for the joint probability of LAYOFFS and BANK DEBT REDUCTION for a sub-sample of financially distressed firms with no asset sales and enjoying no bank debt extension. This bivariate logit is estimated as a multinomial logit model (see Amemiya, 1985), using the same external controls as in Table 6. This estimation strategy allows us to calculate, for firms in this sub-sample, both the conditional probability of layoffs given that the firm experiences a bank debt reduction, and the corresponding conditional probability when the firm's bank debt is not reduced.

|  | Probability of layoffs conditional on: [a] |
|---|---|
| Bank debt reduction | 23.19 |
| NO Bank debt reduction | 15.78 |
| Number of observations | 667 |
| Test of Means [b] | 10.99 (0.00) |

Notes:
[a] Sample mean (%)
[b] t-test for significant differences of the probability of layoffs given that the firm experiences a bank debt reduction and the probability of layoffs given that the firm's bank debt is not reduced. p-value is shown in parenthesis.

### Panel C
### The estimated probability of layoffs conditional on a bank debt extension for a sub-sample of financially distressed firms with no asset sales and enjoying no debt reductions.

We estimate a bivariate logit for the joint probability of LAYOFFS and BANK DEBT EXTENSION for a sub-sample of financially distressed firms with no asset sales and enjoying no debt reductions. This bivariate logit is estimated as a multinomial logit model (see Amemiya, 1985), using the same external controls as in Table 6. This estimation strategy allows us to calculate, for firms in this sub-sample, both the conditional probability of layoffs given that the firm experiences a bank debt extension, and the corresponding conditional probability when the firm's bank debt is not extended.

|  | Probability of layoffs conditional on: [a] |
|---|---|
| Bank debt extension | 16.45 |
| NO Bank debt extension | 13.00 |
| Number of observations | 325 |
| Test of Means [b] | 3.91 (0.00) |

Notes:
[a] Sample mean (%)
[b] t-test for significant differences of the probability of layoffs given that the firm experiences a bank debt extension and the probability of layoffs given that the firm's bank debt is not extended. p-value is shown in parenthesis.

# Table 8
## The impact of layoffs on operating performance

This sample has been set up using a database provided by the Bank of Spain. We exclude from the sample utilities, state-owned firms, firms that were taken over, firms that divested part of their lines of business, firms that changed their lines of business from one sector to another or firms with no interest expenses. The definition of financial distress is based on an interest coverage ratio (EBITA/interest expenses). EBITA denotes earnings before interest, taxes and amortization. We denote as t = 0 the pre-distress period; t = 1 is the period of financial distress; t = 2 denotes the post-distress period. All variables are winsorized at both the upper and lower 1% tails. All nominal variables are denoted in Spanish currency (in millions of Pesetas), and deflated using the 1986 Spanish GDP Price Index.

## Panel A

| Change (%) from t = 1 to t = 2 in: | No layoffs | Layoffs | | Layoffs & Total debt reduction | | Layoffs & Bank debt reduction | | Layoffs & Bank debt extension | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean | Mean | p-value [b] | Mean | p-value[b] | Mean | p-value[b] | Mean | p-value[b] |
| Return on assets (ROA) [a] | 43.82*** | 39.66*** | 0.84 | 23.70 | 0.56 | 60.52*** | 0.41 | 53.88* | 0.76 |
| EBITA/Interest expenses [a] | 67.18*** | 83.61*** | 0.43 | 116.18*** | 0.25 | 119.50*** | 0.08 | 67.43** | 0.99 |
| EBITA/Total assets [a] | 44.42*** | 56.92*** | 0.38 | 41.68*** | 0.83 | 79.95*** | 0.07 | 123.37* | 0.27 |

Notes:
[a] We calculate this variable at t = 1 and t = 2 relative to the corresponding value for the median firm in its sector in that year (using the intermediate sample of 4,566 firms). Then, we use these calculations to evaluate the change in operating performance relative to sector and time.
[b] t-test for significant differences of the means of firms that do not adjust employment and firms that cut employment substantially and/or restructure financially.
*** Significant at 1%; ** Significant at 5%; *Significant at 10%;

## Panel B

| Change (%) from t = 1 to t = 3 in: | No layoffs | Layoffs | | Layoffs & Total debt reduction | | Layoffs & Bank debt reduction | | Layoffs & Bank debt extension | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean | Mean | p-value[b] | Mean | p-value [b] | Mean | p-value[b] | Mean | p-value[b] |
| Return on assets (ROA) [a] | 50.37*** | 45.67 | 0.90 | 15.77 | 0.70 | 94.95*** | 0.04 | 35.69 | 0.73 |
| EBITA/Interest expenses [a] | 103.75*** | 152.92*** | 0.28 | 263.14** | 0.07 | 164.22*** | 0.08 | 359.37 | 0.41 |
| EBITA/Total assets [a] | 76.72*** | 93.65*** | 0.53 | 55.38*** | 0.22 | 109.58** | 0.48 | 233.34 | 0.35 |

Notes:
[a] We calculate this variable at t = 1 and t = 3 relative to the corresponding value for the median firm in its sector in that year (using the intermediate sample of 4,566 firms). Then, we use these calculations to evaluate the change in operating performance relative to sector and time.
[b] t-test for significant differences of the means of firms that do not adjust employment and firms that cut employment substantially and/or restructure financially.
*** Significant at 1%; ** Significant at 5%; *Significant at 10%;