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Abstract

This paper analyses the impact of alternative measures of firms' financial health on their investment and employment decisions. The emphasis is on the analysis of disaggregated data on such financial indicators. For this purpose, itemised data from a sample of the non-financial firms reporting to the Banco de España Central Balance Sheet Data Office Annual Database for the period 1985-2001 is used. We find that corporate financial position -proxied by alternative indicators- affects business activity and that this impact is non-linear and becomes relatively more intense when financial pressure exceeds a certain threshold. We also construct, using different financial variables, composite indicators that summarize the non-linear impact that the financial position has on investment and employment. Our results suggest that the use of firm-level data is particularly relevant in episodes where the financial pressure on a significant number of firms reaches levels at which it has a pronounced influence on real activity. In these episodes, indicators based on aggregate data may not reliably reflect the system's financial soundness since they do not adequately reflect the vulnerability of the most fragile companies.

JEL Codes: C33, E22, G32, J23.
Key words: financial conditions; fixed investment; employment.

1 Introduction

The financial position of the corporate sector may influence the performance of the real economy and the stability of the financial system through its contribution to aggregate demand and its links to the banking system and capital markets. Thus, for instance, excessive indebtedness may restrict the ability of companies to access additional external funds and, as a consequence, it may adversely affect their expansionary capacity. In fact, adjustment by companies to changes in the financial pressure they face (for instance, as a result of a monetary policy shift) can potentially involve a wide range of activities, with the most prominent relating to their investment decisions, human resource policies and financial policies (see Benito and Young, 2002 or Benito and Hernando, 2002). Therefore, the analysis of the financial health of the corporate sector is an important ingredient for an adequate assessment of the macroeconomic outlook.

From the standpoint of identifying the risks to macroeconomic and financial stability, it should be borne in mind that basing the assessment of the financial position of companies on an analysis of aggregate sectoral indices may, while being informative, occasionally cover up vulnerabilities that only a study at a greater level of detail can reveal. In this sense, the implications for the financial strength of the Spanish corporate sector of the increasing debt ratios observed at an aggregate level (see Figure 1) may differ depending on the distribution of indebtedness across firms. Therefore, this paper investigates the impact of financial variables on real activity, placing the emphasis on the analysis of disaggregated data. In particular, making use of microeconometric methods (panel techniques) and itemised data from a sample of the non-financial firms reporting to the Banco de España Central Balance Sheet Data Office Annual Database for the period 1985-2001, we analyse the sensitivity of fixed investment and employment to a relatively broad set of indicators that are usually considered to characterise the financial position of firms. Among these, we include variables providing information on corporate profitability, financial burden and indebtedness (or leverage).

In our view, the main value added of the paper is twofold. First, we evaluate whether the impact of the financial position on business decisions is non-linear. In particular, our conjecture is that this relationship becomes relatively more intense when financial pressure exceeds a certain threshold. Furthermore, we analyse whether the relevant threshold differs depending on the real decision considered. Second, in the light of the estimated impacts of the different financial variables on firms' real decisions, we construct a composite indicator of financial pressure as a weighted average of different financial variables. Again, we investigate to what extent the weights attached to the different financial proxies differ for employment and for fixed investment.

The remainder of the paper is organised as follows. Section 2 provides a preliminary look at the descriptive information of the cross-sectional distribution of financial variables offering an overall assessment of financial pressure experienced by the Spanish corporate sector over the period 1985 to 2001. Section 3 describes the baseline specifications for fixed investment and employment, summarises the estimation methods and presents the basic estimation results. Section 4 analyses whether the impact of the financial position on corporate decisions becomes relatively more intense when financial tightness exceeds a certain threshold, whilst Section 5 constructs composite indicators

of financial pressure, in the light of the estimated impacts of the different financial variables on firms' real decisions. Finally, Section 6 concludes.

2 The financial position of the Spanish corporate sector: a preliminary look at firm-level data

With perfect capital markets, the value of a firm is not determined by its financial structure and, consequently, the real activity of the firm is independent of its financing choice (Modigliani and Miller, 1958). However, financial markets are not perfect. The existence of capital market frictions (asymmetric information problems, agency conflicts between shareholders and managers, distortionary taxation) implies the break-up of the separation between investment and financing decisions. Hence, the financial performance and financing decisions of firms as well as their responses to financial pressure are important to both a country's macroeconomic conditions and the stability of its financial system. Furthermore, when assessing the risks to macroeconomic and financial stability, it should be borne in mind that the fragility of certain firms will not necessarily be offset by the soundness of others. Accordingly, the use of aggregate indicators to assess the financial position of the corporate sector and its impact on real activity may be inadequate and thus a study at a greater level of detail may be required. Indeed, the behaviour of the companies most exposed financially is, for these purposes, as relevant (if not more so) as the average behaviour of the sector. Against this background, the purpose of this section is twofold. First, we attempt to provide an overall picture of the financial position of Spanish non-financial companies and its evolution over the period considered. Second, we try to assess to what extent the real behaviour -more precisely, the demand for factors of production- of the more financially vulnerable firms differs from that of firms with an average financial position.

The data employed are derived from an annual survey of non-financial firms conducted by the Central Balance Sheet Data Office of the Banco de España (see Banco de España, 2002). This is a large scale survey used extensively by the Banco de España to inform its assessment of the Spanish corporate sector. In terms of gross value added the survey respondents jointly represent around 35 per cent of the total gross value added of the non-financial corporate sector in Spain, and the pattern of evolution of the aggregate values for the main variables used here (employment, investment) is quite similar to that observed in the whole economy. This paper employs data for the period 1985 to 2001 for which the coverage of the survey has been relatively stable. Data are only used when there are at least 5 consecutive time-series observations per company. This produces an unbalanced sample of 7,547 non-financial companies and 70,625 observations with between 5 and 17 annual observations per company (see Data Appendix).

Table 1 presents median values for the different variables used in our analysis for subsample periods.[1] The most important aggregate variation observed in (pro)cyclical variables such as fixed investment and cash flow reflects the recession in Spain, the trough of which was experienced in 1993. Also clear from Table 1 is the declining debt-

[1] See Data Appendix for more precise definitions of the variables used in the paper.

service burden apparent in the late 1990s. A median value for the interest debt burden term *idb*, of 0.216 and 0.214 for 1989-92 and 1993-96, respectively, compares to a figure of 0.100 for 1997-2001. This reduction primarily reflects reductions in nominal interest rates and the entry of Spain into the European Monetary Union.[2]

This section presents, in primarily graphical form, preliminary data analysis of the sample of Spanish non-financial firms. This analysis first illustrates variation in the cross-sectional distributions of financial and real variables and how these distributions have changed over time. Then, a comparison is made of the behaviour of investment and labour demand for various sets of firms defined in terms of their financial position, using alternative indicators to proxy the degree of financial pressure on the companies.

First, we consider a narrow definition of the debt-service burden that is defined as the ratio of interest payments on debt to the company's gross revenue (*interest debt burden*). The cross-sectional distribution of this variable and how it varies over time is shown in Figure 2.1. Different percentiles (ie. the 25th, 50th, 75th, and 90th) in the cross-sectional distribution for each year are displayed. The experience of the median company (the 50th percentile) is indicative of the typical Spanish company in each year, whilst the higher percentiles indicate the experience of those companies facing more intense financial pressure. Consider the median company (the 50th percentile) first. Its interest payments relative to gross operating profit fell during the mid-1980s but then began to increase at the end of the 1980s before again declining as growth resumed following the recession of the early 1990s. Variation in this ratio reflects a combination of variation in interest rates, company profitability and indebtedness. The variable peaked in 1993 from which point it has declined steadily. An important finding from Figure 2.1 is that as interest rates have fallen from the mid-1990s, the implied reduction in financial pressure has been felt throughout the cross-sectional distribution of firms in Spain and, indeed, is strongest for the more financially vulnerable. At the 75th percentile of the distribution, the interest debt burden fell from 0.66 in 1993 to 0.25 in 2001. This is a positive development for the financial stability associated with the corporate sector in Spain. It also contrasts with the experience during the recession, at its deepest in 1993, when the financial pressure on the most vulnerable companies increased relative to the more typical companies suggesting that aggregate data on debt burdens at the time understated the vulnerability of the most fragile companies and hence of the system as a whole.

A very similar pattern emerges when considering a broader measure of the debt-service burden as a proportion of gross revenue that includes not only interest payments but also the stock of short-term debt. As can be seen from Figure 2.2 where the cross-sectional distribution of the *total debt burden* is displayed, the highest variation in this ratio is experienced by the most vulnerable companies, i.e. those in the upper decile of this distribution.

The cross-sectional distribution of corporate indebtedness, defined as the ratio of total outstanding debt to total assets, is illustrated in Figure 2.3. Similarly, Figure 2.4 depicts the cross-sectional distribution of net indebtedness. Both figures show a

[2] Nominal short-term interest rates in Spain were in the range 12 to 16 per cent (annual averages) in the period from 1985 to 1990, from which point they were reduced steadily to reach 4 per cent by 2000 with Spain being one of the euro area economies on January 1st 1999.

remarkable stability in the cross-sectional distribution of indebtedness of firms. It should be noted that stability in the company-level cross-sectional distribution can be consistent with aggregate movements in a variable and with variation for individual companies. For instance, the aggregate data corresponding to that in Figure 2.4 indicate an increase in indebtedness from 32.4% in 1997 to 38.6% by 2001. This is explained by large firms increasing their debt levels. The stability of the cross-sectional distribution of indebtedness among Spanish firms also contrasts with findings for UK quoted firms where a marked increase in dispersion in recent years has been found (Benito and Vlieghe, 2000).

Figures 2.5 and 2.6 illustrate two measures of profitability: gross revenue and cash-flow, in both cases divided by total assets. Two key observations arise from these figures. First, profitability is clearly procyclical as we would expect. At the median, gross revenue (cash-flow) over total assets declined from 21.9% (13.5%) in 1988 to 13.9% (7.1%) in 1993, from which point it has since recovered steadily, reaching 15.2% (10.3%) in 2001. Second, the experience of the median firm understates variation at the upper tail of the cross-sectional distribution, and in the case of the cash-flow measure also at the lower tail. For financial stability issues it is the lower tail that is more relevant and here (i.e. at the 10th percentile) cash-flow over total assets fell from 1.7% in 1988 to –7.5% in 1993.

The cross-sectional distributions of fixed investment and employment growth are also considered in Figures 2.7 and 2.8, respectively. Investment is procyclical as expected. In particular, it declines in the recession of 1993 and especially so at the top of the cross-sectional distribution, namely at the 90th percentile. Employment growth at the median firm varies relatively little during the sample period, but becomes negative for the only time during the period in 1993. This disguises more significant variation at both the upper and lower tails of the distribution, which show even stronger declines in the recession of 1993, coinciding with increases in the financial pressure of borrowing costs, as shown above.

This descriptive analysis has shown that there is substantial cross-sectional variation in the distribution of Spanish firms for each of the variables examined. To the extent that the real behaviour differs across companies facing different degrees of financial pressure, the assessment of the financial position of the corporate sector should ideally adopt a disaggregated perspective. To emphasise the relevance of this issue, in what follows we illustrate how investment in physical capital and labour demand differ across companies with different financial positions. For this purpose, Figure 3 compares the average level of both real variables in different corporate groupings defined on the basis of their financial position, proxied by alternative indicators. Each panel of the figure presents the average value of a real variable (the investment rate or the growth rate of employment) for the firms belonging to three different deciles of the distribution defined in terms of a financial indicator (the interest debt burden, the total debt burden, the debt ratio or gross revenue over total assets). The median decile (that including the firms between percentiles 45 and 55) can be regarded as representative of the behaviour of a firm in an average financial position. Analogously, the top (bottom) decile includes the 10% of firms with the highest (lowest) value of the corresponding financial indicator.

First, Figures 3.1 and 3.2 compare the behaviour of firms facing different degrees

of financial pressure, this being proxied by means of a measure of the relative burden of debt (or, in other words, of the firms' capacity to meet interest payments), i.e. our *interest debt burden* (*idb*) variable, which is defined as the ratio of interest payments to gross revenue. This variable, being the net result of changes in interest rates, in corporate profitability and in corporate debt, is a relevant indicator of the financial pressure firms may be facing. In Figures 3.1 and 3.2, no marked differences in demand for factors of production are observed between the firms with lowest financial pressure and those with average financial pressure. However, firms with a higher financial burden in relation to their capacity to generate funds from operations have substantially lower investment and employment growth rates. Moreover, in the case of employment, this difference seems more marked in recessionary phases.

According to Figures 3.3 and 3.4, similar conclusions can be drawn when the comparison is established in terms of our *total debt burden* variable (*tdb*). Thus, those companies facing a higher total financial burden display substantially lower investment and employment growth rates. Differences are less marked between the firms with the lowest total financial burden and those subject to average financial pressure, especially in the case of employment growth.

Interestingly, the pattern of results changes when the level of indebtedness is used as the indicator of financial tightness. Thus, in Figure 3.5, the observed relationship between the investment rate and the debt ratio is not monotonic. Similarly, no significant differences in employment growth are observed among the three deciles considered (Figure 3.6). This absence of a clear relationship between the debt level and the level of activity at the company level may be interpreted as the consequence of two opposite effects. On the one hand, firms with high indebtedness may experience difficulties in gaining access to additional credit to finance new investment projects, but, on the other hand, those companies with higher levels of investment and employment growth are those companies that have been successful in attracting external funds to take advantage of their growth opportunities

Finally, Figures 3.7 and 3.8 show a clear link between the level of profitability and the demand for factors of production. Firms with higher levels of gross revenues over total assets have substantially higher investment and employment growth rates.

Overall, the evidence in this section suggests: first, that there is a substantial dispersion in the distribution of Spanish firms in terms of several indicators of the degree of financial tightness they face. Second, that financial position affects business activity; and, third, that this impact is not linear and becomes relatively more intense when financial pressure exceeds a certain threshold.

3 The impact of financial variables on firms' real decisions

The estimation analysis in this section considers the responsiveness of fixed investment and employment to changes in the financial conditions facing a company, proxied by a set of financial variables. These variables include indicators providing information on corporate profitability, indebtedness (or leverage) and the relative burden of debt and try to capture the degree of financial pressure firms may be facing. More precisely, the financial variables considered are: two measures of the debt-service burden, *tdb* and *idb*,

two measures capturing the indebtedness of the company,(B/A) and $((B-m)/A)$, and two measures of corporate profitability, (GR/A) and (CF/A). Finally, we also consider an indicator of the probability of default that has been constructed using the estimated coefficients of a Probit model for the probability of default estimated by Benito et al. (2003) for a similar sample of Spanish non-financial firms.

3.1 Baseline specifications

The model estimated for fixed investment is an error-correction model which specifies a target level of the capital stock and allows for a flexible specification of the short-run investment dynamics, in which we add different financial indicators as potential explanatory variables. More structural models, such as Q models, would be more appropriate from a theoretical point of view, because they control for expectational influences on the investment decision and it can therefore be argued that financial variables should not enter this specification as proxies for future investment opportunities (see, for example, Fazzari *et al.*, 1988). However, this type of models may be significantly affected by measurement error and have often failed to produce significant and correctly signed key parameters. For this reason, we estimate an error correction model of investment, which is standard in the investment literature.[3] As is emphasised in Bond *et al.* (1999), this model, when estimated, usually displays reasonable long-run and short-run properties.

Starting from a general expression for the desired capital stock, assuming an autoregressive-distributed lag specification for the short-run dynamics, subsuming the depreciation rate into the unobserved firm-specific effects and assuming that variation in the user cost of capital can be controlled for by including both time-specific and firm-specific effects, the following specification for the investment rate can be obtained:[4]

$$\left(\frac{I}{K}\right)_{it} = \alpha_i + \beta_1 \left(\frac{I}{K}\right)_{it-1} + \beta_2 \Delta y_{it} + \beta_3 \Delta y_{it-1} + \beta_4 (k-y)_{it-2} + X'_{it}\gamma + \theta_t + \varepsilon_{it} \quad (1)$$

where i indexes companies i=1...N and t indexes years, t=1...T. Δ denotes a first difference, I/K is the investment rate, y is the log of real sales, k is the log of real fixed capital stock, α_i are company-specific fixed effects, and X represents a vector of financial variables. θ_t are time effects that control for macroeconomic influences on fixed investment common across companies and ε_{it} is a serially-uncorrelated, but possibly heteroskedastic error term. The coefficients β_2 and β_3 indicate the short-run responsiveness of fixed investment to sales growth, whilst the coefficient β_4 indicates the speed of adjustment of the capital stock towards its desired level.

The labour demand equation is derived from a quadratic adjustment cost model. For this reason, we include lagged employment as a regressor. We then add financial factors, as in Nickell and Nicolitsas (1999). Therefore, the demand equation takes the following form:

[3] In any case, a Q model is not possible here, since most of the Spanish firms are not quoted so that the usual Q variable cannot be constructed.

[4] See Bond *et al.* (1999) or Bond *et al.* (2003) for details on the derivation of the investment model.

$$n_{it} = \phi_i + \lambda_1 n_{it-1} + \lambda_2 k_{it} + \lambda_3 w_{it-1} + \lambda_4 \Delta w_{it} + \lambda_5 \xi_{it} + X_i'\eta + \Psi_t + \mu_{it} \qquad (2)$$

where i indexes companies i=1,2..N and t indexes year t=1,2..T. n is (log) average company employment during the year, w is the (log) average real wage at the company, k denotes (log) real fixed capital stock. ξ is a demand shock proxy which consists of the growth in log real sales and Ψ_t represents a set of common time effects (year dummies) which will control for aggregate effects including aggregate demand.[5] μ_{it} is a serially uncorrelated but possibly heteroskedastic error term.

Two elements in equation (2) depart from what is a standard specification for labour demand. First, financial factors, represented by the regressors X_i, are included. Despite the extensive literature considering a potential role for financial conditions in shaping fixed investment (see Hubbard, 1998), there are few studies which allow for such a role in the context of labour demand models.[6] Second, the model includes a demand shock variable, ξ_{it}, following Bentolila and Saint-Paul (1992). Nevertheless, as in the case of fixed investment, a note of caution should be introduced since this reduced-form model of labour demand does not control for expectational influences and therefore, it might be argued that financial variables are to some extent capturing future demand.

3.2 Estimation method

The estimation method consists of the GMM-System estimator proposed by Arellano and Bover (1995) and examined in detail by Blundell and Bond (1998). These models control for fixed effects, with the estimator being an extension of the GMM estimator of Arellano and Bond (1991), which estimates equations in levels as well as in first-differences.

Appart from the bias that would arise if fixed effects were not controlled for, it is also necessary to note that most current firm-specific variables are endogenous. In order to avoid the bias associated with this endogeneity problem, we use a GMM estimator taking lags of the dependent and explanatory variables as instruments.

The use of a GMM-System estimator is justified because in autoregressive models with high persistence in the data such that the lagged levels of a variable are not highly correlated with the first difference, the first-differenced estimator may be subject to finite sample biases associated with weak instruments (see Blundell and Bond, 1998). Blundell and Bond (1998) show that in these circumstances also including the levels equations in the system estimator offers significant gains, countering the bias. Blundell and Bond (1998) also show that in autoregresive-distributed lag models, first-differences of the variables can be used as instruments in the levels equations provided that they are mean stationary. The high levels of serial correlation displayed by several variables included in the models and the fact that most of them can be regarded as mean stationary favour the use of a GMM-System estimator.

[5] The demand shock variable is not considered in the analysis of Nickell and Nicolitsas (1999), but it was included in a similar specification by Bentolila and Saint-Paul (1992).

[6] Some exceptions are Nickell and Wadhwani (1991), Nickell and Nicolitsas (1999) and Ogawa (2003).

The estimation method requires the absence of second order serial correlation in the first differenced residuals for which the test of Arellano and Bond (1991) is presented (labelled M_2). If the underlying model's residuals are indeed white noise then first-order serial correlation should be expected in the first-differenced residuals for which we also present the test of Arellano and Bond (1991), labelled M_1. We also report the results of the Sargan test for instrument validity in the GMM-System equations and the Difference-Sargan statistic, which test the validity of the additional moment conditions associated with the levels equations.

3.3 Basic results

Table 2 reports estimation results for fixed investment. Column 1 reports the results of the basic specification without financial variables. We generally find insignificant levels of persistence in company-level investment, a result quite consistent with results reported by Bond *et al.* (2003). The error-correction term $(k-y)_{it-2}$ is correctly signed and statistically significant with coefficient (robust standard error) of -0.175 (0.022) implying a reasonable speed of adjustment, comparable to that obtained in similar studies. The sales growth terms are positive and significant and their magnitude is in the upper range of the values usually obtained in the literature. We find the expected first-order serial correlation in our first-differenced residuals while there is no evidence of second order serial correlation, the key requirement for validity of our instrumentation stategy and the Sargan test statistics are insignificant at conventional levels.[7]

We then consider adding the financial variables to the basic specification. Columns 2 to 8 of Table 2 report the estimates of the basic specification augmented with one financial variable at a time. First, columns 2 and 3 add debt variables to the standard specification. The expected negative coefficient is obtained although it is only at the margin of significance (p-value = 0.15) in the case of the B/A_{it-1} term. These estimates, in particular that including the net indebtedness term $(B-m)/A_{it-1}$[8], suggest that a high level of debt can lead to balance sheet adjustment in the form of companies deferring or foregoing investment projects (see also Vermeulen, 2002 for an industry-level study). Second, in columns 4 and 5 two indicators of the relative debt-service burden are included. For both variables (the interest debt burden term idb_{it-1} in column 4 and the total debt burden tdb_{it-1} in column 5) a significantly negative and well-determined effect is found. This suggests that the financial pressure of debt servicing plays an important role in influencing investment levels of firms. Third, the estimates in columns 6 and 7, include two indicators of corporate profitability. In both cases, $(GR/A)_{it-1}$ in column 6 and $(CF/A)_{it-1}$ in column 7, the coefficients are significantly positive, which is consistent with studies of investment for other countries. As has been extensively discussed in the literature on investment and financial constraints, the cash-flow terms

[7] In our preferred estimates (those reported in the tables) we selected the instrument set in order that the Sargan test statistic reported was not significant at conventional levels, although these estimates proved very similar to those where the instrument set included instruments dated $t-2$ to $t-6$ in the first-differenced equation and $t-1$ in the levels equation.

[8] By including this indicator we want to test whether debt is important once adjusted for liquidity. An indicator of liquidity (liquid assets divided by short term debt) turned out to be insignificant when included in both the investment and the employment equations.

might be either picking up the relevance of internal finance for investment or acting as as a proxy for investment opportunities. Finally, the results reported in column 8 show that the indicator for the probability of default, pd_{it-1}, displays the expected negative and statistically significant effect on investment.[9] This indicator being a composite measure based on several financial indicators, each of them weighted by its influence on the probability of default, its estimated coefficient in the investment equation reflects the impact of the financial situation on corporate investment, through its incidence on the probability of default.

Nevertheless, the relative importance of different financial variables in explaining the probability of default or the probability of failure might differ from their relative contribution to explaining real decisions of companies. Thus, in order to get a more precise picture of the global impact of financial conditions on corporate behaviour, it is worth directly and simultaneously including several financial indicators in the estimated equations. Thus, it is possible to ascertain which specific financial features (indebtedness, profitability, financial burden...) are more relevant for each specific corporate decision. However, the close links between the different financial indicators imply that few indicators are likely to turn out to be simultaneously significant. As a consequence, the interpretation of the results of this exercise is not a trivial task. Table 3 reports the estimates of specifications of the investment equation, simultaneously including several financial variables. As can be seen from the tables, those variables measuring the burden of servicing debt, both *tdb* and *idb*, remain significant in all specifications and their coefficients are quite robust As regards the indicators of indebtedness, the gross measure *(B/A)* is never significant. In the case of the net debt term *((B-m)/A)*, it retains its significance in most cases. However, a notable decline in the point estimate of its coefficient is observed when a profitability indicator is included. Finally, the coefficients for the corporate profitability terms remain significant in all specifications although their point estimate is lower whenever the net debt term is included in the specification.[10]

Our first set of estimation results for the employment equation is presented in Table 4. Column 1 reports the results of the basic specification without financial variables whereas columns 2 to 8 reports the results obtained when a financial variable is added to the specification. These results show the importance that financial factors have in explaining labour demand. The results in columns 2 and 3 show that debt has a negative (although non-significant) impact on labour demand. However, when considering the two indicators of the relative burden of debt, both of them are seen to have a negative and highly significant impact on labour demand. The results of the estimation when an indicator of profitability is included are reported in columns 6 and 7, and show a positive and significant impact of the profitability indicator on employment demand. Finally, as in the case of the investment equation, a negative and significant coefficient is found for the indicator of the probability of default, pd_{it-1}.

Table 5 shows the results obtained when more than one financial variable is included in the estimation. As can be seen in columns 1 and 4 for debt and 2 and 5 for

[9] The estimate for this variable should be viewed with some caution since the reported standard errors do not take into account that it is an estimated regressor.

[10] Table 3 reports results for specifications including the gross revenue term *(GR/A)*. The pattern of results is qualitatively similar when the cash-flow term *(CF/A)* is included instead of *GR/A*.

net indebtness, both indicators are also non-significant when they are combined with another financial variable. In contrast, indicators of debt burden mantain their significance when they are included in the estimation with an indebtedness or profitability measure. The same applies to profitability indicators: they remain significant when they are combined with another indicator. Finally, columns 7 and 8 show that when three financial indicators are included in the regression (one for indebtedness, another for debt burden and the third one for profitability), the first is no longer significant, as was also the case when it was combined only with one additional indicator, whereas the indicators of debt burden remain significant at a 95% confidence level and the profitability terms are also significant although their point estimates are somewhat reduced.

4 Non-linear effects

The evidence presented in Section 2 shows that firms with a weaker financial situation -i.e. those firms belonging to the decile of the distribution characterised by the highest values of alternative proxies of financial pressure- have substantially lower investment and employment growth rates. However, in general, no significant differences in demand for factors of production are observed between the firms with least financial tightness and those with an average financial pressure. This evidence suggests that the relationship between the real activity of firms and their financial position is non-linear. Moreover, a more pronounced impact of this position on real activity once the financial pressure reaches a certain threshold seems reasonable. In this section, we provide a more formal analysis of this hypothesis. For this purpose, we estimate the investment and labour demand equations described in section 3, but now allowing for a differential impact of financial conditions depending on the relative level of the corresponding financial indicator. As in Tables 2 and 4 we estimate the investment and employment models considering one financial indicator at a time. In each regression, we test whether the companies facing a high financial pressure -i.e. those firms in the upper decile (or quartile) of the distribution defined in terms of the corresponding financial indicator- are more sensitive to the financial conditions. More precisely, we estimate the following specifications:

$$\begin{aligned}\left(\frac{I}{K}\right)_{it} &= \alpha_i + \beta_1 \left(\frac{I}{K}\right)_{it-1} + \beta_2 \Delta y_{it} + \beta_3 \Delta y_{it-1} + \beta_4 (k-y)_{it-2} \\ &\quad + \gamma_1 F_{it} D^F_{0-75} + \gamma_2 F_{it} D^F_{75-90} + \gamma_3 F_{it} D^F_{90-100} + \theta_t + \varepsilon_{it} \qquad (3)\end{aligned}$$

and

$$\begin{aligned}n_{it} &= \phi_i + \lambda_1 n_{it-1} + \lambda_2 k_{it} + \lambda_3 w_{it-1} + \lambda_4 \Delta w_{it} + \lambda_5 \xi_{it} + \\ &\quad + \eta_1 F_{it} D^F_{0-75} + \eta_2 F_{it} D^F_{75-90} + \eta_3 F_{it} D^F_{90-100} + \Psi_t + \mu_{it} \qquad (4)\end{aligned}$$

where D^F_{0-75}, D^F_{75-90} and D^F_{90-100} are dummy variables for observations below the 75th percentile, between the 75th and 90th percentiles, and above the 90th percentile, respectively, of the distribution defined in terms of the financial variable F.

When a corporate profitability measure -either (GR/A) or (CF/A) - is used as financial indicator, we replace these dummies by D^F_{0-10}, D^F_{10-25} and D^F_{25-100}, which are dummy variables for observations below the 10th percentile, between the 10th and 25th percentiles, and above the 25th percentile. In these cases, the lower the percentile, the lower the profitability, and the higher, a priori, the degree of financial tightness.

4.1 Results

Table 6 reports the results obtained for investment when non-linearities are considered. In the specification allowing for a non-linear effect of debt, debt is not significant in either of the groups of companies defined in terms of their level of debt. However, when we consider net indebtedness instead of debt, we obtain evidence in favour of the existence of differences in the impact of this variable on investment, depending on its magnitude: net indebtedness is irrelevant for firms with low or moderate levels of net indebtedness (below the 75th percentile), whereas for those firms above this threshold it has a negative and significant impact both for the group between the 75th and 90th percentiles and for the group in the upper decile.

When indicators of debt burden are considered, results strongly support the existence of non-linearities: both indicators are significant for firms above the 90th percentile, whereas for fims between the 75th and the 90th percentile total debt burden is found to be insignificant and interest debt burden is only at the margin of significance (p-value=0.09) For firms below the 75th percentile, neither of these indicators has a significant impact on investment.

As for profitability indicators, a positive and significant coefficient is obtained for those firms with higher profitability (those above the 25th percentile). However, the coefficients for these variables are rather imprecisely estimated for the other two groupings. As expected, we obtain a higher coefficient for those companies in the lower tail of the distribution (a priori those facing a higher financial pressure). However, this coefficient is only significant for (CF/A).

Ideally, we would like to allow for non-linearities in the effects of more than one financial variable at a time. However, when simultaneously including different financial variables in a non-linear fashion, there is a sharp drop of significance in the interaction terms. For this reason, we opted for a mixed strategy by including one financial variable in a non linear-way and the rest of the financial variables linearly. Using this approach, the results of our preferred specification are reported in the last column of Table 6. In this specification, a linear effect is allowed for gross revenue over total assets and for net debt, while total debt burden enters in a non-linear way. We find, as expected, a positive coefficient for (GR/A) and a negative one for net debt.[11] Finally, a negative impact of total debt burden is only found for firms that are in the upper tail of the distribution.

Results for employment are shown in Table 7, and corroborate the existence of a non-linear impact of financial variables on firms' real decisions. We find, however, some differences with respect to investment: both indicators of indebtedness and debt

[11] Profitability and net debt enter linearly in the specification, although in the table we present the coefficient for each of the three groups (which is equal for all of them) separately.

burden are significant for firms in the upper decile of the distribution, for a 99 per cent confidence level, but for firms between the 75th and 90th percentile only indicators of interest debt burden have a significant impact on employment. When profitability is considered, lower and upper bounds are found to be significant, and, as was also the case for investment, the coefficient estimated for the lower decile is higher than that estimated for firms with higher profitability (above the 25th percentile). As in the case of investment, we also adopted a mixed strategy in the specification of the financial variables in the employment equation. The results of our preferred specification are reported in the last column of Table 7. In this specification, a linear effect is allowed for gross revenue over total assets while total debt burden enters in a non-linear way. A positive and significant coefficient is found for the profitability term and a negative and significant one for total debt burden only for firms that are above the 90th percentile.

Overall, these results corroborate the descriptive evidence in Section 2 and point to the existence of threshold effects on the impact of financial variables on investment and employment.[12] The specific threshold and the different sensitivities to the financial position seem to depend on the particular financial variable considered.

5 Composite indicators of financial pressure

In Section 3, we obtained evidence in favour of the existence of a significant impact of financial variables on the demand for factors of production. The results in Section 4 suggest that this impact is more pronounced for the upper tail of the distributions defined in terms of the proxies for financial pressure. Now, in this section, we wish to construct synthetic indicators that summarise the non-linear influence that financing conditions have on investment and employment. Moreover, on the basis of these composite indicators we wish to assess how the impact of financial conditions has evolved over time with a special emphasis on the distribution across companies of this impact. For this purpose, we compute linear combinations of alternative sets of financial variables, where the relative weights are given by the estimated coefficients in the investment and the employment equations.

Thus, a financial conditions indicator ($FCII$) can be defined as follows:

$$FCII_{it} = -\sum_{k} \hat{\gamma}^k X_{it}^k \tag{5}$$

where $\hat{\gamma}^k$ is the estimated coefficient for financial variable X^k in the investment equation. Analogously, a financial conditions indicator for employment takes the following form:

$$FCIE_{it} = -\sum_{k} \hat{\eta}^k X_{it}^k \tag{6}$$

where $\hat{\eta}^k$ is the estimated coefficient for financial variable X^k in the employment equation. These indicators measure the contributions of the financial variables in the

[12] Although the results clearly support this conclusion, it should be pointed out that the results reported in this section are more sensitive to the set of instruments used than those obtained for the linear specifications presented in the previous section.

investment and employment equations. As the sign of these contributions is changed, the higher the indicator the tighter the financial conditions faced by companies, i.e. the larger the negative impact of financial conditions on investment or employment. Since we have allowed for a non-linear impact of financial variables, the differences in the indicator across firms will reflect not only differences in the financial position but also differences in the sensitivity of the real variables to this position. The lack of a proper measure of the effect of unobserved variables -including the unobserved individual time-invariant effect- makes it difficult to derive a precise measure of the importance of the financial conditions relative to the remaining determinants of investment and employment. However, these indicators represent a useful tool to compare (over time and across groups of companies) the importance of financial conditions in the demand for productive inputs.

Our starting point is to construct financial conditions indicators for investment and employment on the basis of the estimated coefficients of our preferred models in Section 4. In particular, our benchmark models are those in column 7 of Table 6 for fixed investment and column 7 of Table 7 for employment. Both models allow for a non-linear effect of the total debt burden tdb_{it-1}, while restricting the impact of the gross revenue term (GR/A) to be linear. In addition, the investment model also includes a linear net debt term $((B-m)/A)$.

In order to ascertain the relevance of financial variables for companies in different financial positions, it is useful to focus on different percentiles of the distribution of these indicators. More precisely, we present the evolution of the median value of these indicators as representative of the average financial pressure faced by the companies in our sample. We also show the evolution of the 90th percentile, to assess the time profile of the vulnerability of the companies facing a high financial pressure. Finally, we report the weighted average as an aggregate indicator of the position of the corporate sector as a whole. The weight for each firm in this indicator will be given by its contribution to total (aggregate) fixed assets, in the case of investment, or to total employment, in the case of employment. To compare the different percentiles and the weighted average of the financial indicators we normalise them by setting $FCII_{1990}^{median}$ =100 and $FCIE_{1990}^{median}$ =100.

Figure 4 displays the different percentiles and the weighted average of the indicators for the impact of financing conditions on investment and employment. In the case of fixed investment (Panel A of Figure 4), the different percentiles and the weighted average display a similar countercyclical pattern. According to the median FCII, the second half of the 1980s was characterised by a relaxation of financial conditions which was mostly explained by the reduction in corporate debt in a period of high nominal interest rates and, to a lesser extent, by a certain recovery in corporate profitability. In the early 1990, this indicator shows a tightening of financial conditions as a result of an intense deterioration of corporate profitability.[13] After reaching a peak in 1993, the median FCII declined continuously until 1998, owing to the reduction in the level of debt. In this period, there is also a modest improvement in corporate profitability.

[13] Interestingly, if we consider FCIIs derived from models excluding measures of profitability (for instance, models in columns 2 and 5 of Table 3), the tightening of financial conditions during the cyclical downturn of the early 1990s is less severe.

Finally, the median FCII displays a slight increase in the last three years of the sample owing to a slight reduction in corporate profits.

The comparison of the median and the weighted average FCII shows that the weighted average presents higher values for the entire period, implying that the financial position for those firms that are more relevant for investment is weaker than that of the median. Furthermore, in some periods a different evolution pattern of behaviour is observed for the representative (median) firm and the weighted average. For instance, the important tightening in financial conditions observed in year 2001 for the weighted average is not so clearly seen in the median, that has shown a more stable behaviour in the last part of the sample.

Again, the comparison of the median FCII with the higher percentiles reveals that it is in the recessions, especially in the cyclical trough of 1993, when the impact of the financing conditions on investment increased relatively more for the most vulnerable companies than for companies with an average financial pressure.[14] It is also worth noting that the observed increase in the median in the last years of the sample is not observed for the firms in the upper decile of the distribution.

In the case of employment (Panel B of Figure 4), our preferred financial indicator is a weighted average of the *total debt burden* and the *gross-revenue term*. As previously mentioned, a non-linear effect is allowed for the total debt burden term. The profile of the different percentiles of the FCIE is quite similar to that of the FCII. First, the different percentiles display a countercyclical pattern and, second, this pattern is more evident in the case of the highest percentile. Nevertheless, the weighted average indicator displays a larger cyclical variation than in the case of the FCII. Again, the median indicator is not a good proxy of the position of the sector as a whole, although in this case the difference between the median and the weighted average indicator diminished in the last part of the sample. In fact, the median exceeded the weighted average in the last part of the sample period (after 1998), something that was not seen in the FCII. The tightening in financial conditions observed in 2001 for the weighted average FCII is also seen in the FCIE.

Finally, for the sake of comparison, we show in Figure 5 the indicator of financial fragility based on the model of Benito et al (2003) for the probability of default. As in the case of our indicators of the impact of financial conditions, we display the median, the 90th percentile and the weighted average. In this case, the weights are given by the total assets of the firm with respect to the aggregate level of assets. The cyclical profile of the different percentiles of the distribution of this indicator is quite similar to those reported in Figure 4. The median value for this indicator oscillates between 0.002 and 0.009 while the 90th percentile varies from 0.012 to 0.057. As regards the weighted average values, in the most recent period the deterioration in financial conditions started in 1998 according to this financial fragility indicator, while according to our indicators it is only in 2001 that there was a tightening in financing conditions.

[14] As expected, the value of the 90th percentile of the indicator based on a non-linear specification is higher, over the whole sample period, than the value of the 90th percentile of an indicator constructed with the same variables but without considering non-linearities. And, interestingly, it is in the recession when this difference is larger. For the weighted average indicator, a linear especification also yields a degree of fragility persistently lower than that reported here, including non-linearities.

Overall, this evidence shows the relevance of using firm-level data when analysing the changes in the financial position and suggests that financing conditions do not affect all companies equally. A tightening of financial conditions will have a significantly greater effect on the real decisions of those firms with lower financial soundness. This is particularly relevant in episodes where the financial pressure on a significant number of firms breaches the threshold at which it has a more intense influence on business activity. In these episodes, indicators based on aggregate data may not reliably reflect the system's financial soundness since they do not adequately reflect the deterioration of the financial position of the more vulnerable companies.

6 Conclusions

This paper has aimed to assess the impact of financial conditions on firms' real decisions, using a large-scale company-level panel dataset for the period 1985-2001. The analysis has focused on the behaviour of fixed investment and employment which are conceivably two of the most important aspects of adjustment by firms in response to changes in financial conditions. Within the general topic of the relationship between financial conditions and real activity, we have addressed three specific issues: first, the assessment of the relative importance of different financial variables in explaining the real decisions of firms; second, the analysis of the non-linearity in the relationship between financial proxies and real variables; and, finally, the construction of a synthetic indicator to capture the impact of financing conditions on investment (and, alternatively, on employment).

Our results strongly indicate that financial position is important to explain corporate decisions on fixed investment and employment. Several financial indicators turn out to be significant in the estimated equations. In particular, measures of the debt-service burden (both including and excluding the stock of short-term debt) remain significant when additional financial indicators are incorporated and their coefficients are quite robust. As regards the indicators of corporate profitability, they are significant in all specifications, although their point estimates depend on the additional financial variables included in the specification. Finally, the evidence for the indicators of indebtedness is less conclusive. In the investment equation the net debt term is significant in most cases. In the employment equation, the debt terms are never significant in the linear specifications but they are significant for the upper decile of the distribution when considering non-linear specifications.

We have found evidence in favour of the hypothesis of a non-linear relationship between financial conditions and real activity. At a pure descriptive level, we have shown that the group of firms facing a higher degree of financial pressure, that we identify as those in the upper decile of the cross-sectional distribution of firms defined in terms of alternative financial indicators, have substantially lower investment and employment growth rates. The regression analysis has corroborated this result: the sensitivity of investment and employment to financial conditions is substantially larger for those firms in the upper quartile (or decile) of the distribution defined in terms of the corresponding financial indicator. Moreover, in some specifications, the financial variable is not significant for the companies facing a moderate (or low) degree of financial tightness.

Overall, this evidence suggests that the real impact of financial conditions is non-linear and becomes relatively more intense when financial pressure exceeds a certain threshold. As a consequence, from the standpoint of identifying the risks to macroeconomic and financial stability, the use of firm-level data seems to be particularly relevant in episodes where the financial pressure on a significant number of firms reaches levels at which it has a more pronounced influence on real activity. In these episodes, indicators based on aggregate data may not reliably reflect the system's financial soundness since they do not adequately reflect the vulnerability of the most fragile companies. In addition, the analysis of our composite indicators constructed at the firm-level reveals that neither the level nor the changes in the financial pressure experienced by the representative (median) firm is a good measure of the financial pressure faced by the corporate sector. In fact, in the last year of our sample (2001) the observed increase in our median indicators is much lower than that observed for the weighted average.

As regards the most recent data, our composite indicators for the impact of financial conditions on investment and employment remain at moderate levels, in historical terms. At an aggregate level, Spanish firms have shown an increase in debt ratios, although this has not been translated into a higher debt-service burden due to the declining path of interest rates. Thus, the financial position of the corporate sector will not foreseeably represent, on average, a significant obstacle to the recovery in investment and employment. Moreover, a more disaggregated analysis shows that, in the most recent period, the increase in debt ratios for those firms in a weaker financial position, which are, according to our results, the most sensitive to changes in their financial position, has been lower than that observed in the aggregate. Furthermore, the available information for 2003 reveals that the companies with highest indebtedness have indeed experienced reductions in their debt ratios. Nonetheless, the high level of debt at some of these firms, suggests that their ability to obtain additional external funds is now lower and that their exposure to potential shocks is higher. Additionally, our analysis has shown that financial conditions for those firms that are more relevant for investment, and, to a lesser extent, for employment, are tighter than those for the median (representative) firm, and, therefore these companies may be more influenced by shocks affecting their financial position.

Table 1: Sample medians

		1985-1988	1989-1992	1993-1996	1997-2001	1985-2001
I/K	investment rate	0.118	0.103	0.076	0.111	0.100
N	employment	65	47	35	37	43
Y	real sales (1995 prices)	7580.6	5525.9	4213.92	4357.3	5088.8
Δy	sales growth	0.038	-0.007	0.013	0.041	0.021
Δw	wage growth	0.012	0.022	0.004	0.005	0.010
B/A	debt	0.301	0.247	0.269	0.249	0.263
$(B-m)/A$	net indebtedness	0.207	0.164	0.173	0.140	0.168
B/GR	debt over gross revenue	1.500	1.424	1.645	1.489	1.514
idb	interest debt burden	0.188	0.216	0.214	0.100	0.167
tdb	total debt burden	1.052	1.037	1.013	0.714	0.944
GR/A	gross revenue	0.216	0.188	0.162	0.168	0.179
CF/A	cash-flow	0.130	0.105	0.095	0.115	0.110
pd	probabilty of default	0.007	0.009	0.012	0.007	0.009
observations		12,444	18,294	19,448	20,439	70,625

Notes: See Data Appendix for the definition of the variables.

Table 2: Fixed investment

$(I/K)_{it}$	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
$(I/K)_{it-1}$	-0.057 (0.099)	-0.020 (0.083)	-0.084 (0.057)	-0.094 (0.085)	-0.055 (0.085)	-0.099 (0.090)	-0.113 (0.087)	-0.037 (0.079)
Δy_{it}	0.358 (0.124)	0.365 (0.111)	0.347 (0.109)	0.329 (0.095)	0.294 (0.098)	0.312 (0.111)	0.386 (0.113)	0.271 (0.099)
Δy_{it-1}	0.334 (0.112)	0.313 (0.106)	0.379 (0.088)	0.271 (0.086)	0.260 (0.086)	0.321 (0.103)	0.290 (0.104)	0.205 (0.059)
$(k-y)_{it-2}$	-0.175 (0.022)	-0.164 (0.020)	-0.171 (0.017)	-0.168 (0.020)	-0.162 (0.020)	-0.161 (0.020)	-0.158 (0.019)	-0.158 (0.018)
$(B/A)_{it-1}$		-0.070 (0.050)						
$((B-m)/A)_{it-1}$			-0.091 (0.027)					
idb_{it-1}				-0.024 (0.008)				
tdb_{it-1}					-0.004 (0.001)			
$(GR/A)_{it-1}$						0.201 (0.097)		
$(CF/A)_{it-1}$							0.331 (0.126)	
pd_{it-1}								-0.938 (0.352)
M_1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
M_2	0.785	0.469	0.903	0.927	0.739	0.840	0.747	0.539
Sargan	0.188	0.170	0.402	0.091	0.374	0.142	0.156	0.229
Difference-Sargan	0.985	0.931	0.893	0.899	0.999	0.997	0.985	0.999
companies	7,547	7,547	7,547	7,547	7,547	7,547	7,547	7,547
observations	55,531	55,531	55,531	55,531	55,531	55,531	55,531	55,531

Notes: All equations include time dummies (year effects). Estimation by GMM-SYSTEM estimator using the robust one-step method (Blundell and Bond, 1998; Arellano and Bond, 1998). Sargan is a Sargan Test of over-identifying restrictions (p-value reported), with a chi-square distribution under the null of instrument validity. Difference-Sargan is a Sargan Test of the additional moment conditions associated with the levels equations (p-value reported), distributed as a chi-square under the null of instrument validity. M_j is a test of jth-order serial correlation in the first-differenced residuals (p-values reported). These are both distributed as standard normals under the null hypotheses. Asymptotic robust standard errors reported in parentheses. Instruments: in first-differences equation, following lagged values of the regressors: $\Delta y, B/A, GR/A, CF/A$ (t-4, t-5), $(k-y)$ (t-5, t-6) $(B-m)/A$ (t-2 to t-5), idb, tdb, pd (t-3 to t-5). In levels equations, first differences of the regressors dated as follows: $I/K, \Delta y, B/A, (B-m)/A, idb, tdb$ (t-2), pd (t-1), $(k-y), GR/A, CF/A$ (t-3).

Table 3: Fixed investment

$(I/K)_{it}$	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
$(I/K)_{it-1}$	-0.054 (0.075)	-0.101 (0.053)	-0.107 (0.079)	-0.022 (0.076)	-0.085 (0.053)	-0.076 (0.079)	-0.117 (0.057)	-0.133 (0.057)
Δy_{it}	0.316 (0.090)	0.329 (0.088)	0.302 (0.089)	0.277 (0.092)	0.296 (0.089)	0.270 (0.092)	0.292 (0.084)	0.322 (0.083)
Δy_{it-1}	0.257 (0.083)	0.336 (0.071)	0.278 (0.082)	0.245 (0.084)	0.338 (0.072)	0.285 (0.082)	0.364 (0.071)	0.357 (0.070)
$(k-y)_{it-2}$	-0.159 (0.019)	-0.167 (0.017)	-0.158 (0.018)	-0.154 (0.019)	-0.166 (0.017)	-0.155 (0.018)	-0.160 (0.017)	-0.161 (0.017)
$(B/A)_{it-1}$	-0.033 (0.048)			-0.020 (0.049)				
$((B-m)/A)_{it-1}$		-0.075 (0.027)			-0.071 (0.027)		-0.044 (0.031)	-0.046 (0.031)
idb_{it-1}	-0.024 (0.009)	-0.018 (0.009)	-0.017 (0.010)					-0.015 (0.009)
tdb_{it-1}				-0.004 (0.001)	-0.003 (0.001)	-0.003 (0.001)	-0.002 (0.001)	
$(GR/A)_{it-1}$			0.162 (0.094)			0.151 (0.094)	0.153 (0.065)	0.155 (0.065)
$(CF/A)_{it-1}$								
M_1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
M_2	0.706	0.671	0.754	0.449	0.907	0.962	0.465	0.312
Sargan	0.097	0.230	0.087	0.362	0.514	0.275	0.257	0.115
Difference-Sargan	0.818	0.622	0.980	0.974	0.889	0.999	0.319	0.390
companies	7,547	7,547	7,547	7,547	7,547	7,547	7,547	7,547
observations	55,531	55,531	55,531	55,531	55,531	55,531	55,531	55,531

Notes: See notes to Table 2.

Table 4: Employment

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
n_{it-1}	0.915 (0.020)	0.924 (0.015)	0.910 (0.017)	0.943 (0.016)	0.941 (0.017)	0.934 (0.019)	0.927 (0.019)	0.925 (0.017)
k_{it}	0.039 (0.008)	0.037 (0.007)	0.042 (0.007)	0.030 (0.007)	0.030 (0.007)	0.036 (0.007)	0.034 (0.007)	0.039 (0.008)
Δw_{it}	-0.535 (0.118)	-0.533 (0.109)	-0.522 (0.104)	-0.416 (0.097)	-0.507 (0.101)	-0.518 (0.092)	-0.501 (0.099)	-0.436 (0.110)
w_{it-1}	-0.017 (0.053)	-0.023 (0.044)	-0.002 (0.048)	-0.053 (0.042)	-0.037 (0.043)	-0.047 (0.047)	-0.012 (0.046)	0.007 (0.047)
Δy_{it}	0.303 (0.047)	0.305 (0.044)	0.301 (0.044)	0.300 (0.046)	0.299 (0.044)	0.272 (0.041)	0.306 (0.043)	0.312 (0.043)
$(B/A)_{it-1}$		-0.012 (0.021)						
$((B-m)/A)_{it-1}$			-0.010 (0.013)					
idb_{it-1}				-0.022 (0.007)				
tdb_{it-1}					-0.003 (0.001)			
$(GR/A)_{it-1}$						0.127 (0.031)		
$(CF/A)_{it-1}$							0.113 (0.041)	
pd_{it-1}								-0.856 (0.373)
M_1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
M_2	0.082	0.088	0.075	0.117	0.068	0.041	0.088	0.105
Sargan	0.443	0.242	0.444	0.471	0.647	0.657	0.362	0.273
Difference-Sargan	0.075	0.489	0.406	0.130	0.283	0.179	0.083	0.044
companies	7,547	7,547	7,547	7,547	7,547	7,547	7,547	7,547
observations	55,531	55,531	55,531	55,531	55,531	55,531	55,531	55,531

Notes: All equations include time dummies (year effects). Estimation by GMM-SYSTEM estimator using the robust one-step method (Blundell and Bond, 1998; Arellano and Bond, 1998). Sargan is a Sargan Test of over-identifying restrictions (p-value reported), with a chi-square distribution under the null of instrument validity. Difference-Sargan is a Sargan Test of the additional moment conditions associated with the levels equations (p-value reported), distributed as a chi-square under the null of instrument validity. M_j is a test of jth-order serial correlation in the first-differenced residuals (p-values reported). These are both distributed as standard normals under the null hypotheses. Asymptotic robust standard errors reported in parentheses. Instruments: in first-differences equation, following lagged values of the regressors: $n, B/A, (B-m)/A$ (t-5), $a, \Delta y, \Delta w$ (t-5, t-6), $w, GR/A, CF/A$ (t-4, t-5), idb, tdb, pd (t-4 to t-6). In levels equations, first differences of the regressors dated as follows: $n, \Delta w, B/A, (B-m)/A$ (t-2), $idb, tdb, pd, CF/A$ (t-3), GR/A (t-4).

Table 5: Employment

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
n_{it-1}	0.944 (0.013)	0.936 (0.015)	0.950 (0.016)	0.940 (0.013)	0.930 (0.016)	0.945 (0.015)	0.951 (0.015)	0.950 (0.015)
k_{it}	0.029 (0.006)	0.032 (0.007)	0.026 (0.007)	0.030 (0.007)	0.035 (0.007)	0.030 (0.007)	0.027 (0.007)	0.025(0.007)
Δw_{it}	-0.435 (0.090)	-0.433 (0.086)	-0.454 (0.082)	-0.503 (0.095)	-0.500 (0.082)	-0.525 (0.076)	-0.522 (0.073)	-0.453 (0.077)
w_{it-1}	-0.036 (0.038)	-0.033 (0.039)	-0.048 (0.039)	-0.022 (0.038)	-0.037 (0.044)	-0.039 (0.037)	-0.034 (0.035)	-0.038 (0.037)
Δy_{it}	0.292 (0.043)	0.291 (0.043)	0.307 (0.042)	0.288 (0.041)	0.271 (0.038)	0.277 (0.035)	0.274 (0.033)	0.295 (0.039)
$(B/A)_{it-1}$	0.016 (0.024)			0.016 (0.026)				0.005 (0.027)
$((B-m)/A)_{it-1}$		0.007 (0.014)			0.021 (0.015)		0.010 (0.016)	
idb_{it-1}	-0.023 (0.007)	-0.022 (0.008)	-0.017 (0.008)					-0.014 (0.008)
tdb_{it-1}				-0.003 (0.001)		-0.003 (0.001)	-0.003 (0.001)	
$(GR/A)_{it-1}$					0.097 (0.019)	0.102 (0.019)	0.112 (0.020)	
$(CF/A)_{it-1}$			0.084 (0.044)					0.114 (0.044)
M_1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
M_2	0.086	0.084	0.113	0.054	0.042	0.038	0.035	0.084
Sargan	0.201	0.400	0.525	0.191	0.416	0.639	0.591	0.230
Difference-Sargan	0.210	0.144	0.034	0.154	0.079	0.179	0.187	0.031
companies	7,547	7,547	7,547	7,547	7,547	7,547	7,547	7,547
observations	55,531	55,531	55,531	55,531	55,531	55,531	55,531	55,531

Notes: See notes to Table 4.

Table 6: Investment. Non-linear effects.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
$(I/K)_{it-1}$	-0.089 (0.066)	-0.076 (0.069)	-0.102 (0.069)	-0.098 (0.074)	-0.114 (0.076)	-0.134 (0.075)	-0.141 (0.050)
Δy_{it}	0.293 (0.096)	0.346 (0.093)	0.356 (0.090)	0.261 (0.093)	0.344 (0.090)	0.362 (0.092)	0.284 (0.077)
Δy_{it-1}	0.245 (0.095)	0.354 (0.091)	0.339 (0.088)	0.335 (0.087)	0.356 (0.088)	0.290 (0.090)	0.361 (0.067)
$(k-y)_{it-2}$	-0.171 (0.018)	-0.166 (0.018)	-0.170 (0.018)	-0.170 (0.019)	-0.166 (0.019)	-0.159 (0.018)	-0.162 (0.016)
$(B/A)_{it-1}(< p75)$	0.072 (0.077)						
$(B/A)_{it-1}(> p75; < p90)$	-0.013 (0.059)						
$(B/A)_{it-1}(> p90)$	-0.052 (0.054)						
$((B-m)/A)_{it-1}(< p75)$		-0.061 (0.047)					-0.052 (0.030)*
$((B-m)/A)_{it-1}(> p75; < p90)$		-0.147 (0.062)					-0.052 (0.030)*
$((B-m)/A)_{it-1}(> p90)$		-0.127 (0.048)					-0.052 (0.030)*
$(idb)_{it-1}(< p75)$			-0.081 (0.096)				
$(idb)_{it-1}(> p75; < p90)$			-0.100 (0.060)				
$(idb)_{it-1}(> p90)$			-0.031 (0.009)				
$(tdb)_{it-1}(< p75)$				-0.007 (0.008)			-0.004 (0.007)
$(tdb)_{it-1}(> p75; < p90)$				-0.005 (0.010)			0.011 (0.010)
$(tdb)_{it-1}(> p90)$				-0.004 (0.001)			-0.002 (0.001)
$(GR/A)_{it-1}(> p25)$					0.202 (0.101)		0.165 (0.063)*
$(GR/A)_{it-1}(> p10; < p25)$					0.662 (1.103)		0.165 (0.063)*
$(GR/A)_{it-1}(< p10)$					0.658 (0.727)		0.165 (0.063)*
$(CF/A)_{it-1}(> p25)$						0.311 (0.135)	
$(CF/A)_{it-1}(> p10; < p25)$						3.470 (2.770)	
$(CF/A)_{it-1}(< p10)$						0.890 (0.447)	
M_1	0.000	0.000	0.000	0.000	0.000	0.000	0.000
M_2	0.978	0.988	0.756	0.812	0.643	0.486	0.201
Sargan	0.068	0.254	0.032	0.259	0.082	0.395	0.187
Difference-Sargan	0.818	0.882	0.636	0.803	0.849	0.878	0.684

Notes: See notes to Table 2. Number of companies: 7,547. Number of observations: 55,531. (*) Coefficients restricted to be equal.

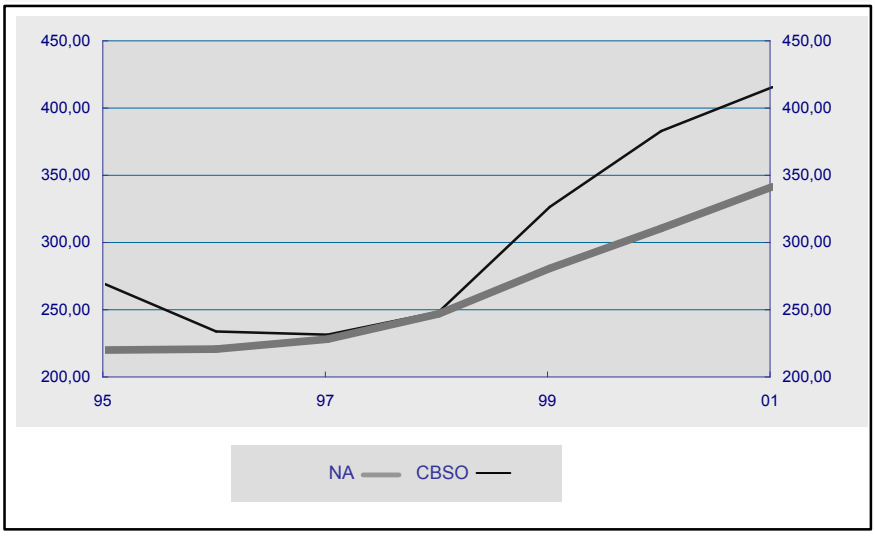
Table 7: Employment. Non-linear effects.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
n_{it-1}	0.922 (0.014)	0.905 (0.015)	0.934 (0.014)	0.931 (0.014)	0.926 (0.016)	0.940 (0.026)	0.958 (0.013)
k_{it}	0.035 (0.007)	0.041 (0.007)	0.033 (0.007)	0.034 (0.007)	0.032 (0.007)	0.029 (0.007)	0.019 (0.006)
Δw_{it}	-0.510 (0.092)	-0.492 (0.092)	-0.635 (0.087)	-0.550 (0.087)	-0.637 (0.080)	-0.519 (0.077)	-0.554 (0.075)
w_{it-1}	0.000 (0.039)	0.043 (0.041)	-0.021 (0.037)	-0.003 (0.035)	0.012 (0.040)	-0.026 (0.039)	-0.050 (0.032)
Δy_{it}	0.297 (0.038)	0.293 (0.042)	0.313 (0.041)	0.286 (0.038)	0.280 (0.038)	0.280 (0.037)	0.280 (0.035)
$(B/A)_{it-1}(< p75)$	0.032 (0.034)						
$(B/A)_{it-1}(> p75; < p90)$	0.015 (0.029)						
$(B/A)_{it-1}(> 90)$	-0.042 (0.023)						
$((B-m)/A)_{it-1}(< p75)$		-0.001 (0.015)					
$((B-m)/A)_{it-1}(> p75; < p90)$		0.001 (0.025)					
$((B-m)/A)_{it-1}(< p90)$		-0.052 (0.023)					
$(idb)_{it-1}(< p75)$			-0.039 (0.051)				
$(idb)_{it-1}(> p75; < p90)$			-0.109 (0.033)				
$(idb)_{it-1}(> p90)$			-0.034 (0.005)				
$(tdb)_{it-1}(< p75)$				0.006 (0.004)			0.005 (0.005)
$(tdb)_{it-1}(> p75; < p90)$				-0.001 (0.004)			0.006 (0.005)
$(tdb)_{it-1}(> p90)$				-0.004 (0.001)			-0.003 (0.001)
$(GR/A)_{it-1}(> p25)$					0.090 (0.012)		0.085 (0.019)*
$(GR/A)_{it-1}(> p10; < p25)$					0.116 (0.060)		0.085 (0.019)*
$(GR/A)_{it-1}(< p10)$					0.304 (0.090)		0.085 (0.019)*
$(CF/A)_{it-1}(> p25)$						0.067 (0.044)	
$(CF/A)_{it-1}(> p10; < p25)$						-1.350 (1.134)	
$(CF/A)_{it-1}(< p10)$						0.549 (0.185)	
M_1	0.000	0.000	0.000	0.000	0.000	0.000	0.000
M_2	0.067	0.052	0.093	0.039	0.045	0.049	0.048
Sargan	0.151	0.334	0.107	0.155	0.567	0.564	0.440
Difference-Sargan	0.235	0.332	0.168	0.149	0.086	0.348	0.164

Notes: See notes to Table 4. Number of companies: 7,547. Number of observations: 55,531. (*) Coefficients restricted to be equal.

Figure 1

DEBT OVER GROSS REVENUE



Note: NA: National Accounts. CBSO: Central Balance Sheet Data Office

Figure 2

PERCENTILES OF DISTRIBUTIONS OF FINANCIAL VARIABLES

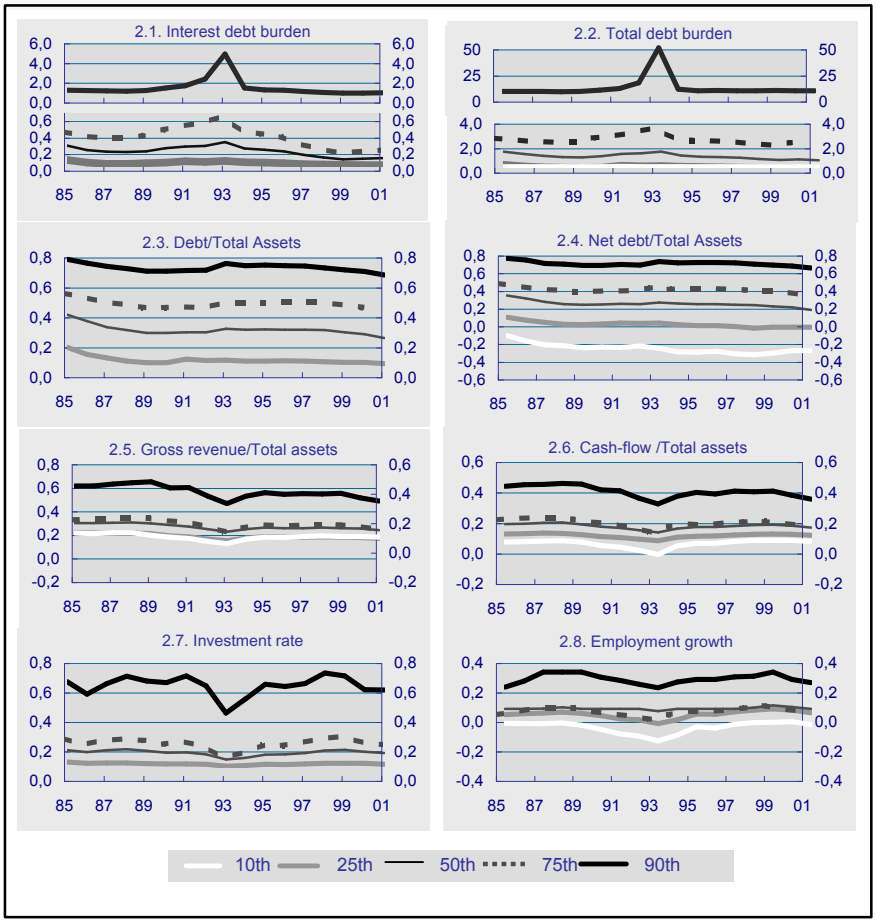


Figure 3

FINANCIAL POSITION AND LEVEL OF ACTIVITY

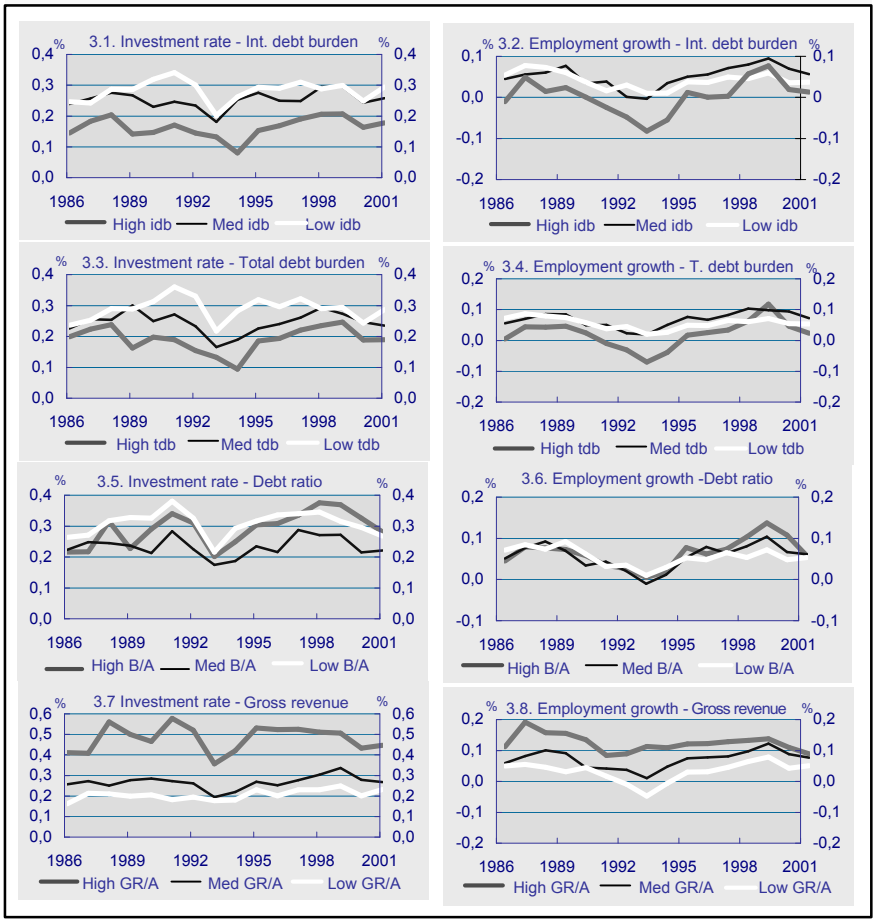


Figure 4

COMPOSITE INDICATORS OF THE IMPACT OF FINANCIAL CONDITIONS

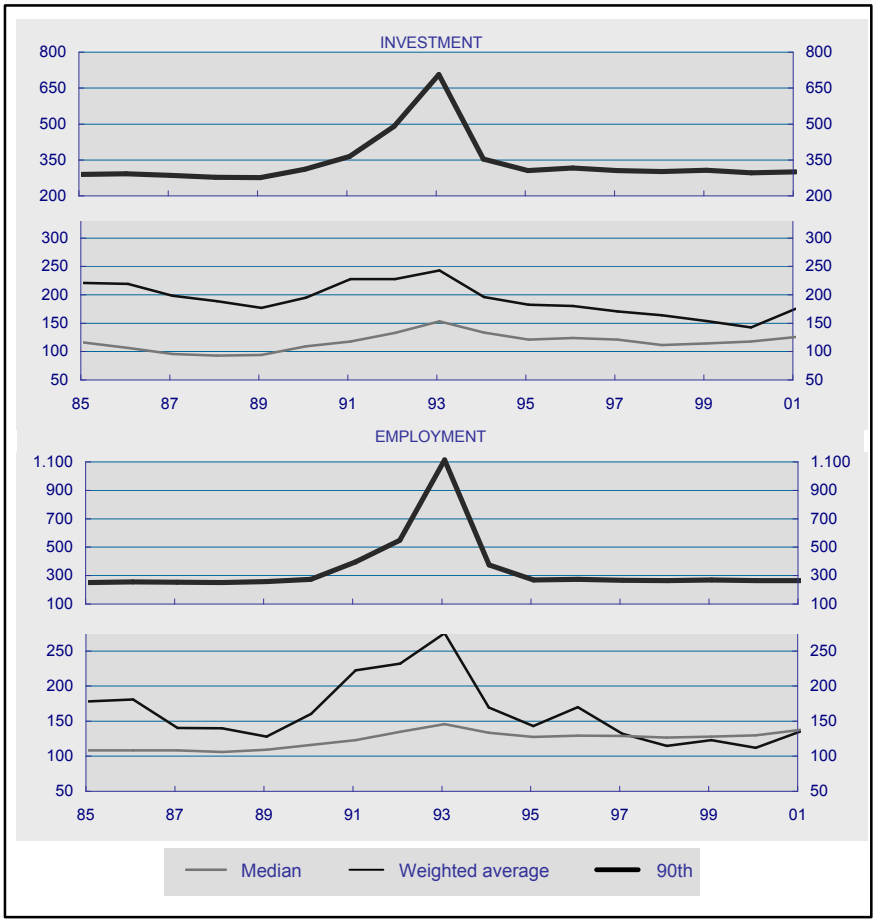
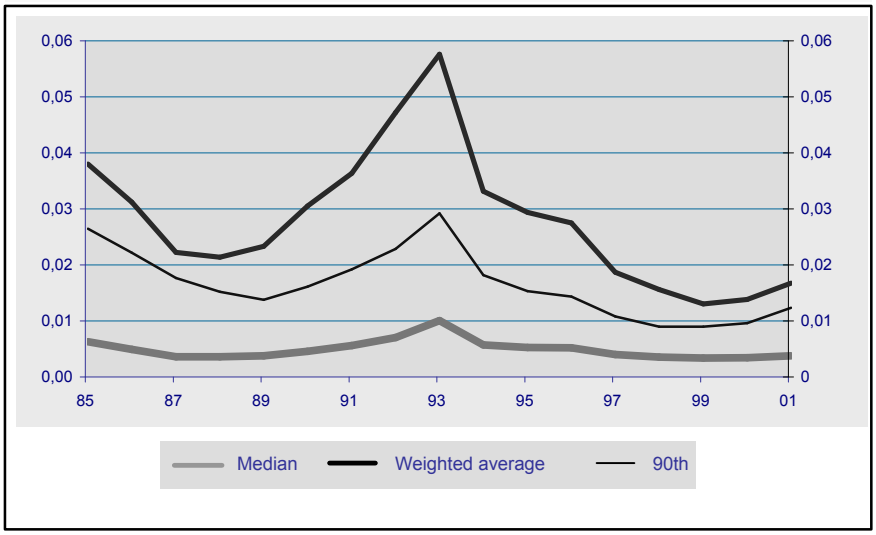


Figure 5

FINANCIAL FRAGILITY INDICATOR



Note: The indicator of financial fragility is an indicator of the probability of default, based on Benito et al. (2003). See the data appendix for a brief description of this indicator.

Data Appendix

Table A.1 tabulates the number of time-series observations per company.

Table A.1: Panel structure

No of observations	5	6	7	8	9	10	11
Companies	1,268	1,109	913	658	581	379	352
No of observations	12	13	14	15	16	17	Total
Companies	411	365	415	400	234	462	7,547

Investment (I)
Purchase of new fixed assets.

Capital stock (K)
Fixed assets at replacement cost (calculated by the Central Balance Sheet Data Office (CBSO) of the Banco de España). When introduced in real terms, K is deflated by the Gross Fixed Capital Formation deflator.

Total assets (A)
This is given by the sum of fixed assets at replacement cost K and working capital less provisions.

Employment (N)
The number of employees during the year. The data also distinguish between the number on permanent and temporary contracts.

Real Sales (S)
Total company sales, deflated by the GDP deflator.

Wages (W)
The average company wage is given by direct employment costs (not including social security contributions) divided by the employment head count and deflated by the GDP deflator.

Gross revenue over total assets (GR/A)
Gross operating profit plus financial revenue divided by total assets.

Debt (B/A)
Total outstanding debt divided by total assets.

Debt over gross revenue (B/GR)
Total outstanding debt divided by gross revenue, GR.

Net Debt ($(B-m)/A$)
Total outstanding debt less cash and its equivalents divided by total assets.

Interest debt burden (idb)
Interest payments divided by gross revenue.

Total debt burden (tdb)
Interest payments plus short-term debt over gross revenue.

Cash flow (CF/A)
Post-tax profit plus depreciation of fixed assets divided by total assets.

Probability of default (pd)
Based on Benito et al (2003), it is obtained from the estimation of a probit model which has as explanatory variables real sales, debt, interest debt burden, short-term debt without cost over total debt, profitability, liquidity, a dummy indicating if the firm pays dividends and the growth rate of gross domestic product.

For interest debt burden and total debt burden, where companies have a negative or zero value for the denominator and a positive value for the numerator the ratio is set equal to the value of the 99th percentile that year; where the numerator is zero, the ratio is set equal to zero, for any value of the denominator. Additionally, for all the variables used as regressors (except those that enter in levels), when the value is higher than the 99th percentile, it is changed for the value of this percentile.

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