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SPANISH SMEs´ SUBSIDISED AND GUARANTEED CREDIT DURING ECONOMIC CRISIS: A REGIONAL PERSPECTIVE

Spanish SMEs´ subsidised and guaranteed credit during economic crisis: A regional perspective

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The aim of this study is to analyse the effects of two Spanish public programmes that provide financial support to small and medium enterprises: a) subsidised credit by the Official Credit Institute and b) bank credit guaranteed by a mutual guarantee society. The study was conducted from a regional perspective and compares the effects of the two programmes during normal times with the effects during economic crisis. The results show that during stable (non-crisis) periods, these programmes affect the growth of assets, sales, and sales to assets ratio. However, during recession, the effects extend to include the growth of employment and sales-employee ratio. Moreover, there are significant regional differences in the impacts of the financial aid programmes.

Keywords: public policies, subsidised credit, guaranteed credit, impact evaluation, economic crisis, regional policies.

JEL classifications: G01, G21, G28, H81

INTRODUCTION

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The figures show that in the European Union (EU), 98% of all firms are either small or medium enterprises (SMEs), and in Spain, close to 99% of all firms are SMEs. Because this sector is the backbone of the economies (European Commission, 2011), it receives the attention of both academic and institutional perspectives. One of the most studied aspects of SMEs is their financial difficulties associated with accessing the credit market. The main aspects to consider in this sense are the credit constraints[1] and the imperfections of the financial markets. In particular, here are relevant features such as i)the roles of collateral and guarantees conditions demanded in return, ii) the high costs involved in obtaining a loan given the size of the project (and the advances in technology), and iii) lender-borrower relationships (PARKER, 2009; KOROSTELEVA and MICKIEWICZ, 2011; DE LA TORRE *et al.*, 2010; ROMERO MARTÍNEZ *et al.,* 2010).

Financial liberalisation increases the resources (external funds and equity), while the volume of initial funding responds positively to international capital inputs represented by non-resident bank loans and remittances, and responds negatively to the volume of offshore deposits (KOROSTELEVA and MICKIEWICZ, 2011).[2] The difficulty of SMEs to access credit markets sometimes increases in economic crisis due to the weakness of the financial system of certain regions within the same country. Given these circumstances, and because of the globalisation of financial markets, SMEs can sometimes indirectly access international financial markets through domestic banking systems (TORNELL and WESTERMAN, 2005).

During the last ten years, the financial environment (e.g., market, institutions, liberalisation and internationalisation processes, cultural aspects and economic growth) has changed, and financial topics are now considered to be strongly related to economic development, a factor that differs among regions of a single country (DEMIRGÜÇ-KUNT and MAKSIMOVIC, 1999; CORNET, 2009). In the specific case of Spain, we consider the studies of CARBÓ, *et al.*, 2003; CARBÓ *et al.*, 2007; FERNÁNDEZ DE GUEVARA and

MAUDOS, 2009. [3] These authors analyse the relationship between the economic development and growth of a region and the impact of that relationship on the financial markets. As a consequence, SMEs, as one of the most important agents of the economy, are now being studied from an in-country regional perspective (e.g., PALACÍN *et al.,* 2012; PALACÍN-SANCHEZ and DI PRIETO, 2013).

Previous studies analyse i) the impact of one or more financial aid policies in a given country, ii) the impact of a specific aid in a particular sector of the economy of one country or regions of one country, and iii) the impact in a specific phase of the entrepreneurship activity in a single country. This article belongs to the second research line, and its main objective is to provide empirical evidence regarding the impact of two of the most important Spanish financial policies for SMEs, which are subsidised credit offered by the Official Credit Institute (ICO)[4] and credit guaranteed by a mutual guarantee society (MGS)[5]. This study focuses to the following three dimensions: i) the assessment of the nature of the impact of programme participation on the performance of the SME (growth of assets, sales, employment, sales to assets ratio and sales-employee ratio), ii) an analysis of whether these public policies have differential effects in times of crisis, and iii) an analysis of whether there are differences in the impact of financial aid across a country's heterogeneous regions.

This paper contributes to the literature in two ways. First, to the best of our knowledge, this study is the first to investigate the impact of the two most important financial policies in different Spanish regions, that is, subsidised credit offered by the ICO and credit guaranteed by an MGS. One notable exception is the study of GARCÍA-TABUENCA and CRESPO-ESPERT (2010), which examines the impact on Spanish beneficiated firms of the credit subsidised by the ICO (only the ICO SME line) and the credit guaranteed by an MGS during the period 1996 to 2003. Second, we have not found previous studies that analyse whether the effects of these public policies vary in times of crisis.

The article is organised as follows. Section 2 describes previous research and presents the hypotheses. Section 3 briefly describes the characteristics of the Spanish regions and the main public policies of the Spanish SMEs. Section 4 is devoted to data and methodology. Section 5 presents the main results of the study, and section 6 offers the main conclusions.

PREVIOUS RESEARCH AND HYPOTHESES

From the perspective of the policymaker, financial policies of SMEs seek to moderate the disadvantages that arise in the credit market for the firms in this sector. These disadvantages include transaction costs and information asymmetries between the financial backers and the business. In response to the heightened restrictions on access to credit, governments have designed public policies that encourage entrepreneurs to finance SMEs and that promote innovation. PARKER (2009) separates the most important programmes present in almost all countries into four categories: i) loan guarantee schemes (one of the best-known and longest-establish finance policy); ii) interest subsidies, iii) policies to promote equity finance (e.g., regulatory policies to reduce the cost of new issues and secondary market transactions and to increase the supply of venture capital funds or taxation policies, and iv) innovation policies and entrepreneurship (e.g., U.S.- *Small Business Innovation Research* (SBIR); Japan - *Small Creative Business Promotion Law*). Moreover, these financial policies can serve as instruments for regional growth. According to CORNET (2009), regional growth is not an exogenous phenomenon, but rather, it depends on the ability of the local businesses to perform and generate income.

In evaluating the impact of financial policies of SMEs, STOREY (2000) argues that the firms that demand aid programmes differ in their level of motivation, which may, for example, imply that their owners are more growth-oriented (a self-selection bias). Another

consideration is that the governmental entity that administers the programme could display a committee selection bias for participant selection by choosing the better firms/applicants to whom funding should be extended (OECD, 2008). These sources of selection bias should be considered in the analyses of the financial policies. According to BAKER (2000), an evaluation of the impact of public financial aid programmes involves determining whether the programme produced the desired effects for its participants and whether those effects are attributable to the programme intervention. Various authors have sought to analyse the effectiveness of public policies for SMEs in different markets. These studies have analysed i) the impact of one or more financial aid policies in a given country (e.g., HYYTINEN and TOIVANEN, 2005; CHANDLER, 2012, among others); ii) the impact of a specific aid in a particular sector of the economy of one country or one region (CANNONE and UGHETTO, 2014), and iii) the impact in a specific phase of entrepreneurship activity in a single country (e.g., WALLSTEN, 2000; ALMUS, 2001; BRADSHAW, 2002; HONJO and HARADA, 2006; RIDING *et al.,* 2007; CRAIG *et al.*, 2008; KOBEISSI, 2009; MOLE *et al*., 2009; OH *et al.,* 2009, among others). In the particular case of Spain, we find that CALVO *et al.,* (2004) have studied a group of firms that received subsidy and that MADRID GUIJARRO and GARCÍA PEREZ DE LEMA (2008) have analysed the impact of financial aid in one of the 17 Spanish autonomous communities (Murcia Region). RIVERA and MUÑOZ (2004) have studied the subsidies received by the industrial sector compared with other country sectors, and GARCÍA-TABUENCA and CRESPO-ESPERT (2010) have evaluated the impacts of two financial aid programmes, the subsidy credit of the ICO SME line and the impact of the Spanish guarantee system provided by an MGS. Summaries of these studies are presented in Table 1.

Table 1 here

With respect to the studies conducted in Spain (Table 2) that evaluated the impact of financial aid programmes, there are important effects on the efficiency measures and on labour productivity measures.

Table 2 here

The empirical evidence generally demonstrates a positive effect on employment creation, whereas there is less support for profit and assets growth. Beyond the observed results, this background survey leads to two methodological conclusions: i) different statistical techniques have been used to consider selection bias (control variables, HECKMAN`s selection model, and matching techniques, among others) and ii) the impacts of various programmes tend to be evaluated over the short term, while long-term results are not significant because outside factors that are difficult to control for over time often intervene.

2.1. Hypotheses

The objectives of financial policies for SMEs are focused on promoting economic development in this sector. Moreover, access to new funds through participation in these programmes should enhance firm performance. Thus, participation in financial aid programmes should improve the observed results in the performance variables. Following the methodology used in previous studies (such as HONJO and HARADA, 2006; CHANDLER, 2012, among others), this analysis attempts to quantify this impact using different performance variables. Table 3 shows the relation between the selected performance variables and previous studies.

Table 3 here

The hypotheses are as follows:

- Assets Growth:

H1: Firms that participate in financial aid programmes should experience greater growth (or fewer declines during crises) in their investments, measured as total assets, than firms in the comparison group.

- Sales Growth

H2: Firms that participate in financial aid programmes should experience greater growth (or fewer declines during crises) in their sales than firms in the comparison group.

- Employment Growth

H3: Firms that participate in financial aid programmes should experience greater growth in the number of employees (or less of a decline during crises) than firms in the comparison group.

- Growth in Sales to Assets Ratio

H4: Firms that participate in financial aid programmes should experience a greater growth in sales to assets ratio (or less of a decline during crises) than firms in the comparison group.

- Growth in Labour Productivity[6]

H5: Firms that participate in financial aid programmes should experience a greater growth in labour productivity (or less of a decline during crises) than firms in the comparison group.

CHARACTERISTICS OF REGIONS IN SPAIN
AND FINANCIAL POLICIES OF SMEs

Spain is an interesting case study with respect to its regional characteristics for several reasons. First, the country has a banking-oriented financial system, and as previously mentioned, almost 99% of the firms are SMEs. Thus, the roll of the banking industry

(commercial and saving banks as well as credit cooperatives) is relevant as there are no alternative sources to finance SME projects, which leads to a significant dependency on bank credit (CARBÓ *et al.*, 2003; CARBÓ *et al.*, 2007). Second, Spain does not present the same homogeneity among its 17 autonomous communities and its two autonomous cities as each region has distinctive social economic features (ILLUECA *et al.*, 2009; FERNÁNDEZ-SERRANO and ROMERO, 2013, among others). Furthermore, the regions differ from other European and non-European countries (PALACÍN *et al.*, 2012; PALACÍN-SÁNCHEZ and DI PIETRO, 2013). Third, according to CUADRADO-ROURA (2010), regional differences are noted in the degree of economic development.

Table 4 summarises the main aspects of the three high-income regions of Spain that are analysed in this study versus the country average. Catalonia and Madrid are two of the largest regions, by population and gross domestic product (GDP), while Basque Country is the richest region as measured by GDP *per capita*. These three regions are also more innovative than the country average, according to their I+D internal expenses (GDP %) and I+D full-time personnel.

Table 4 here

According to the SPANISH COMPETITION COMMISSION (2008 Annual Report of Public Policies), the most important financial aids may be based on the specific industry or sector or on the legal instrument used (a wide variety of aids, including direct subsidies and largest cut). Such direct subsidies include i) loans or loans on favourable terms, ii) tax exemptions or reductions to specific enterprises or categories of enterprises, and iii) guarantees of different types (e.g., exchange or collateral, grants or loans, credit insurance, exports, etc.). Among the most important public policies, we find special lines of finance interest rates subsidised by the government through agreements with financial intermediaries (commercial and saving banks) and MGS organised by almost all Spanish regions and sectors.

It is important to note that MGS have not developed homogenously across Spain: the largest MGS has 4.7 times more members and 24.4 times more alive risk than the smallest MGS. The percentage of SMEs that are members of MGS also varies significantly across Spain regions (CARDONE-RIPORTELLA and BRIOZZO, 2012)[7] [8].

In 2008, the Spanish economy began a process of deterioration in real sector activity, with a 2.5% decrease in the gross domestic product (GDP) over 2007 (ICO, 2008). Similarly, there was a 7.2% decrease in the total credit growth over the previous year. This contraction affected virtually every sector of economic activity due to decreased demand and investment, especially during the second half of 2008. Accordingly, since 2008 the Bank of Spain's indicators revealed the tightening of credit and a decrease in credit demand among non-financial corporations.

DATA AND METHODOLOGY

Data and sample determination

This paper analyses, from a regional perspective, whether differential effects exist for the SMEs that participated in public financial aid programmes during economic crisis. Based on the database of the Iberian System for Financial Statement Analysis (SABI, *Sistema de Análisis de Balances Ibéricos*[9]), the Spanish SMEs that participated in financial aid programmes were identified for two time periods: 2002/2003 (normal pre-crisis years) and 2007 (the beginning of a financial crisis) [10]. Only firms with fewer than 250 employees at the time they received financial aid are included[11].

The financial aid instruments used by the SMEs in the sample are subsidised credit offered by the ICO and bank credit guaranteed by an MGS. It is well known that the guarantee offered by an MGS facilitates access to credit while lowering the cost of the credit,

which is why, following GARCÍA-TABUENCA and CRESPO-ESPERT (2010), the two instruments are considered comparable.

Once these participating firms, referred to as the treatment group, are identified, the next step involves identifying an appropriate comparison group. As in earlier studies (CALVO *et al.,* 2004), a group of comparable firms is selected. At least one business similar to each company in the treatment group[12] is selected according to the following parameters: location (autonomous region), activity (Statistical Classification of Economic Activities in the European Community – NACE-, 2nd revision, 4 digits), and size (total assets measured during the previous year, with a variation of +/-10%). Accordingly, a final sample of 368 observations (firms) was identified, as shown in Table 5.

Table 5 here

In the Appendix (Tables 11 and 12), the sample distribution is shown according to the autonomous region and sector. Half of the sample is concentrated in three of the largest regions (Catalonia, Basque Country, and Madrid[13]), and three sectors make up 73% of the sample: manufacturing (31.2%), retail (24.2%), and construction (17.6%)[14].

Estimation methodology

According to WOOLDRIDGE (2002), the effect of programme participation on the performance variables is analysed by means of *average treatment effects* (ATEs) on the treated group. The model for the performance variables is estimated consistently by interacting the policy treatment effect with each element after subtracting its mean (MOLE *et al.,* 2009). Thus, the estimated equation is:

$$E(y_{t+1}|w, x_t) = \beta_0 + \alpha w + \tau g + \theta g w + \beta x + \beta x g + \psi(x - \bar{x})w + \omega(x - \bar{x})wg + u \qquad \textbf{(1)}$$

where

y: the performance variable of interest measured the year after programme participation (t+1), described in Table 3.

w: the dummy variable that takes the value 1 if the company participated in a financial aid programme, and 0 if it did not.

g: the dummy variable that takes the value 1 if the company belonged to the 2007 sample, and 0 if it did not.

X: the vector combining firm characteristics (control variables) measured during the year of programme participation (t).

$\overline{x}$: the vector of the sample means for each characteristic.

$\beta_0, \alpha, \tau, \psi, \beta, \theta, \omega$: the estimated coefficients.

u: the error term.

The ATE, which measures the effect of participating in the financial aid programme for a firm selected at random from the sample, can be estimated as follows:

$$A\hat{T}E(x) = E(y|w=1) - E(y|w=0) = \begin{cases} \alpha + \psi(x-\overline{x}) & \text{si } g=0 \text{ (year 2002-2003)} \\ \alpha + \theta + (\psi + \omega)(x-\overline{x}) & \text{si } g=1 \text{ (year 2007)} \end{cases} \qquad (2)$$

If parameters θ and ω have statistically significant estimates, then the effect of receiving financial aid in year 2007 differs from the effect of doing so in years 2002/2003.

The control variables (x) included in the estimation are described in the following section. With this methodology, the possible selection bias is addressed through the inclusion of variables that control for growth and other firm characteristics (CHANDLER, 2012)[15]. For the firms that requested financial aid, received it, and reported it, this model controls for the combination of self-selection, committee selection, and data collection biases[16].

We use bootstrapped standard errors clustered on regions to correct for the intra-class correlation[17].

Operational definitions of variables

To estimate the ATE for the performance variables described in the hypotheses (Table 3), the following operational definitions are used:

- Assets Growth: The natural logarithm of assets in year t+1 – the natural logarithm of assets in year t (aid year).

- Sales Growth: The natural logarithm of sales in year t+1 – the natural logarithm of sales in year t (aid year).

- Employment Growth: The percentage change of the number of employees from year t+1 with respect to year t (aid year).

- Growth in Sales to Assets Ratio: The percentage change of sales to assets ratio from year t+1 with respect to year t (aid year).

- Growth in Labour Productivity (Sales-Employee Ratio): The percentage change of the natural log ratio of sales/number of employees from year t+1 with respect to year t (aid year).

A list of the studied variables is presented in Table 6 along with the operational definitions that have been used. The explanatory variables in the ATE model (Eq. 1) are financial aid and the corresponding terms of interaction plus location dummy variables for autonomous regions that represent the communities of Madrid, Catalonia, and Basque Country[18]. The remaining variables act as control variables.[19] These control variables are grouped into ratios of size (assets, sales, age, and employee number); growth (percentage change in assets, sales, and employees); profitability (ROA, ROE); asset management (sales to assets ratio, growth in total assets); financing structure (equity/total assets); sales per employee and growth of this variable; and qualitative variables such as export nature, sector (only the most relevant in the sample), and whether the company belongs to a business

group.[20] There are terms for the interaction between the group and the control variables to control for possible heterogeneity among the companies at different moments in time.

Table 6 here

RESULTS

Descriptive statistics

In this section, the characteristics of each group of firms (comparison and treatment) are studied as a function of the analysis period. Tables 7 and 8 show the sample means for the variables of interest at three moments in time: the year prior to participating in the programme (t-1), the year of programme participation (t), and the year after participating in the programme (t+1). For the years 2002/2003 (Table 7), those firms that received aid experienced more growth in sales and in total assets for the same year as the programme. These findings concur with the self-selection bias described by the OECD (2008) in that the more growth-oriented firms tend to demand public aid.

Table 7 and 8 here

Continuing with the years 2002/2003, there are no significant differences in the year prior to or in the year after programme participation, except for sales-employee ratio and growth in this ratio. It is interesting to note that the firms that participated in aid programmes have a smaller sales/employees ratio than their peers for all years studied. At the same time, the growth in sales-employee ratio was greater for the businesses that did not participate in the programme during the prior year (t-1). These results appear to indicate, *a priori*, that firms with higher sales/employee ratios do not seek out this type of financial aid, possibly because they face fewer restrictions in the financial system. This finding of adverse selection concurs with that observed by OH *et al.* (2009). Note that this difference does not indicate a selection

bias that outweighs the interpretation of the impact of aid programmes because the comparison group companies are "better".

For 2007 (Table 8), no significant differences between the aid year and the prior year are identified except for sales-employee ratio. The same occurs for the period 2002/2003 in that the firms that participated in the programme have a smaller sales/employees ratio than their peers for all years. Similarly, in the year following the programme, size (measured as total assets) is greater for the firms that participated in the programme, which is a result that agrees with the findings of CANNONE and UGHETTO (2014).

The effect of participating in a financial aid programme on performance variables

This section presents the estimates for the ATE according to the methodology proposed by WOOLDRIDGE (2002) and as previously described. The results are displayed in Table 9[21].

Table 9 here

With respect to firms in the period 2002/2003, participation in the aid programmes is relevant to their growth in assets, sales, and sales to assets ratio. However, for firms that participated in aid programmes in 2007, participation also affects growth in employment and sales-employee ratio. Hence, there is evidence to support hypotheses H1 to H5. The interpretation of these results can be extended by quantifying the observed ATEs (Eq. 2). Table 10 summarises the performance variable results (the aid variable and the terms of interaction) regarding whether there are differential effects for participation in financial aid programmes during economic crisis (full calculations according to Eq. 2 are provided in the Appendix). Firms from Catalonia show different impacts of programme participation on growth of assets, sales, and sales to assets ratio, while programme participation has a general

positive effect on growth of sales-employee ratio for Basque Country firms during a recession.

Table 10 here

After programme participation, assets growth increases for older and more profitable firms, at any time. During a recession, larger firms, with respect to the number of employees, also benefit from financial assistance, showing an increase in assets growth.

When analysing he effect of programme participation on sales growth, sales to assets ratio and historical sales growth exhibit an inverse behaviour. In other words, in normal times, firms with higher sales to assets ratio experience an increase in sales growth, but the inverse effect occurs during a recession. On the contrary, after receiving aid in 2002/2003, sales growth increases for those firms with smaller historical growth. However, an inverse effect is evidenced in crisis times. During a recession, firms with smaller sales to assets ratio, and those with higher historical sales growth, are the ones that benefit the most from the financial assistance. In addition, larger firms, with respect to the number of employees, also benefit from financial assistance in that they show an increase in sales growth, which is stronger in a recession.

Firms with smaller historical assets growth exhibit higher sales/assets growth after receiving aid, an effect that decreases during a recession.

Two performance measures show an impact of programme participation only during times of recession: employment growth and sales-employee ratio growth. Of those companies participating in the programme in 2007, the more leveraged firms show an increase in employment growth. In addition, firms with smaller assets growth also benefit from financial aid in that they exhibit an increase in job growth during times of recession. Finally, after programme participation during times of a recession, sales-employee ratio growth increases for younger firms.

Catalonian firms show a differential impact after programme participation on growth of assets, sales and sales to assets ratio. The key variables that capture these effects are ROE and historical assets growth. Less profitable Catalonian firms show higher sales and sales/assets growth after receiving financial aid, at any time. Those firms with higher historical assets growth demonstrate a positive effect from programme participation on sales growth, at any time, and on assets and sales/assets growth during times of recession.

Finally, programme participation during economic crisis has a positive effect on the growth of sales-employee ratio for all Basque firms, regardless of their particular characteristics.

With respect to the control variables, the following observations are made:

- Effect on Assets Growth:

For all firms, capital structure (equity/assets) has a positive differential effect that is stronger in times of a recession. The positive effect of equity/assets for all firms shows that SMEs rely on internal funds for assets growth, especially during recessions, when the effect is higher.

- Effect on Sales Growth:

The sales to assets ratio has a negative effect on sales growth during normal times, but it tends to disappear during recessions. For the 2007 sample, sales growth also has a negative effect.

- Effect on Employment Growth:

The results show a positive effect of equity/assets in 2007, meaning that SMEs that rely on internal funds have better opportunities to create jobs in times of recession.

- Effect on Growth of Sales to Assets Ratio:

Assets growth has a positive effect, though it is less in 2007. Sales growth, however, has negative effects.

- Effect on Growth of Sales-Employee Ratio:

For firms from the 2007 group, the effect of equity/assets is negative, while that of age is positive.

The observed effects coincide, in general terms, with those reported in previous studies. For employment growth, see LERNER (1999); ALMUS (2001); CRAIG *et al*. (2008); MOLE *et al.* (2009); OH *et al*. (2009), and CHANDLER (2012). For sales growth, see Lerner (1999); Oh *et al.* (2009), and CHANDLER (2012). For sales to assets ratio, see RIVERA and MUÑOZ (2004). In addition, an adverse selection effect is observed because a lower proportion of the SMEs with higher sales/employees ratio seek this type of aid, a result that is in line with the findings of OH *et al.* (2009).

CONCLUSIONS

The objective of this study is to analyse, from a regional perspective, whether differential effects exist when Spanish SMEs participate in financial aid programmes (credit subsidised by the ICO or credit guaranteed by an MGS) during times of crisis. This analysis contributes to previous studies as persistent heterogeneity across regions and exogenous components of growth are more easily controlled in a single economy than across economies (CARBÓ *et al.,* 2007).

To control for possible effects from selection bias, several control variables are included to estimate the average treatment effect. One of the main findings is that the effects of financial policy programmes are stronger during times of crisis. For example, in normal times, participation in such programmes only affects the growth in assets, sales, and sales to assets ratio, while in difficult times, the effect also translates to employment and sales-employees ratio growth. Nevertheless, these effects are not homogeneous among all participating firms, but rather, they depend on the firm's characteristics and its regional location. Furthermore, the observed impacts differ among autonomous communities (Catalonia versus the rest of Spain).

Moreover, programme participation during a recession has a positive effect on the growth of sales-employees ratio for all Basque firms regardless of their particular characteristics.

The results reveal that size (measured by number of employees), age, and profitability (ROE) are key variables affecting the outcome of programme participation on assets growth. In this case, SMEs that are expected to face lesser financial restrictions (bigger, more profitable and older firms) also benefit more from the policy programme. Furthermore, bigger firms also benefit from higher sales growth after participation in the policy programme. However, this impact does not prevail for all firms. For instance, less profitable Catalonian firms show an increase in sales and sales to assets ratio growth after the implementation of the financial policy. In addition, more leveraged firms, and those with smaller asset growth, show a positive impact on employment growth after the financial policy programme during a recession. At the same time, for all Spanish firms, after financial programme participation during a recession, sales-employees ratio growth increases for younger firms, which is a particularly interesting effect given those younger firms are more prone to be adversely affected by tightened financial restrictions.

This study presents at least three contributions. First, there is a differential impact of financial policy programme during times of crisis, given the significant effect on employment creation and sales-employees ratio growth observed during crisis years versus normal years. To the best of our knowledge, no previous study has explored the relationship between financial policy and firm performance in the context of economic crisis. Second, the results have implications not only for the planning of SME financial policy programmes but also for the development of counter-cyclical policies, showing the changing effects of policies according to the macroeconomic context. In particular, the observed effect of programme participation on employment growth present only in recession times is particularly useful for policy design. Third, the existence of particular impacts for the Catalonian and Basque firms

leads us to consider differences in implementation of the SME financial policy programmes among regions, and the effects of the programmes on decisions with respect to the location of firms. The design of region-focused policies is necessary to encourage regional equalisation (CORNET, 2009).

As PARKER (2009) notes, in general, mutual guarantee schemes have a limited scope relative to the size of the potential markets they could serve. In fact, in Spain, only a small percentage of SMEs take advantage of the mutual guarantees society (no more than 4%), most likely because the cost to obtain the guarantee is too high (CARDONE-RIPORTELLA and BRIOZZO, 2012). Given the scarcity of resources, especially during times of crisis, these types of studies are particularly useful for policymakers as they work to develop counter-cyclical policies that increase and facilitate SMEs' access to credit.

Some results deserve further analysis. First, the significant effects of sales and asset growth show the relevance of selection bias in policy evaluation. Second, the changing sign of some variables, depending on the moment of analysis, indicates the importance of the economic cycle on firm performance and may suggest the need to design specific policy instruments. Moreover, some effects of programme participation remain to be studied in future research lines, such as the impact on total factor productivity. In addition future research could build on our findings and examine the relationship between financial aid and firm performance in the context of different previous crises. What makes this analysis difficult, however, is that different recessions may have different effects. Recessions associated mainly with financial fluctuations and credit constraints, such as the current recession, can have more severe negative impacts on SMEs than other types of recessions (ERIXON, 2009). Finally, it could be interesting to examine whether these effects vary among countries.

NOTES

[1] The STIGLITZ and WEISS (1981) model was one of the first to explain credit rationing through a model based on the asymmetric information of the value of new ventures. This model has an implicit assumption such that too few entrepreneurs have financial problems. Thus, one important implication of the model is the underinvestment problem (when some socially efficient ventures (e.g., ventures whose expected value is greater than value obtained from employing their resources in their best alternative use) are not undertaken by entrepreneurs). The problem can be solved by subsidising interest income, which increases the equilibrium number of entrepreneurships as social efficiency. On the other hand, De MEZA and WEBB (1987) propose a model where the assumption is the opposite. That is, the authors assume that there are so many entrepreneurs with financial problems that the result is an over-investment problem (when socially inefficient ventures are not undertaken by entrepreneurs). Thus, it is probable that there so many entrepreneurs in the equilibrium in the credit market (loans demanded and offered) that adequate public policies to support private initiatives may discourage those less able entrepreneurs from borrowing from the credit market. According to PARKER (2009), another implication of De MEZA and WEBB (1987)'s model is that policymakers do not have to think that the credit market imperfections mean the existence of insufficient entrepreneurial initiatives, and accordingly, they do not need to design financial instruments to support these initiatives for this group of less able entrepreneurs. The model's fragility changes in economic environments, causing PARKER (2009) to suggest the use of the term *credit constraints* rather than *credit rationing*.

[2] The authors analyse the positive impact of the internationalisation process of financial entities and study the determinants of financing start-up firms in over 50 countries.

[3] Beginning in 2004, Spanish savings banks were released from having to remain in their region of origin. While still maintaining a high concentration in the respective territory, many (especially, but not exclusively, the largest) have migrated to other regions within Spain, expanding their branches to gain new markets and diversify their businesses. Other savings banks have adopted expansionary strategies in their traditional markets. These strategies have a special impact on the Spanish regional financial system (ILLUECA, *et al*., 2009).

[4] http://www.ico.es/web/contenidos/5/4/home/home.html)

[5] Mutual guarantee societies (or mutual guarantee schemes) are the primary way that governments intervene in the credit markets to support SMEs. This scheme is present in an important number of countries (e.g., the U.S., Japan, Italy, Spain, etc.) When the project has a potential for success but presents high risk, the finance institution asks for collateral from the SME, which is obtained (or not) from an MGS (PARKER, 2009). In Spain, government financial support usually comes in the form of a counter-guarantee, which is granted by CERSA (*Compañía Española de Reafianzamiento, S.A.*, http://www.cersa-minetur.es), an instrumental society of the Spanish government. The coverage rate (30 to 75%) depends on policy priorities, such as innovation promotion, and types of operations, such as investments. CERSA also has a helpline to assist companies with less than 100 employees (CARDONE-RIPORTELLA and BRIOZZO, 2013).

[6] Following previous studies the term "labour productivity" is used to refer to a ratio of revenues per employee. For example GARCÍA-TABUENCA and CRESPO-ESPERT (2010) define productivity as added value per employee. In our study "labour productivity" refers to percentage change in sales-employee ratio.

7 Among others, there are tax policies as incentives provided by the autonomous governments to foster the development of a regional basis (e.g., tax incentives for stockholders who invest in the Spanish Alternative Investment Market, MAB).

8 In addition to the developed credit market in different regions (CARBÓ, *et al.*, 2007; ILLUECA *et al.*, 2009), Spain has two special (and new) capital markets that serve as alternative sources of funding for SMEs: the Alternative Investment Market for Growing Companies (MAB) and the Alternative Fixed-Income Market (MARF). In addition, Spain has developed a financial policy that supports SMEs at the regional and national levels, and it has adopted some EU policies in an attempt to improve the financial situation of SMEs (EUROPEAN COMMISSION, 2013).

[9] The SABI database is compiled by Bureau van Dijk Electronic Publishing. See http://www.bvdinfo.com/Products/Company-Information/National/SABI.aspx for more information. The SABI database provides quantitative information (financial statements) and qualitative information for Spanish firms. Included among the qualitative variables is the number of financial entities with whom the businesses operate. Among these entities, the official credit institutions, such as the ICO and the MGS, are listed.

[10] According to GARCÍA-TABUENCA and CRESPO-ESPERT (2010), who compare the ICO and the CERSA databases with SABI, approximately 10% of the SMEs that appear in SABI participate, in any given year, in some type of financial aid programme. Nevertheless, only some of these firms report their participation in this type of programme in SABI. This possible bias in data collection, in addition to possible self-selection and committee selection biases, are addressed in our estimations using several control variables.

11 A firm with fewer than 250 employees matches the European Commission's definition of an SME.

[12] In cases where more than one comparable firm meets these conditions, two firms are randomly selected.

[13] According to the SPANISH STATISTIC INSTITUTE (INE), these three regions account for 39.1% of Spanish firms and 43% of the GDP, and they have the highest GDP *per capita* in Spain.

[14] The real estate sector represents 5% of the sample; significant participation from the high-technology sectors is not observed.

[15] This mechanism of control is imperfect given that it mitigates the potential biases and endogeneity but does not completely eliminate them. In a previous version of this paper, a selection model was estimated to analyse the probability of receiving aid. This model of treatment effects was estimated using consistent estimators in two stages. However, the coefficient that measured the potential bias was not significant, thus a direct estimate via the least squares method, including control variables, was preferable (HONJO and HARADA, 2006).

[16] Note that these three biases can be expected to act in the same direction in that the best businesses request aid, receive it, and have the motivation to report it.

[17] An intra-class correlation reflects the correlation of the observations (firms) within a cluster (regions). A nonparametric bootstrap procedure estimates a model for a specified number of repetitions using samples of the data frame. For each repetition, the main analysis is repeated on the sample data, and the estimate is then stored (the model's coefficients in a linear regression). Once all repetitions have been computed, the standard errors can be calculated by taking the standard deviation of the stored model estimates. In bootstrapped standard errors clustered in regions, instead of drawing the observation units (the firm) with replacement, it draws the cluster units (regions) with replacement.

[18] The selection of these regions is based on their differential characteristics and the large number of SMEs from these geographical locations that participate in the sample: 16.2%, 19.2%, and 16.4%, respective to their specific location, as listed in (Table 10).

[19] The control variables control for the existing heterogeneity among different companies.

[20] It is not possible to control for the factors included in other papers, such as the level of intangible assets or R & D expenses because the data are missing for these variables.

[21] Different specifications of the model are implemented using the variables described in Table 6.

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Appendix

Insert tables 11 and 12

Quantification of ATEs effects

- Effect in Assets Growth (H1):

$$ATE(2002/3) = 0.274(ROE_i - R\bar{O}E) + 0.004(Age_i - A\bar{g}e) - 0.367 \text{ Catalonia(Asset Growth}_i - \text{Asset } \bar{G}\text{rowth})$$

$$ATE(2007) = 0.274(ROE_i - R\bar{O}E) + 0.002(Emp_i - E\bar{m}p) + 0.004(Age_i - A\bar{g}e) +$$
$$+(-0.367 + 1.584) \text{ Catalonia(Asset Growth}_i - \text{Asset } \bar{G}\text{rowth})$$
$$ATE(2007) = 0.274(ROE_i - R\bar{O}E) + 0.002(Emp_i - E\bar{m}p) + 0.004(Age_i - A\bar{g}e) +$$
$$+1.217 \text{ Catalonia(Asset Growth}_i - \text{Asset } \bar{G}\text{rowth})$$

- Effect in Sales Growth (H2):

$$ATE(2002/3) = 0.001(\text{Emp}_i\text{-}\overline{\text{Emp}}) + 0.201(\text{Sales/Assets}_i - \overline{\text{Sa}}\text{les/As}\overline{\text{s}}\text{ets}) +$$
$$-0.487(\text{Sales Growth}_i - \text{Sales }\overline{\text{G}}\text{rowth}) + 0.688\text{Catalonia}(\text{Asset Growth}_i - \text{Asset }\overline{\text{G}}\text{rowth}) +$$
$$-0.939\text{Catalonia}(\text{ROE}_i - \text{R}\overline{\text{O}}\text{E})$$

$$ATE(2007) = (0.001+0.002)(\text{Emp}_i\text{-}\overline{\text{Emp}}) + (0.201-0.242)(\text{Sales/Assets}_i - \overline{\text{Sa}}\text{les/As}\overline{\text{s}}\text{ets}) +$$
$$+(-0.487+1.1)(\text{Sales Growth}_i - \text{Sales }\overline{\text{G}}\text{rowth}) + 0.688\text{Catalonia}(\text{Asset Growth}_i - \text{Asset }\overline{\text{G}}\text{rowth}) +$$
$$+(-0.939+0.803)\text{Catalonia}(\text{ROE}_i - \text{R}\overline{\text{O}}\text{E})$$
$$ATE(2007) = 0.003(\text{Emp}_i\text{-}\overline{\text{Emp}}) - 0.041(\text{Sales/Assets}_i - \overline{\text{Sa}}\text{les/As}\overline{\text{s}}\text{ets}) +$$
$$+0.613(\text{Sales Growth}_i - \text{Sales }\overline{\text{G}}\text{rowth}) + 0.688\text{Catalonia}(\text{Asset Growth}_i - \text{Asset }\overline{\text{G}}\text{rowth}) +$$
$$-0.136\text{Catalonia}(\text{ROE}_i - \text{R}\overline{\text{O}}\text{E})$$

- Effect in Employment Growth (H3):

$$ATE(2007) = -0.430(\text{Equity/Assets}_i - \text{Eq}\overline{\text{ui}}\text{ty/As}\overline{\text{s}}\text{ets}) - 0.782(\text{Assets Growth}_i - \text{Assets }\overline{\text{G}}\text{rowth})$$

-Effect in growth of Sales to Assets Ratio (H4):

$$ATE(2002/3) = -1.406(\text{Asset Growth}_i - \text{Asset }\overline{\text{G}}\text{rowth}) + 1.209\text{Catalonia}(\text{Asset Growth}_i - \text{Asset }\overline{\text{G}}\text{rowth}) +$$
$$-1.842\text{Catalonia}(\text{ROE}_i - \text{R}\overline{\text{O}}\text{E})$$

$$ATE(2007) = (-1.406+1.201)(\text{Asset Growth}_i - \text{Asset }\overline{\text{G}}\text{rowth}) + 1.209\text{Catalonia}(\text{Asset Growth}_i - \text{Asset }\overline{\text{G}}\text{rowth}) +$$
$$-1.842\text{Catalonia}(\text{ROE}_i - \text{R}\overline{\text{O}}\text{E})$$
$$ATE(2007) = -0.205(\text{Asset Growth}_i - \text{Asset }\overline{\text{G}}\text{rowth}) + 1.209\text{Catalonia}(\text{Asset Growth}_i - \text{Asset }\overline{\text{G}}\text{rowth}) +$$
$$-1.842\text{Catalonia}(\text{ROE}_i - \text{R}\overline{\text{O}}\text{E})$$

Note that for Catalonian firms with above-average Assets Growth, in normal times the final effect is negative (-1.406+1.209=-0.197), while this effects results positive in year 2007 (-0.205+1.209= 1.004).

- Effect in growth of Sales-Employee Ratio (H5):

$$ATE(2007) = 0.207 \text{ Basque - } 0.033(Age_i - A\overline{g}e)$$

Table 1. Empirical studies of the impact of Aid Programs in different countries

Author/s	Sample and Aids Programme	Methodology	Results
LERNER (1999)	Studies the effect of the **Small Business Innovation Research Program (SBIR)** in the **U.S.** on a sample of 894 firms.	The comparison group is developed through two matching procedures: one defined by activity and size and the other by location and size. Subsequently, a model of ordinary least squares (OLS) is estimated.	Finds positive effects in the percentage change of sales and employment levels.
WALLSTEN (2000)	Studies the effect of the **Small Business Innovation Research Programs (SBIR)** (for small, high-tech businesses) in a sample of 367 firms.	Has an instrumental variable focus. The instrumental variable is defined as a function of the budget of the funding agency.	Finds no effect on job creation. The program appears to reward the most commercially viable projects.
ALMUS (2001)	The paper analyses the medium-term growth performance of firms that exclusively received **start-up assistance from programs administered by the Deutsche Ausgleichsbank** (DtA), a state owned bank, Studies 1,726 German firms (472 received,aid during their start-up phase).	Uses a three-stage selection model.	Finds significant effects on job growth.
BRADSHAW (2002)	Analyses 1,166 firms that participated in the California State **(US) Loan Guarantee Program.**	Business development before and after receipt of loan is evaluated through a comparison of means.	Finds a positive effect on jobs and revenue generation.
HYYTINEN and	Studies the effect of aid policies in **Finland** on a	A Tobit regression model is used at the industry level.	The industries that rely more on external financing invest more in R

TOIVANEN (2005)	sample of 700 firms.		& D and are more growth-oriented when public financing programs are available.
HONJO and HARADA (2006)	The study analyses the impact of **Japanese SME Creative Business Promotion Law (CBPL)** on capital structure of Japanese SME. Based on panel data from 1995 to 1999 from the Japanese Institute of Economic	Uses LSM at the company level.	Finds a positive effect of the aid measure for assets growth but not for sales and employment.
RIDING, MADILL, and HAINES (2007)	Studies the effect of a **Mutual Guarantees Scheme** in **Canada** on a sample of 350 firms.	Seeks to analyse possible incrementally: whether, as a result of this system, there is access for companies that could not obtain credit previously. A logit model is estimated, for which the dependent variable is whether credit was awarded.	Finds a positive effect of the system of guarantees on credit access.
CRAIG, JACKSON, and THOMSON (2008)	Studies 504 **Loans Guaranteed by the U.S. Small Business Administration** from 1991 to 2001. Data were collected on a local level.	Uses LSM on a cross-section with fixed effects. The unit of analysis is the region and not an individual company.	Finds a positive effect on job creation.
KOBEISSI (2009)	Studies 394 start-ups from the period 1997-1999 in the **US**. Studies **the effect of the Community Reinvestment Act (CRA).**	Uses panel data with fixed effects formulated on a regional level and not by individual company.	Finds that the level of CRA loans is significant in the growth of start-ups per year and for job creation per region.
MOLE, HART, ROPER, and SAAL (2009)	Studies the effects **of British Business Link (BL) Network**.(aid services) to SMEs in England on a sample of 3,348 firms.	Uses a *Probit* model for the probability of being assisted and an average treatment effects model to study program impact.	Finds that intensive assistance has a positive effect on job growth.
OH, LEE, HESHMATI, and CHOI (2009)	Evaluates **the effects of a Mutual Guarantee Scheme** in **Korea** in the post-Asian-crisis period.	Uses propensity score matching comparing firms that participated in the program with those that did not.	Finds that the least productive receive aid. The program has a positive effect on growth in employment, sales, and salaries.
CHANDLER (2012)	Studies the effect of the **Canada Small Business Financing Program (CSBFP)** on a sample of 2,105 firms.	Uses a robust LSM. Includes financing structure and growth intent as control variables.	Finds a positive effect on growth in salaries, employment, and revenue.
CANNONE, and UGHETTO, (2014)	The paper evaluates the efficiency of the **Italian** public financing **programme DOCUP 2000–2006 (Documento Unico di Programmazione**) in the Piedmont region of Italy. The dataset consists of 1,235 firms that applied for public funding to Finpiemonte S.p.A.	Uses a *probit* with sample selection to model application for the program and selection. Then uses a difference-in-difference estimator to assess the impact of the program.	Impact is positive in fixed assets, in the short and medium-term, and in debt, in the short-term.

Table 2. Empirical studies of the impact of general aid programs in Spain

Author/s	Sample and Aids Programme	Methodology	Results
CALVO, GARCÍA, and MADRID (2004)	Studies 53 firms that received a **subsidy** and 53 that did not in the region of Murcia (**Spain**).	Uses business matching. Compares averages between comparison and treatment groups. Uses logistic regression to study the differential characteristics of the subsidised firms.	Finds greater efficiency (use of fixed capital) in the non-subsidised firms and lower risk in the subsidised businesses (both before and after receiving aid). Finds that the positive effect is short term (1 year) but later disappears and that the non-subsidised businesses are more efficient.
RIVERA and MUÑOZ (2004)	Uses data from the Central Balance Sheet Data Office of the Bank of Spain (**Spain**) for the period 1992-2002, with 415 observations (at the sector level).	The authors create two groups based on whether the industrial sector receives higher or lower subsidies than the average. Uses mean differences with t tests and Mann-Whitney U tests.	Obtains positive results for the personal income/expense and revenue/assets indicators. Productive efficiency increases more for larger firms. Does not obtain positive results for other efficiency measures.
MADRID GUIJARRO and GARCÍA PÉREZ DE LEMA (2008)	Studies 532 firms from the **Economic Barometer of SMEs** (Murcia Regional Development Agency, **Spain**).	Studies motivation bias and committee selection bias using logistic regressions.	The variables number of employees, belonging to the industrial sector, and innovative strategies have positive effects on the probability of seeking public aid. The perceived technological position has a positive effect on the probability of receiving public aid.
GARCÍA-TABUENCA and CRESPO-ESPERT (2010)	Evaluates the **Spanish Mutual Guarantee Scheme** and the ICO_SME line), firms from 1998-2003.	Defines two treatment groups and three comparison groups. Uses ANOVA, Kruskal-Wallis, Factor and regression analysis.	Companies that received public support are the most efficient ones in economic terms, generating a higher added value per employee and higher financial resources.

Table 3. Hypothesis and prior evidence for performance variables

Hip.	The Effect (Impact) of Participating in Financial Aid Programs on. . .	Expected Result	Previous Empirical Evidence
H1	Assets growth	+	+ → HONJO and HARADA (2006).
H2	Sales growth	+	+ → LERNER (1999), OH *et al.* (2009), CHANDLER (2012). , HONJO and HARADA (2006).
H3	Job growth	+	+ → LERNER (1999), ALMUS (2001), BRADSHAW (2002), CRAIG *et al.* (2008), KOBEISSI (2009), MOLE *et al.* (2009), OH *et al.* (2009), CHANDLER (2012). ns → WALLSTEN (2000), HONJO and HARADA (2006).
H4	Sales to Assets Ratio growth	+	+ → RIVERA and MUÑOZ (2004), CALVO *et al.* (2004), (only short-term).
H5	Labour Productivity growth	+	+ → GARCÍA-TABUENCA and CRESPO-ESPERT (2010).

Note: "ns" denotes that the observed effect is not significant.

Table 4. Characterization of Madrid, Catalonia and Basque Country versus Spain average

	Madrid	Catalonia	Basque Country	Spain average
Population (2011)	6,486,680	7,539,618	2,184,606	47,190,493
GDP (2010, millions Euros)	190,391	197,919	66,900	1,062,591
GDP per capita (2010, Spain mean=100)	129.9	117.3	135.8	100
I+D internal expenses (GDP %) 2010	2	1.6	2	1.4
I+D full time personnel (% 1000 employees)	19	14.8	18	12
Unemployment rate (%, 2011)	15.50%	20.50%	12.60%	22.80%
Number of firms (%)	15.44%	18.52%	5.08%	100%

Source: Industry, Energy and Tourism Ministry.

Table 5. Sample distribution

Year	SMEs that __Do not Participate__ in Financial Aid Programs (Comparison Group)	SMEs that __Do Participate__ in Financial Aid Programs (Treatment Group)	Total
2002-2003	137	96	233
2007	77	58	135
Total	214	154	368

Table 6. Description of the variables

Variable	Definition
Control variables (vector X)	
Assets	Natural logarithm of total assets
Assets Growth	Assets year t –Assets year t-1
Sales	Natural logarithm of sales
Sales Growth	Sales year t –Sales year t-1
Sales/Emp.	Sales/Number of employees
Sales /Emp. Growth	Percentage change of Sales /Emp ratio
Emp.	Number of employees
Sales to Assets Ratio	Sales/total assets
ROA	Income for the year before interests and taxes/total assets
ROE	Income for the year (net income)/net equity
Equity to Assets Ratio	Capital and reserves/total assets
Manufacturing	Dummy variable that has a value of 1 if the firm belongs to the manufacturing sector (letter C in the NACE Classification 2nd Revision)
Retail	Dummy variable that has a value of 1 if the firm belongs to the retail sector (letter G in the NACE Classification 2nd Revision).
Construction	Dummy variable that has a value of 1 if the activity belongs to the construction sector (letter F in the NACE Classification 2nd Revision).
Exporting	Dummy variable that has a value of 1 if the firm carries out export activities.
Holdings	Dummy variable that has a value of 1 if the firm has holdings in other companies.
Age	Years from the date the business was founded to the moment when aid was received.
Group *(g)*	Dummy variable that has a value of 1 for firms in the comparison and treatment groups for the year 2007 and a value of 0 for the comparison and treatment groups for the years 2002-2003.
Location dummies	
Catalonia	Dummy variable that has a value of 1 if the firm is located in the autonomous region of Catalonia.
Madrid	Dummy variable that has a value of 1 if the firm is located in the autonomous region of Madrid.
Basque Country	Dummy variable that has a value of 1 if the firm is located in the Basque Country autonomous region
Explicative variable	
Aid *(w)*	Dummy variable that has a value of 1 if the firm participated in a financial aid program in year t.
Performance variables (dependent variables) (y)	
Assets Growth	Assets year t+1 – Assets year t
Sales Growth	Sales year t+1 – Sales year t
Emp. Growth	Percentage change in number of employees
Sales/Assets Growth	Percentage change in Sales to Assets ratio
Sales/Emp. Growth	Percentage change of Sales/Emp. ratio

Note: In the ATE model, there are terms for the interaction of the control variables with aid and with group, and there are terms differing from the mean, as described in Eq. 1. This table includes all the tested variables, including those that are not incorporated into the final model.

Table 7. Sample means for the 2002-2003 group

Variable	Aid Year -1 (t-1)		Aid Year (t)		Aid Year +1 (t+1)	
	Comp.	Treatment	Comp.	Treatment	Comp.	Treatment
Assets	14.65	14.81 (0.43)	14.69	14.92 (0.26)	14.75	14.99 (0.25)
Assets Growth	6.58%	3.11% (0.28)	3.83%	10.26%** (0.05)	5.52%	4.35% (0.72)
Sales	14.83	14.99 (0.43)	14.83	15.06 (0.25)	14.85	15.15 (0.13)
Sales Growth	3.39%	0.21% (0.39)	-0.38%	7.06%* (0.07)	1.90%	6.19% (0.42)
Sales/Emp	1.32	0.82** (0.02)	1.37	0.82** (0.01)	1.40	0.87** (0.02)
Sales/Emp Growth	2.49%	-2.92%* (0.08)	4.59%	2.99% (0.72)	3.05%	8.20% (0.36)
Emp.	39.18	46.59 (0.33)	39.65	44.53 (0.52)	39.45	46 (0.41)
Emp. Growth	2.32%	7.04% (0.20)	0.72%	1.12% (0.88)	2.53%	4.35% (0.76)
Sales to Assets	1.46	1.47 (0.79)	1.42	1.40 (0.84)	1.36	1.46 (0.38)
Sales to Assets Growth	3.32%	0.78% (0.70)	-1.44%	3.38% (0.31)	8.62%	7.06% (0.88)
ROA	5.21%	6.26% (0.41)	4.92%	5.17% (0.85)	3.68%	4.73% (0.53)
ROE	11.34%	13.08% (0.71)	31.45%	7.78% (0.45)	-2.31%	4.84% (0.62)
Equity to Assets	38.39%	38.05% (0.92)	40.52%	36.28% (0.26)	40.38%	36.80% (0.35)

Note: Significant differences (ANOVA for quantitative variables, Pearson's chi-squared, and Fisher´s exact test for qualitative variables) between the comparison and treatment groups for each year are shown according to the following notations: **, 5% significance and *, 10% significance. In the Treatment columns, the p-value is shown in parentheses.

Table 8. Sample means for the 2007 group

Variable	Aid Year -1 (t-1)		Aid Year (t)		Aid Year +1 (t+1)	
	Comp.	Treatment	Comp.	Treatment	Comp.	Treatment
Assets	14.14	14.52 (0.14)	14.22	14.61 (0.14)	14.26	14.7* (0.09)
Assets Growth	17.49%	22.91% (0.47)	11.18%	8.79% (0.60)	1.80%	5.07% (0.51)
Sales	14.25	14.65 (0.20)	14.28	14.79 (0.19)	14.30	14.71 (0.11)
Sales Growth	12.47%	21.80% (0.20)	5.72%	13.34% (0.19)	-4.59%	-2.26% (0.69)
Sales/Emp	2.48	1.23*** (0.004)	2.62	1.34*** (0.005)	2.41	1.47** (0.04)
Sales/Emp Growth	10.11%	-5.38% (0.10)	17.09%	3.57% (0.79)	-3.04%	9.29%** (0.04)
Emp.	27.93	33.38 (0.40)	28.7	34 (0.43)	33.9	34.21 (0.97)
Emp. Growth	8.24%	25.25% (0.23)	9.21%	6.22% (0.64)	14.77%	1.89% (0.10)
Sales to Assets	1.29	1.38 (0.50)	1.33	1.47 (0.34)	1.27	1.26 (0.90)
Sales to Assets Growth	31.18%	15.57% (0.71)	4.35%	17.55% (0.27)	5.45%	-1.91% (0.60)
ROA	6.39%	4.75% (0.41)	5.99%	6.56% (0.74)	-0.8%	3.39% (0.63)
ROE	42.55%	28.93% (0.85)	9.79%	13.28% (0.61)	10.11%	12.21% (0.95)
Equity to Assets	31.53%	27.65% (0.50)	31.25%	27.79% (0.57)	16.01%	29.37% (0.62)

Note: Significant differences (ANOVA for quantitative variables, Pearson's chi-squared, and Fisher´s exact test for qualitative variables) between the comparison and treatment groups for each year are shown according to the following notation: **, 5% significance and *, 10% significance. In the Treatment columns, the p-value is shown in parentheses.

Table 9. The effect of variables on performance measures

Variable	Assets Growth	Sales Growth	Emp. Growth	Sales/Assets Growth	Sales/Emp. Growth
Explicative variables					
Aid	0,016 (0,529)	-0,008 (0.844)	0.066 (0.399)	-0,135 (0.109)	-0.113 (0.349)
MAge*Aid	**0,004 (0,075)***	-0,002 (0.537)	-0.002 (0.546)	-0,002 (0.602)	0.016 (0.116)
MROE*Aid	**0,274 (0,015)***	-0,175 (0.482)	0.154 (0.668)	-0,591 (0.154)	-1.272 (0.164)
MEquity/Assets* Aid	-0,139 (0,288)	-0,134 (0.601)	0.141 (0.486)	-0,535 (0.134)	-0.502 (0.115)
MEmp.*Aid	0,000 (0,263)	**0,001 (0.058)***		0,001 (0.563)	
MSales/Assets* Aid		**0,201 (0.000)****			0.097 (0.366)
MAssets Growth* Aid			0.221 (0.408)	**-1,406 (0.007)****	-0.623 (0.277)
MSalesGrowth* Aid	0,130 (0,126)	**-0,487 (0.011)****	-0.131 (0.353)	0,292 (0.589)	0.239 (0.336)
MAssetsGrowth* Aid *Catalonia	**-0,367 (0,000)****	**0,688 (0.000)****		**1,209 (0.000)****	
MROE*Aid *Catalonia		**-0,939 (0.001)****		**-1,842 (0.000)****	
MAssetsGrowth* Aid *Basque		0,427 (0.157)			
Aid*Group	0,026 (0,730)	0,050 (0.328)	-0.110 (0.354)	-0,054 (0.772)	0.067 (0.479)
MAge*Aid* Group	-0,001 (0,858)	0,004 (0.594)	0.016 (0.300)	0,001 (0.965)	**-0.033 (0.002)*****
MROE*Aid * Group	-0,351 (0,101	0,301 (0.317)	0.045 (0.876)	0,647 (0.195)	1.047 (0.237)
MEquity/Assets* Aid * Group	-0,205 (0,423)	-0,081 (0.813)	**-0.430 (0.021)***	0,570 (0.261)	0.695 (0.142)
MEmp.* Aid*Group	**0,002 (0,001)***	**0,002 (0.005)****		0,002 (0.500)	
MSales/Assets* Aid*Group		**-0,242 (0.000)****			-0.097 (0.383)
MAssetsGrowth* Aid*Group			**-0.782 (0.018)***	**1,201 (0.024)***	1.011 (0.107)
MSalesGrowth* Aid*Group	0,111 (0,664)	**1,100 (0.000)****	0.689 (0.117)	1,168 (0.251)	-0.524 (0.128)
MAssetsGrowth* Aid*Group*Catalonia	**1,584 (0,000)****				
MROE*Aid* Group*Catalonia		**0,803 (0.003)****		0.645 (0.195)	
Aid*Group*					**0.207**

Basque					**(0.000)***
Retail			-0.043 (0.366)	-0,144 (0.014)**	
Equity/Assets	**0,086** **(0,06)***	0,139 (0.422)	-0.017 (0.72)	0,515 (0.175)	0.031 (0.955)
ROE	-0,003 (0,963)	0,000 (0.998)	-0.005 (0.816	0,013 (0.878)	0.004 (0.922)
Emp.	0,000 (0,12)	0,000 (0.318)		-0,001 (0.341)	
Age.	-0,001 (0,229)	0,000 (0.8831)	-0.002 (0.38)	0,001 (0.882)	0.000 (0.435)
Sales/Assets		**-0,102** **(0.004)****			-0.051 (0.125)
Assets Growth			0.073 (0.297)	**1,630** **(0.006)****	-0.119 (0.261)
Sales Growth	-0,059 (0,394	0,074 (0.636)	0.046 (0.605)	**-0,794** **(0.066)***	-0.010 (0.915)
Group	-0,039 (0,186)	-0,063 (0.307)	0.102 (0.203)	-0,019 (0.823)	-0.027 (0.366)
ROE*Group	-0,051 (0,608)	-0,029 (0.87)	0.008 (0.918)	0,157 (0.413)	-0.009 (0.884)
Equity/Assets* Group	**0,229** **(0,07)***	0,025 (0.916)	**0.251** **(0.063)***	-0,794 (0.126)	**-0.372** **(0.029)***
Emp.*Group	-0,001 (0,234)	0,000 (0.426)		0,000 (0.972)	
Sales/Assets* Group		**0,100** **(0.05)***			0.046 (0.190)
Age*Group	-0,005 (0,113)	-0,006 (0.419)	-0.007 (0.547)	-0,003 (0.730)	**0.009** **(0.000)***
AssetsGrowth* Group			-0.101 (0.619)	**-1,412** **(0.021)***	-0.044 (0.788)
Sales Growth* Group	0,051 (0,767)	**-0,579** **(0.063)***	0.106 (0.640)	-0,883 (0.424)	-0.116 (0.427)
Constant	0,029 (0,259)	0,108 (0.253)	0.130 (0.600)	-0,116 (0.363)	0. 122 (0.166)
Prob>F	0.000	0.000	0.000	0.000	0.000

Note: Empty cells indicate the variable was not included in the model. Prob>F indicates the p-value for the joint significance test. MVariable (e.g., MROE) indicates that the sample mean is subtracted from the variable when calculating the estimate (according to Eq. 1). Significance is denoted as * at 10%, ** at 5%, and *** at 1%, and p-values are shown in parentheses. Estimations were made with bootstrapped standard errors clustered on regions. Collinearity tests were performed to check for possible problems.

Table 10. Summary of the observed average treatment effects (ATEs)

Firms with above average	Show an effect after program participation on									
	Assets Growth		Sales Growth		Emp. Growth		Sales/ Assets Growth		Sales/Emp. Growth	
	NT	R	NT	R	NT	R	NT	R	NT	R
Age	+	+								-
ROE	+	+	- C	- C, <			- C	- C		
Equity / Assets					-					
Employees		+	+	+, >						
Sales/ Assets			+	-						
Assets Growth	- C	+ C	+ C	+ C		-	-	-, < + C		
Sales Growth			-	+						

NT: Normal Times. R: Recession. <: smaller effect, >: stronger effect, C: effect for Catalonian firms.
Note: Each cell shows the effect of program participation on the target variable. In the case of total assets growth, for example, the firms with higher than average ROE and Age experience a positive effect in assets growth after receiving aid, for all years. Firms with above average employees experience a positive effect in assets growth after receiving aid, only in recession times. Finally, Catalonian firms with above average assets growth show a negative effect in this variable in normal times, but a positive effect in recession. In order de properly interpret the results, it is useful to note that all regressors (independent variables such as age, ROE, etc.) are measured in the year of program participation, while the performance (dependent) variables are measured a year after.

Appendix

Table 11. Sample distribution by Autonomous Communities

Region	Percentage
Catalonia	19.2%
Basque Country	16.4%
Madrid	16.2%
Castile and León	11.10%
Valencia	7.80%
Galicia	5.30%
Castile-La Mancha	4.80%
Andalusia	4.00%
Aragon	4.00%
Murcia	3.50%
Balearic Islands	2.00%
La Rioja	1.50%
Navarra	1.50%
Cantabria	1.30%
Extremadura	0.80%
Asturias	0.50%

Table 12. Sample distribution by sector

Sector	Percentage
Manufacturing	31.2%
Wholesale and retail commerce; automotive repair	24.2%
Construction	17.6%
Real estate activities	5.0%
Transport and storage	4.5%
Extractive industries	4.0%
Information and communications	3.0%
Hospitality	2.5%
Agriculture, livestock, forestry, and fishing	2.5%
Other	5.3%