Financialization in peripheral Europe? Debt and investment cycles of non-financial corporations

Abstract

This paper analyzes the relationship between private debt and investment throughout business cycles, utilizing Sabi, a firm-level database with extensive coverage of Spanish firms, primarily SMEs. The study provides empirical evidence highlighting the significant role of financial variables, specifically indebtedness, in interpreting investment behavior. The results indicate that for medium-sized firms, indebtedness stimulated investment pre-2008 while it contracted it post-2008. These conclusions are partly nuanced if we analyze the effects for micro, large, and construction firms. The results also show that companies are more dependent on internal financing when facing a situation of financial constraint. Financialization, as traditionally interpreted in the literature, plays a minor role in the dynamics of business investment in the case of the Spanish economy. Overall, this study reinforces the idea that the impact of corporate debt on economic dynamics should be considered when formulating economic policies.

SER Keywords: *Crises; Corporate finance; Financial crisis; Financialization; Firms.*

JEL classification: *G32; G30; G31.*

1. Introduction

The financial causes of investment fluctuations have been at the center of academic debate for decades and especially after the Great Recession that began with the financial crisis of 2007-2008. A common thesis is to consider that financialization, understood as a model of accumulation in which profit making increasingly occurs through financial channels (Krippner, 2005, p. 181), has affected the link between finance and investment (Stockhammer, 2004) reducing the income available to invest and generating distributive pressures that against wages (Alvarez, 2015). The consequence is lower growth (Tomaskovic-Devey, Lin and Meyers, 2015).

We take Spain as a case study because it is interesting for several reasons. First, it had one of the largest leverage processes before 2007 and was at the center of the European debt crisis (Buendía,

2020). In subsequent years it was held up as an example of balanced growth (Cárdenas et al., 2020). Secondly, there are several studies on household indebtedness (Medialdea García and Sanabria Martín, 2022) and residential investment (Kohl, 2020) however financial aspects have been little studied from the point of view of non-financial firms, which allows this study to provide evidence on the processes of leverage and indebtedness in the financialized economies of the European periphery.

Since the 1990s the capital investment and credit cycle of Spanish companies has gone through three phases: first, a boom in investment and access to credit until the global Great Recession, followed by a process of deleveraging and a fall in business investment, and finally a way out of the deleveraging process together with a gradual recovery of investment. Taking into account these dynamics, this paper aims to clarify the following question: do corporate indebtedness and deleveraging provide clues to understand the dynamics of investment before and after the Great Recession and the subsequent recovery?

To illustrate this apparently changing relationship between corporate indebtedness and investment of Spanish companies throughout the economic cycle, we highlight the following figure.

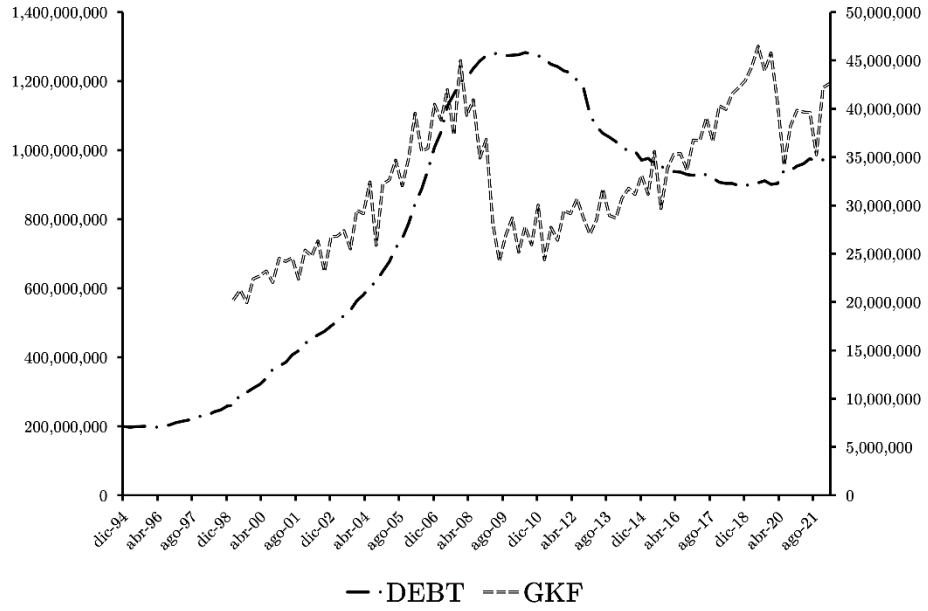

Figure 1. The changing relationship between indebtedness and business investment. *Notes*: Current Euros (Thousands). Left: Debt; Right: Gross Capital Formation (GKF). Source: BdE and INE.

Figure 1 shows that the influence of indebtedness on investment can be problematic. While it is true that recourse to external indebtedness can be an effective means for companies to finance their investments, excessive indebtedness can end up constraining the internal resources of these companies and thus impair and prolong future deleveraging. Obviously, this figure does not allow us to conclude that this is the channel that would have operated after 2008 in Spain. For this reason, the

present article aims to deepen and clarify the influence of external indebtedness on business investment on the basis of two fundamental hypotheses in order to address this issue:

(i) Hypothesis 1: Internal finance is an important variable for understanding investment dynamics even in periods of high leverage, such as that linked to a real estate bubble.

We consider that even though financialization favors financial circuits and could make them less dependent on their internal resources, they are still relevant in investment decision making as the Kaleckian-Minskian approach suggests.

(ii) Hypothesis 2: Financial variables can have varying effects during different phases of the economic cycle, and their impact may either encourage or impede investment.

Debt has an effect on investment in both its flow and stock components and this nature is changeable during the business cycle. Excessive indebtedness constrains internal financing capacity and makes it difficult to obtain additional funding, but at the same time, it can serve as a means to finance an investment boom.

These hypotheses have been attempted to be analyzed recently from a New Keynesian empirical framework (Gebauer et al., 2018; Fernandez de Guevara et al., 2021; Kalemli-Özcan et al., 2022). Additionally, from the post-Keynesian paradigm, previous empirical papers have been limited to exposing the negative relationship between indebtedness and business investment (Ndikumana, 1999; Orhangazi, 2008) or focused on studies on the influence of financialization on fixed capital investment (Tori and Onaran, 2018; Tori and Onaran, 2020). Despite the traditional importance of financial variables in different post-Keynesian investment functions, the emphasis in the financialization literature may have caused the dynamics of indebtedness and deleveraging to remain in the background in empirical articles on investment and capital accumulation with firm-level data from post-Keynesian points of view and ended up being approached from empirical views outside this theoretical approach.

Although we follow the approach of recent studies in the field of the effects of financialization on investment at the firm level from a microeconomic perspective, we introduce three relevant contributions. First, we combine the financialization thesis with the Kaleckian-Minskian literature on investment. This will allow us to qualify some of the results obtained for other regions. Second, we extend the case studies by incorporating the European periphery country with one of the largest indebtedness and crisis processes. Thirdly, as a methodological novelty, we use the Sabi database, the version for Spain and Portugal of Orbis developed by the Bureau van Dijk, which allows us to study all types of companies. This feature is very relevant in the case of Spain because most of the investment is made by unlisted companies. To the best of our knowledge, this is the first time that a

similar study has been carried out and it represents a significant contribution to the changing links between indebtedness and investment in the era of financialization.

This paper is organized as follows. In section 2, we describe the related literature, focusing on the financial constraints' literature, the effect of financialization on firms and the Kaleckian and Minskian literature. In section 3, we describe the process of constructing the database. In section 4 we explain the methodology and the empirical strategy. Section 5 presents the main results, while section 6 discusses different robustness tests and additional results. Finally, section 7 concludes.

2. Related literature: Financial constraints, financialization and the Minskian-Kaleckian literature

The relationship between means of financing and fixed capital investment has received attention from different schools of economic thought, giving rise to different empirical approaches, and is still under discussion. As an example of this relevance in the contemporary economic debate, recent works stand out from different theoretical and empirical approaches, including articles published by international organizations (Bornhorst and Ruiz-Arranz, 2015; Consolo et al., 2019; Cuerpo et al., 2013).

The limitation of the empirical results of the Tobin's Q models and the successive criticisms of their theoretical bases motivated the development of other alternatives from neo-classical economics, such as the direct estimation of future profit flows (Abel and Blanchard, 1986) or the derivation of Euler's equations introducing extensions in the optimization problem that solve some of the theoretical problems posed by the Q of Tobin (Abel, 1980). However, both Tobin's Q theory and Euler's equation estimation models initially maintained the Modigliani–Miller assumption as to the means of financing.

From the 1980s onwards and responding in part to the unsatisfactory results at the empirical level of models focused on Tobin's Q and the cost of capital, financial variables began to be valued as determinants of investment. The article by Fazzari Hubbard and Petersen (1988) initiates a line of research focused on financial constraints and the sensitivity of investment to domestic financing. This literature would extend to other variables, framing itself as a literature on financial constraints and investment. The main idea is that obtaining internal financing means is fundamental for financially constrained companies. The financial constraint is theoretically justified by an information problem in financial markets that prevents the Modigliani-Miller theorem to hold.

Some recent empirical studies on cash flow sensitivity and financial constraints are relevant to our research. First, Gebauer et al. (2018) hold that from 2008 onwards, investment's sensitivity to indebtedness increased, a non-linear relationship, and that moderate levels of indebtedness can have a negative effect on investment for smaller companies with lower profitability. Second, Kalemli-Özcan

et al., 2022 find that companies most exposed to external indebtedness and fragile banks reduce their investment to a greater extent after the outbreak of the financial crisis. Similarly, Durante et al. (2022), use the Orbis database and find that young companies, and therefore more financially constrained, restrict their investment more sharply in the face of monetary shocks than those more consolidated companies. Finally Fernandez de Guevara et al. (2021) argue that main explanatory variable of Spanish investment are financial constraints using Sabi database on the period after 2008.

In contrast to the traditional neoclassical perspective, and the literature of financial constraints that focuses on asymmetric information in financial markets, post-Keynesian literature, from its origin, has highlighted the means of financing as determinants of investment. During the last 15 years, however, it has been more popular to analyze the influence of indebtedness from the perspective of the increasing financialization of non-financial corporations from the heterodox tradition. In the following subsections, we will explain in more detail the characteristics of these two approaches.

2.1 Financialization

The basic hypothesis of the empirical literature in this regard is that financialization has led to a slowdown in investment, both in developed countries (Stockhammer, 2004) and in developing economies (Demir, 2009). Financialization can adversely affect investment in two ways: on the one hand, financial assets can have a crowding out effect and shift investment from the real sector to the financial sector. On the other hand, it is argued that the increasing influence of shareholders may have a detrimental effect on firm growth and thus slow down investment in physical capital as firms need to allocate more funds in order to meet the profitability demanded by shareholders. The influence of financialization is usually assessed in the literature through the effect of variables such as financial receipts and payments, dividends paid or share buybacks.

The increase in indebtedness of non-financial corporations is another characteristic of a multitude of contemporary economies since the 1980s (Palley, 2013); in this same period, the stock of physical capital has remained much more stagnant in some developed economies (especially the United States), so that the financialization literature has also posited the decoupling between corporate indebtedness and investment in physical capital (Davis, 2017). In this regard, Mason (2015) posits that the correlation between new indebtedness and investment in physical capital is decreasing from the 1980s onwards in the United States.

Davis (2017) puts forward two reasons why increased corporate indebtedness and investment may have become decoupled. First, some authors have suggested, for example, that increased corporate debt and shareholder payouts are related in the U.S. economy (Kliman and Williams, 2014; Mason, 2015). For example, it is possible that share buybacks occur to a greater extent through corporate indebtedness rather than through the use of earnings.

Second, it is feasible that part of the expansion of credit to firms will be used to finance the acquisition of financial assets. This fact may mean that the funds that finance the acquisition of financial assets do not imply a decrease in investment in physical capital, leading to the rejection of the crowding-out hypothesis.

However, this approach raises the question of why firms would need to borrow simply to invest in presumably liquid financial assets and, therefore, with a return not much higher than the cost of debt financing (Davis, 2016). One answer to this question may be that large non-financial firms have since the 1980s come to behave more and more like a financial institution, and this change is reflected in their balance sheets, the example of General Electric or General Motors in the United States being paradigmatic in this respect (Froud et al., 2006).

Finally, this literature has also pointed out the possible differences between types of companies, since not all of them access financial markets under the same conditions, and there are thresholds above which the relationship between variables seems to change.

In short, with regard to corporate indebtedness, the hypothesis put forward by this approach could be summarized as follows: the indebtedness of non-financial companies has decoupled the increase in investment in physical capital, especially since the 1980s (highlighting the U.S. context).

2.2 Borrowing and investment finance in the Kaleckian-Minskian literature

According to this line of analysis, indebtedness is a fundamental variable for understanding the dynamics of investment and its cyclical component.

From the post-Keynesian literature with Minskian and Kaleckian roots, it can be argued that the recourse to external indebtedness eventually implies a difficulty to finance investment projects given Kalecki's principle of increasing risk (Kalecki, 1937), which entails an additional cost to external resources, by increasing the risk for the lender and the borrower while external financing increases. Especially in its version by Steindl (1976) Kaleckian-type investment functions have tried to incorporate debt ratios with a negative effect on investment.

Regarding Steindl's analysis of the principle of increasing risk and corporate indebtedness, it should be noted that this author (Lavoie, 2022) has been recognized for the emphasis he placed on a macroeconomic paradox, similar to the Keynesian paradox of thrift, but focused on the evolution of corporate indebtedness (Lavoie, 1995). This "debt paradox" occurs when firms, having exceeded the financial limit after a process of overinvestment with external financing - more costly because of the increased risk - try to reduce their indebtedness, thus reducing investment. If the reduction of investment is a generalized phenomenon among companies, deleveraging may not be delayed, it may be hindered or even have the opposite effect to that expected (increase indebtedness) given the fall

in demand caused by the decrease in investment. This reasoning leads to the inclusion of a variable to consider the external indebtedness of firms in the investment function, thus completing Kalecki's previous formulation, which, although he conceived the principle of increasing risk, does not incorporate it expressly in his formulation of the investment function, but indirectly, through the interpretation that the variable of firms' internal savings may have.

Subsequently Minsky (1975, 1986) further developed the role of financial conditions on investment. According to this author, the economic cycle can be understood on the basis of the increase in external financing, which can lead to the fact that the operating profits obtained by companies during a context of economic boom end up being insufficient to finance the interest burden of debt, triggering a process of financial instability that can lead to a debt crisis, given that the real value of debts tends to increase (a situation known as the Fisher effect). From a Minskian perspective, it can be considered that recourse to external financing, despite the increasing risk of external funds, can on the one hand amplify the possibility of investing in physical capital during the upward phase of the economic cycle while limiting investment during the recessionary phase - once excessive over-indebtedness is reached.

During an economic boom, recourse to external indebtedness can lead to more funds being allocated to investment in physical capital, but, at a point of excessive indebtedness, this situation can lead to financial instability and a decrease in investment. During a recession, the influence of indebtedness is negative in the sense that the funds generated by companies are used to meet the costs of the debt accumulated during the pre-crisis period instead of financing physical capital investment projects.

While this literature gave rise to some pioneering papers that influenced the empirical literature on the relationship between financialization and investment (Fazzari and Mott, 1987; Ndikumana, 1999), it has not been prolific in the subsequent search for this relationship at the empirical level with business data, while the literature in the Kaleckian tradition focused on growth models and the Minskian literature on eminently theoretical models.

However, despite the importance that this current has given to the dynamics of investment, empirical articles with data at the business level carried out from this theoretical perspective are not particularly abundant. Many of them have also focused on the impact of financialization on investment. On the other side, a multitude of analyses have been carried out at an aggregate level around business investment, while articles with data at the business level are scarcer, with the vast majority of which are research focused on the behavior of large listed companies (Davis, 2018; Orhangazi, 2008; Tori and Onaran, 2018).

Keeping in mind the previous commented strands of literature, the objective of this paper is to estimate an investment function with the main determinants of investment where emphasis is placed on the influence of financing and indebtedness throughout the economic cycle, distinguishing the pre-2008 period and the post-2008 period. The exploitation of the balance sheet data of the Sabi database will allow small and medium-sized enterprises to be taken into account, unlike other databases focused on listed companies.

3. Data

3.1. Building the database

This subsection summarizes the process of elaboration of the variables used since several steps have to be taken in the elaboration of a macroeconomic database from a sample of firm data.

For the construction of the sample of non-financial companies, we have downloaded more than 1,100,000 companies from the Sabi database between the period 1996-2019 taking into account, first of all, that they are non-financial companies with at least 4 values for the tangible fixed assets variable during the period.

One of the advantages of using Sabi data with respect to other databases, such as Datastream or Compustat in the case of the United States or Worldscope at global level, is that it is more easily extrapolated at the macroeconomic level by having a database that includes small and medium-sized companies compared to the aforementioned databases, which only include listed companies.

In the case of Spain, given the relatively smaller importance of listed companies compared to other economies, the choice of a broader and more representative database is even more necessary. According to our estimate, approximately 47% of the full sample are SMEs (5-250 workers), 17% are micro firms (less than 5 workers) and 36% are large companies (more than 250 workers).

Following the recommendations of Kalemli-Ozcan et al. (2015) only non-consolidated accounts of the companies have been considered to avoid double counting of data. Once all these variables were downloaded and united in the same database, the database was cleaned following the steps of the aforementioned guide:

(i) Transform variables to constant prices with the GDP deflactor in base 2015.

(ii) Eliminate the annual values for each company that have simultaneous missings in total assets, operating income, sales and employment. In this step, observations in years for which the company presumably has no activity or its accounting data are not available are cleaned from the base. The entire company is not eliminated but the annual data of the company when this condition is met.

(iii) Eliminate the entire company if total assets are negative in any year.

(iv) Eliminate the company every year if employment is negative in any year and also companies with more employment than Walmart (2 million employees) since it would be considered a database error. This last condition is irrelevant since no company in the database meets it.

(v) Eliminate the company every year if sales are negative in any year.

(vi) Eliminate the company every year if any year has a value of employees per million assets greater than the 99.9th percentile in order to eliminate outliers.

(vii) Eliminate the company every year if any year has a value of employees per million assets greater than the 99.9th percentile in order to eliminate outliers.

(viii) Eliminate the entire company when it reports any year a sales value per total assets greater than the 99.9th percentile of the distribution for the same purpose as above.

Once this process has been carried out, we have an unbalanced panel with 1,077,555 companies and 12,797,613 observations. However, for the dependent variable (Investment) the amount is reduced to 10,427,342 observations since investment is calculated as the difference between the tangible fixed assets of one year minus the tangible fixed assets of the previous year, so that the observations of each company for the first year (1996) and those that do not have data for at least two consecutive years for the tangible fixed assets variable are lost. For the econometric analysis, therefore, the time period for which data are available is 1997-2019.

In addition, in an attempt to correct errors in the database, other two additional transformations have been carried out after a descriptive analysis of the data. In the first place, companies with negative values for Long-Term Creditors, Financial Debts, Financial and other similar expenses and Financial Income have been eliminated. In addition, outliers identified as errors in the database given extremely atypical point values have been eliminated. Positive values have also been replaced by negative values for dividend payments, as they were due to database errors given that this variable should be negative as defined in Sabi.

The strength of this methodology for constructing samples from Bureau van Dijk databases is that it is used to preserve the representativeness of business data at the macroeconomic level. As a sample of this representativeness at the macroeconomic level, we will show the correspondence between one of the variables in the database: Financial and other assimilated expenses.

This variable includes all current financial expenses. The following graph shows the evolution during the period of the aggregate of the variable Financial Expenses and other similar expenses and its equivalent at the macroeconomic level, which in this case is the interest paid by non-financial companies. The degree of coverage of the macroeconomic aggregate is very similar. The coverage varies depending on the variables because the definition is not always the same in the database and at

the macroeconomic level and because the coverage is not entirely accurate because although most of the data are available in Sabi for limited and public limited companies, the coverage is not perfect. The obtained correlation coefficient of 0.8516 suggests a strong positive association between these two variables.

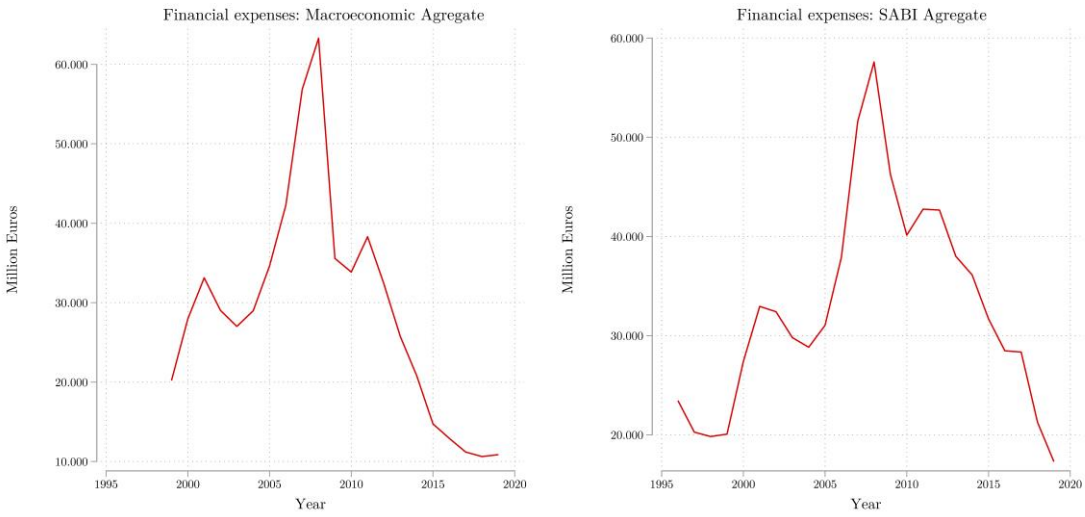

Figure 2. Financial and other assimilated expenses. Macroeconomic representativeness between the database and macroeconomic aggregates. *Notes*: Macroeconomic data from INE y aggregated variables from Sabi.

In the second place, by selecting only companies with at least 4 values for the capital stock we do not have the full aggregate that could be calculated from the Sabi information, since companies with fewer years available obviously also contribute to the aggregate values. The decision to exclude these companies is based on the fact that they are not representative of the investment processes we are analyzing in this study, since their presence in the two decades we are considering is minimal.

All in all, following other papers that employ Orbis or Sabi data to measure business investment (Durante et al., 2022; Fernandez de Guevara et al., 2021; Kalemli-Özcan et al., 2022), we have defined the following variables to carry out the econometric tests:

1. The investment rate is measured by the change in the net capital stock (I_{it}) divided by the net capital stock of the previous period (K_{it-1}). The net capital stock is calculated as gross capital minus depreciation.

2. Indebtedness is measured as long-term debt divided by total assets (D).

3. Financial expenses enter the model as the ratio of financial expenses (interest spendings) to EBITDA (R).

4. The effect of cash flow is shown by the operating income variable as a proportion of total assets (CF).

5. As usual in the fixed capital investment literature, the accelerator effect is captured by sales growth (S).

6. Following Kalemli-Özcan et al. (2022) and Cloyne et al. (2020) we add a size variable, measured as the logarithm of total assets.

Finally, to carry out the econometric tests, the first step, following the literature using Orbis data (Durante et al., 2022; Kalemli-Özcan et al., 2022), is to winsorize the variables to be used in the regression until the kurtosis value of each variable falls below 10. Winsorizing involves transforming the extreme values of the distribution of the variables by the percentile value at which the data are winsorized. Winsorizing to 1% would imply giving the lower end of the distribution the value of the 1st percentile and the upper end the value of the 99th percentile.

In the case of the investment rate, winsorization is carried out at 5%, for debt over total assets, this winsorization is at 1%, in the case of financial expenses over EBITDA and cash flow over assets it is at 2%, and in the case of sales growth it is at 3%. In the first models carried out, we consider only small and medium-sized companies, SMEs (5-250 workers), excluding micro and large companies to delimit the sample since the calculation process in Stata is too demanding with such a large sample (companies in all sectors between 5 and 250 workers are retained for the first econometric tests). Homogenizing the sample may have econometric justification since the model we find is likely to be less biased in this way (Kiviet, 2020). In this case, since the regressors are not normalized by the same variable to correct for the size effect, we include a size variable defined as the logarithm of fixed assets. This variable does not need to be winsorized since its kurtosis is well below 10.

3.2 Descriptive statistics

Next, the average evolution of the variables to be included in the regression is shown, i.e., previously winsorized in order to verify that the behavior maintains the same logic and representativeness as the behavior of the corresponding aggregates at the macroeconomic level.

Figure 3. Main variables' evolution. All firms and SMEs. *Notes*: shaded areas indicate recession.

Figure 3 illustrates that the drop in the net investment rate of companies following the onset of the Great Recession in 2008 is particularly noteworthy. This rate also maintained a substantially lower trend during the post-2008 period. A similar post-2008 effect seems to be seen for the increase in sales, although this variable recovers more quickly. The effect of the Great Recession is also clearly seen in the cash flow over total assets variable. Interest over EBITDA grows to a peak in 2008 and then declines steadily, in line with the deleveraging process and the lower interest cost for the post-2008 period. The debt to assets variable grows during the pre-2008 period, reaching a substantially higher value in 2008 to start decreasing during the subsequent deleveraging period.

From the evidence shown in Figure 3 we can distinguish two clear periods. The first one, from 1997 to 2008, encompasses the rapid leveraging process of non-financial firms, both large and small, which was associated with a strong investment process. The post-2008 period shows the opposite pattern: a deleveraging process with lower investment. Both periods are easily comparable because they have the same temporal duration.

Using this distinction in two subperiods, we can analyze the descriptive statistics for our five variables, again distinguishing between total companies (Table 1) and SMEs (Table 2). Firstly, for both total companies and SMEs, the pre-2008 period is characterized by substantially higher average investment rates and higher sales growth than the post-2008 period; which points to a positive relationship as suggested by the accelerator effect[1].

Table 1

Summary statistics (all firms)

All Firms							
	Variable	**N**	**Mean**	**Std. Dev**	**p25**	**p50**	**p75**
Pre-2008	**Investment**	4,009,943	14.74%	60.63%	-16.78%	-5.08%	16.65%
	Sales	3,904,787	17.92%	61.78%	-10.05%	3.46%	23.33%
	Cash Flow	5,216,549	3.50%	15.40%	-0.15%	3.88%	9.34%
	Interest	4,634,151	16.17%	51.65%	0.78%	10.88%	32.49%
	Long Term Debt	3,397,832	27.34%	26.50%	6.50%	19.17%	41.06%
Post-2008	**Investment**	6,364,159	5.10%	50.37%	-16.89%	-4.22%	0.83%
	Sales	6,050,344	8.20%	55.88%	-16.51%	-0.73%	15.20%
	Cash Flow	7,516,256	0.70%	16.42%	-1.95%	1.90%	6.52%
	Interest	5,954,693	10.59%	52.36%	0.00%	5.17%	24.11%
	Long Term Debt	4,743,125	31.94%	31.31%	7.49%	22.38%	47.58%

Notes: Main statistics considering all firms.

Secondly, cash flow over total assets is also higher in the pre-2008 period; which indicates the procyclical nature of this variable and its decline during the economic crisis.

Thirdly, the weight of interest over EBITDA is higher during the pre-2008 period while debt to total assets is lower. The rising interest cost due to the principle of increasing risk during the pre-2008 period may help us to understand this phenomenon. While debt was increasing, interest rates were progressively rising, whereas during deleveraging, interest rates have been significantly lower.

Table 2

Summary statistics (SMEs)

SME (5-250 workers)							
	Variable	**N**	**Mean**	**Std. Dev**	**p25**	**p50**	**p75**
Pre-2008	**Investment**	1,814,514	15.03%	58.33%	-15.60%	-4.58%	19.08%
	Sales	1,841,822	14.86%	50.34%	-7.50%	3.90%	20.14%
	Cash Flow	2,092,496	5.23%	13.40%	1.51%	5.06%	10.31%
	Interest	1,975,196	18.94%	44.15%	2.63%	12.96%	32.85%
	Long Term Debt	1,515,578	21.66%	21.85%	5.06%	14.73%	31.80%
Post-2008	**Investment**	2,329,482	8.79%	51.44%	-14.86%	-4.18%	7.57%
	Sales	2,359,101	6.94%	43.45%	-11.57%	0.50%	13.63%
	Cash Flow	2,502,503	2.47%	14.69%	-0.07%	3.13%	7.79%
	Interest	2,226,175	13.31%	44.69%	0.43%	6.96%	25.13%
	Long Term Debt	1,785,825	24.04%	24.48%	5.75%	16.56%	34.91%

Notes: Main statistics considering just SMEs.

Fourthly, the fact that we are aggregating a broad period that considers data from 1997 to 2007 is conducive to the Debt to Assets ratio being less elevated in the pre-2008 period given the substantially lower indebtedness in the late 1990s in contrast to the increasing indebtedness in the later period. Once

again, qualitatively the statistics are similar if we compare the companies as a whole with SMEs, although the magnitude varies due to differences in size.

Finally, it is interesting to note that the distribution becomes more homogeneous between the first and second periods both for the sample as a whole and especially for SMEs. This fact seems to point to the fact that during the post-2008 phase the destruction of firms due to the crisis has generated a more similar behavior among those that have continued or joined the sample subsequently.

4. Econometric analysis

4.1 Empirical strategy: Model and estimation

The model that we propose considers the 5 regressors we defined above, takes into account the whole period (1997-2019), and adds interactions between the regressors and the variable Post-2008, which has the value 1 for the period 2008-2019 and 0 for the previous period (equation 1).

$$\begin{aligned} I_{it} = {} & \beta_0 + \eta_i + \beta_t + \sum_{j=1}^{3} \beta_{1j} I_{it-j} + \sum_{j=1}^{3} \beta_{2j} \mathrm{D}_{it-j} + \sum_{j=1}^{3} \beta_{3j} \mathrm{R}_{it-j} + \sum_{j=1}^{3} \beta_{4j} \mathrm{CF}_{it-j} + \sum_{j=1}^{3} \beta_{5j} \mathrm{S}_{it-j} + \\ & + \beta_6 I_{it-1}^2 + \beta_7 \mathrm{D}_{it-1}^2 + \beta_8 I_{it-1}\ \mathrm{Crisis}_t + \beta_9 \mathrm{D}_{it-1} \mathrm{Crisis}_t + \beta_{10} \mathrm{R}_{it-1} \mathrm{Crisis}_t + \beta_{11} \mathrm{CF}_{it-1}\ \mathrm{Crisis}_t + \\ & + \beta_{12} \mathrm{S}_{it-1} \mathrm{Crisis}_t + \beta_{13} \mathrm{Size}_{\ it} + \varepsilon_{it} \end{aligned} \tag{1}$$

Where *I* is the investment rate, *D* is long term debt over assets, *R* is interest spendings over EBITDA, *CF* stands for the cash flow over assets, *size* for the log of assets and *S* for sales growth. *Crisis* is a dummy variable that takes the value 1 after 2008. The operator $\sum_{j=1}^{3}$ is added to take into account that up to three lags have been considered as explanatory variables. We also consider the quadratic effects of lagged debt and lagged investment. Finally, we include the lagged investment variable as an additional explanatory variable.

Since the model adds interactions, it is possible to identify the changing effect for the different variables before and after 2008. The estimated parameter for each regressor without the interactions captures the marginal effect of the different variables on the investment rate in the pre-2008 period. For each variable, the sum between that parameter and the coefficient for the interaction between the variable and the post-2008 dummy is the marginal effect of that variable on investment in the post-2008 period. On the other hand, being a large panel, it allows us to explore the available moment conditions to avoid endogeneity problems.

We estimate a system Generalized Method of Moments (GMM) model using our dynamic panel data. Since the data available contain gaps and it is an unbalanced panel, instead of taking first differences we use deviations with respect to the mean of the future values. This transformation allows eliminating heterogeneous effects at the firm level without losing a large number of observations. Additionally, for the regression to be valid, we seek not to reject Hansen's test, whose null hypothesis

is that a given set of instruments is valid. The autocorrelation statistic in this case is the Arellano-Bond autocorrelation test.

Once this process has been carried out, the results of the model obtained after performing all the previous steps (see Appendix) are presented in Table 3. In this model, the lagged debt over total assets has been considered as a predetermined variable, while interest over EBITDA, cash flow over assets, sales and size are endogenous variables. The lagged quadratic effects have been considered endogenous. The variables interacted with the post-2008 period have also been considered endogenous except in the case of interest on EBITDA, which has been catalogued as exogenous after previous regressions. The model is validated because we did not reject the null hypothesis for the A-B test (AR2) and the Hansen test.

4.2 Results for SMEs

The results indicate changing marginal effects for most of the variables. To make it easier to visualize the marginal effects of each variable, they are shown in the following table.

Table 3

Main variables' marginal effects

First Lag	Pre 2008	Post 2008
Investment	1,4790***	-0,6580***
Long term debt	0,2413***	-0,2084***
Interest	-0,1871***	-0,2327*
Sales growth	-0,6934***	1,3224***
Cash Flow	0,5555**	2,9062***
Number of observations	1,497,021	
Firms	257,542	
Number of instruments	47	
p-value A-B test (AR2)	0.394	
p-value Hansen test	0.163	
Time effects	Yes	

Notes: Investment is measured as a growth ratio, long term debt and cash flow are measured as a ratio of total assets. See Table A.1. of appendix for full results

First, the lagged investment has a marginal effect of 1.48 during the pre-2008 period, while the marginal effect of the interaction between the post-2008 period and lagged investment is negative, so the marginal effect is smaller in the post-2008 period as it becomes -0.66. This result is a good indicator of the change in the investment process between one period and the next. In the pre-2008 period, when the investment rate in the previous period increases by 100 percentage points, the investment rate in the following period increases by 147.9 percentage points. However, taking into account the post-2008 period, increases in investment in the previous year result in a smaller increase in investment in the following year.

Additionally, the second lag of investment is negative and this is a common result for models that include several lags in the regressors in the context of system and difference GMM models. The quadratic effect of the lagged inversion is not significant (Table A.1 of Appendix). The interpretation of the marginal effects is analogous for the rest of the variables.

Second, the lagged debt-to-total assets variable has a positive effect on investment in the pre-2008 period and a significantly negative effect in the post-2008 period. Interestingly, the coefficient is approximately the same (0.24 vs. -0.21) although of opposite sign. This could support the hypothesis that corporate indebtedness plays a relevant role in understanding the processes of investment boom and bust. During the expansionary stage of leverage accelerated investment and during deleveraging phase higher debt reduces investment.

The quadratic effect of lagged indebtedness on investment is not always significant, and although it is not quantitatively relevant, it tends to support the hypothesis of a convex (U-shaped) relationship between indebtedness and the rate of investment.

Third, the lagged interest over EBITDA variable has a negative effect on investment in the pre-2008 period (-0.19) while in the post-2008 period this effect is still negative (-0.23 marginal effect). This implies that a 100 percentage points increase in the interest over EBITDA rate in the previous year constrain the investment rate by 23 percentage points, but this result is just significant at a 10% confidence level.

The result is that interest rates played a role in explaining investment, but their relevance was less than that of other variables. In any case, the idea of increasing risk and increasing financing costs derived from the Kaleckian-Minskian literature is significant in the case of SMEs.

Fourth, regarding cash flow, during the pre-2008 period it encourage investment, but this positive effect increased in the post-2008 period where companies become much more sensitive to cash flow. This evidence points to the relevance of cash flow as an indicator of financial constraint. During the deleveraging period, when debt possibilities were much lower, companies were more affected by the availability of cash-flow and thus avoided the financial constraint.

Fifth, the same is true for sales growth. In the pre-2008 years, sales growth does not seem to have played the traditional accelerator role; in fact, the companies with the lowest growth seem to have made the largest investments. Driven mainly by investments made in previous years and by the availability of financial resources. However, in the post-2008 period the result changes completely and the companies with sales growth are the ones that make the largest investments.

In general, the conclusions that could be drawn from the model are that the influence of the determinants of investment is not constant. Firms are much more sensitive to sales or cash flow in the

post-2008 period. Indebtedness positively induces investment acceleration in the economic boom period and restricts it in the post-crisis period, interest payments have a limited effect in hindering investment in the pre-crisis period and this effect practically vanishes in the post-crisis period.

Finally, investment is much more sensitive to the prior year investment in the pre-2008 period compared to the post-2008 period. This study of business investment may serve to alert us to the problems that arise if totally antagonistic periods of the business cycle are mixed in estimates of investment, which can lead to contradictory results. It also serves to provide some evidence of the weak influence of interest paid by firms on business investment, especially during periods of economic recession.

Finally, it serves to support the Minskyian interpretation of the business cycle, which emphasizes the effect of excess indebtedness during economic booms and recessions. The problems of financial instability continue to significantly affect the investment process and thus the macroeconomic performance of the economies. This conclusion support the idea that policymakers should be aware of the risks associated with excessive lending and borrowing during economic booms, as this can ultimately lead to a financial crisis and recession.

4.3 Robustness checks: micro firms, large firms and construction sector companies

The robustness checks that we have carried out for this research have focused, first, on check the significance of the variables included, and second, on analyzing the results for different types of companies according to their size or sector. In this sense, we have analyzed the results obtained for large corporations, for microenterprises and for construction companies.

The instrument sets have been shortened and collapsed as explained in the Appendix. The time dummies have been used as their own instruments. Variables with lower significance have been eliminated, while maintaining similar results for the estimated parameters, an element that would support the model's unsoundness. We have tested different specifications, trying a difference GMM model that fulfills all the model selection steps that are detailed in the Appendix.

Also, different models that include instruments specific to the system GMM model in some of the variables. In other specifications, we also eliminate the third investment lag that is not significant some of the last specifications after the model selection process. Since the results do not particularly change, we analyze the results of a system GMM up to two lags in the investment variable as regressors.

The classification of companies as SMEs, micro firms, and large corporations has been made on the basis of the number of workers per firm. Companies with less than 5 workers have been considered for this analysis as micro enterprises and those with more than 250 workers have been categorized as large corporations. Additionally, the importance of the construction sector in Spain, due to the real

estate bubble and its bursting in 2008, and its differential impact during the Great Recession justify the need to carry out a more comprehensive analysis of this sector. The results of these robustness tests are shown in Table 4[2].

Table 4

Marginal effects of the main variables by type of company

Variables	SMEs	Construction	Micro firms	Large Firms
First Lag		Pre 2008		
Investment	1.48***	1.43***	1.83***	0.37**
Long term debt	0.24***	1.58*	1.18*	0.09
Interest	-0.19***	0.28***	0.19*	0.05
Sales Growth	-0.69***	0.13	0.34**	0.11
Cash Flow	0.56**	1.06***	0.39	-0.21
First Lag		Post 2008		
Investment	-0.66***	-0.9***	-0.46***	-0.05
Long term debt	-0.21***	1.57	1.28	-0.04
Interest	-0.23*	0.13	0.26	-0.03
Sales growth	1.32***	-0.05***	0.01***	1.04*
Cash flow	2.91***	3.2***	1.6***	-0.38
Size	-0.09**	0.05	-0.05	-0.06
Number of observations	1,497,021	511,417	727,397	27,794
Firms	257,542	92,790	198,126	3,772
Number of instruments	47	47	47	59
p-value A-B test (AR2)	0.394	0.459	0.957	0.613
p-value Hansen test	0.163	0.711	0.479	0.221
Time effects	Yes	Yes	Yes	Yes

Notes: Investment is measured as a growth ratio; long term debt and cash flow are measured as a ratio of total assets. See Table A.1. of appendix for full results

The results of these robustness tests nuance the results obtained in the main model. In this sense, the impact of the post-2008 recession seems less relevant than in the case of SMEs. However, both construction companies and microenterprises were more susceptible to indebtedness at the time before the Great Recession.

In the case of companies in the construction sector during the pre-2008 period, the large real estate bubble is reflected in a positive effect of debt on investment, a relationship that is no longer significant after the bursting of the bubble. The same is true for interest payments, which before the crisis had a negative and significant effect that disappeared afterwards. The most relevant variable in this case is undoubtedly cash flow, which is significant in both periods but triples its effect (from 1.06 to 3.2).

Micro enterprises show a behavior of their investment function similar to that of the construction sector, but with two major differences. The first is that sales growth was significant in both periods, but in the post-2008 period it has an effect of approximately zero. Therefore, the accelerating effect derived from sales disappeared with the financial crisis. The second difference is that cash flow was

not significant in the pre-2008 period but becomes significant and very relevant in explaining investment in microenterprises, in fact it is the largest marginal effect of all the explanatory variables.

The significantly higher impact of internal financing represented by the cash flow variable after the Great Recession for all firms except for large corporations is in line with the traditional financial cash flow sensitivity literature which states that large firms have less difficulty in coping with their financial constraints. For these types of companies, the variable that shows a change in trend is the sales.

Investment in large companies has been characterized by dependence on relatively few factors and a disconnect between financial variables and investment decisions. In the pre-2008 years, the main factor was the previous year's investment, which is consistent with the fact that large companies carry out investment projects that are prolonged over time due to their volume and importance. Consequently, hysteresis was the main explanatory factor in the pre-crisis period. After 2008, however, another real variable took over: Sales growth. This evidence suggests that large companies resumed their investments when the economy recovered, i.e., they had a clearly pro-cyclical behavior.

Additionally, the size variable has a negative effect on the investment rate of SME, which implies that larger firms within this group have a lower investment rate. This fact may be due to the fact that they start from a larger capital stock, which prevents such high investment rates on their capital.

In conclusion, according to the literature on financialization that we have summarized in section 2, it was possible to expect that financial assets would have different effects depending on the size of the firms. Our estimate suggests that it is only relevant within the SME group: large SMEs have a lower investment than the rest in relative terms. This suggests that the traditional effect of higher financial liabilities and lower investment observed in the era of financialization is only found among large firms in Spain.

However, this study also has certain limits. First, by using a dynamic model, we are imposing that the companies must have observations for several consecutive years, so that this fact generates a certain selection bias that may be affecting the results. Thus, the conclusions can be extrapolated to companies that have remained at least the years necessary to carry out the estimations, which do not have to be comparable to all companies. On the other hand, the use of the employee variable to determine the size of the companies may also be debatable. There are alternatives such as considering the stock of capital to delimit this variable. However, capital stock measurements are not straightforward and differ significantly by sector. In our opinion, the use of the number of workers offers a homogeneous criterion for the economy as a whole.

5. Discussion and Conclusion

The findings presented in this paper provide valuable insights into the relationship between financial constraints, debt, and investment decisions of different kinds of firms. We have tested our hypotheses using a sample that, unlike most studies, includes data from small and medium-sized unlisted companies available from Sabi.

As shown in the results sections after the Great Recession both SMEs and more financially constrained firms such as construction firms and micro enterprises show a much higher sensitivity to cash flow after 2008. This result supports the first hypothesis that firms are more sensitive to cash flow when facing financial constraints. The fact that large firms do not show a significant change in the relevance of the cash flow variable further supports this idea. This implies that firms facing financial constraints prioritize the availability of cash flow over other factors when making investment decisions.

Moreover, the results also indicate a cyclical effect of the debt variable. This fact supports the second hypothesis, which proposes that debt spurs investment in the pre-2008 period while hindering it in the post-2008 period. This cyclical effect of debt coincides with the deleveraging process that was initiated after the financial crisis of 2008. However, this cyclical component is observed in the case of SMEs, but is not significant for other firms, indicating that the response of firms to indebtedness is heterogeneous according to sector or firm size.

In addition, we have found evidence of the possible disconnection of investment from its financial determinants as suggested by the financialization literature, but only in the case of large firms. This result suggests that in peripheral European economies such as Spain the link still exists in the majority of SMEs and therefore indebtedness continues to be transmitted to investment; the central aspect being the cyclical nature of its impact.

On the contrary, in large companies, whose fundamental determinant is economic activity, as well as in micro companies and the construction sector, indebtedness is not a significant variable after 2008 because they face a strong financial restriction. Consequently, financialization does not always imply a restriction of investment (crowding-out effect), although it does seem to be associated with the instability linked to the cycles of indebtedness and deleveraging that have characterized the Spanish economy.

Overall, this paper findings shed light on the importance of financial constraints and debt in firms' investment decisions. This impact, moreover, is heterogeneous across firms. The results provide useful insights to understand the determinants of investment decisions and how they are affected by financial factors.

Finally, the evidence reinforces the idea that the impact of corporate debt on economic dynamics should be taken into account when formulating economic policies. Our results imply that policymakers should be aware of the risks associated with excessive lending and borrowing during economic booms. Moreover, if it is understood that the recession is exacerbated by the deleveraging process, policy decisions may be more focused in providing a less painful way out of financial crises. By recognizing the role of excess indebtedness linked to financial deregulation in the business cycle, it would be possible to take steps to mitigate these risks and promote more stable and sustainable economic growth over the long term.

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Endnotes

[1] It should be noted that the value of the investment rate can be negative because the measure we consider is net investment after depreciation. Therefore, those companies that do not make capital investments in a year and amortize part of their capital may have a negative value in this variable. However, since this variable shows the change in net capital stock, it is more relevant in understanding future business dynamics (Kalemli-Özcan et al., 2022).

Appendix

A.1 Model Selection

Dynamic panel data models are usually estimated through two fundamental methodologies: the difference GMM and system GMM models (Arellano and Bond, 1991) and system GMM (Blundell et al., 2001; Blundell and Bond, 1998).

As usual when working with panel data, the above model in levels includes unobservable and time-invariant heterogeneous effects, η_i. These heterogeneous effects must be removed from the model so that the parameters can be estimated in an unbiased manner in the more realistic context of fixed effects. The usual way to proceed in a dynamic panel is by performing the first difference of the model, so that time-constant variables are eliminated. This transformation prevents the identification of any time invariant variables.

However, with the GMM system this identification is possible, although not always statistically advisable (Kiviet, 2020). In any case, if our interest is to identify the pre- and post-crisis parameters and not the influence of time-constant variables that are not the object of our analysis, it is not necessary to introduce them into the model, since the effect that they may have is eliminated when taking first differences, so that we can demonstrate that the estimated parameters are unbiased without the need to include additional variables that do not vary over time but that might a priori seem essential in the model (for example, the case of the sector variable).

Since the data available contain gaps and it is an unbalanced panel, instead of taking first differences, the transformation that allows eliminating heterogeneous effects at the firm level without losing a large number of observations is the transformation into deviations with respect to the mean of the future values. This transformation is usually referred to in the literature as Forward Orthogonal or FOD transformation (Arellano and Bover, 1995). This simply means that the transformed model in each period t would be the original model minus the model with each variable at its mean value as of period t+1.

The estimator usually preferred in these models is the two-step estimator that employs an efficient weights matrix. The Windmeijer correction (Windmeijer, 2005) is also applied as an option.

Since we do not assume homoscedasticity of the errors, the over-identification statistic to be analyzed is the Hansen test. For the regression to be valid, we seek not to reject Hansen's test, whose null hypothesis is that a given set of instruments is valid. The autocorrelation statistic in this case is the Arellano-Bond autocorrelation test. The result for the model to be efficient must be to reject the Arellano-Bond test for autocorrelation of order 1 and not to reject the test for orders 2 and 3. The null

hypothesis is that the individual errors are uncorrelated. It is to be expected that, if in the initial untransformed model, there is no autocorrelation problem, there is an autocorrelation problem for the model in first differences due to the construction of the model itself, but that this autocorrelation disappears with higher lags. It is for this reason that we seek to reject the null hypothesis (no autocorrelation) for the Arellano Bond test of autocorrelation of order 1, and not to reject this hypothesis for higher orders of this test.

According to Roodman (2009), if the estimation is carried out with a set of instruments and without them under the hypothesis of instrument validity, the difference between the Sargan or Hansen tests that are calculated follows a chi-square with degrees of freedom equal to the number of instruments that are trying to be evaluated. This test is often referred to as the Hansen difference test. This test is only valid if Hansen's overidentification test has not been previously rejected. Like the Hansen test, it seeks not to reject its null hypothesis (which would imply that the additional instruments are valid). As will now be seen, this test is relevant in trying to determine which variables are endogenous, predetermined and exogenous.

Once the FOD transformation is performed, the valid instruments for the endogenous variables would be the variables in levels from the first lag backwards. The valid instruments for the predetermined and exogenous variables would be the variables in levels from the contemporaneous period backwards. Formally, the conditions of moments in this would be as follows (Kripfganz, 2019):

$$E\left[y_{i,t-s}\widetilde{\Delta}_t u_{it}\right] = 0, s = 1,2,\dots,t \tag{2}$$

for the dependent variable lag,

$$E\left[\boldsymbol{x}_{i,t-s}\tilde{\Delta}_t u_{it}\right] = 0, t-s = 0,1,\dots,T \tag{3}$$

for strictly exogenous regressors,

$$E\left[\mathbf{x}_{i,t-s}\widetilde{\Delta}_t u_{it}\right] = 0, s = 0,1,\dots,t \tag{4}$$

for other predetermined regressors and

$$E\left[\mathbf{x}_{i,t-s}\widetilde{\Delta}_t u_{it}\right] = 0, s = 1,2,\dots,t \tag{5}$$

for endogenous regressors.

Furthermore, additional moment conditions can be added when the relationship between the variables is persistent (system GMM). For endogenous and predetermined variables, the difference of the lagged endogenous variable at each time t can be added as valid instruments. For exogenous variables, the contemporaneous difference can be added as an instrument. Both types of instruments serve to instrument the variables in the equation in levels. Therefore, in this case the model is called system GMM, since on the one hand we have the transformed model (in this case it is the FOD

transformation) and on the other hand the model in levels (in which case we use the difference variables as valid instruments).

These models usually suffer from over-identification problems because when the time period grows the instruments increase rapidly. To illustrate this, we show what the model's instrument matrix would look like if only the lagged endogenous variable had to be instrumented and in a first differences model (with more variables and a model with the FOD transformation the problem is analogous). Note that in the case of the first differences model the instruments available for the endogenous variable are the lags from lag 2 backwards. In this model, period t=1 is lost when taking first differences. For period t=2 there would be no instruments available. At t=3 the only available instrument would be y_{i0}. In t=4, the available instruments would be y_{i0} and y_{i1}. At t=5, y_{i0}, $y_{i1}$and y_{i2} would be included as instruments. With 5 time periods and considering that the first one is lost when taking first differences, there would be 6 instruments that could be used. If we use more periods, the instruments will continue to grow: each time we add a period the instruments would grow by a quantity t-2. In this case, for a single parameter to be estimated, given that we assumed a model with only the lagged endogenous variable as regressor, we can count on a matrix with dozens of instruments available.

One possibility to correct this excessive proliferation of instruments is the collapse option implemented in the Stata command xtabond2 (Roodman, 2009). In this case, the instruments would no longer proliferate excessively as they did in the previous case, since they are no longer taken into account for each period separately as before. In this case, for five time periods we would no longer have six instruments. In this case, we would only have three instruments for the transformed variable $\Delta y_{i,t-1}$, which would be y_{it-2}, $y_{i,t-3}$ and $y_{i,t-4}$.

Another standard option in Stata commands to try to avoid over-identification in dynamic panel data models is to shorten the instruments (curtailed instruments). For example, in the case above with four periods and collapsed instruments, we could shorten the instruments so that there are only two, e.g., y_{it-2} and y_{it-3}. This option is especially useful for regressions with an extended time period where it is not justified to employ very lagged instruments that may be poorly correlated with the variables of interest. In the case of the regressions, we are going to carry out, it will be usual to combine the collapsed and shortened instruments, given the length of the time period available to us.

In order to select the model the fundamental references are Kiviet (2020) and Kripfganz (2019). Both authors propose a sequential method to select difference and system GMM models.

The first step is to choose a candidate model that does not omit relevant variables and where the instruments do not proliferate excessively. For this we take into ac- count all the variables collected in

the previous model, transformed into deviations with respect to the future mean. For these estimations we consider a priori that all variables are endogenous and that the lagged investment is predetermined. The time dummies serve as an instrument of themselves in the equation in levels (Kripfganz, 2019). we must find the model that satisfies the autocorrelation and Hansen tests. According to Kiviet (2020), the Hansen's test must offer a value higher than 0.20 to be reliable, and the autocorrelation test of order one must be rejected, while those of higher order must offer values higher than 0.20. As for the Hansen's Difference test, p-values greater than 0.10 must be obtained for all subsets of variables (this test allows us to see if each subset of instruments used to instrument each of the variables is relevant). we considered it necessary to collapse and shorten the instruments so that the excessive proliferation of instruments would not invalidate the tests. This procedure is fairly standard.

The model is transformed by taking differences with respect to future means by means of a two-stage estimation with Windmeijer correction for standard errors. If the models do not meet the tests, try to include variables or limit instruments to avoid over-identification.

The next step is to check whether any of the coefficients of the most distant lags of the regressors or of the endogenous variable has a p-value above 0.5. The process consists of eliminating the lags of the least significant variables one at a time as long as the results of the Hansen and autocorrelation tests remain satisfactory.

Then you have to add one by one previous lags as instruments on the variables considered endogenous to see if they could be considered as default instead. In the xtabond2 command an extra additional lag must be added independently (usually in Stata add the option gmm(1 1)) for each variable. Once all these regressions have been carried out, it is necessary to analyze which variable has the highest p-value of Hansen's incremental test, as long as it is greater than 0.5. For the variable that meets this requirement, it can be considered as a default in the following regressions. Once this variable has been considered as a default, one by one for the rest of the variables a previous lag must be added as an instrument and the p-values of Hansen's incremental test must be reanalyzed. we can consider the variable with the highest Hansen's incremental test p-value as the default and repeat the process until we do not obtain Hansen's incremental test p-values higher than 0.5.

The next step is to repeat the above sequential process, but in this case analyzing the variables previously considered as default. To these variables we have to try adding an extra lag as an instrument (usually in the command in xtabond2 gmm(0 0)). This will allow us to classify the variables as exogenous instead of default. After this step and the previous one we would already have classified the variables as exogenous, predetermined or endogenous without having to resort to a self-imposed theoretical criterion.

Another step to consider is to perform the 2-step corrected regression and compare it with the robust 1-step GMM model. If the results are similar, it is an indication that the model is robust and the preferred option would still be the 2-step corrected GMM given its higher efficiency.

At this point we can start to eliminate lags of non-significant variables with a p- value below 0.5 as long as the autocorrelation and over-identification values are still satisfactory.

Kiviet recommends trying to eliminate the most distant lags and analyzing how the model varies. If the estimates still meet the relevant tests, the excess instruments can be removed, as long as their number remains credible and sufficient.

To eliminate the rest of the non-significant variables that have remained in the model up to this point, it is necessary to carry out joint significance tests, since it is not advisable to automatically eliminate variables with p-values greater than 0.05.

The final step is to investigate whether additional difference instruments can be valid for the equation in levels (which would be to add instruments specific to the GMM system model). These additional instruments should be tested one by one for each of the regressors and if the p-values of the Hansen's difference test are greater than 0.3, the model should be estimated with these additional instruments.

A.2 Main Results

Table A.*1*.

Main Results and Robustness Checks

Variables	SMEs	Construction	Microfirms	Big Firms
I_{it-1}	1.479018***	1.426674***	1.834055***	0.3660281**
	(0.48558)	(0.1980987)	(0.530673)	(0.1672417)
I_{it-2}	-0.01448	0.0083913	0.006611**	-0.0280907*
	(0.011377)	(0.0087967)	(0.006732)	(0.0168617)
I_{it-3}	-0.002804	0.0020093	-0.000588	
	(0.004755)	(0.0047196)	(0.004000)	
I_{it-1} x Crisis $_t$	-2.13705***	-2.323426***	-2.295561***	-0.41662
	(0.344999)	(0.4571975)	(0.694076)	(0.2883648)
I^2_{it-1}	-0.166295			-0.0406011
	(0.307698)			(0.02473)
size	-0.0933**	0.0510872	-0.050241	-0.0621116
	(0.378613)	(0.034667)	(0.055076)	(0.0533009)
D_{it-1}	0.241321***	1.584158*	1.178079*	0.0897466
	(0.071231)	(0.8639726)	(0.623963)	(0.0832106)
R_{it-1}	-0.18715***	0.2837825***	0.185444*	0.0520108
	(0.072812)	(0.1031033)	(0.101289)	(0.0596236)
CF_{it-1}	0.555587**	1.058028***	0.392093	-0.2098266
	(0.262022)	(0.402119)	(0.748443)	(0.1547409)
S_{it-1}	-0.69344***	0.1266677	0.342547**	0.1062627
	(0.196414)	(0.180402)	(0.239157)	(0.3435953)
R_{it-2}	0.008593	-0.014819	-0.017646*	-0.0016883
	(0.008433)	(0.6521833)	(0.010403)	(0.0076498)
CF_{it-2}	-0.40869**	-0.3168011	-0.017646	0.3928331***
	(0.159500)	(0.1247949)	(0.160411)	(0.1300788)
S_{it-2}	0.034439	-0.0001696	0.008672	0.0624459***
	(0.026111)	(0.0414414)	(0.049654)	(0.0178908)
D_{it-3}	-0.04129*	0.0005924***	-0.016705	-0.038253
	(0.024316)	(0.0667961)	(0.041819)	(0.034063)
R_{it-3}	0.002043	-0.00469	-0.004684	-0.004505
	(0.003639)	(0.005705)	(0.004637)	(0.007122)
CF_{it-3}	-0.04865	-0.1042973**	-0.087785**	0.098217*
	(0.043984)	(0.0429023)	(0.047917)	(0.057515)
S_{it-3}	0.011776*	-0.0013046	-0.002812	-0.005168
	(0.005771)	(0.0079533)	(0.005167)	(0.009195)
D_{it-1} x Crisis $_t$	-0.44972***	-0.0154808	0.099619	-0.132947
	(0.081119)	(0.1495628)	(0.066892)	(0.096150)
R_{it-1} x Crisis $_t$	0.099547*	-0.1498291	0.074757	-0.085225
	(0.054693)	(0.1190213)	(0.076219)	(0.088934)
CF_{it-1} x Crisis $_t$	2.350629***	2.139713***	1.203370***	-0.171764
	(0.4936603)	(0.0429023)	(0.563412)	(0.223013)
S_{it-1} x Crisis $_t$	2.015916***	-0.171991***	-0.327921***	0.937754*
	(0.346759)	(0.0535234)	(0.180998)	(0.490309)
Number of observations	1,497,021	511,417	727,397	27,794
Number of firms	257,542	92,790	198,126	3,772
Number of instruments	47	47	47	59
p-value A-B test (AR2)	0.394	0.459	0.957	0.613
p-value Hansen test	0.163	0.711	0.479	0.221
Time effects	yes	yes	yes	yes
p-value Wald test t effects	0.00	0.00	0.00	0.00

Notes: Results for SMEs firms, Construction firms, Microfirms and Big Corporations.

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