BANCO DE ESPAÑA
Eurosistema

ECONOMIC BULLETIN 3/2018
ANALYTICAL ARTICLES

# Investment and financing of Spanish non-financial corporations: an analysis using firm-level data

Daniel Dejuán, Álvaro Menéndez and Maristela Mulino

12 July 2018

According to the analysis conducted in this article, based on individual firms' balance sheet information, Spanish corporate investment tended to pick up from 2014 and to do so with greater intensity at SMEs than at large corporations, after having contracted more forcefully during the early stages of the crisis at SMEs. In any event, as regards the stock of productive assets (tangibles and intangibles alike), the investment level attained in 2016 is expected to still be below pre-crisis figures. Analysis of investment determinants highlights the fact that the strength of the financial position and of profitability are positively related to business investment decisions, especially during the post-crisis period. As to the sources of financing used, firms with net positive investment resorted, throughout the period, both to own and borrowed funds, although the relative weight of the latter fell significantly from 2008. Firms investing intensively in intangibles – which were financed, until 2007, both with own and borrowed funds – began, with the onset of the crisis, to depend practically exclusively on own funds. That suggests the possible existence of greater difficulties for firms with a high concentration of intangible assets in gaining access to borrowed funds.

# INVESTMENT AND FINANCING OF SPANISH NON-FINANCIAL CORPORATIONS: AN ANALYSIS USING FIRM-LEVEL DATA

The authors of this article are Daniel Dejuán, Álvaro Menéndez and Maristela Mulino of the Directorate General Economics, Statistics and Research.

## Introduction

Business investment is one of the main engines of economic activity and, at the same time, a key conditioning factor of business productivity and, therefore, of future growth. It is thus worth knowing how it performs over time and understanding what are its main determinants, along with the source of the resources with which it is financed. National Accounts information enables the changes in this variable to be observed from an aggregate standpoint[1]; but, given the high heterogeneity among non-financial corporations, the use of individual information contributes to enriching the analysis significantly.

The aim of this article is to further the study of non-financial corporations' investment on the basis of individual firms' balance sheet information. Specifically, investment developments are analysed from 2000 to 2016 (the latest year for which annual data are available), distinguishing by sector and size, and characterising the firms that have made a greater investment drive during this period. A breakdown into tangible and intangible investment is also offered. This is relevant given the growing interest for investment in intangible assets, considering that a portion of these intangibles may exert a notable effect on business productivity.[2]

Intangible assets can be classified in three categories: software and databases, research and development or other activities that may derive in scientific or artistic property rights, and economic competencies (such as improvements in employee skills and in organisational structure, or brand reputation development). Under National Accounts, intangibles would encompass assets belonging to the first of the above three categories (software and databases), to which other elements such as R+D, mineral exploration and original recreational, literary and artistic works would have to be added. Business accounts would, moreover, in addition to those described above, include other elements fundamentally linked to the category of economic competencies, such as rights exclusive to future goods and services, or licences to exploit resources or to pursue specific activities, among others. In any event, these two definitions of intangible capital are occasionally considered as insufficient, as they exclude elements such as advertising or employee training expenditure, which are classified, under current accounting rules, as current expenditures for the year in which they are undertaken. Given that the analysis conducted in this article is based on information from firm-level accounting, the intangible assets considered are those determined by these regulations, which to some extent might understate firms' investment effort, as opposed to that which would ensue from using the broader definition, for which no data are available. In any event, the concept used is broader than that applied by National Accounts, meaning that the degree of understatement is less than that resulting from using this latter source.

1 See "The buoyancy of investment in the recovery: determinants and challenges", Chapter 3, *Annual Report, 2017,* Banco de España.

2 See footnote 1.

In drafting this article, information from the CBI (Integrated Central Balance Sheet Data Office Survey) has been used. The CBI contains data on the annual accounts of approximately 600,000 corporations for each year[3], with an approximate coverage, in terms of gross value added (GVA), of 50% of the total non-financial corporations sector, according to the data furnished by National Accounts.

The article is structured as follows. The second section analyses the developments in business investment from 2000 to 2016, on the basis of the type of investment (tangible or intangible) and company size, and it studies the behaviour of the group of most dynamic firms, i.e. those whose net investment has been positive. The third section investigates the main determinants of business investment, using certain regression exercises. The aim of the final section is to disclose the main sources of financing used by companies, on the basis of firms' investment effort and of the type of asset (tangible or intangible) in which they invest.

## Investment by non-financial corporations

On National Accounts data for the 2000-2016 period, the performance of productive investment, measured in terms of gross fixed capital formation and in line with its marked procyclicality, was as to be expected in each of the phases the Spanish economy underwent over this period (see Chart 1.1). Thus, according to this source, gross fixed capital formation grew to 2007, in nominal terms, at an average rate of around 10% per annum. With the onset of the crisis, this expansionary trend was curtailed, with negative rates being posted both in 2008 and, especially, in 2009, with subsequent rates at zero or slightly positive until 2013. Thereafter, against the backdrop of economic recovery, the annual rates of increase in productive investment resumed figures of between 5% and 10%, although in 2016, pre-crisis levels had not yet been recovered.[4] The sample of CBI companies broadly reflects similar developments in gross fixed capital formation to those in National Accounts, though with the disaggregated information the impact of the double-dip recession in the Spanish economy can be more clearly discerned, with marked declines also during 2012 and 2013. The breakdown by size shows that, during the crisis, investment by the SMEs in this sample contracted to a greater extent than investment by large corporations, whereas, on the contrary, it picked up more sharply as from 2014.

Chart 1.2 depicts gross fixed capital formation in relation to the stock of productive capital (intangibles and intangibles) in place at the start of each period (investment ratio) for the CBI companies. It can be seen how this indicator moved on a declining trend from 2000 to 2007[5], with a cumulative decline of 4 pp, standing at the latter date at around 14%. This pattern of reduction stepped up with the onset of the crisis, and a low of 6.3% was recorded in 2013. During the most recent period of recovery this trend has been reversed, and the investment ratio has increased slightly, to 7.4% in 2016, but it is still some distance from its level in the pre-recession years. In terms of type of asset, it can be seen how around 85% of total investment was in tangible assets, a percentage that has held very stable throughout the period analysed.

3 The CBI annual database contains microeconomic information drawn from firm-level accounts, which allows the changes in companies' investment flows and financing to be studied at a disaggregated level. Although the number of firms per year stands at around 600,000, for the latest available year, namely 2016, there are around 450,000, given that new information continues to be added.

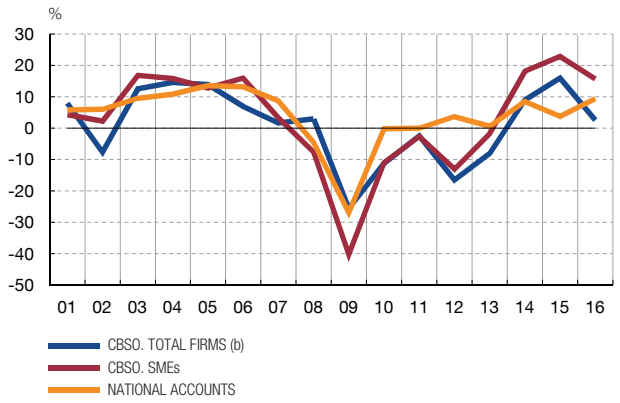
4 Other investment indicators, which exclude construction, and which are measured in real terms, do in fact evidence a resumption of pre-crisis levels (see Chapter 3, Section 2, "The buoyancy of investment in the recovery", *Annual Report*, 2017, Banco de España).

5 During this period there was very high growth in residential investment, which is not included in the indicator analysed in this article, since such investment is by households and not by firms.

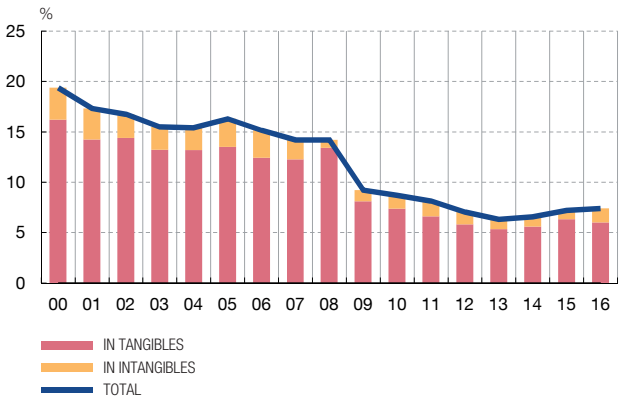
## INVESTMENT BY NON-FINANCIAL CORPORATIONS (a)

CHART 1

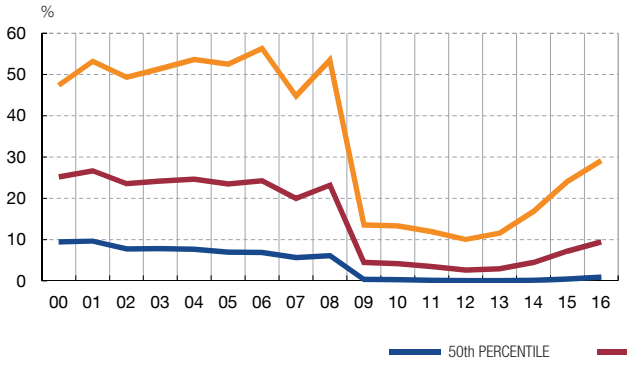
1 GROSS INVESTMENT
Year-on-year growth rate



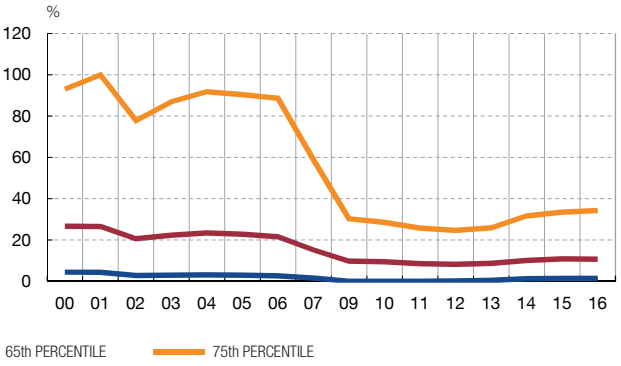

2 INVESTMENT RATIO. BREAKDOWN BY CATEGORY (c)



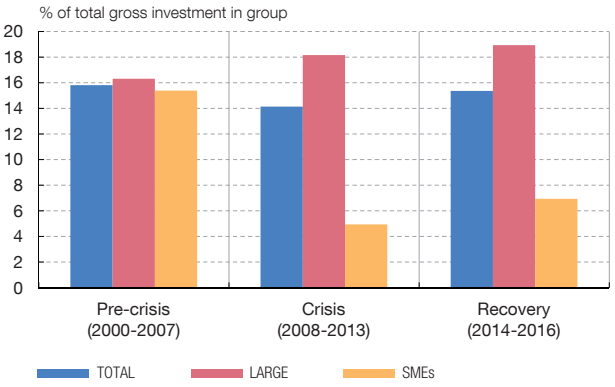

3 DISTRIBUTION OF THE INVESTMENT RATIO IN TANGIBLES (c)



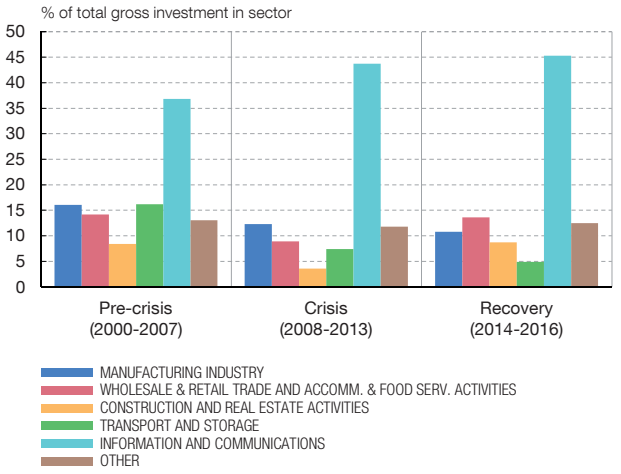

4 DISTRIBUTION OF THE INVESTMENT RATIO IN INTANGIBLES (c) (d)




5 WEIGHT OF GROSS INVESTMENT IN INTANGIBLES. BREAKDOWN BY SIZE (e) (f)




6 WEIGHT OF GROSS INVESTMENT IN INTANGIBLES. BREAKDOWN BY SECTOR (f)




SOURCES: INE and Banco de España.

**a** Excluding holding companies and firms, from the standard questionnaire, whose stock of financial investment in group companies is greater than €10 billion and over 75% of total assets.
**b** Data calculated drawing on a common sample of firms for two consecutive years.
**c** Ratio defined as Investment flow/Total tangibles at t-1.
**d** Owing to the introduction of a new general chart of accounts in 2008, in which leasing is reclassified, it is not possible to identify investment in intangibles correctly for that year.
**e** Definition of sizes in accordance with EC Recommendation 2003/361/EC.
**f** The data depicted have been calculated as simple means of the annual ratios for each period.

Charts 1.3 and 1.4 display information on the statistical distribution of the investment ratios, on the basis of the type of asset (tangible or intangible). Specifically, the 50th, 65th and 75th percentiles are shown, evidencing in each case a high dispersion of these indicators (proxied by the distance between the 50th and 75th percentiles), which diminishes during recessions and increases during upturns.

Chart 1.5 shows that the weight of gross investment in intangibles relative to total investment in fixed assets held fairly stable throughout the three sub-periods considered (pre-crisis, crisis and recovery), at around 15%. The breakdown by company size shows a highly differentiated pattern in respect of SMEs and larger corporations. Among the latter, the relative significance of investment in intangibles has increased throughout the period analysed, from 16.3% pre-crisis to 18.9% during the recovery. At SMEs, by contrast, the weight of this type of investment declined substantially during the crisis, by somewhat over 10 pp, coming to account for only 4.9% of their total investment in fixed assets, and rose slightly during the subsequent recovery to 6.9%. The breakdown by sector shows most notably that it is in information and communications where investment in intangible assets has constantly retained a higher weight, moving on a slightly increasing trend from 36.8% in the pre-crisis period to 45.3% in the economic recovery stage (see Chart 1.6).

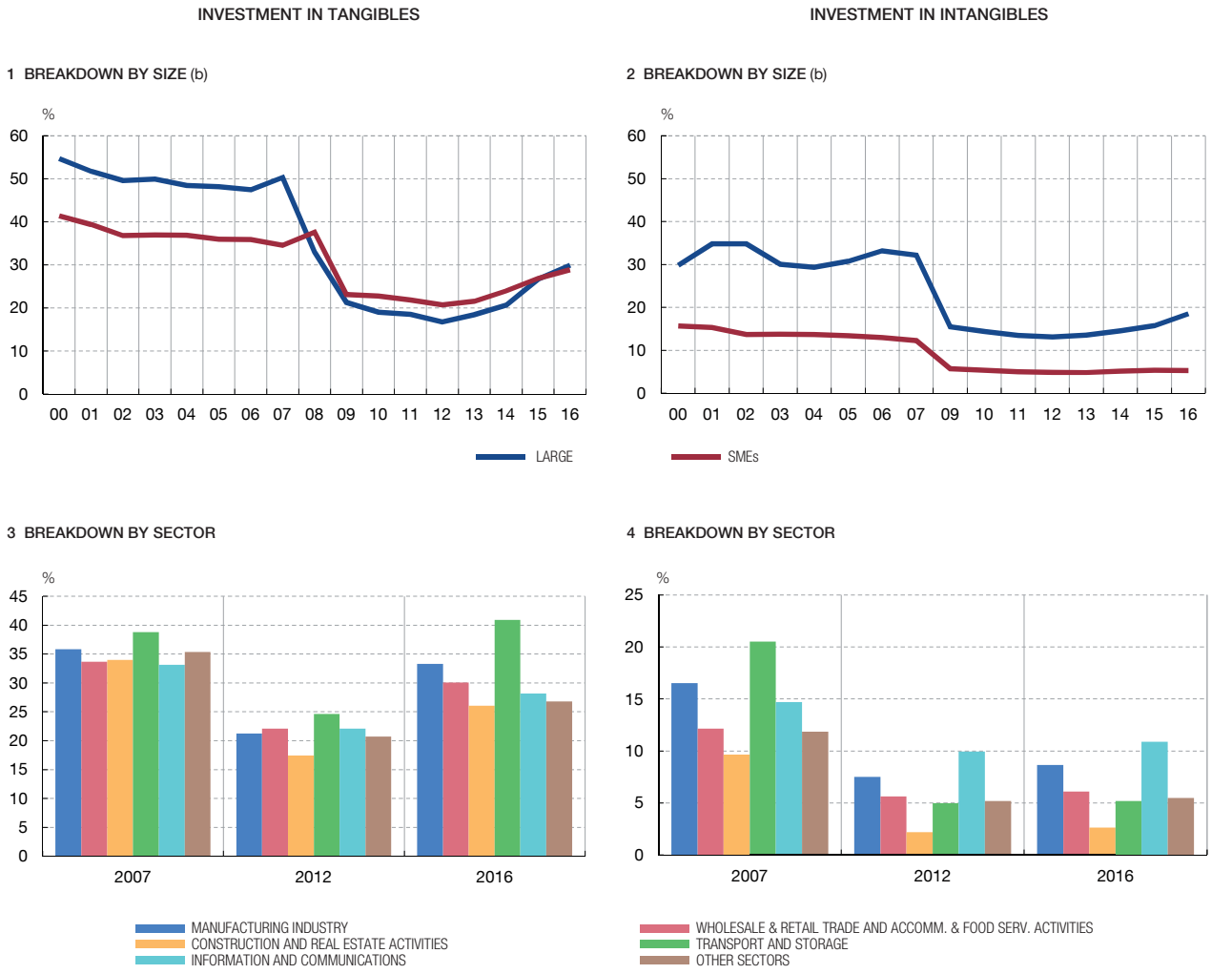
Analysis of the group of firms whose net investment is positive reveals that the proportion of companies in this position also evidence a performance closely linked to the business cycle, both in the case of investment in tangible assets and, to a lesser extent, of that in intangibles (see Chart 2.1 and 2.2). At the onset of the crisis there was a strong decline in this proportion, both in the group of SMEs and, to a greater extent, in that of large corporations. From 2013, this proportion tended to increase across the board, except in the case of SMEs investing in intangible assets. With a breakdown at the sectoral level, the data for 2016 show a significant and widespread recovery in the proportion of companies with net positive investment in tangibles, following the decline recorded during the crisis; notable in this connection was the transport and storage sector, as it was the only one in which this proportion exceeded that for 2007 (see Chart 2.3). In the case of investment in intangibles, the proportion of companies with net positive investment also fell during the crisis in all sectors, though the recovery subsequently has been very slight, in line with what was observed in the analysis by size. This meant that in 2016 only manufacturing industry and the information and communications sector had slightly higher percentages than those prevailing in 2012, with the remaining sectors posting similar figures to those of the recessionary period (see Chart 2.4).

**The determinants of investment**

In order to analyse the determinants of Spanish firms' decisions to invest in tangible and intangible assets in the 2000-2016 period, a linear probability model has been estimated whose main results are given in Tables 1 (for tangible assets) and 2 (for intangibles). As can be seen in the first column of Table 1, the propensity to invest in tangible assets is less at SMEs than at larger corporations. In addition, the probability of investment in this type of asset tends to diminish with the age of the company, an aspect that might be related to the greater need of fledgling companies for investment. Moreover, a greater propensity to invest in tangible assets is seen at those firms belonging to the manufacturing industry and, to a lesser extent, to the wholesale and retail trade and the accommodation and food services activities sector..

Columns 2 to 5 of Table 1 include firm-level fixed effects in order to take into account the effect of all those non-observed determinants of investment in tangibles that hold constant

NUMBER OF FIRMS WITH POSITIVE NET INVESTMENT (a) CHART 2




SOURCE: Banco de España.

**a** Excluding holding companies and firms, from the standard questionnaire, whose stock of financial investment in group companies is greater than €10 billion and over 75% of total assets.
**b** Definition of sizes in accordance with EC Recommendation 2003/361/EC.

over time.[6] The results obtained appear to underscore the significance of the indicators of firms' profitability and financial position. Considering the whole of the period analysed, it is seen that those firms with lower profitability and a worse financial position (greater leverage and interest debt burden) have a lower probability of investing in tangible assets. This result is consistent with the expected effect according to the literature, which stresses the importance of financial variables and access to credit as conditioning factors of investment.[7] Columns 3 to 5 of Table 1 shows that having a healthy financial position and higher profitability proved to be of greater importance, for the decision to invest in tangibles, during the crisis and the recovery. This appears to indicate that those

6 While controlling for fixed effects enables potential bias in the estimation to be eliminated, those factors that are generally stable over time (such as size and the business sector) will in the main be absorbed by the fixed effect. For this reason, interest in this case focuses on time-varying variables, i.e. the indicators that characterise firms' profitability and financial position.
7 See, inter-alia, the papers by Lang et al. (1996), Aivazian et al. (2005), Martínez-Carrascal and Ferrando (2008) and Herranz and Martínez-Carrascal (2017).

DETERMINANTS OF THE PROBABILITY OF A FIRM EVIDENCING GROSS INVESTMENT IN TANGIBLE ASSETS GREATER THAN ZERO (a) (b) TABLE 1

| | Complete period (2000-2016) | Complete period (2000-2016) | Pre-crisis (2000-2007) | Crisis (2008-2013) | Recovery (2013-2016) |
|---|---|---|---|---|---|
| § SMEs | -0.105*** | -0.036*** | -0.034*** | -0.034*** | -0.034*** |
| § From 5 to 9 years | -0.024*** | -0.038*** | -0.037*** | -0.037*** | -0.037*** |
| §From 10 to 19 years | -0.022*** | -0.048*** | -0.046*** | -0.046*** | -0.046*** |
| § >20 years | -0.001 | -0.044*** | -0.041*** | -0.041*** | -0.041*** |
| §Information and communications | -0.006*** | -0.002 | -0.002 | -0.002 | -0.002 |
| §Transport and storage | -0.008*** | -0.004 | -0.005 | -0.005 | -0.005 |
| §Construction and real estate activities | -0.043*** | -0.015*** | -0.016*** | -0.016*** | -0.016*** |
| §Wholesale and retail trade and accommodation and food services activities | 0.007*** | 0.003 | 0.003 | 0.003 | 0.003 |
| §Manufacturing industry | 0.036*** | -0.001 | -0.001 | -0.001 | -0.001 |
| Growth in employment$_{it-1}$ | 0.047*** | 0.017*** | 0.006*** | 0.018*** | 0.035*** |
| Growth in sales$_{it-1}$ | 0.016*** | 0.011*** | 0.010*** | 0.010*** | 0.011*** |
| Profitability$_{it-1}$ | 0.205*** | 0.040*** | 0.025*** | 0.049*** | 0.082*** |
| Interest debt burden$_{it-1}$ | -0.013*** | -0.014*** | -0.003*** | -0.015*** | -0.019*** |
| Indebtedness$_{it-1}$ | -0.038*** | -0.040*** | -0.011*** | -0.041*** | -0.042*** |
| Firms | 656,950 | 656,950 | 373,799 | 487,766 | 354,550 |
| Observations | 3,453,142 | 3,453,142 | 1,145,852 | 1,387,538 | 722,440 |
| Firm-level fixed effects | NO | YES | YES | YES | YES |

SOURCE: Banco de España.

**a** Marginal impacts obtained through the estimation of a linear probability model using the least squares method (column 1) and fixed effects (columns 2 to 5), with adjusted and clustered standard errors at firm level.The estimation is with CBI data for the 2000-2016 period. *, ** and *** denote significance for confidence levels of 90%, 95% and 99%, respectively.

**b** The variable to be explained takes the value one if gross investment in tangible assets is greater than zero and zero otherwise. Profitability is defined as the ratio of gross operating profit to the firm's average volume of assets in the period considered; the interest burden, as the ratio of interest payments on financing received to gross income (sum of the gross operating profit plus financial revenue), and indebtedness, as the ratio of debt to total assets. The variables preceded by the symbol § are dichotomic, and take the value one if the firm belongs to the group with the related characteristic and zero otherwise.

characteristics that influence access to credit played a more relevant role in the post-crisis period, in line with what was found in other papers.[8]

Replicating the foregoing exercise, Table 2 focuses on analysing the determinants of decisions to invest in intangible assets. In line with what was found for investment in tangible assets, decisions here appear to be positively correlated to company size. Moreover, the fact that the coefficient that captures the differing propensity of SMEs to invest doubles (in absolute terms) with regard to what is detected for the case of tangible assets highlights the significance of company size in the decision to invest in intangibles.[9] Unlike what was seen in the case of investment in tangible assets, the propensity to invest in intangibles grows with the age of firms, suggesting that this type of investment appears to be concentrated fundamentally in older companies. Lastly, the sector in which the propensity to invest in intangible assets is highest is that of information and communications.

8 See Posada et al. (2014).

9 Arrighetti et al. (2014) argue three possible reasons why firm size may be a relevant conditioning factor of the decision to invest in intangible assets. Firstly, large corporations have a greater capacity to exploit the economies of scale associated with the accumulation of intangible assets. Secondly, larger corporations show greater efficiency when it comes to legally protecting their intangible assets. Finally, being large generally means that firms have greater capacity to withstand the uncertainty associated with this type of investment.

DETERMINANTS OF THE PROBABILITY OF A FIRM EVIDENCING GROSS INVESTMENT IN INTANGIBLE ASSETS GREATER THAN ZERO (a) (b) TABLE 2

| | Complete period (2000-2016) | Complete period (2000-2016) | Pre-crisis (2000-2007) | Crisis (2008-2013) | Recovery (2013-2016) |
|---|---|---|---|---|---|
| §SMEs | -0.226*** | -0.007 | -0.005 | -0.005 | -0.005 |
| §From 5 to 9 years | 0.007*** | 0.001 | 0.004*** | 0.004*** | 0.004*** |
| §From 10 to 19 years | 0.027*** | 0.003** | 0.008*** | 0.008*** | 0.008*** |
| §>20 years | 0.066*** | 0.002 | 0.006*** | 0.006*** | 0.006*** |
| §Information and communications | 0.086*** | -0.002 | -0.002 | -0.002 | -0.002 |
| §Transport and storage | 0.049*** | -0.002 | -0.002 | -0.002 | -0.002 |
| §Construction and real estate activities | -0.056*** | -0.002 | -0.003 | -0.003 | -0.003 |
| §Wholesale and retail trade and accommodation and food services activities | 0.006*** | 0.003 | 0.003 | 0.003 | 0.003 |
| §Manufacturing industry | 0.050*** | 0.002 | 0.002 | 0.002 | 0.002 |
| Growth in employment$_{it-1}$ | 0.023*** | 0.008*** | 0.011*** | 0.005*** | 0.009*** |
| Growth in sales$_{it-1}$ | 0.004*** | 0.003*** | 0.000 | 0.005*** | 0.003*** |
| Profitability$_{it-1}$ | 0.109*** | 0.011*** | 0.079*** | -0.015*** | -0.006** |
| Interest debt burden$_{it-1}$ | 0.000 | -0.005*** | -0.003*** | -0.006*** | -0.005*** |
| Indebtedness$_{it-1}$ | 0.011*** | 0.002** | 0.046*** | -0.009*** | -0.011*** |
| Firms | 656,950 | 656,950 | 373,799 | 487,766 | 354,550 |
| Observations | 3,255,830 | 3,255,830 | 1,145,852 | 1,387,538 | 722,440 |
| Firm-level fixed effects | NO | YES | YES | YES | YES |

SOURCE: Banco de España.

**a** Marginal impacts obtained through the estimation of a linear probability model using the least squares method (column 1) and fixed effects (columns 2 to 5), with adjusted and clustered standard errors at firm level.The estimation is with CBI data for the 2000-2016 period. *, ** and *** denote significance for confidence levels of 90%, 95% and 99%, respectively.

**b** The variable to be explained takes the value one if gross investment in intangible assets is greater than zero and zero otherwise. Profitability is defined as the ratio of gross operating profit to the firm's average volume of assets in the period considered; the interest burden, as the ratio of interest payments on financing received to gross income (sum of the gross operating profit plus financial revenue), and indebtedness, as the ratio of debt to total assets. The variables preceded by the symbol § are dichotomic, and take the value one if the firm belongs to the group with the related characteristic and zero otherwise.

Controlling for firm-level fixed effects, columns 2 to 5 of Table 2 focus on analysing the effects associated with corporate profitability and with financial position. Taking the period as a whole, those more profitable firms with higher growth show a greater probability of investing in intangible assets, in line with what was found for the case of investment in tangibles. However, the breakdown by sub-period reveals significant heterogeneity, with the profitability effect negative and close to zero in the post-crisis period. Also, in clear contrast to what was seen in the case of investment in tangibles, a higher debt ratio entails an increase in the probability of investing in intangible assets during the pre-crisis period, an effect which turns negative and is of limited magnitude in the subsequent years. In short, these results appear to point to a potentially greater decoupling between the decision to invest in intangibles and the ability to gain access to credit (which appears to be closely linked to financial position) compared with what was found for the case of the decision to invest in tangible assets.

Lastly, Table 3 offers the results of a regression in which the effect of the different determinants on the total investment ratio is estimated, with both the extensive (decision to invest) and the intensive (investment level) margins being considered. Column 1 of this table shows that, controlling for the rest of the factors, SMEs have a higher investment ratio than large corporations. Hence, although SMEs evidence a lower probability of

**INVESTMENT RATIO DETERMINANTS** (a) (b) **TABLE 3**

| | Complete period (2000-2016) | Complete period (2000-2016) | Pre-crisis (2000-2007) | Crisis (2008-2013) | Recovery (2013-2016) |
|---|---|---|---|---|---|
| § SMEs | 0.020*** | -0.025*** | -0.024*** | -0.024*** | -0.024*** |
| §From 5 to 9 years | -0.086*** | -0.072*** | -0.071*** | -0.071*** | -0.071*** |
| §From 10 to 19 years | -0.125*** | -0.090*** | -0.088*** | -0.088*** | -0.088*** |
| § >20 years | -0.153*** | -0.075*** | -0.075*** | -0.075*** | -0.075*** |
| §Information and communications | 0.067*** | -0.026** | -0.026** | -0.026** | -0.026** |
| §Transport and storage | 0.030*** | -0.006 | -0.006 | -0.006 | -0.006 |
| §Construction and real estate activities | -0.029*** | 0.000 | -0.001 | -0.001 | -0.001 |
| §Wholesale and retail trade and accommodation and food services activities | 0.001 | 0.006 | 0.006 | 0.006 | 0.006 |
| §Manufacturing industry | 0.002 | -0.001 | -0.001 | -0.001 | -0.001 |
| Growth in employment$_{it-1}$ | 0.047*** | 0.014*** | 0.017*** | 0.010*** | 0.019*** |
| Growth in | 0.029*** | 0.019*** | 0.026*** | 0.014*** | 0.015*** |
| Profitability$_{it-1}$ | 0.186*** | 0.062*** | 0.125*** | 0.017*** | 0.088*** |
| Interest debt burden$_{it-1}$ | -0.014*** | -0.016*** | -0.013*** | -0.017*** | -0.016*** |
| Indebtedness$_{it-1}$ | -0.007*** | -0.075*** | -0.062*** | -0.089*** | -0.066*** |
| Firms | 656,395 | 656,395 | 371,738 | 485,078 | 352,449 |
| Observations | 3,428,548 | 3,428,548 | 1,138,296 | 1,377,912 | 716,405 |
| Firm-level fixed effects | NO | YES | YES | YES | YES |

SOURCE: Banco de España.

**a** Marginal impacts obtained through the estimation of a linear regression model using the least squares method (column 1) and fixed effects (columns 2 to 5), with adjusted and clustered standard errors at firm level.The estimation is with CBI data for the 2000-2016 period. *, ** and *** denote significance for confidence levels of 90%, 95% and 99%, respectively.

**b** The variable to be explained is defined as the ratio of gross fixed capital formation to the stock of capital in the previous year. Profitability is defined as the ratio of gross operating profit to the firm's average volume of assets in the period considered; the interest burden, as the ratio of interest payments on financing received to gross income (sum of the gross operating profit plus financial revenue), and indebtedness, as the ratio of debt to total assets. The variables preceded by the symbol § are dichotomic, and take the value one if the firm belongs to the group with the related characteristic and zero otherwise.

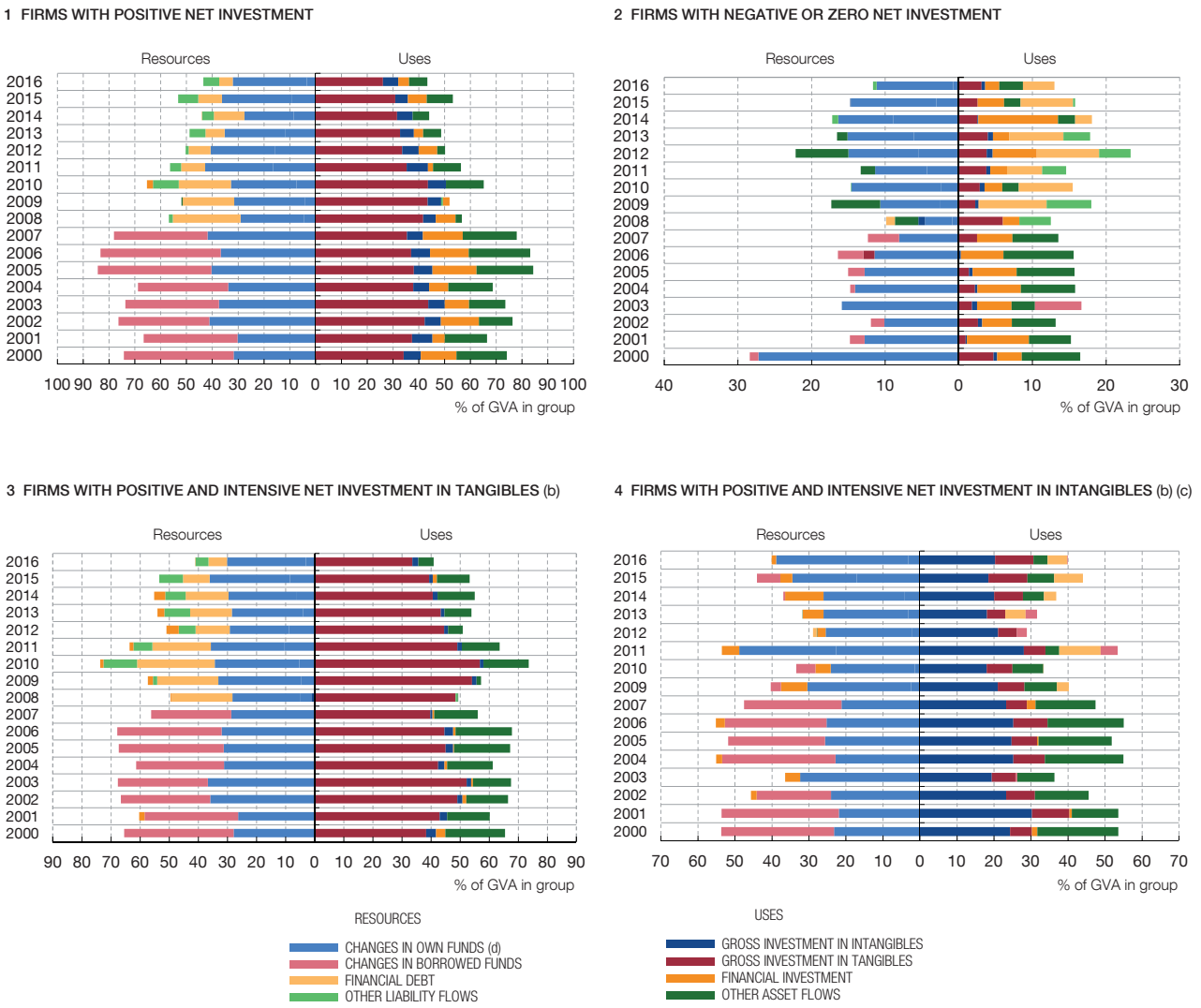
investment than larger companies, the estimate reveals that those SMEs that invest do so more intensively than large corporations. Moreover, the findings indicate that the investment ratio diminishes with the age of the company, an aspect that may be related both to more intensive investment activity by fledgling companies and to their smaller capital stock. It is further observed that the investment ratio is positively related to the firm's profitability and its financial strength. The breakdown by sub-period shows that the importance of profitability and of the growth in sales and in employment diminished after the crisis, while the negative effect associated with the interest debt burden and the debt ratio took on greater importance during the crisis, characterised by the tightening of credit conditions, an aspect which was partially reversed during the economic recovery phase.

### Sources of financing

Chart 3.1 shows that firms with positive net investment have resorted, throughout the period analysed, both to external borrowing and to own funds (capital increases, retained profits or other). The resort to external borrowing was, in relative terms, greater between 2000 and 2007[10], while from 2008 their weight progressively diminished in favour of own funds, which

10 The financial statements required of most small and medium-sized enterprises under the 1990 Spanish General Chart of Accounts, in force until 2007, did not have additional information enabling breakdowns of external financing by type (financial, commercial or other) to be had; accordingly, for this period it is only possible to distinguish between liabilities-side flows, separating them into "changes in net worth" and "other changes in liabilities".

ASSET AND LIABILITY FLOWS OF NON-FINANCIAL CORPORATIONS (a) CHART 3




SOURCE: Banco de España.

**a** Excluding holding companies and firms, from the standard questionnaire, whose stock of financial investment in group companies is greater than €10 billion and over 75% of total assets.
**b** The firm is considered to invest intensively in a category of tangible assets if the gross investment flow in such assets is greater than or equal to 30% of the absolute value of the sum of investment in fixed and financial assets.
**c** Owing to the introduction of a new general chart of accounts in 2008, in which leasing is reclassified, it is not possible to identify investment in intangibles correctly for that year. Accordingly, the data relating to that year are not depicted.
**d** Includes capital increases, retained profit and other.

became the main source of financing of these firms, both through capital increases and other changes in net worth, essentially resources generated by the firms themselves as a result of profits obtained. However, it is notable how even in this latter period, marked by greater difficulties in access to external borrowing and by the heavy contraction in corporate debt in aggregate terms, the more dynamic firms continued to finance a portion of their investment with borrowings, albeit to a lesser extent than in the previous years.

Set against this, at companies where net investment has been negative or zero, own funds were the main debt-raising channel throughout the period analysed, whereas other liabilities showed relatively insignificant increases (between 2000 and 2007) or reductions, as a result of the deleveraging processes that were predominant as from 2008 (see Chart 3.2). As regards uses, these companies evidenced practically at all times positive gross capital formation,

albeit for small amounts, and, overall, they increased their holdings of financial assets, which might be due to the fact that within this group of firms are some whose limited investment effort might be in response to the insufficient or uncertain prospects of profitability of their productive activities, and not so much to the shortage of funds with which to finance them.

Charts 3.3 and 3.4 focus respectively on the group of firms that invest intensively, or in the main, in tangible and intangible assets so as better to identify the sources of financing used in the acquisition of each of these two types of assets. These charts show how, until 2008, these firms financed their investment, in tangible and intangible assets alike, with borrowed funds and with own funds, against a background of easier access to credit and an economic expansion. Nonetheless, the significance of own financing was slightly higher in the case of investment in intangibles, accounting for around 53%, on average for the period as a whole, while for investment in tangible assets financing via external borrowings represented around 49% over the same period. Conversely, both during the crisis and in the subsequent recovery, investment by firms with a high propensity to invest in intangible assets began to be financed almost exclusively with own funds, unlike the acquisitions of tangible assets, a portion of whose financing continued to be sustained by borrowed funds, albeit to a lesser extent than in prior years. The change in pattern in how these firms financed themselves suggests greater difficulties in gaining access to external borrowing at firms with a high propensity to invest in intangible assets, especially after the start of the crisis, which perhaps has to do with the greater risk perceived by lenders, with asymmetric information problems or with the lesser availability of assets susceptible to be used as collateral in financing operations.[11] However, nor can it be ruled out that these changes are also in response to demand-side factors, since during the period analysed there have been significant changes in the characteristics of the firms that invest intensively in intangibles.[12]

12.7.2018

## REFERENCES


AIVAZIAN, V. A., Y. GE and J. QIU (2005). "The impact of leverage on firm investment: Canadian evidence", *Journal of Corporate Finance,* 11(1), pp. 277-291.

ARRIGHETTI, A., F. LANDINI and A. LASAGNI (2014). "Intangible assets and firms' heterogeneity: evidence from Italy", *Research Policy,* vol. 43, no. 1, pp. 202-213.

BROWN, J. R., G. MARTINSSON and B. C. PETERSEN (2012). "Do financing constraints matter for R&D?", *European Economic Review,* 56, pp. 1512-1529.

EUROPEAN INVESTMENT BANK (2018). *From recovery to sustainable growth,* EIB Investment Report.

HERNANDO, I., and C. MARTÍNEZ-CARRASCAL (2008). "The impact of financial variables on firms' real decisions: Evidence from Spanish firm-level data"*, Journal of Macroeconomics,* 30(1), pp. 543-561.

HERRANZ, F., and C. MARTÍNEZ-CARRASCAL (2017). *The impact of firms' financial position on fixed investment and employment: an analysis for Spain,* Working Papers, no. 1714, Banco de España.

LANG, L., E. OFEK and R. M. STULZ (1996). "Leverage, investment, and firm growth", *Journal of Financial Economics,* 40, pp. 3-29.

MARTÍNEZ-CARRASCAL, C., and A. FERRANDO (2008). *The impact of financial position on investment: an analysis for non-financial corporations in the euro area,* Working Papers 943, European Central Bank.

POSADA, D., A. URTASUN and J. GONZÁLEZ MÍNGUEZ (2014). "Un análisis del comportamiento reciente de la inversión en equipo y de sus determinantes", *Boletín Económico,* junio, Banco de España.


11 The greater difficulty firms may face when financing investment in intangible assets through the use of external borrowing has recently been underscored by the European Investment Bank (2018). Specifically, descriptive evidence suggests that those firms that invest more intensively in intangible assets make greater use of in-house financing, are less satisfied by external borrowing access conditions and have a greater probability of being financially constrained. Moreover, the paper by Brown et al. (2012) offers empirical evidence relating to the effect of financial constraints on investment in R + D for the case of a sample of European companies, highlighting the role played by the problems of asymmetric information and the lack of collateral in this type of investment.

12 Thus, following the financial crisis substantial changes were observed in the sectoral composition and/or in the distribution of the age and size of firms that invested intensively in this type of asset. Insofar as these characteristics might be relevant for determining access to external financing, the decline witnessed in this form of financing might also be due to this change in composition.