

# FINANCIAL CONTRAINS FOR INNOVATIVE FIRMS: THE ROLE OF SIZE, INDUSTRY AND ICT USES TO EXPLAIN THE IMPROVEMENT OF FIRMS' FINANCIAL STRUCTURE

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## **Abstract**

This paper uses a large data set of Catalan firms in all the economic branches to analyse the effects of size, sector and the degree of ICT uses on financial constraints for innovative firms. We have conducted a micro econometric analysis following Henry *et al.* (1999) investment model to empirically contrast the relationship between investment expansion over time and financial variable, and we have used von Kalckreuth (2004) methodology, based on data with information on financial constraints. Our preliminary results indicate that it exists a positive and significant relation between the investment variation and firms' financial structure, emerging financial constraints for more innovative firms. These limitations are also higher for micro companies and firms within the services' industry. Finally, we have also found that advanced ICT uses by more innovative firms allow them to reduce the constraints related to the access to sources of finance.

**Key words:** Innovation, Investment, Financial constraints, ICT uses

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## *Introduction*

Under the assumption of imperfect capital markets, the access of firms to financial resources differs depending on the importance of information asymmetry, uncertainty and agency problems. These constraints generate a wedge between the costs of external finance and the opportunity costs of internal resources (von Kalckreuth, 2003). A critical consequence of this fact is that sources of finance do not fit with the neo-classical hypothesis (Modigliani and Miller, 1958). As they are no longer perfect substitutes, the amount of internally generated funds may matter to the firm's investment decision.

Concerning investment behaviour in firms, there is an increasing number of works that give evidence about the existence of financial constraints for innovative firms<sup>1</sup>. This kind of constraints can be explained through the trade-off between the characteristics of investments in innovation, as they are risky, highly specific and with cash flow returns in the long term, and the usual behaviour of financiers, which is characterised by a short term orientation and risk aversion. In addition, the financial constraints are empowered by the existence of information asymmetries between managers and financing agents (Goodacre and Tonks, 1995). Despite of the empirical evidence available about the significant differences on the financial structure of innovative and non-innovative firms which explain that innovators are more likely to experience financial constraints (Fazzari *et al.*, 1988), it has been also demonstrated that successful innovative activity in firms allow them to obtain monopoly profits, which emerge as important internal resources avoiding firms' dependence of external financial sources and decreasing the scope of financial constraints (von Kalckreuth, 2004). Accordingly, firms' size and its adjustment capacity (von Kalckreuth, 2006), its ownership of tangible assets, its capacity to reach sustainable profitability rates, or its market position, can explain different intensity levels of financial constraints.

Within this framework, this paper aims to enlarge our understanding about the role of finance in the explanation of investment decisions in firms, the significant differences between financial structure of innovators and non-innovators, and the potential of ICT uses to surpass financial constraints inherent to innovative activities. To do that, we have divided the paper in four sections. Section I is focused on the literature review about the existent theoretical and empirical evidences in the relationship between innovation, finance and ICT uses. Section II presents the hypotheses, the methodology and the data set. Section III contains our statistical test results. And, finally, Section IV concludes the paper.

### *I. Theoretical framework: innovation, finance and ICT uses*

Investment decisions in innovative firms are influenced by financial structure. Empirical literature results in this field indicate that there are important constraints for financing innovative investments among companies. These constraints emerge for the lack of equilibrium between the economic characteristics of innovation and the economic behaviour of finance agents. As financial resources are not perfectly allocated among firms, differences between external resources cost and the opportunity cost of internal resources afflore. The different theories that try to explain this relationship argue that a firms' profitability (Henry *et al.*, 1999), the disposal of free internal cash flow and the cost of external resources affects significantly decision of investment in innovation.

Theories of capital structure, although tend not to focus directly on firms' technological traits, but are useful to identify the causes that may explain why more innovative firms use to have a particular financial structure and favour some particular sources of finance (Aghion *et al.*, 2004).

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<sup>1</sup> See Bond, Elston, Mairesse and Mulkey (2003) for comparisons in Belgium, France, Germany and the United Kingdom; Bond, Harhoff and van Reenen (1999), who were the first to undertake a detailed micro econometric comparison of firm investment behaviour in the United Kingdom and Germany; or von Kalckreuth (2003) and Chirinko and von Kalckreuth (2002, 2003) for Germany.

### *Financial constraints of innovators' investments*

The causes of financial constraints for innovative firms have been explained in the international literature through different approaches.

One approach emphasises information asymmetries between investors and firms' managers. Difficulties in assessing future cash flows from innovative activity generates the emergence of this lack of equilibrium and it can result in some positive net present value investments not being financed (Goodacre and Tonks, 1995). This situation reflects the effects of short-termism in capital markets (Innovation Advisory Board, 1990) and it originates out of the interaction of financing and investment decisions, as the suppliers of finance have less information available about the profitability of the investment project than firms' managers or entrepreneurs. Information asymmetries can be divided in two main situations (Laffont and Maskin, 1980): *i*) adverse selection, leaded by hidden information from managers to financiers; and *ii*) agency problems, leaded by managers' hidden actions.

Adverse selection leads to signalling problems (Myers, 1984, Myers and Majluff, 1984; Miller and Rock, 1985; Stein, 1989) that have as a consequence equilibrium points where there are under-investment decisions. For instance, under the assumptions of the most well-known signalling model, Myers' (1984) "Pecking Order" theory of capital structure, rank their financial resources, preferring the use of free internal sources first, then external debt and finally external new equity to fund investments, due to the effect of dilution costs. Thus, the inherent conflict of interest between equity and debt holders led to under-investment.

These adverse selection effects on investments are greater for more innovative firms, because they usually show higher levels of asymmetric information between insiders and outsiders, and, hence, dilution costs tend to be higher. Therefore, more innovative firms are likely to be more reluctant on external sources of funds, but are likely to favour debt over new equity among external resources of finance, in order to avoid the relatively high dilution costs (Aghion *et al.*, 2004).

In his seminal work, Arrow (1962) recognized that the risk-shifting solutions to the under-investment result might lead to incentive problems. The trade-off between principal and agent utilities usually implies that adopted policies lead to a sub-optimal decision of investment according to firms' utility, preferring to promote short-term investment projects as they are easier to be monitorized by owners and controlled by managers. In fact, all the different papers conducted in this field<sup>2</sup> adopt optimal contracts that results in an allocation of financial sources that is bellow the first best.

Another approach focuses on bankruptcy costs (Brealy and Myers, 2003). These costs tend to be relatively lower in non-innovative firms, as they usually present a higher proportion of tangible capital among their assets, and higher in innovative firms, because they use to have a more important proportion of intangible assets. In this last case, for a given level of debt, the risk of bankruptcy may also be higher. This factor implies that more innovative firms are likely to be less reliant on external debt to fund their investments, in order to minimise their expected bankruptcy costs.

Finally, a third different approach emphasizes control rights (Hart, 1995). According to this theory, the lower the value of tangible assets inside a firm, the higher is the interest of outside investors on having control over the firm's decisions in order to satisfy their wealth constraints. This alternative theory of the pecking order also predicts that innovative firms will favour internal funds, in order to reduce the pressure of outside investors on control rights, but differently suggests that these firms will be likely to prefer new equity rather than debt among the external sources of finance.

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<sup>2</sup> Such as the classical Works of Holmstrom and Weiss (1985), Holmstrom and Ricart i Costa (1986) and Ricart i Costa (1989).

## *ICT uses and financial constraints*

The use of digital technologies in managing and operating the finance and investment flow may lead to a reduction of the financial constraints that affect more innovative firms. Two are the main factors that explain this assumption.

On one hand, a direct effect. ICT uses for financing purposes may improve the information flow between managers and suppliers of finance, leading to a better equilibrium that reduces under-investment, based on a higher convergence of managers and financiers future cash flows' expectations. These dilution of information asymmetries can happen in two ways: *i)* through the interest of suppliers of finance to fund more risky and long-term investment projects under the assumption of a higher amount and quality of information available; and *ii)* through the use of digital technologies as a channel of signalling and monitoring investment projects, and, thus, avoiding the need to conduct short-term projects as a signal of better rates of firms' profitability.

On the other hand, an indirect effect. As it has been demonstrated in growth microeconomics (Bresnahan *et al.*, 2002), when ICT adoption and use are well combined by firms with a suitable organizational structure and practice and with skilled workers, the advanced use of digital technologies arise as a source of firm's efficiency, contributing to explain the increase of labour productivity.

The main consequence of the abovementioned effects might reduce the financial constraints affecting more innovative firms, by the decrease of the amount of net positive investment projects that remain without be funded, and the short-termism of the suppliers of firms' finance.

## *II. Hypotheses, methodology and data set*

Within this finance of innovation general framework, we aim to verify a set of hypothesis:

*H1: Financial variables, measured by financial profitability, financial structure, cost of funds and internal free cash flow, are significant determinants of firms' investment levels.*

*H2: Investment decisions in innovative firms are limited by financial constraints, showing a positive and significant relation between firms' finance and the investment in intangible assets.*

*H3: The degree of financial constraints shows a direct relationship with firms' size, reflecting the fact that the lower is a firm's size, the higher are the financial constraints affecting its investment decisions.*

*H4: Financial constraints affecting investment decisions in innovative firms are particularly higher in innovative services, due to a lower proportion of tangible capital among their assets compared to manufacturing industries.*

*H5: Advanced ICT uses allow innovative firms reduce the financial constraints that affect their investment decisions, as there is a decrease of the intensity in the relationship between financial variable and investment expansion.*

Following Henry *et al.* (1999), we specify a model of multiple linear regression (general model), that takes the following functional form:

$$\Delta I_i = \beta_0 + \beta_1 \Delta Rf_i + \beta_2 \Delta Ef_i + \beta_3 \Delta Cf_i + \beta_4 FT\_03_i + \beta_5 DEf\_01_i + \beta_6 CAj\_03_i + \mu_i$$

Where,  $\Delta I_i$  is the variable to explain of the model and  $\Delta Rf$ ,  $\Delta Ef$ ,  $\Delta Cf$ ,  $FT\_03$ ,  $DEf\_01$  and  $CAj\_03$  are the independent variables, the four first representative ones of the different modalities as the companies catch the financial resources necessary to carry out the investing strategy and

the two last ones are variable real that affect, according to the theory of the investment, in the accomplishment of investment projects. The term of the disturbance is the variable  $\mu_y$ .

In order to contrast if this relation of causality is fulfilled, in the first place, we defined the following variables:

**Table 1. Definition of the variables of the model to contrast**

Acronym	Name of the variable	Construction of the variable
Dependent variable		
$\Delta I_i$	Variation company's <i>i</i> total assets, exercise 2003 respect to exercise 2001.	
Financial independent variables		
$\Delta Rf_i$	Variation company's <i>i</i> financial yield, exercise 2003 respect to exercise 2001.	The financial yield has calculated like the quotient between the net result of the exercise and the shareholders equity funds end of the year. <sup>3</sup>
$\Delta Ef_i$	Variation company's <i>i</i> financial structure, exercise 2003 respect to exercise 2001.	The financial structure is the quotient between debt and shareholders equity to end of the year.
$\Delta Cf_i$	Variation company's <i>i</i> debt cost, exercise 2003 respect to exercise 2001.	The debt is obtained as quotient between the financial expenses gathered in the account of results during the exercise and the debt's explicit financial cost to end of year.
FT_03 <sub><i>i</i></sub>	Flow of treasury by unit sold generated by society <i>i</i> , during the economic exercise 2003.	Se has calculated like the quotient between the sum of the net result of the exercise, of the expenses total by dowries in the amortizations and provisions, divided by the net amount of revenues.
Real independents variables		
DEf_01 <sub><i>i</i></sub>	Company's <i>i</i> productive efficiency distance, to exercise 2001	This variable is measured by means difference between the ratio, company's income by sales on assets and the maximum value of the ratio for sample's set.
CAj_03 <sub><i>i</i></sub>	Company's <i>i</i> adjustment cost, exercise 2003 respect exercise 2001.	Is measured through the ratio that the differential of the income of operation between exercises 2001 and 2003 relates, and the differential of the operation costs.

Source: Own elaboration.

In order to investigate the relationship between innovation and the determinants of firms' investment demand we use a direct approach by relying on explicit statements by the firms themselves. We are able to explore a micro data base of PIC (Project Internet Catalonia<sup>4</sup>) for 2001 and 2003 years. The sample was generated carrying out a survey by questionnaire<sup>5</sup> resulting on a representative sample of 2,038 Catalan firms, quoted by firms' size and economic sector<sup>6</sup>.

Apart from its size, the data set has two important characteristics that are relevant to our problem. First, it contains many small firms, on which very little information is available from micro data sets based on quoted companies. Second, firms report on their innovation behaviour. They state whether or not a product innovation was achieved during the two past years and whether or not it was fundamental in a technological sense.

In order to verify the fulfilment of  $H2^7$ , we have divided the sample available in two groups: innovative and the rest of companies of the sample, that we have identified them us non-innovative companies. In order to catch the innovation in the Catalan company we have created a dichotomizing variable that:

- it takes value 1, when the Catalan companies affirm that: a) has introduced some type of general innovation with the use of the ICT; b) has introduced some type of product

<sup>3</sup> We suppose that the net amounts of the balance sheet at the end of period are representative of the average net amounts of the fiscal year.

<sup>4</sup> *The Network Company in Catalonia: ICT, Productivity, Competitiveness, Salaries and Performance in Catalonia's Companies*, funded by the Catalan Government. Available at URL: [www.uoc.edu/in3/pic/eng/network\\_company.html](http://www.uoc.edu/in3/pic/eng/network_company.html)

<sup>5</sup> The questionnaire, quite complex, includes 128 questions, as well as additional observations. The interviews, held with entrepreneurs or company directors who have a global vision of the whole activity, were generally well received and the collaboration of the interviewed was high. In addition, we have completed the questionnaire information with economic and financial information available to the general public in the *Register Mercantile* (Mercantile Register), obtained through the SABI program.

<sup>6</sup> In this sense, the analysis of more than 500 variables, forming a matrix of one million data about the Catalan firm, was carried out according to the common research methodology in social sciences; that is the frequency analysis, the contingency tables and the regression analysis, crossed with company sizes and economic sectors defined in the research.

<sup>7</sup> Von Kalckreuth (2004).

- innovation with the support of the ICT; and c) have introduced some type of innovation of process with the use of the ICT;
- and value 0 in alternative case.

In *H3* we set out to contrast that it is an inverse relation between the enterprise dimension and the variation of investment. This inverse relation is fulfilled so much for the innovative companies as for the non-innovative companies. For this contrast, we have used a variable that measures the enterprise dimension taking the following values:

- 1, when the company has 5 or less workers;
- 2, when the company has of 6-9 workers;
- 3, when the company has of 10-19 workers;
- 4, when the company has of 20-99 workers;
- 5, when the company has 100 or more workers.

Just as with the second causal relation, we have made an analysis of the variance between the indicator of size and the investment variation, and we have contrasted it with our general model, but this time dividing the universe for each one of the dimensions that are associated significantly with the variation of assets.

*H4* causal relation analysis object arises from the hypothesis according to which the variation of an enterprise investment in the services sector depends on the change in financial resources. In this sense, we have generated the variable that catches the sector of activity within as the companies are located, that take the following values:

- 1) when the company is located within the sector of the information industry;
- 2) when the company comprises of the industrial sector;
- 3) when the company comprises of the services sector.

Following the usual methodology, we have contrasted the effects of association between the variation of assets and the size variable, and we have talked back the general model, sectioning the universe based on the type of economic activity.

And, finally, in order to verify the accomplishment of *H5*, we have divided the general sample in two groups, one of them formed by those companies with ICT's low use and the other by companies that make an ICT's average or advanced use. Additionally to the general analysis for the Catalan company set, innovative and non-innovative companies have been separated.

### *III. Results*

The measurement of the total investment made by the Catalan company during an economic exercise can be analyzed as much through the contribution of real variables (the enterprise dimension, the cost to fit to the enterprise organization or the distance to the border of efficiency of the sector) like of variables bound to the enterprise financing.

In this sense, next we have conducted an analysis of the determinants of firms' investment that it tries to contrast the general hypothesis that the financing modality conditions the enterprise investment made in a period.

The estimation of the basic model (852 companies), by ordinary square minimums, determines results to us that corroborate the assumptions established in the theory of the financing, according to which the expansion of the enterprise investment depends on the financing that is able to obtain the company, either of internal form, by means of a flow of treasury that allows to face the financial necessities, or of external form, or catching new shareholders or through third. Indeed, so and as it is gathered in table 2, the coefficients  $\beta$  of the model they are very significant and positive, with an explanatory capacity of the model of 52%. We would emphasize the fact that more of a 50% of the variation of the enterprise investment it is explained by the variable variation of the financial structure ( $\Delta Ef_i$ ). In the general sample the real variables, distance to the efficiency and adjustment costs, are not revealed significant in the decision to carry out new projects of investment on the part of the society.

On the basis of this first causal relation, of general order, the availability of the economic and financial information for the Catalan companies in period 2001-2003 allows the exposition of other hypotheses of investigation. The second causal relation that we set out to contrast is the fact that the financial restrictions in the innovative companies are a brake to the enterprise investment.

We have contrasted, through an analysis of variance, the association between the enterprise investment, caught through the variation of the assets, and the innovating behaviour of the Catalan companies. Finally, and for the resistance of the second specified causal relation, we have reproduced the general model, nevertheless, this time, sectioning the universe of companies, between non-innovative and innovators.

The results of the analysis of the variance, corresponding to the association between the variation of the total assets and the innovating behaviour, suggest the existence to us of linking between the enterprise investment and the fact that the company is innovative. With respect to the results of the analysis of causal relation, the estimation of the coefficients  $\beta$  of the basic model, now, nevertheless, for a sample of 517 innovative companies, it allows to verify the positive and significant relation between the enterprise investment of the innovative companies and the variables related to the financing, with a  $R^2$  of 63% (table 2.). So and as it was to hope we stated the explanatory force of the financial variables in the variation of the investment for the innovative companies, continues being the variation of the financial structure the variable with greater explanatory weight.

Now well between the determinants related to the financing of the enterprise investment of the non-innovative companies, with a population of 335 companies, the financial variables continue having a direct relation but they lose its superiority, because the made analysis is given away that the internal resources generated by the society (FT\_03) are already not a limitation in the investing strategy of the society.

When sectioning the general sample according to the innovating behaviour appears like significant element in the decision of investment of the company, innovative as much non-innovative, the distance to the productive efficiency (DEf\_01) being the main impeller of the new enterprise projects; significant variable and with positive sign in the innovative companies and, of opposite sign for the non-innovative companies (to see table 2); the effect but is not coincident, for the innovative companies the bias is positive because they increase the projects of investment with the intention to reduce to the distance to the maximum of the more efficient group and being; however in the non-innovative companies gap is negative, revealing itself like a limitation of the enterprise investment.

The third causal relation that we set out to contrast is that an inverse relation between the enterprise dimension and the variation of the investment. This inverse relation is fulfilled so much for the innovative companies as for the non-innovative companies.

With respect to the causal relation that defines an inverse relation between the dimension and the enterprise investment, as much in the innovative companies as in which they are not it, the analysis of contingencies corroborates the positive association to us between both variables. The estimation of the coefficients  $\beta$  of the basic model it allows to verify the positive and significant relation (with a  $R^2$  of 73%), between the variation in the enterprise investment of the innovative micro companies and the enterprise financing, as it is reflected in table 1. Also we have stated which the relation is positive and significant (adjustment of 33%) between the enterprise investment of non-innovative micro companies and three of the four variables related to the financing (table 2), the generated bottoms of financing internally are not significant (FT\_03).

The comparison of the coefficients of the kindness of the adjustment demonstrates, this way, the high explanatory power of the financial variables in the analysis of the variation of the investment for the innovative micro companies.

The behaviour of the variable distance to the efficiency (DEf\_01) is significant for joint the dimension micro company and, like in the second causal relation, the sign of the determinant is



not coincident, is positive for the innovative companies and negative for the non-innovative ones.

The fourth causal relation analysis object arises from the hypothesis according to which the variation of the enterprise investment in the sector services depends of the variation in the financing

With respect to the causal relation that it wanted to demonstrate the impact of the sector in the determination of the investment flow, the analysis of the variance corroborates the existence to the relation between the enterprise investment behaviour according to the enterprise sector to which the society belongs. The estimation of the coefficients  $\beta$  of the basic model in this new section of companies, it allows to verify the positive and significant relation (adjustment of 70%) between the enterprise investment of the -innovative companies of the sector services and the representative variables of the financing, as it is reflected in table 1. However we verified that, for the non-innovative companies of the sector services, the relation is positive and significant only for debt and by the cash flow (table 2.). Of the made analysis it is deduced that in the group formed by the non-innovative companies the financial restrictions are not a barrier so hard to the enterprise investment like in the innovative companies of the sector services.

And finally, the behaviour of the variable distance to the efficiency (DEf\_01) is significant for the sector services and, like in the second and third causal relation, the sign of the determinant is not coincident, is positive for the innovative companies and negative for the non-innovative ones.

**Table 2. Determinants of the explanatory investment model in Catalan companies. 2001-2003** (model of multiple linear regression; dependent variable: variation of the total assets between 2003 and 2001)

Values of $\beta$ standardized							
Determining of the investment	In the Catalan company in general	Segmentation according to the innovation degree:		Segmentation of the micro companies according to the innovation degree:		Segmentation of the companies of the sector services according to the innovation degree:	
		Innovative companies	Non-innovative companies	innovative micro companies	Non-innovative micro companies	Innovative of the sector services	Non-innovative micro companies of the sector services
(Constant)							(**)
$\Delta Rf_i$	0,167*	0,159*	0,138*	0,191*	0,151*	0,178*	0,106
$\Delta Ef_i$	0,607*	0,667*	0,225*	0,716*	0,368*	0,711*	0,246
$\Delta Cf_i$	0,202*	0,139*	0,254*	0,107*	0,328*	0,149*	0,311*
FT_03 <sub>i</sub>	0,204*	0,242*	0,066	0,266*	0,089	0,218*	0,097*
DEf_01 <sub>i</sub>	0,003	0,105*	-0,295*	0,111*	-0,387*	0,069*	-0,249*
CAj_03 <sub>i</sub>	-0,025	-0,018	-0,092	0,002	-0,201*	-0,019	-0,090
N	852	517	335	421	297	374	237
R <sup>2</sup> corrected	0,522	0,628	0,195	0,732	0,328	0,701	0,229

\* Meaning of  $\beta < 0,05$

\*\* The nonsignificant one

Source: Own elaboration.

Now we approached in this section the incidence of the use of the digital technologies (ICT) in the financial cycle of the company, and in particular, the study of the contribution of the enterprise use of these technologies to the overcoming of the financial restrictions that affect to the development of processes of innovation in the Catalan company.

Linear regression results (see table 3) for the Catalan company set allow to verify that, for the companies with ICT's low uses (N=563), its propensity to invest is conditioned by the restrictions to access the financing funds, as much generated internally, how obtained externally with increase the equity or increase the debt. Also, in these companies the bias between the real income and the potentials (DEf\_01) is not a motor to increase the investment.

We stated, nevertheless, in the companies with ICT's advanced and average use (N=289), an overcoming of the financial limitations in the investing strategy by means of the equity increase (Rf), using new capital.

When centering our attention center in the innovative companies with ICT's low uses (N=296) as much the financial variables, with the exception of debt cost (Cf), as the real variables are significant. However in the innovative companies with an ICT's intensive use (N=267) we see how the necessity to generate interna resources I (FT\_03) stops being a necessity to carry out the investment projects and, the societies with a superior differential between the company's income and the potential income (Def\_01), do not direct their activity investing to reduce this "gap".

We can conclude, therefore, that the intensive ICT's use in the innovative companies allows them to reduce the limitations associated to obtaining financing funds, since the results of the analysis demonstrate that a weakening of the restrictions to the financing of investment decisions takes place carried out by those firms with advanced and average digital technologies's uses.

**Table 3. Explanatory model determinants of investment in Catalan companies according to ICT's uses, 2001-2003.** (model of multiple linear regression; dependent variable: variation of the total assets between 2003 and 2001)

Values of $\beta$ standardized						
Determining of the investment	In the Catalan company in general		Segmentation according to the innovation degree:			
	ICT's Low uses	ICT's Advanced uses	Innovative companies		Non-innovative companies	
			ICT's Low uses	ICT's Advanced uses	ICT's Low uses	ICT's Advanced uses
(Constant)	(1)					
$\Delta Rf_i$	0,214*	0,051	0,256*	0,141*	0,022	0,144
$\Delta Ef_i$	0,509*	0,238*	0,781*	0,200*	0,623*	0,139
$\Delta Cf_i$	0,264*	0,639*	-0,013	0,386*	0,121*	-0,593*
FT_03 <sub>i</sub>	0,124*	0,095*	0,206*	0,076	0,245*	0,349*
Def_01 <sub>i</sub>	-0,076*	0,042	0,201*	-0,334*	0,041	0,273*
CAj_03 <sub>i</sub>	-0,057	0,000	-0,122*	-0,096	-0,001	-0,197
N	563	289	296	267	220	68
R <sup>2</sup> corrected	0,301	0,678	0,477	0,312	0,683	0,39

\* Meaning of  $\beta < 0,05$

Source: Own elaboration.

#### IV. Conclusions

In spite of the international consensus about the importance of firms' investment in intangible capital for promoting the innovation processes and as an improving source of companies' productivity and competitiveness, there exist some restrictions that limit the access of innovative companies to the needed financial resources to carry out their investments, and, thus, they determine their capital structure.

In this work we have focused on the analysis of the financial constraints affecting firms' investment. On the basis of a representative sample of Catalan companies we have been able to verify that the assumptions established in the Financial Literature are fulfilled by the relation between financing and investment, so that, the existence of a positive and significant relation between the investment variation and firms' financial structure is demonstrated. In this sense, it important to remark that we have found empirical evidence about the fact that firms' financial structure, debt costs and internal free cash flow explain the scope and intensity of investment

expansion. Therefore, we stated that financial restrictions for the enterprise's investment do exist and, moreover, these limitations have an important weight in the investment variation within the innovative companies, due to the usual middle-term returns that characterise their investment activity.

It has been also possible to empirically verify the existence of important financial restrictions for the investment decisions in micro companies and those within the services industry, being much higher than the meaning for innovative companies in these two segments. Therefore, middle-size and large firms, as well as information industry's and manufacturing companies do not show constraints to obtain resources for financing their expansion.

Finally, and concerning the analysis of ICT uses effect on firms' investing behaviour, our results allow us to conclude that digital technologies' intensive use (companies with ICT's average and advanced use), within more innovative companies reduces the limitations related to the access to sources of finance.

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