START-UP CONDITIONS AND THE PERFORMANCE OF WOMEN - AND MEN - CONTROLLED BUSINESSES IN MANUFACTURING INDUSTRIES

CONDICIONES INICIALES Y RESULTADO EN EMPRESAS DIRIGIDAS POR MUJERES - Y HOMBRES - EN EL SECTOR MANUFACTURERO

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ABSTRACT
Recent research into the economic performance of women-controlled firms suggests that their underperformance may not be the result of differences in the *managerial ability* of women as compared to men, and that it may in fact be a consequence of differing levels of start-up resources. Using accounting data, we examine the effects that selected start-up conditions have had on the observed economic performance of a sample of 4450 Spanish manufacturing firms. The results, which indicate significant differences in the initial conditions and show lower levels of assets and employee numbers in women-controlled firms, have implications for the economic performance of such firms.

KEY WORDS: Women controlled firms, performance, growth, initial resources, firm size, financial debt, manufacturing industries.
JEL: M13, M21

RESUMEN
La investigación empírica sobre el desempeño económico de las empresas dirigidas por mujeres sugiere que las diferencias entre este y el desempeño observado en empresas dirigidas por hombres no se debe necesariamente a diferencias entre hombres y mujeres en cuanto a sus habilidades como gerentes de esas empresas sino más bien pueden ser el resultado de las diferencias en las condiciones iniciales en las que se crearon dichas empresas. Usando información contable, este trabajo examina los efectos que algunas condiciones iniciales puedan tener sobre el desempeño económico observado para una muestra de 4450 empresas manufactureras Españolas. Los resultados indican diferencias significativas entre las condiciones iniciales de las empresas dirigidas por mujeres y, respectivamente, por hombres. Para la muestra analizada las empresas dirigidas por mujeres tienen menos activos y un menor número de empleados lo que explica, al menos parcialmente, el menor desempeño en empresas gestionadas por mujeres.

PALABRAS CLAVE: empresas dirigidas por mujeres, desempeño empresarial, crecimiento, recursos iniciales, tamaño de la empresa, deuda financiera, industrias manufactureras.

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1 INTRODUCTION

Over the last few decades, policy makers and academics have generally come to consider entrepreneurship as beneficial to the socio-economic development of regions and nations, mostly because new firms generate employment, bring innovation to the market and increase overall industrial productivity through increased competition (van Stel, Carree and Thurik, 2007). Although they still constitute a minority of all entrepreneurs, more and more women are setting up and running their own businesses around the world (Allen, Langowitz and Minitti, 2007). Women's entrepreneurship has recently been recognised as an important *untapped* source of economic growth (*OECD*, 2004) and most governments are designing public initiatives to encourage women's involvement in entrepreneurship. The rationale behind this is quite straightforward: if new businesses started by men are likely to produce positive outcomes for a country's economic and social well being, so too are businesses set up by women. Consequently, if they are to achieve the desirable outcomes by which entrepreneurship can benefit society, then women's business ventures should also pass the survival and growth tests.

Yet, the study of women entrepreneurs and their business ventures provides some evidence to indicate that women's ventures are at a certain disadvantage compared to those of men. Empirical research provides unequivocal evidence that women controlled firms (hereafter *WCBs*[1]) start with a lower overall capitalization (Alsos, Isaksen and Ljunggren, 2006; Marlow and Patton, 2005; Watson, 2002), they tend to be smaller than firms controlled by men (Cliff, 1998; Rosa, Carter and Hamilton, 1996; Singh, Reynolds and Muhammad, 2001) and they are overrepresented in retail and services, industries which are situated at the " 'end' of the value chain" (Brush and Chaganti, 1999: 233) where businesses earn lower returns (Anna et al., 1999).

Intuitively, if *WCBs* and *MCBs* tend to differ in terms of industrial activity, business scale and funding, they might also exhibit different levels of business performance. Previous research, however, has not provided conclusive evidence about performance differences between women-controlled and men-controlled businesses. Some empirical evidence indicates that *WCBs* do not perform as well as *MCBs* in terms of sales and profitability (Cooper et al., 1994; Rosa et al., 1996; Fasci and Valdez, 1998; Watson, 2001; Bosma et al., 2004; Cron et al., 2006; Boohene et al., 2008), survival rates (Cooper et al., 1994; Carter et al., 1997; Robb, 2002; Bosma et al., 2004) or business growth (Cooper et al.,

(1) No explicitly stated definition of the concept of women-controlled business was found within previous literature. However, judging by the criteria chosen by various different authors to classify a firm as women-controlled, two main trends can be identified. Some studies class as *WCBs* those firms whose owners or main proprietors are women (Chell and Baines 1998; Fasci and Valdez 1998; Brush and Hirisch 2000; Collins – Dodd et al. 2004). The classification of *WCBs* is also based on the sex of the first key decision maker – such as the *CEO* or the president of the board of directors - (Du Rietz and Henrekson, 2000; Watson 2001 and 2002; Watson and Robinson 2003). In this study we define *WCBs* as those firms whose executive managers are women. We consider this to be an adequate definition as it reflects the real participation of women (as managers) in the day-to-day decision making processes within the firm and in business performance.

1994; Alsos et al., 2004;). Other studies do not find such differences (Chell and Baines, 1998; Watson and Robinson, 2003; Johnsen and McMahon, 2005; Coleman 2007) and a third group of studies provide evidence that only partially supports the *female underperformance hypothesis*[2] (DuRietz and Henrekson, 2000; Watson, 2002; Collins-Dodd et al., 2004)

Explanations of the disadvantage of *WCBs*' in terms of resources and the way in which that may adversely affect the performance of *WCBs* are related to the wider socio-economic and cultural context. Carter and Shaw (2006:41) indicate that "[a]s the resources (financial, social, human and cultural) required for business ownership are shaped and influenced by the wider socio-economic and cultural environment, the structural, societal and cultural roles and experiences of women provide a backdrop to, and permeate throughout women's enterprise activities and experiences. Put simply, women's role as business owners reflects their wider position in society. Moreover, as both employees and business owners, women's activities are constrained by a number of economic, structural and cultural barriers." Such barriers refer to the gender pay gap, occupational segregation and the restricted opportunities for career advancement that are available to women, and to work-life balance issues.

The persistent pay inequality between men and women – with women being paid lower wages than men in the labour market - affects women around the world (Kunze, 2008). There is also empirical evidence of the existence of a gender-pay gap in Spain (de la Rica et al., 2008; García et al., 2001)[3]. Furthermore, the gender pay gap increases with pay scales and qualifications (de la Rica et al., 2008). Garcia et al. (2001) provide evidence indicating that while 50% of the highest paid men earn about 12% more than 50% of the highest paid women, the wage floor for 10% of the best paid men is 15% greater than it is for 10% of the highest paid women.

One direct consequence of lower wages for women is that they may have fewer opportunities to "accumulate financial capital to start or acquire businesses, other things equal" (Boden and Nucci, 2000: 352). There is ample empirical evidence indicating that women start their ventures with lower levels of financial resources (Cooper et al., 1994; Carter et al., 1997; Boden and Nucci, 2000; Alsos et al., 2004). In addition, business under-capitalization has often been cited as a primary reason why emerging businesses underperform (Marlow and Patton, 2005) or even fail (Chandler and Hanks, 1998).

Traditionally, the gender pay gap has been explained within the context of human capital theory (Becker, 1985) which argues that individual characteristics like education and work

(2) "All else equal, female entrepreneurs tend to be less successful than their male counterparts in terms of conventional economic performance measures" (DuRietz and Henrekson, 2000:1)
(3) On average, the wages of Spanish women are about 70% less than that those of men (INE, 2008).

experience are responsible for differences in pay. However, the evidence suggests that these differences play a minor role in the persistence of the gender pay gap. It seems that the gender pay gap is more related to the level of occupational segregation and the wage structure (Plantega and Remery, 2006). Research has consistently shown that female employment is concentrated in a narrow range of lower-paying occupations (Carter and Shaw, 2006). This occupational segregation by gender is persistent in most industrialized countries including Spain (see *INE* (2008) and Polavieja (2008) for recent evidence on this matter) and affects women through both horizontal and vertical occupational segregation. Whereas horizontal segregation refers to overrepresentation of women in some sectors of the economy (such as retail and services), vertical segregation refers to the underrepresentation of women in "high-status occupations (such as managerial jobs) and their overrepresentation in low-status occupations (such as clerical jobs)" (Estévez-Abe, 2006:142).

Horizontal segregation of paid employment provides a partial explanation of why women choose certain industries when they switch to entrepreneurship. Women's businesses tend to be concentrated in retail and service industries "where businesses are relatively smaller in terms of employment and revenue as opposed to high technology, construction and manufacturing." (Anna et al., 1999:279). Furthermore, having women concentrated in such a narrow range of occupations (usually what is known as the five C's – caring, cashiering, catering, cleaning and clerical) ensures that women have both less and less varied work experience than men (Carter and Shaw, 2006), placing women at a disadvantage with respect to their human capital. Vertical segregation refers to the "invisible artificial barriers, created by attitudinal and organizational prejudices which block women from senior executive positions" (Wirth, 2001:1). There is ample empirical evidence indicating the existence of vertical segregation in organizations around the world (Oakely, 2000; Terjesen and Singh, 2008). Starting a business of their own can be a way for women to come "out from under the glass ceiling" (Mattis, 2004) but vertical segregation also restricts the amount of women's managerial experience and, thus, "implies diminished opportunities for women to acquire human capital relevant to both the production and managerial components of entrepreneurial activities" (Boden and Nucci, 2000:353).

Due to the higher flexibility it may provide to women – who still undertake the largest share of domestic responsibilities and childcare[4] – business ownership has long been perceived as compatible with the women's role in child-rearing (Winn, 2004). However, recent research provides evidence that the issue of balancing work and domestic responsibilities can have an adverse impact on women's businesses (Bock, 2004). Based on their review of the literature, Carter and Shaw (2006) point out several ways in which

(4) Studies indicate that Spanish women take responsibility for most of the housework (Instituto de la Mujer, 2007; Polavieja, 2008). On average, women living in partnerships report doing more than three quarters of all the housework whereas nearly 70% of all employed married and cohabiting Spanish men admit that they do less than a quarter of the housework (Polavieja, 2008: 208).

work-life balance issues may affect *WCBs*. Firstly, more women than men choose to start their businesses at home in order to accommodate both domestic responsibilities and work. Operating a business from home may affect the legitimacy of the business in the eyes of stakeholders such as creditors, thus affecting women's access to finance. Secondly, the need to schedule business activities around childcare may limit the time women invest in their businesses and may create a role conflict for women, which can be stressful. Hence, such work-life balance issues may also limit the initial resources that women can acquire and invest, thus adversely impacting the performance of their businesses.

It has long been acknowledged by research in entrepreneurship that initial endowments have an impact on how firms develop. As pointed out by Kimberly (1979:438) "just as for a child, the conditions under which an organization is born and the course of its development in infancy have non-trivial consequences for its later life". Cooper et al (1994:372) also indicate that initial resource endowments affect organizations' "strategies, which in turn bear upon the capabilities developed in the young firm. Later competitive positions may be path-dependent, with firms that were unable to pursue desirable early strategies, later finding themselves unable to match those that could". Hence, if women start up businesses that are usually smaller than those of men and employ less financial capital, one might expect lower levels of financial performance from *WCBs* during the subsequent development of their firms.

This paper seeks to provide further empirical evidence regarding the performance of women-controlled businesses by examining the impact that initial resource endowments – such as initial size and financial capital – have upon the early performance of their firms as compared with the early performance observed in men-controlled firms. The empirical application considers combinations of resources of a material nature, rather than education, work experience, entrepreneurial skills or managerial abilities of the women and men who started up the ventures included in our sample of 4450 manufacturing companies . This is grounded in previous research which reasons, as mentioned above, that in comparison with men-controlled firms, women-controlled firms generally underperform because women tend to establish ventures in less profitable industries and start-up their firms on a smaller scale and with lower endowments of capital than men do. In other words, the paper starts from the assumption that women and men are equally able as entrepreneurs but that differences in the amount of material resources employed at start-up affect the performance of their firms in the early years. The analysis of underlying factors – e.g. socio-cultural conditions - that produce differences in the amount of resources that men and women entrepreneurs are able to raise and employ at start-up goes beyond the scope of this study and is not examined.

The remainder of this paper is organised as follows. In the next section we present a review of relevant literature and the hypotheses to be tested. The third section covers

methodological issues such as data and the empirical model. The fourth section provides a presentation and a discussion of empirical results. The final section provides the conclusions and limitations of the study and the implications for future research.

2 LITERATURE REVIEW AND HYPOTHESES

With some notable exceptions, the impact of initial resource endowments on the performance of *WCBs* has been understudied. Instead, we find a larger number of papers that examine and compare the performance of *WCBs* and *MCBs* at post start-up periods. The two types of research show two common features: firstly, they employ a variety of performance measures and, secondly, they provide mixed evidence regarding the performance of *WCBs*.

A summary of the research examining the impact of start-up conditions on the performance of *WCBs* and *MCBs* is presented in Table 1a.

Some of the studies that examine the impact of initial endowments on performance (Cooper et al., 1994; Carter et al, 1997; Boden and Nucci, 2000 and Bosma et al., 2004) measure performance as the firm's ability to survive. Cooper et al. (1994) found *WCBs* just as likely to survive as *MCBs* but less likely to grow due to lower initial resource endowments. Carter et al. (1997) used the flip side of business survival as a performance measure and found higher odds of failure for *WCBs*. However, although this study found certain resource deficiencies in the case of *WCB*s (smaller scale and less instrumental experience from working in retail) such resource deficiencies did not appear to affect the probabilities of *WCBs* failing as much as they did *MCBs*. Bosma et al. (2004) used two performance measures in addition to survival: the profit made by firms and the cumulated employment during the period of study. The study found a significant positive relationship between the founders' education, their previous experience as employers and their experience in business. However, as gender was used as a control measure, there was no further discussion on how the initial human and social capital affects the performance of *WCBs*.

Finally, Alsos et al. (2004) tackled the question of business growth in *WCBs* in relation to the initial capital available for start-up. The study indicated that *WCBs* raised lower levels of capital both at start-up and 19 months after and reports a strong association between the amount of capital raised at start-up and sales turnover after 19 months. However, having controlled for the amount of capital at start-up, no significant differences between *WCBs* and *MCBs*' business growth was found.

While the question of how initial endowments affect performance is relatively understudied, a large number of papers examine and compare the relative performance of

TABLA 1a.- EMPIRICAL RESEARCH ON THE EFFECT OF START-UP CONDITIONS ON THE PERFORMANCE OF WOMEN-CONTROLLED BUSINESSES

Author(s) / Sample	Evidence of *WCBs* under-performance	Initial resources considered	Performance measures	Summary of results
Cooper et al. (1994) 1053 newly created US firms (385 failed and 668 surviving firms	YES	**1) human capital** - entrepreneur's level of education - management know-how - industry know-how **2) financial capital** - total amount of capital invested by the time of first sale	Probabilities for: Business failure Survival with some growth Growth (in employees): Firms with growth levels of at least 50% and which added at least two new employees	A strong positive relationship was found between the human and financial capital employed at start-up and firms' probability of survival and growth. Such factors as venture size, financial capital base or lack of prior experience in business organizations were found as working "to the disadvantage of female and minority entrepreneurs". Results indicate that although WCBs were just as likely to survive as MCBs, they were less likely to grow.
Carter et al (1997) 203 (59 *WCBs*) US firms in the retail industry	YES	**1) tangible resources** - business size at start-up - access to financial capital **2) intangible resources** - the level of prior experience in launching new venture - the extent to which business founders have experience working in the same industry as that of the new venture **3) strategy**	Business failure	*WCBs* show higher odds of discontinuing than *MCBs* and the lack of initial human and financial resources significantly increases the odds of business discontinuance. Data analysis also indicates certain resource deficiency for *WCBs* (men were found to have more industry experience and they started the businesses at a larger scale). However, this resource deficiency did not appear to differentially affect the survival of *WCBs* relative to *MCBs*. Regarding the effect of strategy upon business survival the results indicate that, through strategic choice, *WCBs* can decrease their odds of discontinuance, ie. strategy was found to be more important for the success of *WCBs*.
Bodden and Nucci (2000) 2256 male and 2625 white non-Hispanic sole proprietors in the retail trade and service industries that started their businesses in 1980 and 1985	YES	**Owner attributes:** marital status; education; prior paid employment experience; age; howers worked per week in business **Business attributes:** start-up or buy-out; home based business; capital used at start-up; years of ownership tenure; industry.	Business survival: dichotomous variables (1 if owners claim they still own their business and 0 otherwise)	Education and prior experience in employment enhance the survival prospects of both *WCBs* and *MCBs*. Women were found to use much less financial capital to start or acquire their businesses. However, a positive relationship between survival prospects and initial capitalization has been established partially, only for businesses which started in 1980.

TABLA 1a.- EMPIRICAL RESEARCH ON THE EFFECT OF START-UP CONDITIONS ON THE PERFORMANCE OF WOMEN-CONTROLLED BUSINESSES

Author(s) / Sample	Evidence of *WCBs* under-performance	Initial resources considered	Performance measures	Summary of results
Bosma et al. (2004) Over 1100 Dutch entrepreneurs (number of women not specified)	YES	**1) human capital** - experience in business ownership - experience in activities relevant to business ownership - industry experience **2) social capital** -contact with entrepreneurs in networks -ways of information gathering - emotional support from spouse - presence of spouse **3) financial capital** - other income available - experienced problems getting started	Survival Profit Employment	Male business founders outperformed women on all performance measures. Results indicate that specific investments of firm founders in human or social capital enhance business performance. In addition, initial capital constraints have a negative impact on survival time and earnings. The study does not indicate whether these resources influence the performance of *WCBs* and *MCBs* differently.
Alsos et al. (2004) 360 newly founded Norwegian firms (21.9% WCBs)	YES	**Financial capital**: the amount of capital invested at start-up (debt+equity)	Early sales growth (19 months after start-up)	The results indicate that *WCBs* grow less than *MCBs*, and that there is a funding gap between men and women entrepreneurs at start-up, with women raising smaller amounts of capital. In addition the amount of capital obtained at start-up was found to be strongly associated with sales turnover 19 months later. However, after controlling for the amount of financial capital invested in the new ventures, no statistically significant differences were found between *WCBs* and *MCBs* with respect to the early growth in terms of sales turnover.

WCBs and *MCBs* at post start-up periods. A brief review of studies that test the *female underperformance hypothesis* is presented in Table 1b. Whereas some studies provide evidence that *WCBs* underperform relative to *MCBs* (Rosa et al., 1996; Fasci and Valdez, 1998; Watson, 2001; Cron et al., 2007; Boohene et al., 2008) others do not report performance differentials based on entrepreneurs' gender (Chell and Baines, 1998; Watson and Robinson, 2003; Johnsen and McMahon, 2005; Coleman, 2007). In addition, some research papers find only partial support for the *female underperformance hypothesis*, which is supported for some but not all of the performance measures used (DuRietz and Henrekson, 2000; Watson, 2002; Collins-Dodd et al., 2004).

The empirical evidence summarized in Table 1b indicates a consensus among the various research studies with regard to *WCBs* being generally smaller than *MCBs* in terms of their number of employees (Rosa et al., 1996; DuRietz and Henrekson, 2000; Watson and Robinson 2003; Coleman, 2007), total assets (Rosa et al., 1996; Coleman, 2007) or sales (Rosa et al., 1996; Collins-Dodd et al., 2004; Alsos et al., 2006; Coleman, 2007). Regarding the growth dimension of business performance, Johnsen and McMahon (2005) find no differences between the pace of growth of *WCBs* and *MCBs* whereas Coleman (2007) finds that *WCBs* grow at a faster pace.

Some studies also indicate that firms controlled by women are less profitable than those controlled by men (Fasci and Valdez, 1998; Watson, 2001 and 2002; Collins-Dodd et al., 2004). Nonetheless, other studies find no significant differences with respect to all or some of the profitability measures employed (DuRietz and Henrekson, 2000; Johnsen and McMahon, 2005). It appears therefore that there are some conflicting results from previous research on differential performance between *WCBs* and *MCBs*. The relatively small samples they analyse[5] (cross-sectional data almost exclusively) and their limited geographic coverage (usually Anglo-Saxon countries) make it difficult to generalize from their findings. Furthermore, they are limited to sectors where women are overrepresented such as retail and services while little is known about the performance of *WCBs* in less *traditional* sectors such as manufacturing or construction. Based on a large sample of Spanish firms in the manufacturing industry, this study makes its contribution in an area that has hardly been explored by previous empirical research in the field.

Overall, previous research indicates that women start their ventures with lower initial endowments. In this study we hypothesise that this *disadvantage* at start-up leads to lower levels of business performance during the consequent development of their firms. Hence, we state the following two hypotheses:

(5) Exceptions to this are the Australian studies – Watson (2001, 2002, 2003) and Johnsen and McMahon (2005), all using the same data base; DuRietz and Henrekson's (2000) study of Swedish entrepreneurs, and Robb's (2002) study of US firms.

TABLA 1b.- EMPIRICAL RESEARCH ON THE PERFORMANCE OF WOMEN-CONTROLLED BUSINESSES AT POST START-UP PERIODS

Author(s) / Sample	Evidence of *WCBs* under-performance	Performance measures	Summary of results
Rosa et al. (1996) 600 (300 women) *UK* small business owners in textile and clothing, business services and hotel and catering industries	YES	Primary measures: Number of employees Growth in employees Sales turnover Value of capital assets	*MCBs* outperformed for each of the primary performance measures. Women employed less core staff and they show less growth in employment. *MCBs* have higher sales turnover and more physical assets. After controlling for a series of demographic factors, gender still appears to be a significant determinant of performance differences.
Chell and Baines (1998) 104 microbusinesses in the *UK* business services sector 40 *MCBs*, 39 *WCBs* and 25 mixed	NO	Business turnover Growth orientation: composite measure based on changes in number of employees, business turnover and floor space	After controlling for industry and size, no significant differences in business turnover or growth orientation were found. Women were found to be just as likely to keep their business and domestic lives separate as they were to want to integrate business and family.
Fasci and Valdez (1998) 604 (682 women) *US* owners of small accounting practices	YES	Ratio of annual net profit to annual gross revenue of the firm	Data showed a difference of +6% in the profit ratio of *WCBs*. When controlled for a series of business and personal characteristics, *MCBs* are expected to have a higher ratio of profits to gross revenue. Businesses established to attain flexibility and home-based businesses had significantly lower profit ratios (95% of women established their practices to attain flexibility). Business size and age and work experience of the owner were found to be strongly related to the profit ratio of the business.
DuRietz and Henrekson (2000) 4200 Swedish firms (10% *WCBs*) from multiple sectors	PARTIAL	Self-reported variables of growth in: Sales Profitability Employment Orders	*WCBs* underperformed when data was examined at the most aggregate level. After controlling for a series of business and industry characteristics, *MCBs* outperformed only with respect to sales growth.

TABLA 1b.- EMPIRICAL RESEARCH ON THE PERFORMANCE OF WOMEN-CONTROLLED BUSINESSES AT POST START-UP PERIODS

Author(s) / Sample	Evidence of *WCBs* under-performance	Performance measures	Summary of results
Robb (2002) Nearly 45000 firms (30642 WCBs) from a wide range of sectors	YES	Business survival (conditional probability that the business closes at one moment, given that it has survived up until that moment)	Smaller firms and single unit firms were more likely to close than larger and multiple units firms, respectively. After controlling for firm size, industry, legal and organizational form and location, there were significant differences in the survival prospects of businesses by owner race and gender. Women-owned businesses were 5% more likely to close than businesses owned by men.
Watson (2001) 14426 Australian SMEs (875 *WCBs*) from a wide range of sectors	YES	Total income Profit /Loss	Finds significant demographic differences which are also associated with the under-performance of *WCBs*. After controlling for these demographic factors, *WCBs* still underperform with respect to *MCBs*.
Watson (2002) 14426 Australian SMEs (875 *WCBs*) from a wide range of sectors	PARTIAL	Return on assets (ROA) Return on equity (ROE) Ratio of total income to total assets	Although *MCBs* generate more outputs and use higher levels of inputs profitable *WCBs* outperformed profitable *MCBs* whereas no significant differences were found for unprofitable firms. For profitable firms, all the independent variables were significant in explaining differences in ROA whereas for ROE the number of days the business operated was not significant.
Watson (2003) 4939 Australian SMEs from a wide range of sectors (331 *WCBs*)	PARTIAL	Discontinuance of business (failure rates)	Prior to controlling for industry effects the failure rates of *WCBs* appeared to be higher than for *MCBs*. However, after controlling for industry, no significant differences were found in failure rates of *WCBs* as compared to *MCBs*. *WCBs* show higher failure rates in industries where they are overrepresented (i.e., retail trade and service) as compared to industries where *MCBs* are overrepresented (i.e. manufacturing, construction, mining and wholesale trade).
Watson and Robinson (2003) 2367 (131 *WCBs*) Australian SMEs from a wide range of sectors	NO	Reward - to - variability ratio based on average annual profit – as reward measure – and standard deviation in profits as variability (risk) measure.	*WCBs* have significantly lower profits and less variation in profits. However, after controlling for risk, no significant differences were found in performance.

TABLA 1b.- EMPIRICAL RESEARCH ON THE PERFORMANCE OF WOMEN-CONTROLLED BUSINESSES AT POST START-UP PERIODS

Author(s) / Sample	Evidence of *WCBs* under-performance	Performance measures	Summary of results
Collins-Dodd et al (2004) 160 (86 women) Canadian owners of small accounting practices	PARTIAL	Gross revenue Net profit Satisfaction with: Gross revenue Net profit Growth	Significant differences were found for quantitative measures of performance (gross revenue and net profit). No significant differences were found in the satisfaction with the performance of practices. After controlling for personal and business characteristics, no significant differences were found. The following independent variables were found to be significant in explaining financial performance: number of employees, location of the business, years in practice, education, number of dependent children and the desire to make more money.
Johnsen and McMahon (2005) Longitudinal data Australian *SMEs* from a wide range of sectors: 1996: 2102 (177 WCBs) 1997: 2087 (164 WCBs) 1998: 2082 (192 WCBs)	NO	Financial performance: Return on owner's equity Return on total assets Business growth: Growth in employees Growth in sales Growth in assets	The gender of the owner – manager did not emerge as statistically significant either for the differences in the financial performance or for those in the growth of the businesses, in any model or year.
Cron et al (2006) 572 owners (178 women) of small veterinarian practices in US	YES	Personal income of the entrepreneur	Owner income was significantly lower for women. Male service providers started their practice to achieve a financial success. While female owners are found to work the same number of hours as male owners, they have less experience, operate fewer locations and work with more associates.
Coleman (2007) 2795 US firms (of which 605 *WCBs*) owned by white women and men in service and retail industries	NO	Return on sales Sales growth	*WCBs* in the sample appeared as more profitable and demonstrated a significantly higher year to year growth in sales. For *WCBs* the measures of human capital had a higher impact on profitability, whereas the measures of financial capital had a higher impact on the performance of *MCBs*.
Boohene et al (2008) 600 general merchants in the retail industry in Ghana (296 women)	YES	Self reported measures of business success	The study found gender differences in entrepreneurs' personal values, which lead to men and women adopting different business strategies, which in turn affect performance. However, the results indicate a weak direct influence of gender on performance.

H_1: *There is a positive relationship between start up size and the firm's future performance.*

H_2: *There is a positive relationship between financial capital and the firm's future performance.*

There is evidence that suggests that women differ from men with respect to what they regard as their *ideal sized* firm (Cliff, 1998). Women entrepreneurs therefore tend to establish a maximum business-size threshold for their firms, usually smaller than that established by men, beyond which they prefer not to expand. Furthermore, women entrepreneurs tend to be more concerned than men about the risks associated with fast-paced business growth and "deliberately strive to expand in a controlled and manageable manner" (Cliff, 1998: 538). Hence, if business size at start-up positively influences a firm's future performance this effect might be lower in the case of women-controlled firms as their size tends to be smaller as compared with men-controlled firms.

Another possible explanation of performance differences between *WCBs* and *MCBs* concerns the relationship between business size and women's access to capital. Several studies provide evidence that women's businesses grow less than men's and assert that this difference is due to the "substantial funding gap that limits women's opportunities to grow their ventures" (Brush et. al, 2002:1, cited in Alsos et. al, 2006:680). Although this study does not directly explore the issue of whether women face more stringent requirements from banks to obtain loans, the results indicate that women start up with significantly lower levels of assets and long term debt, which could also be an indication of less access to funding for *WCBs*. If a firm's financial capital is expected to favourably affect its future performance and if women-controlled firms tend to invest less financial capital in their businesses, this might explain eventual performance differences between *WCBs* and *MCBs*. These considerations led us to define the following hypotheses subsequent to H1 and H2, respectively.

H_{1a}: *The relationship between start-up size and a firm's future performance is stronger for MCBs than for WCBs.*

H_{2a}: *The relationship between financial capital and a firm's future performance is stronger for MCBs than for WCBs.*

3 DATA AND METHOD

3.1. Data

The dataset used in this study was collected from the *Sistema de Análisis de Balances Ibéricos* (*SABI*) database for the period 2000–2005. The *SABI* database contains financial information on more than 500,000 Spanish and Portuguese firms. Given the purpose of this

study, we collected yearly information on Spanish firms from 12 manufacturing industries which started-up as small to medium-sized enterprises (*SMEs*) between 2000 and 2004 and did not cease their activity during that period. This means that the firms included in the sample range from one year old to five years old. The application of these criteria yielded a final dataset of 4,450 firms of which 533 are women-controlled[6].

The industry configuration by gender for each sector considered in the sample is presented in Table 2. Five of the twelve sectors pertain to the food and beverages industry while the remaining seven belong to the pharmaceutical industry, the manufacture of electric and electronic equipment and machinery and the manufacture of basic metals and structural metal products. Regarding gender distribution within the firms in these sectors, it may be observed that the presence of *WCBs* predominates in the manufacture of machinery and equipment, the manufacture of electrical machinery and apparatus and, in all food and beverage industries with the exception of the manufacture of vegetable oil and fats. Conversely, *MCBs* prevail in the pharmaceutical industry, the manufacture of office machinery and computers, the manufacture of radio, television and communication equipment and the manufacture of structural metal products.

Loscocco and Robinson (1991) categorize the manufacturing industries as *male-typed* whereas the retail and service industries are considered as *female-typed*. Given that all firms in our sample belong to manufacturing industries, we have used the *OECD's* industry classification in accordance with the degree of technological implementation (Hatzichronoglou, 1997) to check for the existence of possible patterns, if any, regarding women's preferences when launching new ventures in *male-typed* industries. For each industry the proportion of firms relative to the total number of firms for the period under analysis (2000-2005) was calculated. We can see that most of the firms in the total sample belong to sectors of a medium degree of technological implementation (79.58%). As far as gender distribution is concerned, more *MCBs* than *WCBs* are present in sectors that have a high degree of technological implementation (5.72% of all *MCBs* versus 4.24% of all *WCBs*). Firms belonging to sectors with a lower degree of technological implementation are predominantly women-controlled (18.52% of all *WCBs* versus 14.36% of all *MCBs*). Although these results suggest a certain pattern of business behaviour for *WCBs* within manufacturing industries these results should be interpreted with caution and should be addressed in further research.

Table 3 presents year-by-year start-ups by gender of the director and aggregate descriptives of their characteristics. The information provided in the table is consistent

(6) According to the demographic statistics provided by the Instituto Nacional de Estadística (www.ine.es), a total of 42,170 firms were set up during the period between 2000 and 2004 in the above mentioned sectors. Taking into account the survival rates of industrial firms (54.66 % of firms created survive after the fourth year; see Cámaras de Comercio, Industria y Navegación, 2001), it is estimated that 23,050 of those firms survived. This means that our sample of 4,450 firms constitutes almost 20 % of the surviving firms generated in the Spanish industrial sectors under consideration.

TABLE 2.- INDUSTRY CONFIGURATION OF THE SAMPLE

Industry sectors	Degree of technological implementation§	% Women controlled firms	% Men controlled firms	% Overall
Production, processing and preserving of meat and meat products (151)	Low	7.92 **	6.59	6.76
Processing and preserving of fish and fish products (152)	Low	1.77 **	1.16	1.23
Processing and preserving of fruit and vegetables (153)	Low	4.44 ***	3.03	3.20
Manufacture of vegetable and animal oils and fats (154)	Low	1.16 *	1.64	1.58
Manufacture of dairy products (155)	Low	3.23 ***	1.94	2.10
Manufacture of pharmaceuticals, medicinal chemicals and botanical products (244)	High	0.76 **	1.26	1.20
Manufacture of basic metals (27)	Medium	8.93	9.82	9.71
Manufacture of structural metal products (281)	Medium	40.36 ***	45.88	45.19
Manufacture of machinery and equipment (29)	Medium	14.63	14.44	14.46
Manufacture of office machinery and computers (30)	High	1.26	1.70	1.64
Manufacture of electrical machinery and apparatus (31)	Medium	13.32 ***	9.73	10.10
Manufacture of radio, television and communication equipment and apparatus (32)	High	2.22	2.80	2.73
High-technology implementation		4.24 ***	5.72	5.54
Medium-technology implementation		77.25 **	79.92	79.58
Low-technology implementation		18.52 ***	14.36	14.88

§ According to *OECD's* classification. Total number of observations: 15,826 corresponding to time period 2000–2005. Standard deviation is presented in brackets. *, **, *** indicates significance at the 0.10, 0.05 and 0.01, respectively (two-tailed).

with the findings of previous research. It can be observed that the yearly number of start-ups is up to nine times bigger for *MCBs* than *WCBs*. Furthermore, newly established firms controlled by women are on a smaller scale (*WCBs* show up to 3 times lower assets). No significant differences in size were found between *WCBs* and *MCBs* when size is measured by taking the total number of employees.

TABLE 3.- CHARACTERISTICS OF START-UPS BY STARTING YEAR (MEAN VALUES)

	2000	2001	2002	2003	2004
Firms	**914**	**404**	**1,091**	**1,033**	**1,008**
WCB	104	40	124	132	133
MCB	813	365	968	905	875
Initial total assets	**728.64**	**1,041.51**	**618.84**	**404.52**	**350.72**
WCB	242.03 ***	1,680.94	310.12 **	243.54 **	235.29 **
MCB	742.05	1,009.22	690.47	439.35	368.19
Initial employees	**7.28**	**10.92**	**5.52**	**5.11**	**5.38**
WCB	6.27	15.95	4.39	4.26	5.57
MCB	7.42	10.50	5.68	5.35	5.34
Initial debt (long term)	**154.48**	**129.50**	**188.10**	**148.63**	**63.29**
WCB	70.05 *	28.90 **	36.51 **	33.38 *	46.57
MCB	165.39	148.73	222.14	173.08	67.67
Initial financial cost	**10.36**	**9.42**	**11.24**	**4.01**	**3.44**
WCB	2.95 **	7.54 *	2.95 **	1.95 ***	2.77
MCB	11.40	10.17	13.08	4.37	3.54

Firms are considered woman-controlled if a woman serves as CEO. Financial cost is measured through the interest paid for long term debt. Total number of firms 4,450: 533 *WCB*: 533 firms and 1,982 observations. *MCB*: 3,917 firms and 13,844 observations. Monetary values are expressed in thousands of Euros. *, **, *** indicate significance at 0.10, 0.05 and 0.01, respectively (two-tailed).

New firms controlled by men score higher on initial endowments of financial resources, their initial debt (measured through the amount of contracted long-term debt) being significantly larger (*MCBs* show up to 5 times larger long term debt than *WCBs*). Similarly, the financial cost (measured by taking the interest paid for the contracted long-term debt) is up to 4.4 times higher in the case of *MCBs*.

3.2. Performance variables

Two aspects of business performance are considered, namely business growth and risk-adjusted profitability. We could have chosen more 'subjective' indicators of performance, such as the extent to which the firm and/or the entrepreneur has achieved the objectives set (Reid and Smith, 2000). Some authors argue that men and women may perceive and measure business performance differently and therefore, a relativist approach to performance would fit better into this stream of research. It was argued in previous research that women may be less concerned with financial rewards than men are (Watson, 2001) and that they are more interested in pursuing *intrinsic* goals, such as independence or balancing work and family responsibilities (DeMartino and Barbato, 2003).

Consequently, it was considered that women assess their success in business in relation to their achievement in attaining personal goals (e.g., goal attainment, self-fulfilment), while men are assumed to assess success using quantitative criteria (e.g., profit, growth) (Carter et al, 2001). Therefore, if women do not view success and performance in the same terms as men do, they will also differ in the performance levels they seek and achieve. However, previous research on this matter provides "generally conclusive [empirical evidence indicating] that men and women tend to use the same criteria for business performance, which is often a combination of firm-based criteria (sales turnover, profitability, etc) and personal criteria (fulfilment, ambition etc)" (Carter and Shaw, 2006: 69).

Some empirical comparisons of *WCBs* and *MCBs*' performance that found little or no differences in terms of profitability, found bigger differences in terms of growth related measures (Cooper et al., 1994; DuRietz and Henrekson, 2000). This can be explained through the findings of research on growth aspirations of women business owners which posits that "growth orientation is a complex phenomenon that may well be influenced by gender" (Morris et. al, 2006: 239), and provides empirical evidence that suggests a lower propensity towards growth among women (Rosa et. al, 1996 and Menzies et al., 2004) as well as a tendency for women to set lower business thresholds beyond which they prefer not to expand (Cliff, 1998). Business growth therefore appears to be a differentiating characteristic between *WCBs* and *MCBs*. Yet very few studies examine business growth in particular (Johnsen and McMahon, 2005), probably due to the lack of longitudinal data (DuRietz and Henrekson, 2000).

From an operational point of view, and similar to Watson and Robinson (2003), we first measure performance as Sharpe's (1975) reward-to-variability ratio. This variable was originally developed to evaluate the performance of securities and investment portfolios, and it is defined as the ratio of a profit measure (reward) divided by the standard deviation observed for those profits (variability). The importance of controlling for risk when assessing the performance of male and female SMEs becomes more evident as it has been shown by empirical evidence that women tend to have higher levels of risk aversion because women are more reluctant to assume the burden of business debt and to engage in rapid business growth (Carter and Shaw, 2006: 63). This way, the Sharpe ratio not only provides a risk-adjusted picture of performance that could facilitate the evaluation of SME's performance, but its use is further justified given the potentially dissimilar objective functions of male and female business managers, where the attitude towards risk-taking behaviour seems to play a key role.

In our context, the Sharpe ratio is measured as the ratio of net profits divided by its standard deviation. At this point two important considerations are also in order. First, we consider net profits as a reward because it represents the monetary outcome earned by ventures, and for market-driven managers profit constitutes a major component of the

performance construct (Taggard, 1996; Watson and Robinson, 2003). Second, our approach to the Sharpe ratio implies the calculation of annual values for this variable to control for time variations. Also, and given the need to control for differences at the industry level in what concerns the variability of risk, we estimated the Sharpe ratio separately for each sector in our sample. From Table 4 it can be observed that, in our sample, risk-adjusted performance of *WCBs* is significantly lower (3.49%) relative to that shown by their male counterparts (8.38%).

TABLE 4.- PERFORMANCE MEASURES – MEAN VALUES (FIRMS SET UP BETWEEN 2000 – 2004)

	Women controlled firms	N	Men controlled firms	N	Overall	N
Performance						
Sharpe Ratio	0.0349 ** (0.6819)	1,268	0.0838 (1.1693)	9,091	0.0778 (1.1211)	10,359
Sales growth	0.3970 ** (0.8710)	1,175	0.4520 (0.8634)	8,371	0.4452 (0.8645)	9,546
Labour growth	0.1925 (0.5603)	983	0.2124 (0.5680)	6,883	0.2099 (0.5670)	7,866

N refers to the number of observations for the corresponding variable and category. The number of observations changes due to the existence of some missing values. Standard deviation is presented in brackets. *, **, *** indicate significance at 0.10, 0.05 and 0.01, respectively (two-tailed). The Sharpe Ratio is defined as the ratio of a profit measure (reward) divided by the standard deviation observed for those profits (variability). Sales and labour growth measures were computed as yearly variations in sales and in the number of employees, respectively.

The second dimension of economic performance (business growth) was measured using two variables, namely the yearly variations in total sales and the yearly variations in the number of employees. Sales and employment growth are considered desirable outcomes of successful entrepreneurial firms and are frequently employed as valid indicators of business growth in performance comparisons between *WCBs* and *MCBs*. Therefore, the growth measures used within this study are defined as the annual logarithmic change in sales volume and the number of employees. From the descriptives we observe that, between 2000 and 2005, the average annual rate of sales growth of *MCBs* (45.20%) is significantly higher than that reported for *WCBs* (39.70%). A similar picture emerges when comparing the annual employment growth between *MCBs* (21.24%) and *WCBs* (19.25%), although, differences in employment growth are not statistically significant for this variable (Table 4).

3.3. Empirical method

Multivariate analysis was used to examine the differential effects that firm size and financial resources might have upon business performance. As far as the econometric approach is concerned, panel data analysis is the most efficient tool when the sample is a mixture of time series and cross-sectional data, since this structure allows us to take unobservable and constant heterogeneity into consideration, i.e., the specific characteristics of each firm. As a result, a fixed-effects model appears to be the most suitable methodological tool. To justify the use of the chosen econometric approach, we carried out the Hausman (1978) specification test. As indicated below in section 4, the results of this test further corroborate the appropriateness of the fixed-effects parameter estimates.

Business performance is assumed to be a function of a set of independent variables where the constraints faced by recently created firms (e.g. undercapitalization, smallness) play an important role. To test for the existence of the differential impact of such constraints on the performance of the firms in our sample we propose the following regression:

$$Performance_{i,t} = \beta_0 + \beta_1 Firm\,Age_{i,t} + \beta_2 Size_{i,t-1} + \beta_3 Size^2_{i,t-1} + \beta_4 Leverage_{i,t-1} + \beta_5 LongTermDebt_{i,t-1} + \beta_6 FinancialCost_{i,t-1} + \beta_7 Time_{i,t} + \beta_8 Time_{i,t}\ x\ Industry_{i,t} + \eta_1 + \epsilon_1 \quad [1]$$

Where iN=1,..., and iT=1,..., represent the cross-sectional units and the time periods, respectively, h_i is the unobserved fixed firm-specific effect, and e_{it} is the stochastic error term varying cross-time and cross-unit. Equation [1] was estimated for the sub-sample of *WCBs* and *MCBs* separately, and in terms of our hypotheses we expect that $b_2>0$ and $b_3>0$ (H_1), this effect being greater for *MCBs* ($H_{1a} = \beta_2{}^{MCB} > \beta_2{}^{WCB}$ *and* $\beta_3{}^{MCB} > \beta_3{}^{WCB}$). We also expect a positive relationship between financial resources and performance ($H_2 = \beta_4 > 0$, $\beta_5 > 0$ and $\beta_6 > 0$, and finally we expect that $\beta_4{}^{MCB} > \beta_4{}^{WCB}$, $\beta_5{}^{MCB} > \beta_5{}^{WCB}$ *and* $\beta_6{}^{MCB} > \beta_6{}^{WCB}$, indicating that these financial variables have a greater impact on performance in the case of the group of *MCBs* (H_{2a}).

However, we are aware that the mere comparison of parameter estimates obtained from the estimation of the model presented in equation [1] is not enough in itself to confirm that size and access to finance exert a differential effect on *WCBs* and *MCBs* when it comes to future performance. In order to corroborate our hypotheses, it is necessary to test for the presence of parameter heterogeneity across the groups of firms under analysis, namely *WCBs* and *MCBs*. Thus, we use the Chow test (1960). This procedure is especially useful for the purposes of this paper as it examines whether parameter estimates obtained for one group of the data equal those obtained for another group of the data (Greene, 2003). This test has been commonly used to validate data pooling in statistical analysis, but in our case the Chow test represents the econometric test that best fits our attempt to determine the extent to which size and access to financial resources affect performance, and whether size and access to finance exert a differential impact on performance between *WCBs* and *MCBs*. To

ensure the robustness of the results, we run the Chow test for each of the variables related to size and financial resources.

With regard to the set of independent variables, we introduce the size of the firm, measured through total assets when the dependent variable is the Sharpe ratio, the number of employees, when the dependent variable is employment growth, and sales volume, when the dependent variable is sales growth. The variables related to financial resources include long term debt (used as proxy for financial capital), financial costs (measured as interest paid for long-term debt), and the financial leverage ratio (measured as the ratio of debt to equity) to proxy the financial structure of the firm[7]. Two additional control variables are considered: time dummies, and an interaction term between time and industry to control for the differential effect that industry sectors may have on our performance measures.

Table 5 presents the descriptives for the independent variables used in this study. As expected, and consistent with previous research, *WCBs* show lower levels of resource endowments than *MCBs*. On average, *WCBs* are significantly smaller than *MCBs*, which are more than four times as large as women-controlled firms, as determined by total assets. Regarding the second measure of size, it can be observed that, on average, the number of employees in *MCBs* is almost one and a half times the workforce employed by *WCBs*.

Concerning the use of financial capital, *MCBs* show, on average, nine times more long-term debt than *WCBs* and, consequently they incur significantly higher financial costs (the interests paid by *MCBs* for the long-term debt are nearly six times greater than those paid by *WCBs*). In addition, the average values obtained for leverage ratio (debt-to-equity) indicate that *WCBs* show a more balanced capital structure as compared to *MCBs* (8.62 versus 11.10).

4 EMPIRICAL FINDINGS

This section presents the empirical findings. The regression results are presented in Tables 6 to 8 and are discussed below. In all the Tables, specification 1 only considers age of the firm, size terms and leverage as independent variables. Model 2 takes into account the long term debt and Model 3 introduces the financial costs into the analysis.

As we mentioned in the previous section, we decided to use a fixed-effects approach for our estimations. However, this decision is critical in any analysis since the random and

(7) The size of the business and its financial capital are considered initial resources in the start-up year and inputs in the subsequent years and are expected to behave according to the hypotheses stated above.

TABLE 5.- DESCRIPTIVE STATISTICS. MEAN VALUES FOR 2000 – 2005
(FIRMS SET UP BETWEEN 2000 – 2004))

	Women controlled firms	N	Men controlled firms	N	Overall	N
Performance						
Sales growth	0.3970 ** (0.8710)	1,175	0.4520 (0.8634)	8,371	0.4452 (0.8645)	9,546
Labour growth	0.1925 (0.5603)	983	0.2124 (0.5680)	6,883	0.2099 (0.5670)	7,866
Sharpe's Ratio	0.0349 ** (0.6819)	1,268	0.0838 (1.1693)	9,091	0.0778 (1.1211)	10,359
Firm features						
Total assets *(t-1)*	556.81 *** (2,631.84)	1,303	2,190.88 (44,167.52)	9,286	1,989.80 (41,374.40)	10,589
Total sales (t-1)	770.78 *** (3,473.54)	1,198	1,679.24 (12,678.92)	8,514	1,567.18 (11,937.33)	9,712
Employees (t-1)	8.16 *** (14,73)	1,024	11.40 (40.98)	7,159	10.99 (38.70)	8,183
Firm age (years)	3.23 (1.24)	1,449	3.25 (1.24)	10,194	3.25 (1.24)	11,643
Long term debt (t-1)	93.46 *** (297.70)	1,168	881.13 (27,399.74)	8,358	784.56 (25,666.38)	9,526
Financial costs (t-1)	8.03 *** (17.58)	1,185	47.65 (1,008.45)	8,458	42.78 (944.56)	9,643
Leverage *(t-1)* (debt / equity)	8.62 * (37.21)	1,289	11.10 (81.24)	9,183	10.80 (77.19)	10,472

N refers to the number of observations for the corresponding variable and category. The number of observations changes due to the existence of some missing values. Standard deviation is presented in brackets. *, **, *** indicate significance at 0.10, 0.05 and 0.01, respectively (two-tailed). The Sharpe Ratio is defined as the ratio of a profit measure (reward) divided by the standard deviation observed for those profits (variability). Sales and labour growth measures were computed as yearly variations in sales and in the number of employees, respectively.

fixed effects models may produce different results (Greene, 2003). A fixed effects model produces consistent parameter estimates in the presence of random or fixed individual effects. To corroborate the consistency of our estimations, we estimated the Hausman specification test for all our models (Hausman, 1978). The results of this test are shown, for each model, in Tables 6 to 8, and in all cases the hypothesis of similarity of the

coefficients in the fixed and random effects models can be rejected. This means that parameter estimates obtained from the fixed-effects model are more efficient (smaller asymptotic variance), and that the error terms are correlated with the explanatory variables; the nature of the individual effect is therefore fixed.

However, as we ran two separate regressions for *WCBs* and *MCBs*, a critical question arose as to whether size and access to financial resources were equally affecting performance in *WCBs* and *MCBs*. To address this question we performed the Chow test and the results are presented in Table 10.

The regression results for each dependent variable (sales and employment growth, as well as the Sharpe ratio) reveal interesting findings regarding the relationship between firm-size and economic performance. Arguably, the sign in the parameter estimates suggests that this relationship is U-Shaped for men-controlled businesses (Specifications 1 to 3 for *MCBs* in Tables 6 to 8). On the other hand our findings show that for women-controlled businesses the size-growth relationship is negative when business growth is the performance measure (Specifications 1 to 3 for *WCBs* in Tables 6 and 7).

This negative relationship between business size and growth, measured both in terms of number of employees and sales volume, indicates that smaller firms controlled by women tend to grow faster than larger ones. These results are in accordance with previous research findings reporting different growth orientations for *WCBs* (e.g. Cooper et. al, 1994; Cliff, 1998; Menzies et. al, 2004). This could indicate that women, as managers, are more concerned by the risk attached to fast-growing behaviour, which can be interpreted as a signal of their lower growth propensity (Cliff, 1998). Furthermore, the different shape of the growth–business size relationship between *WCBs* and *MCBs* signals that the latter grow at a decreasing rate, whereas larger firms controlled by men may benefit from economies of scale and, thus, exhibit positive variations in employment and sales.

Concerning the risk-adjusted profitability measure (Sharpe ratio in Table 8), our results show that the performance of women-controlled businesses is not conditioned by size, whereas for men-controlled businesses we find the same U-shaped relationship pattern. These results indicate that smaller men-controlled firms show negative risk-adjusted performance rates, but beyond a crucial threshold, larger firms controlled by men exhibit an upward trend in performance.

Regarding the effects that the selected finance-related variables – long-term debt, financial costs and leverage – have on performance, the results show similar patterns when performance is measured as business growth (variations in sales and employment), whereas the results obtained for the risk-adjusted profitability measure (Sharpe ratio), are slightly different.

TABLE 6.- REGRESSION RESULTS: SALES GROWTH OF FIRMS

	Women controlled firms			Men controlled firms		
	(1)	(2)	(3)	(1)	(2)	(3)
Firm age (years)	-0.0497 (0.0554)	-0.0008 (0.0340)	0.0005 (0.0347)	-0.0080 (0.0409)	-0.0219 (0.0531)	-0.0106 (0.0611)
Size (in sales) *(t-1)*	-0.7339 *** (0.1222)	-0.5807 *** (0.1126)	-0.7961 *** (0.1274)	-0.9752 *** (0.0419)	-0.9769 *** (0.0456)	-0.9458 *** (0.0390)
Size squared *(t-1)*	-0.0158 * (0.0092)	-0.0304 *** (0.0110)	-0.0148 * (0.0088)	0.0145 *** (0.0038)	0.0144 *** (0.0022)	0.0091 *** (0.0035)
Leverage *(t-1)*	0.0006 (0.0004)			0.0001 (0.0001)		
Long term debt *(t-1)*	0.0438 *** (0.0123)			0.0389 *** (0.0069)		
Financial cost *(t-1)*	0.2267 *** (0.0517)			0.1924 *** (0.0167)		
Time (dummies)	Yes	Yes	Yes	Yes	Yes	Yes
TimeIndustry	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	5.2296 *** (0.3282)	4.5450 *** (0.2770)	4.9435 *** (0.2908)	5.6394 *** (0.2538)	5.6074 *** (0.3080)	5.3698 *** (0.3284)
R-square (within)	0.7848	0.8004	0.8052	0.7497	0.7536	0.7757
R-square (overall)	0.2539	0.2534	0.3232	0.2374	0.2509	0.3090
F – Test	46.91 ***	45.39 ***	50.91 ***	293.34 ***	271.83 ***	324.57 ***
Hausman test	697 ***	678 ***	517 ***	4,812 ***	3,739 ***	3,668 ***
Number of firms	471	461	460	3,231	3,156	3,154
Number of observations	1,164	1,077	1,126	8,277	7,740	7,992

Firms are considered woman-controlled if a woman serves as CEO. Firm age is measured in years, firm size is the log value of sales, leverage is calculated as the ratio of debt to equity, and financial cost is the interest paid for the contracted long-term debt. Heteroskedasticity adjusted standard errors are presented in brackets. *, **, *** indicate significance at 0.10, 0.05 and 0.01, respectively.

TABLE 7.- REGRESSION RESULTS: EMPLOYMENT GROWTH OF FIRMS

	Women controlled firms			Men controlled firms		
	(1)	(2)	(3)	(1)	(2)	(3)
Firm age (years)	-0.1844 ** (0.0805)	-0.1823 ** (0.0842)	-0.1776 ** (0.0740)	0.0190 (0.0542)	-0.0232 (0.0559)	-0.0145 (0.0551)
Size (in labour) *(t-1)*	-0.7235 *** (0.0891)	-0.6660 *** (0.0789)	-0.7844 *** (0.0782)	-0.9243 *** (0.0479)	-0.9402 *** (0.0440)	-0.9401 *** (0.0485)
Size squared *(t-1)*	-0.0357 * (0.0214)	-0.0510 ** (0.0242)	-0.0296 ** (0.0152)	0.0140 ** (0.0069)	0.0238 ** (0.0121)	0.0161 ** (0.0089)
Leverage *(t-1)*	0.0008 (0.0006)			0.0001 (0.0001)		
Long term debt *(t-1)*		0.0382 *** (0.0135)			0.0422 *** (0.0065)	
Financial cost *(t-1)*			0.1612 *** (0.0275)			0.1251 *** (0.0140)
Time (dummies)	Yes	Yes	Yes	Yes	Yes	Yes
TimeIndustry	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	2.3121 *** (0.3645)	2.1553 *** (0.3807)	2.1358 *** (0.3364)	1.6479 *** (0.2490)	1.6946 *** (0.2561)	1.6115 *** (0.2521)
R-square (within)	0.7279	0.7330	0.7458	0.6050	0.5983	0.6117
R-square (overall)	0.1484	0.1529	0.1979	0.0954	0.1115	0.1352
F – Test	28.11 ***	25.97 ***	31.82 ***	118.20 ***	104.73 ***	116.59 ***
Hausman test	510 ***	450 ***	557 ***	3,617 ***	2,769 ***	2,741 ***
Number of firms	409	400	399	2,830	2,757	2,753
Number of observations	973	902	944	6,817	6,394	6,579

Firms are considered woman-controlled if a woman serves as CEO. Firm age is measured in years, firm size is the log value of the number of employees, leverage is calculated as the ratio of debt to equity, and financial cost is the interest paid for the contracted long-term debt. Heteroskedasticity adjusted standard errors are presented in brackets. *, **, *** indicate significance at 0.10, 0.05 and 0.01, respectively.

TABLE 8.- REGRESSION RESULTS: SHARPE RATIO

	Women controlled firms			Men controlled firms		
	(1)	(2)	(3)	(1)	(2)	(3)
Firm age (years)	-0.3631 ***	0.4004 ***	-0.3460 ***	0.2152 ***	0.1987 **	0.2029 **
(0.0422)	(0.0049)	(0.0410)	(0.0785)	(0.0795)	(0.0832)	
Size (in assets) *(t-1)*	-0.3710	-0.3292	-0.4148	-0.2115 **	-0.1998 **	-0.2089 **
(0.2453)	(0.2567)	(0.2902)	(0.1209)	(0.1013)	(0.1060)	
Size squared *(t-1)*	0.0339	0.0262	0.0294	0.0351 ***	0.0338 **	0.0323 **
(0.0248)	(0.0251)	(0.0279)	(0.0176)	(0.0170)	(0.0162)	
Leverage *(t-1)*	-0.0056 **			-0.0001		
	(0.0025)			(0.0002)		
Long term debt *(t-1)*		0.0622			0.0145	
		(0.0420)			(0.0178)	
Financial cost *(t-1)*			0.0947			0.0972 ***
			(0.0856)			(0.0381)
Time (dummies)	Yes	Yes	Yes	Yes	Yes	Yes
TimeIndustry	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	-1.0430 *	-4.6907 ***	-0.8830	-4.3088 ***	-4.3039 ***	-4.3385 ***
(0.6352)	(0.6781)	(0.7598)	(0.5065)	(0.5153)	(0.5190)	
R-square (within)	0.3571	0.3537	0.3420	0.2649	0.2653	0.2717
R-square (overall)	0.0100	0.0100	0.0100	0.1120	0.1151	0.1210
F – Test	5.28 ***	4.55 ***	4.67 ***	24.85 ***	22.52 ***	24.86 ***
Hausman test	530 ***	211 ***	483 ***	1,934 ***	1,776 ***	1,862 ***
Number of firms	405	391	398	2,747	2,671	2,685
Number of observations	867	801	847	6,314	5,902	6,134

Firms are considered woman-controlled if a woman serves as CEO. Firm age is measured in years, firm size is the log value of assets, leverage is calculated as the ratio of debt to equity, and financial cost is the interest paid for the contracted long-term debt. Heteroskedasticity adjusted standard errors are presented in brackets. *, **, *** indicate significance at 0.10, 0.05 and 0.01, respectively.

The regression results in Tables 6 and 7 indicate that financial resources – measured as long-term debt – and the financial cost associated with debt exert a positive and highly significant impact on business growth for both *WCBs* and *MCBs*. In other words, both *WCBs* and *MCBs* use debt to expand their businesses. These findings contradict results provided by previous research suggesting that, rather than seeking immediate expansion, women use finance in start-up years for purposes that are linked more to survival and business consolidation (Coleman, 2007). However, when risk is accounted for when measuring performance (Sharpe ratio, Table 8), neither of these two variables appear to affect the profitability of *WCBs*. Nonetheless, our results reveal that financial costs linked to debt boost economic performance in the case of *MCBs*.

Regarding the results for the variable related to the debt-structure (leverage), this has no impact on business growth irrespective of the gender of the manager. However, when performance is defined as the Sharpe ratio (Table 8), we find that leverage (debt-structure) has a negative and statistically significant effect on the performance of women-controlled businesses. This could only indicate that women who decide to bias their sources of finance to long-term debt exhibit lower levels of performance, as compared to their male counterparts.

This latter result, together with those reported for the impact of long-term debt and financial cost on business growth, could indicate that men-controlled businesses benefit more from debt to grow and increase performance, relative to women-controlled businesses, because either suppliers of finance favour larger firms (Orser and Foster, 1994) or women are subject to different lending policies (Coleman, 2000 and Orser, et al., 2006). Consequently, we tested for potential differences in the mean interest rate (financial cost divided by debt) charged to women and men-controlled businesses (Table 9). We did not however find any statistically significant differences in the mean interest rates charged to women- and men-controlled businesses. We cannot therefore support the lending-bias argument to explain the negative effect that our leverage variable exerts on the performance of women-controlled businesses, or the highly significant positive effect that debt and financial cost have on growth and risk-adjusted performance shown by men-controlled firms.

To summarize, our findings indicate that, in the manufacturing industries considered in the sample, women- and men-controlled firms show significant differences regarding their initial conditions. *WCBs* consistently show lower levels of assets and employee numbers, contract lower amounts of long-term debt and therefore incur lower financial costs. In addition, at this point our results suggest that there are differences in the impact of size and finance-related variables when comparing the performance of *WCBs* and *MCBs*. We

(8) We are grateful to one of the anonymous reviewers for clarifications given upon this issue.

TABLE 9.- MEAN INTEREST RATE[(a)] APPLIED TO WOMEN AND MEN CONTROLLED BUSINESSES

Year	Women controlled firms	Men controlled firms	Full sample
2001	0.0155 (0.0235)	0.0180 (0.0372)	0.0173 (0.0348)
2002	0.0286 (0.0306)	0.0268 (0.0328)	0.0271 (0.0323)
2003	0.0320 (0.0841)	0.0252 (0.0357)	0.0258 (0.0434)
2004	0.0285 (0.0556)	0.0258 (0.0511)	0.0260 (0.0508)
2005	0.0248 (0.0337)	0.0268 (0.1396)	0.0264 (0.1284)
Overall	**0.0270 (0.0518)**	**0.0257 (0.0920)**	**0.0258 (0.0857)**

Note: (a) Mean interest rate is calculated as financial cost divided by debt. Standard deviation is presented in brackets. No statistically significant differences were found between mean interest rates of women and men controlled businesses.

therefore proceeded to corroborate the significance of these differences by means of the Chow test. As indicated above, this test compares the parameter estimates of *WCBs* and *MCBs* for each of the variables in all the various model specifications presented in Tables 6 to 8; the results of the Chow test are presented in Table 10.

Regarding the effect of size on business performance, our empirical findings provide partial support for the first set of hypotheses. Irrespective of the performance variable chosen, for our sample of Spanish manufacturing firms, business size has a non-linear effect on *MCBs*' performance both in terms of business growth (sales and employment) and in terms of profitability (Sharpe ratio). When comparing the parameter estimates for the size variables between *WCBs* and *MCBs*, we observe that these coefficients are significantly different only when business growth (employment and sales) is the performance measure. $\beta_2^{MCB} < \beta_2^{WCB}$ *and* $\beta_3^{MCB} > \beta_3^{WCB}$.However, we failed to find differences in the parameters related to the size variables when the Sharpe ratio is the dependent variable (Table 10). These results could indicate that larger firms controlled by men may achieve significant gains from economies of scale and show increasing rates of performance. This condition does not hold for women-controlled firms. The results are similar to those obtained by some previous research (e.g. Watson and Robinson, 2003) and indicate that although women-controlled firms are smaller (due probably to the amount of resources they employ at start-up), women are as effective as men irrespective of the size of their firms and the risk they bear (provided risk is controlled for in the measurement of that performance).

STABLE 10.-RESULTS FOR THE CHOW TEST: DIFFERENCES BETWEEN WCBS AND MCB IN THE IMPACT OF SIZE AND INITIAL FINANCIAL CONDITIONS

	Size (*t-1*)	Size squared (*t-1*)	Leverage	Long-term debt	Financial cost
Panel A: Sales Growth					
Model 1 (Leverage)	5.06 **	7.66 ***	2.14		
Model 2 (Long-term debt)	11.54 ***	14.19 ***		0.18	
Model 3 (Financial cost)	2.21 *	5.37 **			0.02
Panel B: Employment Growth					
Model 1 (Leverage)	2.86 *	3.28 *	1.91		
Model 2 (Long-term debt)	7.66 ***	6.84 ***		1.10	
Model 3 (Financial cost)	2.39 *	2.72 *			1.29
Panel C: Sharpe ratio					
Model 1 (Leverage)	0.02	0.18	5.64 **		
Model 2 (Long-term debt)	0.00	0.50		0.87	
Model 3 (Financial cost)	0.01	0.28			2.23 *

*, **, *** indicate significance at 0.10, 0.05 and 0.01, respectively.

Consequently, we partially confirm hypothesis H_1 only for men-controlled firms, and we confirm hypothesis H_{1a} which proposed that the effect of size on performance is greater in *MCBs*.

As for the financial structure of firms, our results indicate that, irrespective of the gender of the manager, firms with a strong preference for debt as their main source of financial resources, as compared to equity, do not exhibit higher growth rates (employment and sales). On the contrary, we observe that the coefficient associated with leverage for the sub-sample of *WCBs* is significantly lower than that reported for the group of *MCBs* $\beta_2^{MCB} > \beta_2^{WCB}$ (Chow test: 5.64 and significant at the 5% level), confirming that a financial structure that is biased towards equity exerts a negative impact on the performance of *WCBs* when the Sharpe ratio is the dependent variable.

Finally, we find that, for both *WCBs* and *MCBs*, financial capital (long-term debt and financial cost) is positively related to business growth. In this case, the coefficients obtained for the sub-samples of *WCBs* and *MCBs* are not significantly different, indicating that the positive effect that financial capital is having upon business expansion is homogeneous in our sample (Table 10). Nevertheless, a different picture emerges when we examine the results for performance measured by the Sharpe ratio. In this case, we observe that the only statistically significant difference emerges from the comparison between the coefficients for financial cost $\beta_2^{MCB} > \beta_2^{WCB}$ (Chow test: 2.23 and significant at the 10% level). This result could reflect that, on the one hand, male managers have a greater

incentive to achieve financial outcomes in order to meet the cost of their debt. On the other hand, and consistent with the findings of Alsos et. al (2006) and Coleman (2007), these results could show that women are more likely to use financial capital for purposes more aligned to objectives other than financial performance (for instance, survival). These results confirm hypotheses H_2 and H_{2b}, which propose that financial resources positively impact on performance, and that this effect is greater for *MCBs*, respectively.

5 CONCLUSIONS

The purpose of this study was to examine how start-up conditions such as initial size and financial capital affect the business performance of women- and men-controlled firms. Firms were defined as women- and men-controlled, according to the gender of their executive managers. In assessing performance, this study simultaneously considers firms' growth in terms of sales and employment (desirable outcomes of entrepreneurial firms) as well as their profitability (as a source of future investments and, therefore, of business growth).

This study improves upon previous research on the performance of *WCBs* in several ways. Firstly, whereas much previous research on the performance of *WCBs* has been based on limited samples, usually from retail and service industries, and has been cross-sectional, this study has employed a large data set of 4,450 Spanish firms from twelve manufacturing industries and has examined their performance over five consecutive years since their launch. Secondly, this study provides empirical evidence for firms set up in several manufacturing industries for which the existing evidence is scarce. Most previous studies are focused on retail and service firms, reflecting researchers' acknowledgement of women's over-representation in those industries (considered as *female-typed* industries). Yet, as previously argued in this paper, not all women start up businesses in retail and services and recent empirical evidence indicates a trend for women to enter *male-typed* industries such as manufacturing, construction and high technology. Hence, performance comparisons of *WCBs* and *MCBs* in such economic sectors are relevant to gain a full understanding of the factors that might enhance or impede business survival and growth of *WCBs*.

This study has tested two sets of hypotheses regarding some initial conditions that can affect *WCBs*' performance immediately after start-up. The first set of hypotheses suggested a positive relationship between initial size and business performance, but a weaker relationship in the case of *WCBs*. The empirical evidence previously presented in this study provides only partial support for this first set of hypotheses. For all the firms in the sample, performance is negatively affected by business size. These results resemble those obtained in previous research into small business growth that shows how growth rates are negatively related to the size and the age of the firms (e.g. Mata, 1994 and Hart and

Oulton, 1996) and could indicate that small firms grow faster in order to ensure their survival (Audretsch, 1991 and Correa Rodriguez et al., 2003).

Moreover, this study's findings indicate different shapes to the relationship between *WCBs* and *MCBs*. The relationship has a U-Shape for *MCBs*, that is men-controlled businesses grow initially at a decreasing rate but, when they expand beyond a certain threshold, their growth rates increase with size. As opposed to *MCBs*, the relationship between business size and growth is negative, indicating that *WCBs* experience lower growth rates than *MCBs*. One possible explanation comes from results reported in previous research according to which differences exist between women and men entrepreneurs regarding what they see as the *ideal-sized* firm (Cliff, 1998).

The second set of hypotheses tested in this study concerned the impact of finance (measured through initial long-term debt and annual financial costs) on business growth and profitability and suggests that while financial capital has a positive impact on subsequent business performance, this effect is weaker in the case of *WCBs*. Results in this case indicate that both the amount of long-term debt and the annual amount of interests paid for the long-term debt (financial costs) enhance business growth for both *WCBs* and *MCBs*. However, when firm profitability is employed and performance is measured by controlling for risk, financial costs appear to boost the performance of *MCBs*. This result could reflect the fact that, on the one hand, male managers have a greater incentive to achieve financial outcomes to ensure the cost of their debt is met. On the other hand, and consistent with findings in Alsos et. al (2006) and Coleman (2007), these results could show that women are more likely to use financial capital for purposes that are more aligned to business survival than to financial performance.

The study, however, is subject to a number of limitations which lead on to future improvements and extensions. First, starting from the assumption that the possible differences between the economic performance of *WCBs* and *MCBs* is rather a result of differences in starting conditions (Carter and Shaw, 2006) this study only considered the impact of initial features of a firm, such as business size at start-up and initial debt, on the economic performance of the firms included in the sample. However, initial start-up conditions are not limited to firm specific features but extend to such matters as human capital (attributes, skills, education and experience), social capital (relationships and networks) and organizational capital (organizational relationships, structures, routines, culture and knowledge) (Firkin, 2003). As indicated in Cooper et. al (1994) the performance of firms is influenced by non-financial capital, ie such items as the entrepreneurs' formal education, previous experience and access to general networks, and this influences their decision-making processes and the extent to which they perceive and exploit business opportunities.

Although research on human and social capital in women-controlled business is at an early stage (Carter and Shaw, 2006), some studies indicate that *WCBs* and *MCBs* differ with respect to the amount and quality of the non-financial capital they possess (Boden and Nucci, 2000). This suggests that some of *WCBs*' underperformance could at least partly be explained by variations in non-financial capital with respect to *MCBs*. Unfortunately, this study did not have access to data reflecting non-financial resources employed at start-up. Further research, however, should consider the performance of *WCBs*' by taking into account a wider range of factors that reflect a firm's entrepreneurial capital.

A second set of limitations stems from the measurement of business outcomes within this study. Performance was measured through *traditional* indicators that are usually employed in entrepreneurship research such as sales, employment and profitability. Only the pecuniary component of business outcomes was therefore considered. While growth and profitability may be crucial ingredients for business success, they might not be the only outcomes pursued by entrepreneurs. Furthermore, as indicated in Brush and Hisrich (2000), for comparisons between *WCBs* and *MCBs,* performance should be examined in broader terms than purely economic ones and it should also refer to outcomes other than financial items such as personal economic performance (the entrepreneur's salary) and social performance (employee satisfaction, social contributions), goal achievement and effectiveness. The consideration by future research, of such complementary measurements of business performance could therefore better identify and explain the factors underlying the survival and growth of *WCBs*.

Finally, we should also note that this study focused on performance immediately after start-up; for some of the firms included in the sample the available information was limited to the first two years of their life. However, even for those firms founded in 2000, the information used to assess business performance was limited to the first five years after start-up. A two-to-five year period can be too short for firms to demonstrate their capabilities, especially in the case of high-tech firms (Cooper et. al, 1994) for which a longer period is needed for them to acquire the skills and competitive capabilities required for business success. Therefore, longitudinal information covering more than five years could be of more use in unravelling the factors underlying the business performance of *WCBs* in *male-typed* industries.

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