HUMAN CAPITAL AND FIRM PERFORMANCE: A CONTINGENT ANALYSIS

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ABSTRACT

Growing interest has been shown in the degree to which investment in human capital contributes to firm performance, yet limited research attention has been paid to the contextual conditions that moderate this relation. This investment may be more beneficial in some contexts than in others. Specifically, this study examines how temporary work and organizational size affect the value of human capital. We carry out a comparative analysis of the impact of human capital on firm performance among small and large companies with high and low use of temporary employment. From a sample of 1,403 industrial Spanish companies, findings indicate that the impact of human capital on labor productivity and return on sales is moderated by temporary work and organizational size. The most beneficial context is represented by a large company with a high degree of human capital and a lower use of temporary employment.

COMBINED EFFECT OF HUMAN CAPITAL, TEMPORARY EMPLOYMENT AND ORGANIZATIONAL SIZE ON FIRM PERFORMANCE: EVIDENCE FROM SPAIN

A firm's human capital is an important source of sustained competitive advantage (Hitt, Bierman, Shimizu, & Kochhar, 2001) and therefore investments in the human capital of the workforce may increase the employee productivity and financial results (Barney, 1991; Black & Lynch, 1996; Hayton, 2003, Pfeffer, 1998; Snell & Dean, 1992). Firms can increase their human capital levels through human resource management practices related to employee selection and training (Delaney & Huselid, 1996; Hitt et al., 2001; Skaggs & Youndt, 2004). Selection refers to an organization's attempts to hire employees with high levels of education and expertise. Training, on the other hand, refers to creating value internally through activities designed to further the development of its current employees. Organizations can use selection to increase their generic human capital, while focusing on training to develop firm-specific human capital (Groot & Van Den Brink, 2000; Skaggs & Youndt, 2004). Thus, firms create value through the selection and development of their employees.

Becker & Gerhart (1996), Hayton (2003), and Youndt, Snell, Dean & Lepak (1996) state that the usefulness of human capital will be more important in some contexts than in others. The impact of human capital on firm performance will depend on other organizational factors. This contingency perspective has traditionally been adopted to examine how company strategy moderates the effect of human capital on firm performance (e.g., Hitt et al., 2001; Skaggs & Youndt, 2004). Contingency studies using other organizational characteristics as moderators are needed to gain further insights into human capital-performance relationships (Youndt et al., 1996). It is our purpose to contribute to this line of research by introducing two new moderator variables: organizational size and temporary employment. The human resource practices that are effective in large organizations will not automatically work in small organizations (Tansky & Heneman, 2003) and consequently, more attention should be

given to the interaction between organizational size and resource management practices related to human capital (Heneman, Tansky, & Camp, 2000). Unfortunately, studies that have analyzed the impact of human capital on firm performance generally only consider organizational size as a control variable (e.g., Hayton, 2003; Koch & McGrath, 1996; Skaggs & Youndt, 2004). Similarly, Burges and Connell (2006) point out the paucity of literature examining the interaction between temporary work and human capital. Various authors (e.g., Auer & Cazes, 2003; Pfeffer, 1998) warn that the use of temporary contracts, a form of employment that firms increasingly resort to, can moderate the value of human capital.

In this study, we take the firm as our unit of analysis to examine how the effect of human capital on firm performance varies according to the use of temporary workers and the size of the organization. The objective of the study is two fold. First, we aim to observe whether this effect varies among firms with different sizes and uses of temporary contracts. We examine both the direction and the intensity of this effect. Our second aim is to discover the overall effect of human capital, temporary contracts and organizational size on the level of firm performance. To this end, we identify the combination of these three variables that leads to the highest and lowest levels of profitability, using the Survey on Business Strategies carried out by the Ministry of Industry, Tourism and Trade on a sample of 1,403 Spanish industrial firms. With a few exceptions, most research on the firm-level impact of human capital has been specific to United States companies; however experience in other countries may provide information to fill the gaps in the knowledge about the United States environment (Guthrie, 2001; Heneman et al., 2000).

CONCEPTUAL FRAMEWORK

Human capital as a strategic resource

Human capital refers to the collective knowledge, skills, and abilities of the individuals working in an organization (Snell & Dean, 1992; Wright et al., 1994). Human capital is the result of a firm's deliberate investment through the selective hiring of employees with high general skills (or formal education) plus a firm investment in training of more specific skills through "in-house" training activities (Skaggs & Youndt, 2004; Snell & Dean, 1992). From the resource-based view of the firm, various scholars (e.g., Hitt et al., 2001) suggest that human resource practices related to employee selection and training have been considered critical to foster firms' human capital. In accordance with this theoretical perspective, strategic resources—those that are unique, difficult to imitate and valuable—lead to a sustainable improvement in organizational performance (Barney, 1991). Intangible resources (like human capital) are more likely to produce a competitive advantage because they are rare and socially complex, and therefore difficult to imitate (Hitt et al., 2001). Human capital represents an inimitable asset in terms of knowledge and skills that are only of use to a particular company. A workforce that produces superior employee output is expected to be the result of individual and firm practices, histories and cultures, which cannot be readily articulated and that would be very difficult and costly to imitate (Way, 2002; Wright et al., 1994).

Firms create value through employee selection and training, thus increasing their performance. There are several reasons for this. First, this combination provides a firm with a skilled workforce capable of ongoing learning, and employees develop a greater knowledge to respond to intense competition, constant product innovation and more complex technologies (Appelbaum et al., 2000; Batt, 2002; Snell & Dean, 1992). Second, the human capital pool can improve firm performance through its contribution to the firm's flexibility. In this sense,

investment in human capital improves employability and therefore labor flexibility (Groot & Van Den Brink, 2000). Workers with higher levels of education and training are more employable, i.e., they can be employed in more jobs and perform multiple tasks within the firm. Third, as the level of employee human capital is fostered, people develop more efficient means of accomplishing task requirements, thereby increasing productivity (Wright et al., 1994). Fourth, high skills in the workforce are a requirement for empowerment, and benefit from delayering the organization (Appelbaum et al., 2000). More responsibility at shop floor level enables the firm to delayer the organization by reducing middle management. Furthermore, employee participation in decision making increases motivation and commitment to the organization and encourages employees to work harder (Huselid, 1995; Pfeffer, 1998). Human capital is also relevant to promote collaboration among the workforce (Motowidlo & Schmitt, 1999) and the attainment of high qualifications by employees increases their performance in team activities (Molleman & Slomp, 1999). Considerable empirical evidence (e.g., Black & Lynch, 1996; Delaney & Huselid, 1996; Youndt et al., 1996) corroborates the positive effects of human resource practices related to enhancing human capital for firm's outcomes.

Interaction between human capital, temporary employment and organizational size

Although the positive effect of human capital on firm performance may be considered universal, the intensity of this effect may vary from one context to another. Studies such as those by Barney (1991), Becker and Gerhart (1996) and Hitt et al. (2001) indicate that the value of resources and capabilities depends on the context in which they are used. Consequently, an integrated view of human capital must be taken, in which its interrelations with other elements of the organization are included and evaluated. Human resource management must be observed as a system—an integrated whole—in which the complementarities or synergies between various human resource practices (internal fit) and

between these practices and other contextual factors (external fit) will improve firm performance (Becker & Gerhart, 1996; Dyer & Reeves, 1995; Hayton, 2003; Huselid, 1995; Youndt et al., 1996). The overall analysis of both these types of fit is essential if the usefulness of human capital is to be correctly evaluated. Thus, we jointly observe temporary employment and organizational size as moderating variables.

Temporary or casual workers are hired to perform jobs for short periods; their employment can last anywhere from hours to months, and ends when the employing firm no longer desires their services (Davis-Blake, Broschak, & George, 2003). There are various reasons why this mode of employment reduces the effectiveness of human capital. First, Appelbaum et al. (2000), Davis-Blake et al. (2003), Delaney and Huselid (1996) and Pfeffer (1998) argue that workers will only expend extra effort it they expect a high level of permanence in the job. Temporary employment breaks the traditional deal of a lifelong job with mutual loyalty between the employer and the employee (Pfeffer, 1998; Tsui & Wu, 2005). Firms where employment security exists contribute to reinforcing the trust relation between employees and employers, thereby increasing employee motivation and commitment to the firm. The effectiveness of even highly skilled employees will be limited if they are not motivated to perform their jobs (Delaney & Huselid, 1996, Huselid, 1995). Second, Davis-Blake et al. (2003) and Sánchez and Toharia (2000) argue that the use of temporary employees also has a negative repercussion on the motivation and commitment of other employees that do have permanent contracts. The proportion of temporary workers negatively affects the average level of labor effort in the firm, since this kind of human resource policy affects the morale of all types of workers and breaks up group cohesion and stability of relations between workers. Third, Appelbaum et al. (2000), and Arulampalam and Booth, (1998) state that greater firm investment in training workers will be more efficient when the firm follows a policy of permanent employment contracts because the firm can amortize its

investment. Investment in human capital is only justified if it is amortized in the long term, and the use of temporary contracts hinders this return. Fourth, the target of using temporary workers is not compatible with the target of enhancing employees' ability to perform a variety of jobs through the acquisition of skills (Arulampalam & Booth, 1998). Firms are more likely to invest in training and development of employee skills, the longer the post-training period over which they can amortize their investment. Thus, firms with the heaviest investment in training are those with the lowest use of temporary contracts (Arulampalam & Booth, 1998; Diaz-Mayans & Sánchez, 2004).

Various studies have examined the issue of organizational size (e.g., Batt, 2002; Boone & Van Witteloostuijn, 1996; Panayotopoulou, Bourantas & Papalexandris 2003) and suggest that the positive impact of human capital on firm performance is more pronounced in large as opposed to small firms. First, Sels et al. (2006) and Way (2002) argue that the cost of investment in human capital for small firms outweighs the benefits that they gain from providing high human capital, since small firms do not obtain as many benefits from economies of scale as large firms do. Human capital expenditures can be spread over the output; and therefore, large firms earn higher returns per unit of human capital practices. Second, some empirical evidence supports the fact that large firms have advantages in innovation. Specifically, Tsai (2005) states that innovative activity, in terms of R&D intensity, increases more than proportionately with firm size. The effectiveness of R&D greatly depends on internal group cohesion and collaboration among employees (Schilling & Hill, 1998). Because human capital is relevant in promoting collaboration among the workforce (Motowidlo & Schmitt, 1999), large organizations benefit more from human capital since it contributes to the collaboration required by innovation initiatives in the firm. Third, Panayotopoulou et al. (2003) argue that in small firms, generally in the growth stage of the organizational life cycle, human resource management is mainly administrative, as the

primary concern of the organization is to grow, thus focusing on short-term economic factors. In contrast, a large firm, generally in the mature stage, has lower growth expectations, and gives more importance to effectiveness, which is achieved by gaining competitive advantage through its human resources. Therefore, organizational size is expected to positively affect the relationship between human capital and firm performance. Fourth, small firms cannot benefit from delayering the organization, as they do not employ any middle management that can be reduced by increasing employee empowerment on the shop floor (Appelbaum et al., 2000). In small firms it is also difficult to introduce self-responsible teams that exclude the hierarchical position of the entrepreneur. Fifth, if a small firm serves a local market, opportunities to increase sales through more human capital are very scarce (Batt, 2002). Investment in human capital does not pay off because the restricted scope of their markets limits sales opportunities. Hence, any focus on recruiting and developing a highly competent workforce will not have a positive effect on small firm productivity.

In sum, temporary employment and organizational size can moderate the effect of human capital on firm performance. The greater the use of temporary workers by a firm, the smaller the positive effect of human capital on firm performance will be. In contrast, the larger the organization, the greater the positive effect of human capital on firm performance will be. Taking these arguments as a whole, we therefore expect that the larger the size of the organization and the lower its use of temporary contracts, the higher the positive impact of human capital on firm performance will be, such that:

Hypothesis: The positive effect of human capital on firm performance will be greater in large firms with low temporary employment than in small firms with high temporary employment.

METHODOLOGY

Sample

To empirically test the theoretical hypothesis put forward, we used the Survey on Business Strategies - *Encuesta sobre Estrategias Empresariales* (ESEE, 2002)- carried out by the Ministry of Industry, Tourism and Trade. The reference population for the survey comprises firms with 10 or more employees in the Spanish manufacturing industry, with the exception of industrial activities related to oil refining and the treatment of fuels. All the variables measured take an annual time frame. We used data from 2002 in our study, the most recent year in which the survey was undertaken. From the original sample of firms (1,635 firms), cases with missing data for any of the variables included in the study were eliminated (90 firms), as were cases with coding errors (125 firms) and non-standard cases (17 firms) that could devalue the information provided for that year, such as firms affected by takeover, merger or separation processes. The final sample used in this study was 1,403 firms. Distribution by sector of activity is provided in Table 1, which includes both the Standard Industrial Classification system (SIC) and the Spanish National Classification of Economic Activities –*Clasificación Nacional de Actividades Económicas* (CNAE)-. According to European Commission (1996) criteria, 671 cases were small firms (10-49 employees), 377 cases were medium-sized firms (50-249 employees) and 355 were large firms (250 employees and over).

Insert Table 1

Measures

Control variables. Following the advice of researchers in the field (e.g., Becker & Gerhart, 1996; Huselid, 1995), due to the large size of the dataset a conservative approach

was used in including as many control variables as possible. Specifically, we selected five control variables: age of the organization, degree of dependency, sector of activity, labor intensity and innovative intensity. The age of the firm (AGE) was calculated as the number of years between its constitution and the year of the survey. Degree of dependence (DEP) was defined as the percentage of participation in the firm's capital by another firm. The industrial sector was defined by the CNAE classification, with 13 sectors of activity identified. As this is a categorical variable, a reference category must be defined, which is not included in the regression analysis. In our case, we selected the primary metal industry and fabricated metal products sector. The remaining industrial sector categories were introduced as dummy variables and took the value of 1 when the firm belonged to the corresponding sector and 0 otherwise (see Table 2). The labor intensity variable (LABINT) was calculated as the ratio between the personnel costs and the total net fixed assets. Finally, innovative propensity (INNOV) was calculated as the percentage coefficient between R&D expenditure and firm sales.

Independent variables. Similarly to Skaggs and Youndt (2004), we used a composite selection and training index to assess the level of human capital possessed by the firm's employees. More specifically, we measured human capital (HC) as the mean of the standard values of two indicators: the educational level of the hired employees, calculated as the workers with higher or intermediate education as a proportion of the total workforce; and investment in training, calculated as the ratio between training expenditure and the total number of employees in the firm. With regard to the two moderating variables, organizational size (SI) was defined by the total number of employees in the firm, while temporary employment (TE) was calculated as the proportion of the total workforce of employees with a temporary contract.

Dependent variables. We used organizational and financial measures of firm performance because they represent different hierarchical levels and because human capital is most likely to directly impact on organizational outcomes, followed by financial outcomes (Dyer & Reeves, 1995). In comparison with organizational outcomes, the increasing complexity of factors that influence financial outcomes would modify the contribution of human capital (Dyer & Reeves, 1995, Huselid, 1995). Concerning organizational performance, we followed previous studies (e.g., Koch & McGrath, 1996), by choosing the logarithm of sales per employee as a measure of labor productivity (PROD). This is a key indicator of workforce performance as it indicates the extent to which a firm's human capital is efficiently creating output. However, it does not include the costs associated with productivity gains and the balance between costs and gains (Sels et al., 2006), and consequently, it is advisable to use a financial performance measure**.** Concerning financial performance, following Hitt et al. (2001), we chose return on sales (ROS) to detect operational efficiency.

Table 2 presents the sets of control, independent and dependent variables and their respective descriptive statistics. Of note is the high level of temporary contracts in the sample of firms analyzed, with an average of 16%. In Spain, following the labor reform of 1984 introduced to bring down high rates of unemployment, widespread use of temporary contracts was observed in almost all sectors of the economy and types of jobs (Diaz-Mayans & Sánchez, 2004; European Commission, 2005; Sánchez & Toharia, 2000). A common trend in both the United States and Europe is the increasing frequency with which firms resort to temporary employment (Auer & Cazes, 2003; Pfeffer, 1998). Table 3 presents the correlation coefficients among the variables. The existence of a negative relation (-0.073) between organizational size and temporary contracts reveals the use of temporary contracts to be more widespread in small than in large firms. Large firms are less likely than small firms to use temporary workers (Davis-Blaque & Uzzi, 1993). Likewise, the positive correlation (0.221)

between organizational size and human capital demonstrates that small firms have a significantly lower level of human capital than large firms. Due to financial limitations, small firms are less likely than large firms to invest in human capital (Hayton, 2003). Finally, the negative correlation (-0.145) between human capital and temporary contracts is also of note; evidence that the greater the use of temporary contracts, the lower investment in human capital will be.

Insert Table 2

Insert Table 3

Statistical procedure

We follow the recommendations of Aiken and West (1991) to carry out the analysis of the interaction between human capital, temporary employment and organizational size. Previous human resource research examining an interaction between three variables has adopted this procedure (e.g. Hitt *et al.,* 2001). These authors recommend centering the independent variables in order to use these centered values to calculate the interactions or products between the variables. They also advise following the hierarchical regression procedure. Along these lines, when the existence of a third order interaction is postulated, the principal effects and the second order interaction effects must first be introduced. To test the contingent hypothesis put forward in this study, we then calculate the simple regression lines of human capital (principal variable) on firm performance (dependent variable), according to organizational size and temporary employment (moderator variables). This involves dichotomizing the two moderator variables by choosing a standard deviation above (high) and

below (low) the corresponding mean values of temporary employment and organizational size. The possible combinations between these two levels for each of the two dimensions provide us with the four scenarios shown in Figure 1. The hypothesis formulated in this study will be confirmed if the slope of the simple regression line for large firms with low temporary employment (*C*) is positive and greater than the slope of the simple regression line for small firms with high temporary employment (*B*).

Insert Figure 1

RESULTS

Table 4 shows the results of the regression analysis carried out for the two firm performance indicators. For each model constructed, we present its coefficient of determination (R^2), the significance test (*F*) and the respective regression coefficients of the variables. Model 1 shows the main effect of the control and independent variables. In model 2, the second order interaction terms are added. Finally, in model 3, third order interaction is introduced. Two significant second order interactions (HCxTE: -0.048; HCxSI: -0.074) can be seen when labor productivity is used as a dependent variable. An examination of return on sales reveals that both the second order interaction (HCxTE: -0.115) and the third order interaction (HCxTExSI: -0.072) are significant. The first empirical evidence is thus provided to show that organizational size and temporary employment act as moderating variables in the effect of human capital on firm performance.

Insert Table 4

The next stage is to calculate the simple regression lines of the effect of human capital on firm performance according to the high and low levels of the two moderating variables. The results of this analysis are provided in Table 5. Finally, Table 6 shows the values of the *t* statistic of differences between the various scenarios. Specifically, to test the proposed hypothesis, a comparative analysis must be made between the contexts of small firms with high temporary employment (B) and large firms with low temporary employment (C). The hypothesis will be confirmed if the impact of human capital on firm performance is positive and greater in context C than in context B. As evidenced in Table 5, this first requirement is fulfilled for both labor productivity and ROS. If there is a significant difference between the values of the regression coefficients of the two different contexts, the condition is sufficiently met. The second condition (see Table 6) is met when return on sales is examined (3.317), but is not fulfilled in the case of labor productivity. Human capital has a similar significant positive impact in these two contexts. Consequently, our hypothesis is only confirmed when ROS is examined.

Insert Table 5

Insert Table 6

Although the hypothesis formulated in this study focuses on the comparison of two opposed contexts (B-C), we also considered it worthwhile to adopt a descriptive approach and highlight certain results from Tables 5 and 6. First, we demonstrate that the positive effect of human capital on firm performance is not universal; in other words, an increase in human capital does not always have a positive effect on firm performance. Particularly, the results

show that human capital has a negative effect on ROS in large firms with high temporary employment. Second, on considering ROS, we found that the firms that most benefit from increased human capital are large firms with low levels of temporary contracts (*C* > *A*; *C* > *B*; *C* > *D*). In contrast, when we considered labor productivity, the firms that most benefit from increased human capital were revealed to be small firms with low levels of temporary contracts (*A* > *B*; *A* > *C*; *A* > *D*). Third, within the context of small firms, an increase in human capital is shown to increase labor productivity, but does not have a significant effect on firm profitability. This may be due to the fact that any increase in human capital is offset by a major increase in both direct and indirect costs to small firms, thus leading to a drop in firm profitability (Sels et al., 2006). Within the small firm sector the outcomes produced by an increment in human capital do not exceed the labor costs associated with it.

The second objective of the present study, to analyze the combined effect of human capital, temporary employment and organizational size on firm performance, is observed from a graphic representation of the simple regression lines. This enables us to identify the most and the least beneficial combinations of the three variables. The combined effect is presented in Figures 2 and 3. The firm performance values shown in these figures were calculated from the higher and lower values of human capital, defined respectively by a standard deviation above (0.793) and below (-0.793) its mean value (see Table 2).

Figure 2 shows that the combination with the optimum labor productivity (11.793) occurs when a large firm follows a human resource management policy based on low levels of temporary contracts and high human capital. In contrast, the least beneficial context (11.072) occurs in the small firms with a low level of human capital and a high use of temporary employment. Within the small firm context, the optimum human resource management policy consists of introducing high human capital and low temporary employment, as this combination achieves labor productivity of 11.705, a similar result to that

reached by large firms following the same human resource management policy. Within the context of large firms, we can see that lower levels of temporary contracts are always more beneficial than high levels, regardless of the level of human capital. This result is also shown in the small firm context. Finally, the point where lines A and D intersect (-0.080) is also of note. With higher levels of human capital, smaller firms with fewer temporary employees attain higher labor productivity levels than large firms with high numbers of temporary employees. The opposite occurs when we examine lower values.

Insert Figure 2

In Figure 3, we can observe that the combination with the optimum profitability (0.238) occurs when a large firm follows a human resource management policy based on low levels of temporary contracts and high human capital. In contrast, the least beneficial context (0.033) occurs in small companies with a high degree of human capital and a high use of temporary employment. Within the small firm context, the optimum human resource management policy consists of introducing high human capital and low temporary employment, as this combination achieves a ROS of 0.068. In addition, again within the context of small firms, when their human capital is lower, the low (line A) or high (line B) use of temporary employees gives similar results: a ROS of 0.036 and 0.037 respectively. In the case of large firms, first, we can observe that they always achieve a higher ROS than small firms, regardless of the degree of human capital and number of temporary employees they have. Furthermore, the point of intersection (0.068) between large firms with high (D) and low (C) temporary employment can be appreciated. When higher human capital values occur, large firms with fewer temporary employees obtain greater ROS than large firms with higher numbers of temporary employees. The opposite occurs when lower values are considered.

Finally, the similarity of the results in large firms that follow totally different human resource policies should be noted. The profitability of large firms with high temporary employment and limited human capital reaches 0.234, while large firms with fewer temporary employees and high human capital reach a level of 0.238. This suggests that large firms are able to choose between these two human resource management policies, since both lead to notable financial results that are fairly similar. We can therefore report that large firms have more room to maneuver than small firms, which are limited to following a single human resource management policy based on lower levels of temporary employment and high human capital .

Insert Figure 3

CONCLUSION

We draw on the contingent resource-based view to explore whether the effect of human resource management practices related to human capital on firm performance is moderated by the extent to which temporary employment is used and by organizational size. The existence of significant differences in the effect of human capital on firm performance between small and large firms with high and low use of temporary employment (see Tables 5 and 6) confirms that organizational size and temporary contracts act as moderating variables. These results support the thesis put forward by Becker & Gerhart (1996) and Youndt et al. (1996) concerning the need to adopt an integral view of human resource management in search of complementarities. Decisions about investment in human capital and the use of temporary contracts should be taken jointly by personnel managers, in accordance with the size of the firm. If this holistic view is ignored, a full understanding of their impact on firm

performance will be obscured. Given the importance of these interactions, isolated actions designed to achieve a certain effect may be counter-productive. Thus, for example, evidence is provided to show that an increase in human capital will have a negative effect on financial performance in large firms with a high use of temporary workers. This result also refutes the universalist assumption that human capital will have a positive effect on firm performance in any circumstances.

In particular, our hypothesis advocates that the positive effect of human capital on firm performance is more intense in large firms with low temporary employment than in small firms with high temporary employment. This finding partially supports our contingent hypothesis, which is confirmed when ROS is examined, but not when labor productivity is selected as the dependent variable. As Dyer & Reeves (1995), Huselid (1995) and Sels et al. (2006) have already pointed out, it is likely that these different results are due to the different nature of these two performance indicators. While labor productivity reflects employee efforts that are somewhat insulated from variation in capital and product markets, ROS actually picks up these other factors. The mixed results could be also a sign that costs rise faster than revenues in small firms, thereby marginalizing the impact of human capital on financial performance. Management costs associated with higher investment in human capital are too high for small firms to enjoy the same benefits that larger companies do (Sels et al., 2006). This supposition is confirmed by Figure 3, which shows that large firms, regardless of the human resource management policy they adopt, always make a larger profit than small firms. Finally, it should be noted that the most beneficial context, in both labor productivity and ROS (see Figures 2 and 3), occurs in large companies with a high degree of human capital and a low use of temporary employment.

While not wishing to minimize the differences between small and large firms, a feature common to both types of firm should be pointed out: the most profitable human

resource management policy is manifest when temporary contracting is low and human capital is high. This combination leads to the highest level of labor productivity and ROS in both small and large firms. Consequently, the argument put forward by Pfeffer (1998) and Tsui and Wu (2005) is as relevant to small and medium firms as it is to large firms: namely that the economic value of using temporary employees is less attractive than previously perceived. Our findings support the hypothesis that the joint presence of the two factors creates a tension between the requirement for employee commitment to the job and the absence of a reciprocal management commitment to job security that is prejudicial for a firm's success (Appelbaum et al., 2000). The widespread use of temporary contracts has led to the situation in which many human resource managers are seeking to develop high human capital in a climate of high job insecurity (Bacon & Blyton, 2001; Osterman, 2000). As Bacon and Blyton (2001) suggest, what is less likely, however, is that investment in human capital will achieve its full potential in the presence of high job insecurity. There is therefore a certain incompatibility, a substitution effect of firm results, between human capital and temporary employment.

Our findings do not coincide with Cardon's (2003) proposal that in small firms the integration of temporary workers may result in benefits, since these skilled workers represent a variable rather than a fixed cost and the financial constraints of small firms prevent them from introducing and taking advantage of high human capital. This may be because this author bases her argument on the idea that temporary employees are highly qualified, which contrasts starkly with the European and Spanish employment situation, characterized by the fact that the proportion of employees with temporary contracts is highest for the lowest education level (Diaz-Mayans & Sánchez, 2004; European Commission, 2005). Moreover, as Hayton (2003) explains, for smaller firms financial constraints may mean that the implementation of human resource practices related to human capital may be limited;

however, this does not mean that this investment will be less significant to firm success, and vice versa. In other words, a positive correlation between organizational size and human capital does not imply that small firms will benefit less from this investment than large firms. Likewise, although large firms are less likely than small firms to use temporary workers (Davis-Blaque & Uzzi, 1993), this should not encourage us to defend their greater use in small firms.

To summarize, this research provides sufficient empirical evidence to show that temporary work and organizational size affect the usefulness of human capital. Recommendations for future studies should therefore also consider the interaction among these three elements. Our results should be interpreted within the industrial context. Previous studies (e.g., Black & Lynch, 1996) have shown that the effect of human capital on performance may vary between manufacturing and non-manufacturing sectors. For this reason, we recommend that similar studies be carried out in other sectors of activity to test our findings. A final suggestion for extending this research would be to examine other modes of external employment, such as part-time work or subcontracting, since these different modes can have different effects on the relationship between human capital and firm performance (Davis-Blake et al., 2003).

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Table 1. Distribution of firms according to sectors of activity (*N* = 1,403)

SIC	CNAE	Number	Percentage
20 and 21	DA. Food, drink and tobacco industry	187	13.33%
22 and 23	DB. Textile and clothing industry	133	9.48%
31	DC. Leather and footwear industry	37	2.64%
24 and 25	DD. Timber and cork industry	51	3.64%
26 and 27	DE. Paper industry; publishing, graphic arts and reproduction of engravings	119	8.48%
28	DG. Chemical industry	81	5.77%
30	DH. Rubber transformation and plastic materials industry	85	6.06%
32	DI. Other mineral, non-metallic product industries	101	7.20%
33 and 34	DJ. Primary metal industry and fabricated metal products (reference category)	216	15.40%
35 and 36	DK. Machinery and electrical equipment manufacturing industry	106	7.56%
38	DL. Electrical, electronic and optical materials and equipment industry	100	7.13%
37	DM. Manufacturing of transportation equipment	88	6.27%
39	DN. Miscellaneous manufacturing industries	99	7.06%

Table 2. Definition and descriptive statistics of the variables included in the regression analysis (*N*=1,403)

Variable	Definition	Mean	s.d.
AGE	Number of years since the firm was constituted	24.583	20.734
DEP	Percentage of participation in the firm's capital by another firm	34.627	44.668
DA	1 if food, drink and tobacco industry; 0 otherwise	0.133	0.340
DB	1 if textile and clothing industry; 0 otherwise	0.094	0.293
DC	1 if leather and footwear industry; 0 otherwise	0.026	0.160
DD	1 if timber and cork industry; 0 otherwise	0.036	0.187
DE	1 if paper industry; publishing, graphic arts and reproduction of engravings; 0 otherwise	0.084	0.278
DG	1 if chemical industry; 0 otherwise	0.057	0.233
DH	1 if rubber transformation and plastic materials industry; 0 otherwise	0.060	0.238
DI	1 if other mineral, non-metallic product industries; 0 otherwise	0.072	0.258
DK	1 if machinery and electrical equipment manufacturing industry; 0 otherwise	0.075	0.264
DL	1 if electrical, electronic and optical materials and equipment industry; 0 otherwise	0.071	0.257
DM	1 if manufacturing of transportation equipment; 0 otherwise	0.062	0.242
DN	1 if miscellaneous manufacturing industries; 0 otherwise	0.070	0.256
LABINT	Labor intensity	4.888	58.788
INNOV	Innovative intensity	0.599	1.661
HC	Human capital	0.000	0.793
TE	Proportion of workers with temporary contracts	0.160	0.199
SI	Number of employees	200.939	355.288
PROD	Labor productivity	1.470	0.591
ROS	Return on sales	0.122	0.186

Table 3. Bivariate correlations among variables[a]

Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. AGE	1								
2. DEP	0.226**	1							
3. LABINT	-0.024	-0.022	1						
4. INNOV	0.107**	0.129**	0.024	1					
5. HC	0.218**	0.327**	-0.002	0.224**	1				
6. TE	-0.234**	-0.204**	-0.021	-0.097**	-0.145**	1			
7. SI	0.267**	0.371**	-0.019	0.060*	0.221**	-0.073**	1		
8. PROD	0.268**	0.475**	-0.020	0.069*	0.388**	-0.238**	0.305**	1	
9. ROS	0.139**	0.228**	-0.022	-0.005	0.188**	-0.039	0.451**	0.385**	1

Notes: [a] Dichotomous variables of the industrial sectors were omitted. ** $p < 0.01$; * $p < 0.05$; (bilateral)

Table 4. Results of the hierarchical regression analysis

Variables	Labor productivity			Return on sales		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
AGE	0.084**	0.086**	0.086**	-0.001	-0.003	-0.005
DEP	0.304**	0.289**	0.289**	0.040	0.042	0.041
DA	0.080**	0.079**	0.079**	0.006	0.003	0.001
DB	-0.192**	-0.191**	-0.191**	-0.041	-0.044	-0.043
DC	-0.021	-0.019	-0.019	-0.017	-0.019	-0.019
DD	-0.001	0.000	0.000	-0.034	-0.034	-0.035
DE	-0.011	-0.010	-0.010	0.013	0.011	0.011
DG	0.057*	0.061*	0.061*	0.058*	0.045	0.039
DH	-0.021	-0.018	-0.018	0.024	0.026	0.025
DI	-0.027	-0.027	-0.027	0.020	0.022	0.023
DK	-0.049+	-0.049+	-0.049*	0.010	0.010	0.014
DL	-0.052*	-0.051*	-0.051*	0.014	0.016	0.015
DM	-0.003	-0.001	-0.001	-0.004	-0.001	0.003
DN	-0.090**	-0.087**	-0.087**	-0.020	-0.020	-0.019
LABINT	-0.013	-0.013	-0.013	-0.015	-0.015	-0.014
INNOV	-0.034	-0.040+	-0.040+	-0.061*	-0.062*	-0.062*
HC	0.192**	0.194**	0.195**	0.069*	0.047+	0.036
TE	-0.126**	-0.143**	-0.144**	0.014	-0.019	-0.012
SI	0.094**	0.131**	0.132**	0.415**	0.401**	0.393**
HCxTE		-0.049*	-0.048+		-0.095**	-0.115**
HCxSI		-0.076**	-0.074**		0.027	-0.002
TExSI		0.008	0.008		0.018	0.026
HCxTExSI			0.004			-0.072*
R^2; F	0.381; 44.74**	0.386; 39.48**	0.386; 37.74**	0.224; 21.01**	0.232; 18.93**	0.235; 18.41**

Notes: Standardized regression coefficients. ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$ (bilateral)

Table 5. Effect of human capital (*X*) on firm performance (*Y*) according to organizational size and temporary employment

Labor productivity		*Organizational size*	
		Low	High
Temporary employment	High	*B:* $Y = 11.217 + 0.183^{**} X$ (0.056)	*D:* $Y = 11.437 + 0.079 X$ (0.075)
	Low	*A:* $Y = 11.456 + 0.314^{**} X$ (0.049)	*C:* $Y = 11.644 + 0.188^{**} X$ (0.051)
Return on sales		*Organizational size*	
		Low	High
Temporary employment	High	*B:* $Y = 0.035 - 0.002 X$ (0.015)	*D:* $Y = 0.194 - 0.050^{*} X$ (0.020)
	Low	*A:* $Y = 0.052 + 0.020 X$ (0.013)	*C:* $Y = 0.186 + 0.066^{**} X$ (0.014)

Notes: standard error in parenthesis. ** $p < 0.01$; * $p < 0.05$; (bilateral)

Table 6. Values of the *t* statistic between each pair of simple regression lines

Simple lines	*A - B*	*A - C*	*A - D*	*B - C*	*B - D*	*C - D*
Labor productivity	1.760+	1.800+	2.640^{**}	0.066	1.111	1.203
ROS	1.157	2.421^{*}	2.941^{**}	3.317^{**}	1.920+	4.754^{**}

Notes: ** $p < 0.01$; * $p < 0.05$; + $p < 0{,}10$ (bilateral)

Figure 1. Types of possible contingent scenarios

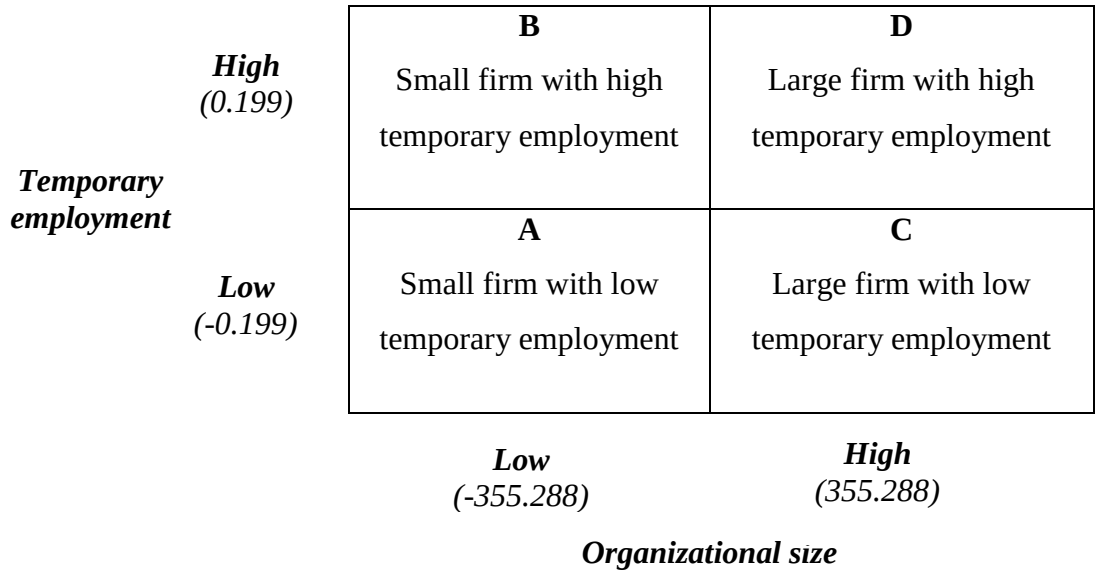

Figure 2. Effect of human capital on labor productivity according to temporary employment and organizational size

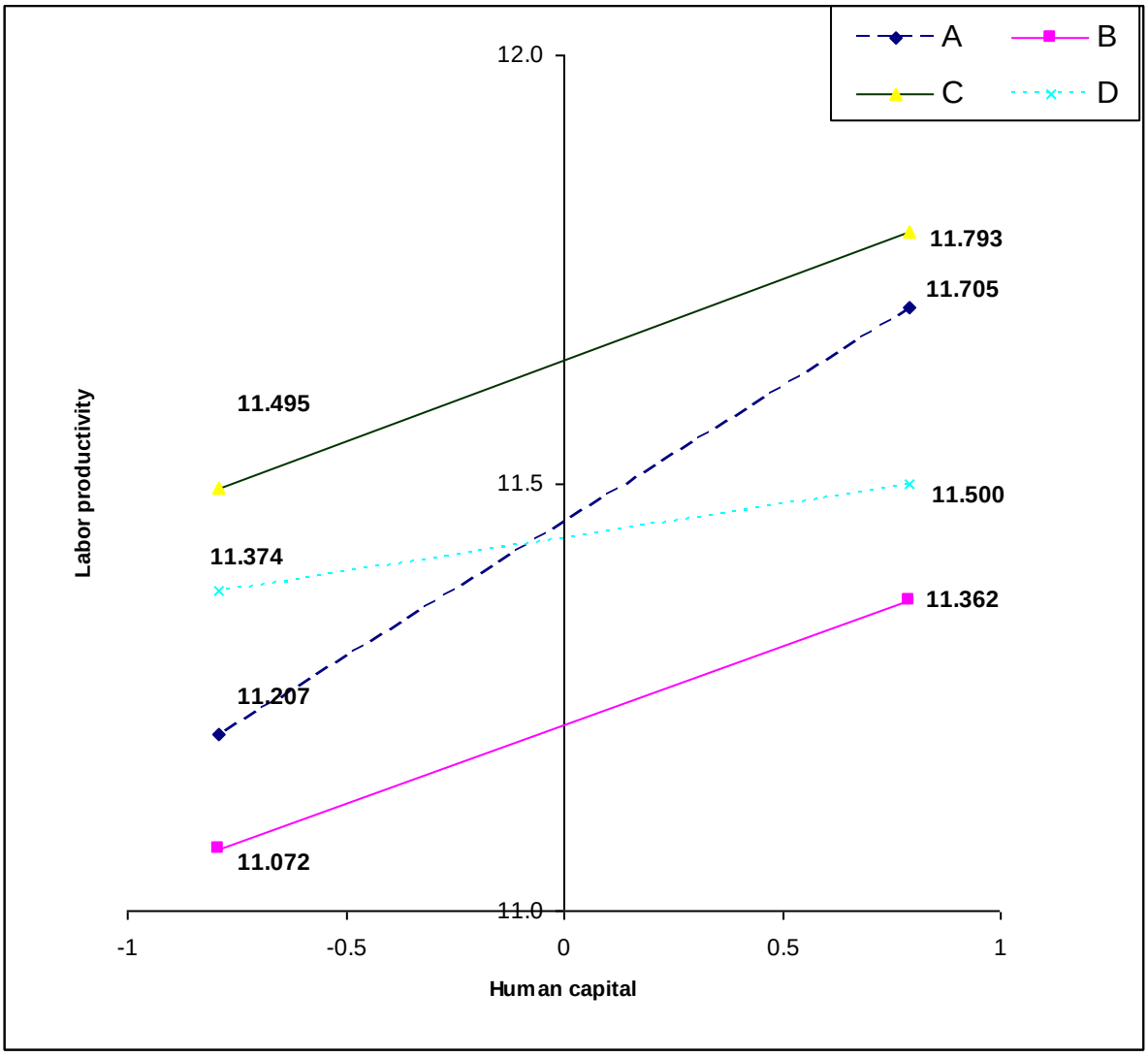

Figure 3. Effect of human capital on return on sales according to temporary employment and organizational size