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Firm's Current Performance and Innovative Behavior Are the Main Determinants of Salaries in Small-Medium Enterprises

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FIRM'S CURRENT PERFORMANCE AND INNOVATIVE BEHAVIOR ARE THE MAIN DETERMINANTS OF SALARIES IN SMALL-MEDIUM ENTERPRISES

Abstract

Our aim was to analyze the effects of firms' innovative behavior on their employees' salaries in the Spanish manufacturing industry. Data were provided by the Spanish Business Strategy Survey, a panel data comprising more than 2,000 firms. We found a premium in the wage paid by innovative firms, regardless of size. However, when taking company size into account, we found that the effect of innovations was greater in small-medium enterprises (SME), contrary to what was expected. This finding —together with the fact that the salaries of large innovative firms are higher— suggests that large Spanish manufacturing firms have found it difficult to react and adapt to major environmental changes brought about by Spanish membership in the European Union as of 1986. We also found support for the proposition that salaries in large firms are purposely isolated from firm's current benefits in order to foster the development of firm-specific human capital. In the SME group, however, current performance was a major determinant of salaries and of the ability to appropriate the rents stemming from innovative behavior and the technological opportunities offered by the industry in which these companies were competing. Finally, our analysis backs the assumption that salaries in both large and small-medium firms are generated by two distinct economic regimes, supporting the proposition that an SME is not simply a scaled-down large firm.

1. WAGES, INNOVATIONS AND FIRM SIZE

Based on our analysis of the innovative behavior of both large and small-medium Spanish manufacturing firms, we found remarkable differences in how this behavior affected employee salaries, suggesting that there are actually two processes generating the salaries paid. The two groups were found to differ in terms of the impact of current company performance and innovative behavior on salaries, the opportunity conditions they face, the appropriability conditions of the economic rents stemming from their innovative activity, and the firm-specific resources to which they have access.

Although profitability is the final variable measuring changes in a firm's competitive position, it is only one part of the value created by its strategy. The other part consists of differences in salaries, i.e., wages above the value of the marginal productivity of each resource employed in the production process. If firms grow by developing firm-specific resources in order to implement a competitive strategy designed to achieve a competitive advantage, there must be quality differences between the assets and skills to which small-medium enterprises (SME) have access versus those of large firms, and consequently, differences between their competitive strategies (Cyert & Kumar, 1996). Extremely profitable SMEs can exist in sectors with volatile demand (Fiebenbaum & Karnani, 1991; Casson, 1995) or in niche markets (Choi & Scarpa, 1994), even when they pay salaries slightly above the value of marginal productivity. Thus, changes in company profitability do not allow us to infer similar movement in company efficiency (Dosi, 1988).

The Spanish economy contains a high percentage of SMEs and is currently experiencing significant changes in the business climate, making it an exciting subject for study concerning the firm's role in the process of wealth generation and effective political measures to promote

company growth. A recent initiative of the Spanish Ministry of Industry and Energy — MINER—to construct panel data with company-level data on more than 2,000 manufacturing firms allows us to test theory empirically in order to gain insight and, thereby, design effective policies that promote economic growth.

We had four aims in our research. First we were interested in looking at the existence of a differential wage stemming from quasi-rents in innovating firms. Since quasi-rents, or organizational rents, as they are designated by Aoki (1984), will be appropriated by the owners of firm-specific resources if employees are one of the owners, then there will be a wage premium in the salary paid by innovative firms. Next we looked at the question of SMEs being a scale-down big enterprise (Casson, 1995). If large and small-medium firms are alike, then the wage premium paid by both groups of firms will not differ; otherwise it will be greater in large firms. If firms grow by developing firm-specific resources (Penrose, 1959), large firms must be much more productive than SMEs and their employees must be able to appropriate part of their profitability. Third, any difference found in the wage premium paid by large and small-medium firms must lead us to ask what actually determines employees' salaries in each group. Lastly, on the basis of the above hypothetical differences, we needed to look at whether the salaries paid by both groups of firms were rooted in different economic regimes.

In our analysis, we found that innovative Spanish firms paid higher salaries than those not committed to innovative activities, suggesting that the employees of Spanish companies own part of the firm-specific resources and are able to appropriate part of their organizational rents. As for the second question, we found a linear relationship between the innovative behavior of Spanish firms and their size, indicating that we should study the effect of firms' innovative behavior on the wages of large and small-medium firms separately. Surprisingly, however, this linear

relationship was contrary to what was expected, with wage premium being higher in small, innovative firms than in large organizations.

This fact —together with the need to estimate a first-order difference equation for the wage determinants for the large-firm group instead of the model used in the SME group— suggests that large Spanish firms are finding it difficult to react and adapt to the changing economic environment resulting from Spain's recent membership in the European Union. This finding lends support to Henderson and Mitchell's (1997:7) assertion that firms which develop extensive organizational capabilities —large firms— find it more difficult to adapt to major changes in its environment than firms relying on the skills of individuals —SMEs—. An analysis of wage determinants in both large and small-medium firms shows that the effect of firms' innovative behavior on salaries varies. In the SME group we found that a company's product and process innovations affected salaries more than twice as much as in large firms. Product innovation also had a major impact on salaries in large firms, although the magnitude of this impact was smaller than in the SME group.

Current company performance affected salaries in both groups, but its impact on employees' salaries was greater in the large-firm group. This finding—together with the effect of business innovative behavior on salaries—suggests that salaries in large firms are purposely isolated from current company performance in order to foster the development of firm-specific human capital (Doeringer and Piore, 1971). Since firms grow by developing organizational capabilities —firm-specific skills— that are embedded in organizational routines (Nelson and Winter, 1982) residing in both employees and entrepreneurs, employee wages in large firms must be isolated from current organizational rents. This is not the case for SME employees, where organizational capabilities reside in the entrepreneur and his/her management team (often family members).

Appropriability and technological opportunity conditions affected the impact of innovation on wages in the small-medium enterprises, but not in large firms, hence suggesting that large firms have the necessary resources to appropriate the rents stemming from their innovative behavior, although many SMEs do not have them. Lastly, we found support for the hypothesis that there are different regimes generating the salaries paid by large and small-medium Spanish firms, along the same vein as Acs and Audretsch (1988) found in their study of the determinants of small-medium and large firms' innovations.

This paper is organized as follows. In the following section we present and link earlier research into the determinants of wage premiums: competitive advantage, firm-specific resources, organizational rents and differences in firm-specific capabilities between SMEs and large-firms. In the third section, we discuss the development of our research design in order to find answers to our research questions. In the fourth section we present our findings and proceed to discuss their implications in the fifth section. Lastly, we present our main conclusions.

2. FIRM SIZE AND THE DETERMINANTS OF WAGE PREMIUMS

The resource-based view of the firm suggests that firms increase their competitive advantage by improving production efficiency through intangible resources, company assets and capabilities (Wernerfelt, 1984; Barney, 1991). This view originally stems from the theory of firm growth suggested by Penrose (1959) and subsequently developed by other authors (Teece, 1980 and 1982; Wernerfelt, 1984; Barney, 1986, 1989, 1991 and 1992; Prahalad & Hamel, 1990; Peteraf, 1993). The resource-based view pays closer attention to heterogeneity among firms and the origins of firms' idiosyncratic characteristics, that is, it considers each firm individually (Rumelt 1984; Nelson 1991).

Based on this approach, resources are the determinants of firms' competitiveness, yet what is meant by firm's resources? In our case, we understand resources to be a set of elements available for implementing a given competitive strategy (Barney, 1991:101; Penrose, 1959:xi). Like Abernathy & Clark (1985), we differentiate between capital assets —which can be physical assets (Williamson, 1985), human capital (Becker, 1975) or marketing assets (Biggadike, 1981)— , the way they are organized (Barney, 1991 and 1992), and the capabilities developed inside the organization, i.e., the collective knowledge shared by groups of employees and partially embedded in organizational routines. Specifically, capabilities consist of the set of skills and technologies required by a firm to offer a particular benefit to its customers (Hamel & Prahalad, 1994). The term "resources" refers to anything that could be considered a strength for a company —even tangible or intangible assets and skills— under the condition that they remain within the firm at least semi-permanently (Wernerfelt, 1984).

A firm's competitive advantage is based on the control of a distinctive level of resources. However, to sustain this advantage, firms must develop product and process innovative strategies to improve or, at least, maintain a differential level of resources. Accordingly, the resource accumulative process requires flows of assets and capabilities to improve productivity. We designate the set of elements not available to other competing firms in the market as "distinctive resources" since there is no strategic factor market (Dierickx & Cool, 1989), the resources can be imitated only imperfectly and there are no strategic substitutes. According to Barney (1991), a firm enjoys a temporary competitive advantage when it develops a competitive strategy that creates a market value that no other firm, at present or potentially, can imitate. This competitive advantage is based on the aforementioned distinctive resources. Thus, the firm can earn short-term rents stemming from the imperfection generated by its competitive strategy in the product and/or input markets (Cyert & Kumar, 1996b:28).

Consequently, we designated strategic resources as a set of distinctive resources that have become entry barriers (Wernerfelt, 1984; Peteraf, 1993). If a firm is implementing a competitive strategy based on the development and implementation of strategic resources, then it will enjoy a sustained competitive advantage. Hence, a competitive advantage can be maintained when it is based on a competitive strategy that is hard to imitate, specifically when other firms are unable to replicate the benefits of that strategy (Barney, 1991:102). However, Cyert and Kumar (1996a and b) have shown that in a dynamic setting, firms must change their product-market and organizational strategies over the company life-cycle in order to increase the sustainability of their competitive advantage as learning and adaptation costs increase with firm's size (1996b:30-31).

Because firm-specific resources are not embodied in a single agent, they are the product of team effort. Thus, if one individual decides to withdraw his/her supply of skills, the company's routines and, therefore, capabilities will not be readily affected (Aoki, 1984:27). Since quasi-rents have different origins, Aoki has designated their sum as "organizational rent" (1984:31). As Aoki holds, this organizational rent will be appropriated by the owners of firm-specific resources. Stockholders and employees have the bargaining power to appropriate it. Both groups of assets are needed to develop capabilities or organizational skills, thus without the cooperation of both groups of assets, company performance will be lower (Holmstron, 1989:317-8). In fact, the organizational-rent share that goes to employees, as Aoki, Dosi and Cyert and Kumar suggest, may take the form of wage premiums. The higher the organizational rents achieved by capabilities or organizational skills, the higher the employees' wage premium will be.

Nonetheless, the adherence to organizational routines and administrative procedures where capabilities lie may have its costs or drawbacks. When consumers, competitors, suppliers

and customers change their behavior, and even when economic institutions change, organizational routines clash with the firm's new strategic decisions (Doeringer & Piore, 1971, Bogaert, Martens & Van Cauwenbergh, 1994, Cyert & Kumar, 1996). As Aoki points out: "... and once-efficient customs may be turn into 'collective bads' from the viewpoint of the firm." (1984:26).

Doeringer & Piore also stated that organizational routines reinforce themselves by their frequent recurrence and the satisfaction or reward enjoyed by the organization's members (p.74). Thus, the longer an organizational routine has been functioning and the greater the satisfaction achieved in the past through its use, the more difficult it will be to modify, or as Cyert & Kumar put it, "incumbent or larger firms suffer adaptation costs due to the presence of imperfections in their internal-labor market" (1996b: 28-9). These authors have also shown that these adaptation costs imply that larger firms have higher learning costs than smaller firms. As a result, firms need to implement product and process innovations in order to improve the capacity of their capabilities to offer benefits to customers —cost and value—, reduce their learning costs and also reduce the resistance of organizational routines to change (adaptation costs).

The above arguments suggest that there are reasons for SMEs being something more than a miniature large company. Casson (1995:124) put forward the following hypothesis: "the link between a general theory of the firm and small firm economics comes from identifying small firms as the firms that specialize in operating in volatile environments." Even though we agree with Casson's answer, we disagree with his causality chain because he appears to consider SME capabilities to be static —in Casson's model, volatility comes from the difficulty to foresee demand conditions—, although, in reality, volatility is partially controlled by a firm's innovative strategies (Smith, 1956; Piore & Sabel, 1984; Cyert & Kumar, 1996). According to the latter,

"economizing requires not only adaptation in the passive sense of the firm taking as given the random arrival of the 'shocks' but that the firm also consciously generates these shocks in a pro-active way." (1996a: 220).

The resource-based view of the firm (Penrose, 1959; Wernerfelt, 1984; Barney, 1986, 1991) and evolutionary economics (Nelson & Winter, 1982) gives us a causality chain in which company size is the result of innovative managerial, marketing and organizational decisions. Whereas strategic marketing decisions aim to maintain and improve the value of firm-specific resources, the company's actual capabilities and assets make it possible to implement its marketing decisions. Thus, an innovative firm's strategies must be based on an accumulated set of firm-specific resources and on developing new ones to fill the gap between the level of the firm's resources and the need to implement the strategies (Hamel & Prahalad, 1994). Cyert & Kumar (1996) showed that a firm's marketing strategies ("product market", in their words) and organizational designs are closely related when it comes to seeking a competitive advantage.

Hence, a firm's size is the result of managerial decisions intended to develop and accumulate company capabilities (Teece, 1986) and focus on finding new ways in which they can be used (Penrose, 1959). Furthermore, as Dierickx & Cool (1989) pointed out, time-compression diseconomies, asset mass efficiencies, asset interconnectedness and causal ambiguity are characteristics of the process of resource accumulation, such that firms with an existing set of capabilities and strategic assets find themselves in a favorable position in the resource accumulation process. As firms get larger, however, their learning and adaptation costs increase and consequently, Cyert & Kumar's model predicts that firms will change their marketing and organizational strategies over the product life-cycle from strategies emphasizing

entrepreneurial and marketing function —product innovation— early in the company's life-cycle to those focused on cost reduction and process innovation (1996a).

Along the same lines as Penrose (1959), Aoki (1984), Piore & Sabel (1984), Teece (1986), Casson (1995) and Cyert & Kumar (1996), we suggest that large firms become large because they develop decision-making procedures, firm-specific resources and capabilities embedded into routines. Small firms remain small because they are unable to develop these intangible and firm-specific resources. This proposition differs from Casson's only in that we have not taken the intellectual qualities of a firm's management team as a given —we could interpret these intellectual qualities as a measure of those routines develop inside the firm—, but as a dynamic learning and adaptation process led by innovative managerial strategies. SMEs do not specialize in volatile environments because they lack the intellectual qualities required to select and memorize administrative procedures but rather because they are unable to devise innovative strategies based on (and intended to develop) new company capabilities, a fact that frequently keeps them small—; these are precisely the intellectual qualities mentioned in Casson's model.

As firms become larger due to implementation of successful competitive strategies, they earn quasi-rents stemming from imperfection in the product and/or input markets that results in imperfection in their internal labor markets as employees share the organizational rents. Nevertheless, as they get larger, their learning and adaptation costs also increase, thus causing a change in the way they compete. As firms grow they tend to employ product-innovation strategies, but when they actually become large, they shift toward the implementation of cost reduction strategies. In short, we expect employee wages of innovative firms to be higher than those of non-innovative firms, even though the determinants of the wage premium in small firms

are different than those in large ones. This suggests that wage premiums are rooted in different technological regimes (Nelson & Winter, 1982; Winter, 1986; Acs & Audretsch, 1988), defined as combinations of opportunity and appropriability conditions of cumulativeness of technological advances (Malerba & Oresenigo, 1996).

3. RESEARCH DESIGN

Research questions

The aim of our research was four-fold. First we addressed the question of the existence of differential wages stemming from quasi-rents in innovative firms. Since firms earn short- and even long-term rents due to product and input market imperfections caused by distinctive and strategic resources respectively, then rents are shared to the extent that these resources are shared by the firm's owners and employees,. Therefore, if we could reject the null hypothesis that wages do not differ between innovating and non-innovating firms, $w_I=w_N$, we would be able to support the alternative that states that owners and employees share organizational rents, $w_I>w_N$.

Secondly, we dealt with Casson's (1995) question about whether there is any reason for SME being anything other than a large firm scaled down to a smaller size. In our test, however, only company size was controlled. If we analyzed wages in innovating and non-innovating firms and found a significant interaction between a firm's innovative activity and its size in which size affected the wage earned by their employees, $(w_I^S-w_N^S)< (w_I^L-w_N^L)$, then we would be able to claim an affirmative answer to Casson's query, at least until we have a more robust test.

Thirdly, we proposed the following determinants of the wage premium. Like Cyert & Kumar (1996), we expected product innovation to have a positive impact on employee wage

premiums in both small-medium and large firms (larger in the former). The opposite situation was expected in the case that firms conduct process innovation and carry out both activities simultaneously. However, we also expected the impact of the firm's innovative activity on employee wage premiums to be moderated by appropriability and opportunity regimes where firms are competing.

By appropriability we mean the innovators' ability to protect their innovations from imitation and, consequently, to reap profits from their innovative strategy. Opportunity conditions refer to the ease of innovation by would-be innovators, and are related to the innovation potential of each technology (Nelson & Winter, 1982). As Levin, Cohen and Mowery (1985) demonstrated, concentration measures are proxies of both theoretical constructs and the effects of the respective sector are proxies of opportunity. By using a measure of concentration along with the sector's effects, we were able to split the moderating effect of the appropriability and opportunity conditions. We expected both theoretical constructs to have a positive effect on the wage premium earned by employees working in innovating firms. In other words, innovating firms will not be able to reap the benefits stemming from their innovative activity if they compete in regimes of weak appropriability (Teece, 1986), whereas firms competing in settings where innovating activity is easier will collect greater benefits from their innovative activity and consequently, the wages paid to their employees will be higher.

The last set of determinants refers to the firm-specific skills developed by firm's employees. As Doeringer & Piore (1971) and Aoki (1984) have shown, for a firm's employees to develop firm-specific skills they must carry out long-term idiosyncratic investments. In order to encourage employees to invest in firm-specific skills, the internal labor market must be isolated from the external labor market and, therefore, from current company performance. Thus,

we expected a firm's financial performance to positively affect the wage premium earned by employees working for small firms but not to influence the wage of employees working for the large ones at all. This would mean we could not reject the null hypothesis stating that SMEs specialize in volatile environments not because of any lack of intellectual ability to select and memorize administrative procedures, but because they are unable to devise innovative strategies based on, and intended to develop new, the firm's capabilities.

Finally, we dealt with the proposition that the determinants of wage premium must be different in small and large enterprises since as they grow, they change their cumulative set of capabilities and hence, the costs of learning from their environment and adapting to this new information. By splitting the sample into small- and large-firm sets, we were able to examine the above proposition and by controlling the variables that could affect the influence of a firm's innovative behavior on wages, we were able to conduct a much more robust test on the second research question. To the extent to which wages in small and large firms stem from different technological regimes, a difference in the parameters for the small- and large-firm regressions would offer support for Winter's (1986) and Casson's (1995) hypotheses.

Sample and variables

The database used for this study contained company-level information for the Spanish manufacturing industry obtained from the Business Strategic Survey (ESEE) and covered the period 1990-1994. The survey consisted of a panel with a different number of firms each year. However, we considered only the 2,188 firms that submitted data for each year. Samples were selected by excluding observations with missing values due to problems of data consistency.[1]

[1]We excluded any firm reporting zero sales and/or zero employment.

Observations for firms that did not report information in any of the three years were also deleted. This gave a final sample consisting of a balanced panel with 1,306 observations available for each period. The representative sample of the manufacturing industry was justified by comparing descriptive statistics of the main variables from the complete sample (2,188 firms) with the reduced one (1,306 firms). We confirmed the existence of two broad groups of firms: approximately 65 percent are small and medium-firms (less than 200 workers) and 35 percent are large firms (more than 200 workers).

Below we present the definition of variables. As an dependent variable, we used the *average firm wage* expressed as a logarithm to designate wage rents of employees (LNWAGE). Since one of the hypotheses we wished to test was the existence of organizational rents derived from innovations, we defined three innovation variables. For this purpose, we used the information available from the Business Strategic Survey on the kind of innovation activity being conducted by the firm. In all, we employed three categorical variables: PRODUCT (assigned a value of 1 when the firm specifically answered "yes" *only* to new product development and 0 otherwise); PROCESS (same as product but *only* when considering the inclusion of a new process) and BOTHINOV when the firm engaged in *both* types of innovation at the same time. We used these variables to test for real innovations in an attempt to separate innovations producing a new product from those that simply change the production process. Moreover, our interest in separating both activities supports the hypothesis that research activities are not homogeneous and that the determinants are different as well. In fact, we expected product innovation to detect and measure a wage premium in small companies. On the other hand, we expected process innovation, or both product *and* process innovation, to play a more significant role in large firms.

The second test concerned the role of firm size. To perform this test, two categorical variables referring to firm size were defined. SMALL was a dummy variable equal to 1 for small-medium firms (less than or equal to 200 workers) and LARGE, a dummy variable equal to 1 for large firms (more than 200 workers). Complementary to this hypothesis, we included concentration measures in the study in an attempt to detect and measure the conditions of appropriability and technological opportunity. The latter was approximated by four sector dummy variables[2] while the former, as Acs and Audretsch (1988) postulated, could be detected and measured by means of a relative market share variable (SHAREL) in an attempt to ascertain a company's market position with respect to the largest firm in each sector.

Although our interest was in measuring changes in wages due to improvements in internal capabilities through innovation variables, we included a set of wage determinants to determine the firm-specific qualifications of workers in order to test the company's labor structure. The survey contained information on employee share according to skill level. With this information we considered three variables that indicated employee skill level. We defined these variables as the proportion of engineers and employees in the firm with degrees (SKILLED), proportion of semi-skilled workers (SEMI-SKILLED) and proportion of non-degreed workers (NON-DEGREED). As stated above, these three categories allowed us to establish a clear indication of employment structure according to firm size.

Finally, we introduced a firm's observed productivity indicator (PT) as a proxy for the firm's organizational rents and also as a representative of the firm's specific skills that provides information on the cooperative routines that might affect wages. PT was defined as the quotient

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[2]We have 18 industry dummies meeting the NACE-CLIO criteria available in the sample, although we grouped them into four: chemicals and metal products; electrical goods, agricultural-industry machinery and motor vehicles; food, beverages and tobacco; and leather, wood and paper products. (We chose "chemicals and metal products" as our baseline industry).

obtained when dividing the firm's added value by the average number of employees during the year.

Table 1 lists descriptive statistics for the main variables according to size, allowing us to roughly observe several behavioral differences between the two groups of companies. As expected, we observed that wages were higher in large firms than smaller ones. The standard deviation also showed greater variance in remuneration within small companies. The descriptive statistics indicated that large firms showed a tendency to be more likely to be engaged in innovation activities. Process and simultaneous innovation rates were higher for large companies whereas product innovation appeared to be similar in both groups. This evidence confirms the hypothesis that large firms have a greater capacity to introduce some technical activity since they can take advantage of a better set of capabilities. It is also worth noting that there was a higher percentage of highly skilled workers (SKILLED and SEMI-SKILLED) in large firms. SMEs had low percentages of skilled employees, although this did not necessarily indicate that they specialized in volatile environments due to the lack of qualified workers but rather to the implementation of strategies based on their capabilities.

On the other hand, market share figures were interesting because they showed that large firms were better positioned market-wise, although there was considerable heterogeneity in this group with respect to the standard deviation. Interestingly, the value of the variable reflecting firm productivity, PT, was higher in large companies, as expected, although the mean productivity of SMEs was not insignificant. Finally, industry structure was similar in *Chem* and *Food*, but for *Electrical* and *Leather*, behavior was very different. Whereas the percentage of large *Electrical* firms was around 30% versus 18% for small firms, small firms in the *Leather*

sector accounted for a higher percentage, at 40 per cent. This is an indicator of the variations in technology opportunities that firms face.

Table 1. Descriptive Statistics				
	SMALL-MEDIUM (No. observ.: 3705)		LARGE (No. observ.: 2105)	
VARIABLES	MEAN	STD. DEV.	MEAN	STD. DEV.
LNWAGE	0.893	0.416	1.355	0.348
PRODUCT	0.096	0.295	0.088	0.284
PROCESS	0.138	0.345	0.215	0.411
BOTHINOV	0.100	0.300	0.280	0.449
SKILLED	0.023	0.048	0.048	0.067
SEMI-SKILLED	0.037	0.058	0.054	0.058
NON-DEGREED	0.940	0.082	0.898	0.103
CHEM.	0.286	0.452	0.302	0.459
ELECTRICAL	0.166	0.372	0.321	0.467
FOOD	0.154	0.361	0.150	0.357
LEATHER	0.394	0.489	0.228	0.420
SHAREL	0.016	0.034	0.206	0.255
PT	4.116	2.846	6.267	4.179

The empirical model

Our study focused on the importance of a firm's capabilities in wage premiums by taking into account the varying structures of companies. Hence, the specification can be formulated as follows:

$$W_{it} = \alpha W_{it-1} + \phi' INOV_{it} + \delta TAM_{it} + \gamma' X_{it} + \varepsilon_{it} \qquad [1]$$

where W is the average wage of firm i in period t (in natural logs), INOV is the innovation matrix containing the three technical variables presented in the previous section, TAM

is a categorical variable that controls firm size, X relates to other controlled variables, such as S which represents the skill composition of the labor force within the firm at the beginning of the period,[3] SHAREL is the relative market share of the firm and PT its productivity, ε_{it} is a random term composed of heterogeneity effects μ_i and a standard mixed error term, v_{it}. Finally, the introduction of lagged wages controls the dynamics in the process of wage determination and provides some assessment of how they affect current labor negotiations.

It is important to notice that we assumed that unions have no bargaining power concerning overall employment figures in the economy but only in firms, since this was where our specific interest lay. In Spain, this is possible because unions do not represent most workers, only those who are members; in fact, union members are insiders who have bargaining power within the firm.

Working with panel data has an advantage over cross-sectional analysis because unobserved heterogeneous effects (called "fixed effects" in the panel data) can be controlled, for example, the ability of manager to achieve good company performance throughout the period. The fixed effect parameter, μ_i, which measures such ability introduces a correlation with the lagged variable under the assumption that μ_i is unobservable. The result of the correlation is that Ordinary Least Squares (OLS) or Within Group (WG) estimation methods are inconsistent and hence, the need to overcome the correlation problem using alternative procedures. The estimation process finally proposed consisted of applying an alternative Instrumental Variable (IV) developed by Arellano and Bover (1995) and Blundell and Bond (1995). In this method the correlation between fixed effects and lagged wage is controlled using ΔW_{it-2}, as an instrument for

[3]Unfortunately, we do not have information on skill composition for the entire sample period. Hence, we must assume either that there were no changes in skills over time or that current skills are a function of past knowledge. Regardless of which assumption is chosen, we can safely assume that an employee's initial abilities are a good approximation of his/her skills.

lagged wage; this variable does not contain the fixed effects. This approach consisted of using the initial information conditions for deriving optimal estimators in dynamic panel data models.

In addition, we considered the possibility that innovation was endogenous. Hence, we need to instrument it to control the correlation among the technological variables and the error term. The instrument utilized will be I_{it-1} which not only corrects endogeneity problems but is also consistent with the organizational literature which considers innovation to have a lag in its determination process (Hall, et al. (1986)). Lastly, we checked that wage and productivity would be determined simultaneously; however, the correlation matrix and the previous control of innovation endogeneity led us to consider that productivity is an exogenous variable.[4]

4. FINDINGS

In general, Spanish industry has not engaged in much innovative activity. However, since Spain joined the European Economic Community (EEC) in 1986, firms have been led to change their strategic behavior in many cases. In fact, by 1992 45 per cent of the firms had introduced some kind of innovation compared with figures of around 15 per cent in 1986, as indicated by the Central de Balances survey conducted by the Bank of Spain (Labeaga and Martínez-Ros, 1994). Traditionally, Spanish industry has primarily been composed of small-medium firms with a low percentage of innovative activity. However, during the 1980's companies developed some technical changes (mainly in process innovation, according to data) which possibly affected the composition of their labor force as well as their internal capacity to compete. Entry into the EEC may be considered to have changed the competitive business environment, a new situation that required that companies devise innovative strategies to be more competitive and gain market share in both domestic and foreign markets.

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[4]Results of this correlation matrix are available on request.

A descriptive analysis for the entire period, 1990-1994, yields a significant feature: on the average, 15 per cent of firms carry out both product and process innovation, 9 per cent innovate only in new products and 14 per cent only in new processes. However, the evolution of these types of activities has been different. Product innovation has experienced an increase during the period, reaching 10 per cent in the final year studied. This contrasts with a slight decline in process innovation during the same year after a huge increase in 1991 (from 20 to 19%). A possible explanation for this is that the economic recession in Spain has had a greater influence on process innovation than product innovation. This is to be expected if we assume that the process view has permanent effects on company profitability whereas the product view has only temporary effects.

Figure 1: Innovations by type

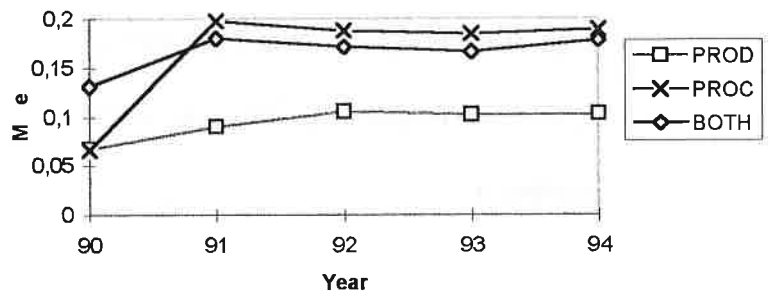

Table 2 shows the number of firms that performed innovative activities during the period 1990-94, broken down according to company size. Although the number of companies in the sample carrying out innovative activities was similar in small and large companies, the proportion differed as can be seen when considering the total number of firms in each group. A Chi square test rejects the hypothesis that the number of innovating firms is independent of their size ($\chi^2 = 342.1$). Consequently, we may state that in the Spanish industrial sector, large firms exhibit more innovative activity than small firms, although this does not necessarily result in higher

wages if company size is not associated with the existence of a competitive advantage due to greater efficiency achieved from firm-specific resources.

Table 2: Number of firms conducting innovating activities during 1990-1994			
	Innovating	Non-Innovating	Total
Small	1237	2468	3705
Large	1228	877	2105
Total	2465	3345	5810

In order to assess the effect of innovative activities on the wages paid by Spanish firms, we analyzed employee wages for firms undertaking some kind of innovation. Table 2 contains the results of a cross-tabulation of average wage (in natural logs) that distinguishes between innovating versus non-innovating firms and large versus small firms. The results clearly show that, on the average, innovating firms pay higher wages than those who do not carry out this activity, and that this difference is statistically significant at 1 per cent. When looking at the wage differential according to firm size, we observe that large firms pay workers more than small ones, and that this is also statistically significant.

Table 3: Mean of wage (in natural logs) by innovation activity and firm size			
	Innovating	Non-innovating	Total
Small firms	0.964	0.857	0.893
Large firms	1.364	1.344	1.355
Total	1.163	0.985	1.061

Surprisingly, we found that the salary difference was greater between large firms and small ones than between innovating and non-innovating firms. If companies grow by developing specific resources, particularly those routines that comprise their organizational capabilities, we should see a greater salary difference between firms as their size grows. To determine if these salary differences were random, we performed a variance analysis by studying the effect of

innovations on the salary paid by firms, controlling firm size. If we could reject the null hypothesis proposing that the relationship between innovation and size is insignificant, then we should separately analyze the impact of innovations on the wage paid by both groups of firms, since the influence will be moderated differently by other variables that could approximate both the firm's capacity to appropriate the profits generated and the technological opportunities offered by the sector in which they do business and by greater business efficiency.

Figure 2: Mean wage (in natural logs) by size

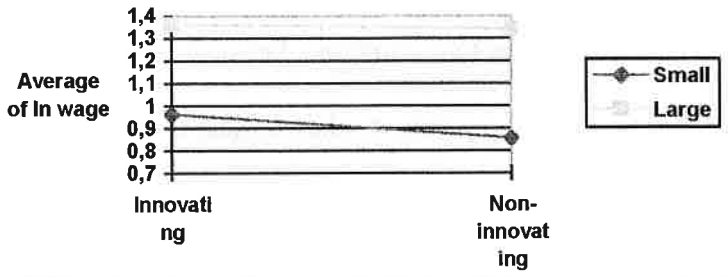

Figure 2 shows a linear-ordinal relationship pattern (see Green & Tull, 1978:356-372). The differential effect of moving from non-innovating to innovating on the salary premium earned by employees depends on the firm's size. The incremental effect is of the same order (positive) although less pronounced for large firms. This can be seen by looking at the departures from parallelism observed in each line segment. Actually, according to the F ratios of the variance analysis, the interaction between a firm's size and its innovating activity was quite significant (with an alpha level of less than 0.001).

As a result, we split the sample by size in an attempt to test for differences in pay structure. In equation [1] we considered that firm size was important to control but what we were also assuming was that small-medium firms and large firms use the same wage determination process. If we do not assume it *a priori*, we could study the differences in wage formation according to the size. In order to analyze this process, we proposed breaking the

sample into two groups (small and large) and estimating each subsample separately using different specifications for each one.

Large firms:

$$\Delta W_{it} = \phi' INOV_{it} + \gamma' X_{it} + \varepsilon_{it} \qquad [2]$$

Small-medium firms:

$$W_{it} = \alpha W_{it-1} + \phi' INOV_{it} + \gamma' X_{it} + \varepsilon_{it} \qquad [3]$$

We decided to estimate these two equations because we observed that the lagged wage parameter in large firms was approximately 1, thus indicating that past company performance played a key role in this size group, in contrast with the small-firm group, in which current activity was relevant, hence causing innovations to have a positive influence on wage determination.

The main findings of both processes are summarized in Table 4 where we also report the standardized beta coefficients. A larger wage difference was found between small-medium and large firms in all industries. While SMEs of all industries pay higher wages, we found that only large *Electrical* firms gave employees higher salaries. Although the wage process differed between small-medium companies and large ones, interesting conclusions may be reached concerning the influence of innovations on salaries. In both size groups, we observed that product and process innovations, taken separately, were the variables that most influenced salaries, although the effect was larger in small firms. Process innovations were also the ones that most favored workers when sharing current rents, which are reflected by the productivity indicator (PT). On the other hand, increases in the relative market share, as shown by the

minimal significance of its coefficient, does not appear to affect the capacity of entrepreneurs of SMEs to appropriate a portion of the profits produced by product innovations.

In large firms, both types of innovation had a lower impact on salaries. Like SMEs, however, increases in market share did not affect the rent-distribution process. Moreover, we also observed that productivity level per worker was significant but did not play a key role in the salary determination process, showing that large firms introducing some kind of innovation already had a dominate position in the market and did not seek direct profit increases from these activities. Lastly, when firms performed product and process innovation simultaneously, the effect on salaries was null regardless of the size group.

Table 4. Wage determination according to firm size[1]						
	SMALL FIRMS			LARGE FIRMS		
Dependent Variable:	lnwage			Δlnwage		
Variables	**Coefficient**	**Beta[2] coeff.**	**T-stat.**	**Coefficient**	**Beta coeff.**	**T-stat.**
$LNWAGE_{t-1}$	0.459	0.459	2.033	**n.a.**	**n.a**	**n.a.**
PRODUCT	0.202	0.143	2.179	0.099	0.081	1.888
PROCESS	0.251	0.208	2.079	0.046	0.054	1.977
BOTH	0.101	0.072	1.365	0.025	0.032	1.183
SKILLED	1.024	0.101	2.507	-0.034	-0.007	0.413
SEMI-SKILLED	0.417	0.058	1.552	0.080	0.013	0.842
ELECTRICAL	0.210	0.188	2.569	0.021	0.028	1.541
FOOD	0.160	0.139	3.405	0.026	0.027	1.883
LEATHER	0.156	0.183	2.934	0.017	0.021	1.528
SHAREL	0.269	0.022	0.821	-0.007	0.005	0.408
PT	0.059	0.404	1.989	0.003	0.036	3.251
No. observations:	1,482			1,684		
Chow's test: 14.36						

[1]All results are robust to heteroskedasticity.

[2]Beta coeffient=$\beta_i \frac{S_i}{S_y}$; where β_I is the regression coefficient, S_i is the standard deviation of the independent variable, and S_y is the standard deviation of the dependent variable.

Finally, we checked the existence of different regimes in the wage determination strategy using the Chow test and the specification in levels. Clearly, we rejected the null hypothesis that β estimates in both regressions were equal. This confirmed that salaries in both large and small-medium enterprises were generated by two distinct economic regimes, as Winter (1986) argues.

5. DISCUSSION AND IMPLICATIONS

Spanish firms have changed their innovative behavior since Spain became an EC member in 1986. In fact, the number of firms carrying out some kind of innovation process was threefold by late 1992. By that time, one out of ten Spanish firms were involved in product innovation,

almost one and a half out of ten Spanish firms were committed to implementing process innovation, and more than 15% were conducting both kinds of innovation. When crossing innovative behavior with firm size (Table 1), we found interesting figures: in terms of product innovation only, SMEs innovated more than large firms, although the difference was not impressive; however, when firms engaged *only* in process innovation or in *both* types of innovation, large firms innovated considerably more than small-medium ones.

How has this innovative process affected salaries paid by Spanish manufacturing firms? In particular, we were interested in knowing if salaries paid by innovative firms were higher, $w_I > w_N$. Results showed that innovating firms paid higher wages on average than those offered by non-innovating firms, and that the same pattern was found in both groups of firms (SMEs and large firms): $w_I^L > w_N^L$ and $w_I^S > w_N^S$. Thus, if firms can grow as the result of their capacity to develop organizational capabilities, then theory predicts that the salary difference among innovating firms will be greater in large firms than in SMEs, $w_I^L - w_N^L > w_I^S - w_N^S$.

A variance analysis showed that there was actually a linear relationship between innovation and size, suggesting the need to study the effect of innovations on salaries paid in each size group separately. Although the relationship favored salaries paid by innovative SMEs instead of large-innovating firms as theory predicted, the regression model used to estimate the determinants of salary levels in both groups of companies showed that in large firms, the firms' innovating activity only affected salary variations and not the levels.

This result showed the difficulties that large Spanish firms are experiencing in adapting to a significant change in the competitive environment: the incorporation of Spanish industry into the single European market and growing global competition they face from the remaining European countries as well as other industrialized (recent GATT agreements) and developing

(multifibre agreements, etc.) nations. Spanish manufacturing firms were particularly well adapted to compete in a protected market and firms that begin to achieve particularly high profitability through the efforts of firm-specific skills or organizational capabilities will have to pay higher wages and salaries that will capitalize on future organizational rent streams.

As Henderson and Mitchell (1997:7) pointed out, "firms that develop extensive organizational capabilities find it more difficult to adapt to major changes in an industry's environment than firms that rely on the capabilities of individuals." This further demonstrates the need to estimate the econometric model in levels for SMEs and in differences for the group of large firms. Recent articles in the Spanish press indicated that there are sometimes up to three labor agreements in a firm that define different wage scales for the same job and showed that salaries paid to the oldest employees included organizational rents from competitive advantages that the company had lost. Since salaries successfully resist being reduced, new employees must compensate for the competitive advantage lost.

The aforementioned difficulties experienced by Spanish manufacturing firms to adapt to major changes in their competitive environment are not new. Some time ago, Hall (1982) documented the problems experienced by American firms to adapt to new competitive environments and described the characteristics of some successful ones. Business press has also recently been writing about the idea that firms are learning organizations (The Economist, 11 Nov 1995, p.75). Although this issue is not new —Alfred Sloan, manager of General Motors (GM) in the 1930's, created a caste of general managers whose main job was to gather information from the shop-floor and the market (the learning activity) and use it as the basis for allocating resources (the adaptive activity). This seems to be the logical reaction to the downsizing that occurred in so many large firms during the 1980's. As Stephen Roach, an

economist for Morgan Stanley, recently pointed out (Cinco Días, 27 May 1996, p. 23), "there is future only if firms compete through the development of firm-specific assets and skills" and firms have not been investing in organizational resources because of the low rate of productivity increase during 1981-95 in the U.S., according to his study.

When analyzing the effects of innovative activity conducted by Spanish manufacturing firms, we observed that the effect on salaries paid differed according to company size. In general, the two types of innovation were important in both size groups, although the magnitude differed. Thus, whereas figures for large firms ranged between 3 and 10 per cent, in SMEs the effects showed a twofold increase. In particular, process innovations in SMEs resulted in salary increases of 25 per cent. This indicates that the implementation of improvements associated with production efficiency also leads to employee incentives in the form of increased rents. Nonetheless, the result for product innovations was not insignificant, since these innovations also provide substantial salary increases (20%). In large firms, however, product innovations had a greater impact than process innovations.

The results show that the impact of innovations on salaries was influenced by opportunity conditions in the firm's respective industrial sector. The SME group had better technological opportunities for innovation in the electrical, machinery and motor vehicle sector (designated "electrical" in Table 4) as well as the food, drink and tobacco sector (designated "food") and leather, wood and paper products sector (designated "leather") than the reference sector (chemicals and metal products). In the large-firm group, however, only the food sector offered better technological opportunities for large companies.

When we analyzed appropriability conditions, we observed that there were no significant differences in the large-firm group, indicating that large firms have the necessary resources to

appropriate the profits derived from their innovative activities. In the SME group, appropriation conditions (approximated by the *sharel* variable) also shown to be irrelevant to profits obtained from innovation. As Teece (1986) showed, companies can compete in different appropriability regimes, with those of weak appropriability being especially adverse. Consequently, companies lacking the necessary resources —either because they have no access or time to develop them— will experience a decrease in the amount of time during which they can enjoy the profits generated by their product innovations.

An analysis of the different magnitude of the *pt* variable in the two size groups showed a huge organizational difference between small-medium enterprises and large ones. Whereas large firms isolated their internal labor market from current organizational rents, SMEs did not. Large firms —along with their employees— invest in firm-specific skills and so the salaries paid are affected by the net present value of organizational rents rather than current rents. On the other hand, SMEs rely only on the skills of individuals (Henderson and Mitchell, 1997) and pay their market value, hence the salaries paid are affected by their current organizational rents.

Apparently, data for Spanish industry do not support the proposition of Cyert & Kumar (1996) that suggests that as they grow, companies experience an increase in the costs of learning and adaptation to their competitive environment. According to these authors, the same organizational capabilities that allow them to improve their skills in order to compete by imitating and innovating also create imperfections in their internal market that slow down their capacity for learning and adaptation, thus causing variations in their innovation strategies that encourage process innovation rather than product innovation. Nevertheless, before drawing conclusions we must relate the effect of current performance on salaries to the impact of innovations. Current performance suggests that salaries paid by large firms are isolated from

current profits, as proposed by theory (Doeringer and Piore, 1971) whereas the effect of innovations on salaries indicates that product innovations have a greater impact than process innovations. If salaries are isolated from current performance in large firms, then we should find that salaries are less affected by innovations, as is indeed the case and, moreover, that product innovations tend to have a greater impact than process innovations, since these are the innovations that add value to organizational routines. In order to test the thesis of Cyert and Kumar (1996), therefore, we should analyze the effect of innovation strategies on company profits instead of salaries paid.

Finally, Chow's test rejects the null hypothesis that states that there are no significant differences between the process that generates the salaries in both groups of firms. Apart from the difficulties faced by the Spanish manufacturing large firms to adapt to major change in their competitive environment, there are remarkable differences between the behavior of both large and small-medium manufacturing enterprises. Not only do their innovative strategies differ, but also the opportunity conditions they face, the appropriability conditions of the economic income stemming from their innovative activity, and the firm-specific resources to which they have access. This result —along with that found by Acs and Audretsch (1988) when studying the determinants of small-medium and large firms innovations— lends support to the hypothesis that small-medium enterprises are not simply scaled-down large firms.

6. CONCLUSIONS

We studied the effect of firms' innovative behavior on their employees' salaries and found a wage premium in the wages paid by innovative Spanish firms regardless of their size. However, when we looked at the premium according to size, we found the effect of innovative behavior to be greater in the SME group than in large firms, contrary to what was expected. This

finding —together with the fact that the salaries of large innovative Spanish firms are higher than salaries paid by SMEs— suggests that large Spanish manufacturing firms are finding it hard to react and adapt to the major environmental changes brought about by Spanish membership in the European Union. Furthermore, the average wage paid by larger firms was not affected by their current performance, suggesting that it is isolated from current benefits in order to foster the development of firm-specific human capital. In the SME group, however, current performance was a major determinant of salaries as well as the firm's ability to appropriate profits stemming from innovative behavior and technological opportunities offered by the industry where they are competing. Lastly, we found support for the assumption that salaries in both groups of firms are generated by two distinct financial regimes, providing evidence for the proposition that a SME is not simply a scaled-down large firm.

REFERENCES

ABERNATHY, W. J. & K. B. CLARK (1985) Innovation: Mapping the Winds of Creative Destruction, Research Policy, 14, 3-22.

ACS, Z. J. & D. B. AUDRETSCH (1988) Innovation in Large and Small Firms: An Empirical Analysis, American Economic Review, 78 (4), 678-690.

AOKI, M. (1984) The Cooperative Game Theory of the Firm. New York: Clarendon Press.

ARELLANO, M. and O. BOVER (1995) Another Look at the Instrumental-Variable Estimation of Error-Components Models, Journal of Econometrics, 68, 29-51.

BARNEY, J. B. (1986) Organizational Culture: Can It Be a Source of Competitive Advantage?, Academy of Management Review, 11 (3), 656-665.

BARNEY, J. B. (1989) Asset Stocks and Sustained Competitive Advantage: A Comment, Management Science, 32 (12), 1512-3.

BARNEY, J. B. (1991) Firm's Resources and Sustained Competitive Advantage. Journal of Management, 17, 99-120.

BARNEY, J. B. (1992) Integrating Organizational Behavior and Strategy Formulation Research: A Resource Based Analysis, Advances in Strategic Management, 8, 39-62.

BECKER, G. S. (1975) Human Capital-A Theoretical and Empirical Analysis, with Special Reference to Education. New York: Columbia University Press.

BIGGADIKE, E. R. (1981) The Contributions of Marketing to Strategic Management, Academy of Management Review, 6 (4), 621-632.

BLUNDELL, R.W. and S. BOND (1995) On the Use of Initial Conditions in Dynamic Panel Data Models, mimeograph.

BOGAET, I., R. MARTENS & A. VAN CAUWNBERGH (1994) Strategy as a Situational Puzzle: The Fit of Components. In G. Hamel & A. Heene Competence-Based Competition, 57-76. Chichester, West Sussex: John Wiley & Sons

CASSON, M. (1995) The Organization of International Business, vol. II. Aldershot (UK): Edward Elgar.

CHOI, Ch. J. & C. SCARPA (1994) A Note on Small versus Large Organizations, Journal of Economic Behavior and Organization, 24, 219-223.

CYERT, R. M. & P. KUMAR (1996b) Strategies for Technological Innovation with Learning and Adaptation Costs, Journal of Economics & Managerial Strategy, 5 (1), 25-67.

CYERT, R. M. & P. KUMAR (1996a) Economizing by Firms through Learning and Adaptation, Journal of Economic Behavior and Organization, 29, 211-231.

DIERICKX, I. & K. COOL (1989) Asset Stock Accumulation and Sustainability of Competitive Advantage, Management Science, 35 (12), 1504-1511.

DOERINGER, P. & M. J. PIORE (1971) Internal Labor Markets and Manpower Analysis. New York: M. Charpe Inc. (Notes come from the Spanish edition published by the Ministerio de Trabajo y Seguridad Social, Madrid, 1985.)

DOSI, G. (1988) Sources, Procedures, and Microeconomic Effects of Innovation, Journal of Economic Literature, XXVI (September), 1120-1171.

FIEGENBAUM, A. & A. KARNANI (1991) Output Flexibility-A Competitive Advantage for Small Firms, Strategic Management Journal, 12, 101-114.

GREEN, P. E. & D. S. TULL (1978) Research for Marketing Decisions. Englewood Cliffs, N. J.: Prentice-Hall.

HALL, W. K. (1982), Survival Strategies in a Hostile Environment, Harvard-Deusto Business Review, (4th quarter), 79-91.

HALL, B.H: Z. G. & J. A. Marsnan (1986) Patents and R&D: Is There a Lag?, International Economic Review 27, 265-283.

HAMEL, G. & C. K. PRAHALAD (1994) Competing for the Future. Cambridge, Mass.: Harvard Business School Press.

HENDERSON, R. & W. MITCHEL (1997) The Interaction of Organizational and Competitive Influences on Strategy and Performance, Strategic Management Journal, 18 (SI, Summer), 5-14.

HOLMSTROM, B. (1989) Agency Costs and Innovation, Journal of Economic Behavior and Organization, 12, 305-327.

LABEAGA, J.M. & E. MARTÍNEZ-ROS (1994) Estimación de un modelo de ecuaciones simultáneas con VDL: Una aplicación con datos de la Industria Española, Investigaciones Económicas, XVIII (3), 465-489.

LEVIN, R. C., W. M. COHEN & D. C. MOWERY (1985) R&D Appropriability, Opportunity, and Market Structure: New Evidence on Some Schumpeterian Hypotheses, American Economic Review, Papers and Proceedings, 75 (2), 20-24.

MALERBA, F. & L. OERSENIGO (1996) Schumpeterian Patterns of Innovation are Technology-Specific, Research Policy, 25, 451-478.

NELSON, R. (1991) Why do Firms Differ, and How Does it Matter?, Strategic Management Journal, 12 (S1), 61-74.

NELSON, R. & S. G. WINTER (1982) An Evolutionary Theory of Economic Change. Cambridge, Mass.: The Belknap Press of Harvard University Press.

PENROSE, E. (1959) The Theory of the Growth of the Firm. New York: Oxford University Press, Inc. 1995 edition.

PETERAF, M. A. (1993) The Cornerstones of Competitive Advantage: A Resource-Based View, Strategic Management Journal, 14, 179-91.

PIORE, M. & Ch. SABEL (1984) The Second Industrial Divide - Possibilities for Prosperity. New York: Basic Books. (Notes come from the Spanish edition by Alianza Editorial, Madrid, 1990.)

PRAHALAD, C. K. & G. HAMEL (1990) The Core Competencies of the Corporation, Harvard Business Review, 68 (3), 79-91.

RUMELT, R. P. (1984) Towards a Strategic Theory of the Firms, in Robert BOYDEN LAMB (ed.) Competitive Strategic Management. Englewood Cliffs, N. J.: Prentice-Hall Inc.

SMITH, W. R. (1956) Product Differentiation and Market Segmentation as Alternative Marketing Strategies, Journal of Marketing, 21 (July), 3-8.

TEECE, D. J. (1980) Economics of Scope and the Scope of the Firm, Journal of Economic Behavior and Organization, 1, 223-247.

TEECE, D. J. (1982) Towards an Economic Theory of the Multiproduct Firm, Journal of Economic Behavior and Organization, 3, 39-63.

TEECE, D. J. (1986), Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy, Research Policy, 15, 285-305.

WERNERFELT, B. (1984), A Resource-Based View of the Firm, Strategic Management Journal, 5, 171-180.

WILLIAMSON, O. E. (1985), The Economic Institutions of Capitalism. New York: Free Press.

WINTER, S. G. (1986) Schumpeterian Competition in Alternative Technological Regimes, in R. H. DAY & G. Eliasson (Eds.), The Dynamics of Market Economies, 199-232. Amsterdam (The Netherlands): Elsevier Science Publishers.