

Size, Age and Activity Sector on the Growth of the Small and Medium Firm Size

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ABSTRACT. Although corporate growth is one of the most researched subjects in different areas of economic science, it is not currently based on a general theory or generally accepted conceptual definition. In spite of this, growth has usually been considered an essential objective for a firm, contributing to its survival and competitiveness. This work aims to provide a more in-depth study of the factors that condition the growth of small and medium-sized firms, by offering some empirical evidence that will contribute to its modelling, especially in relation to the influence of size, age and activity sector. In this context, we shall attempt to contrast the validity of Gibrat's approach and the Learning Theory.

1. Introduction

Despite being one of the most studied subjects in different areas of economic science, corporate growth is not currently based on a general theory or generally accepted conceptual definition, since there are many approaches and opinions about its range, measurement parameters and determining factors.

Irrespective of the prevailing tendency at each time, the evolution of strategic thought in the last century usually presents growth as a fundamental objective for the firm, which contributes to its survival and competitiveness and which permits the achievement of a coalition of individual interests of the agents directly or indirectly related to the organisation.

Thus, investors give greater value to firms with

positive opportunities for future growth, providing executives not only with a greater financial reward, but also with greater levels of power, prestige and socio-professional fulfilment. However, reality shows how growth is not just the objective of the leaders of larger firms, but also of those in small and medium-sized firms, who, in most cases, are also the owners. Moreover, other groups, such as employees, customers and creditors, are also interested in the long-term continuity of the firm, which is why it is essential for it to reach an appropriate level of long-term profitability and growth.

The importance of growth is also apparent in the preoccupation of the various administrations in developing an economic climate that favours corporate expansion. To this end, several policies have been developed, aimed at achieving a critical size that favours competitiveness and reduces the death rate characteristic of small and medium-sized firms. Such policies presuppose the existence of a positive relationship between size and competitiveness. However, the effectiveness of these policies could be questioned if growth were really a random phenomenon or separate from firm size, as Gibrat (1931) pointed out when putting forward the Law of Proportional Effect, generating a certain controversy, which has lasted until today.

Within this framework, and among the empirical contributions, which have attempted to analyse the factors that condition and/or explain corporate growth, firm size has received the most attention, acting, in its relationship with growth, as the spinal column of the different approaches and focuses developed in this regard.

More recently, the Learning Theory has attempted to make up for the limitations or dissatisfactions of previous approaches, such as

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Gibrat's stochastic model (1931), to explain the growth dynamics of firms, by adding to the size factor others, such as age or activity sector, which recognise the importance of learning within the organisation, innovation, capacity of the directors, the competitive characteristics of the market, etc.

In this sense, the spatial scope to which this study is limited, the region of the Canary Islands, introduces a new attraction, given that the singular characteristics of this island environment might impose a limit on firm expansion when faced with a reduction in market size and a lack of competitiveness with external productions, owing to higher supply and distribution costs. However, as several macroeconomic indicators point out, the Canaries is one of the Spanish regions that has shown greater economic development in the last few years, adding yet another greater incentive to the study of the determining factors of firm growth in the islands.

In this context, and by using a sample of Canarian firms taken from the Commercial Performance Information Bureau of the University of La Laguna (from hereon CPIBLL), we have considered an investigation process with a double objective: (1) to analyse to what extent the singu-

larities of the socio-economic environment of the Canaries limit or introduce differential aspects into the expansion dynamics of its firms, and (2) to evaluate the degree of adaptation of the Canarian firm growth process to the approaches of the Learning Theory, by analysing the influence exerted by other factors, such as age and activity sector, as well as growth.

With this aim in mind, we have structured our work in the following manner: in the second section, we consider a brief review of the different theoretical and empirical contributions concerning growth that have been put forward from different areas of economic science. Thirdly, the main methodological aspects that characterise the empirical contrast are presented, the results of which are shown in epigraph four. Finally, section five is a summary of the main conclusions reached.

2. Corporate growth: some references

Despite the numerous studies about growth since it became popular as a factor for business competitiveness in the fifties', there is no current specific theoretical framework, nor even a list of

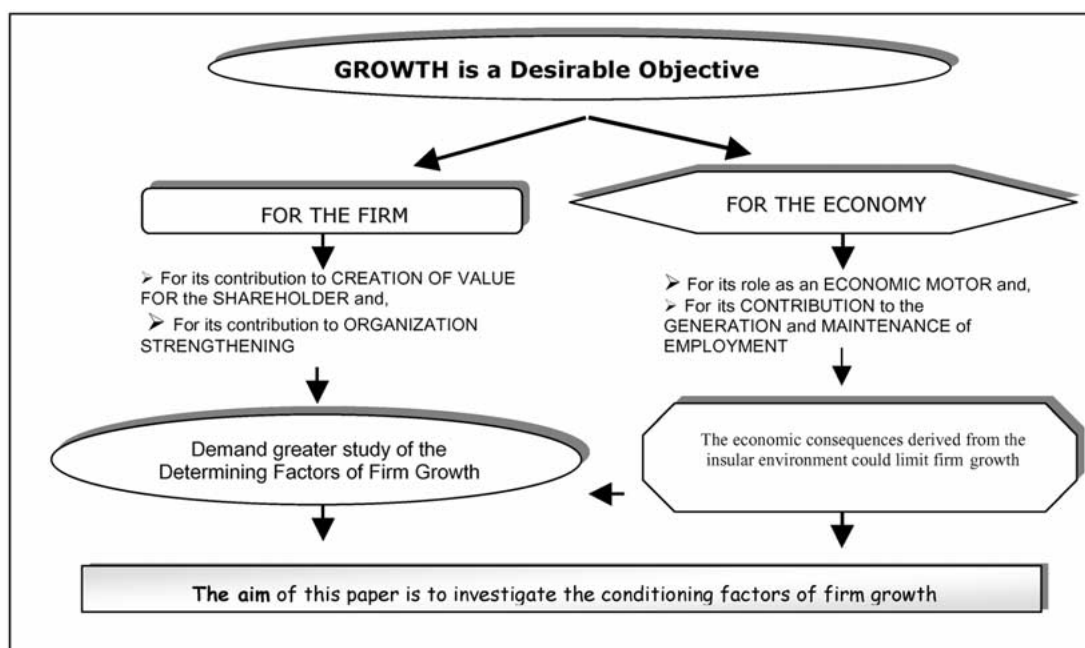


Figure 1.

conditioning factors. The characterisation of the subject of the parameters under study (the firm), the determination of a single measurement (or group of them) that unequivocally quantify growth, or the difficulty in distinguishing economically between growth and development¹ constitute some of the causes that explain this conceptual void.

Within this framework and among the empirical contributions that have attempted to analyse the factors that condition and/or explain corporate growth (degree of innovation, internationalisation, productivity, profitability, market share, etc.), firm size has received the most attention. A large part of this research could even be structured according to the sign of the growth-economy relation. Thus, we have:

1. The Classic Economic Theory indirectly tackled the study of growth as a change between two situations of balance within the production theory, focussing its attention on the search for optimum size (Viner, 1932) and on the modelling of investor behaviour (Chenery, 1952; Koyck, 1954; Jorgenson, 1963).

This approach proposed the existence of a negative relation between growth and size, smaller firms growing more rapidly than large ones, in view of the desire to reach a minimum efficient size as soon as possible. From this viewpoint, efficiency seems to reside in the achievement of economies associated with a larger size. Therefore, growth constitutes a limited process, by which the expansion behaviour experienced by the great multinationals cannot be explained.

2. The Behaviourist approach to growth, initially developed by Baumol (1959, 1962), Penrose (1962, 1995) and Marris (1964), is able to explain the continuous expansion of large firms beyond the limits proposed by economic efficiency, by working on the principle of the existence of a separation between the functions of property and control, given that growth enables executives to gain a higher degree of satisfaction for their individual objectives.

From this perspective, growth is a continuous process that arises the moment that management strives to exploit a group of underused factors to the utmost, the only limit being the coordinating

capacity of the management team to inspire confidence and security (Penrose, 1959).

3. Parallel to the previous perspective, the stochastic approach to growth makes its appearance back in 1931, when Gibrat (1931) put forward his Law of Proportional Effect, in which he states that size does not influence growth. In this Law, growth is described as a random phenomenon, resulting from several factors that act in a multiple fashion on the initial size of the firm. Benefits, profitability, possibilities for market expansion, the executives' aversion to risk or industrial or political trends are some of the factors that interact to determine firm growth, by favouring expansion, in some cases and, in others, a reduction in size.

As well as the inexistence of optimum size, three important implications, which become basic precepts, are derived from the fulfilment of Gibrat's Law:

- All firms have the same likelihood of growing at a determined rate, irrespective of their initial size, while the average expected growth and its variability are the same for all types of size.
- Past growth does not influence present growth, since there is no serial correlation.
- The variance of firm sizes tends to augment with the passing of time, which implies an increase in sectorial concentration if the number of firms remains constant.

The important implications of the fulfilment of Gibrat's Law (given that its effectiveness would be questioned) for the different public policies directed at promoting firm growth, and the greater facilities for establishing contrasting hypotheses against other alternatives have encouraged the development of numerous studies that have lasted until now.²

In that respect, and despite the ratification of the Law for some works, the violation of some of the basic assumptions has been the most common result. We have systematised these failures to comply into five types of growth-size relations, shown in Table I.

4. Precisely the limitations or dissatisfactions of the random approach to explain the dynamics of firm growth has recently given rise to a fourth,

TABLE I
Most frequent reasons for failure to comply with Gibrat's Law

Type I:	Small firms grow faster than large ones. Evans (1987a), Dunne and Hughes (1994) and Wing, Chow and Fung (1996) reach this conclusion. The negative relation justifies the search for the efficiency and competitiveness associated with a larger size.
Type II:	The opposite of Type I. The works of Samuels (1965), Prais (1976) and Dunne and Hughes (1994), among others, state this. The positive relation is justified by the special advantages available to large firms in contrast to the rest, the so-called economies associated with size, which materialise into greater powers of negotiation.
Type III:	Although average growth does not vary with size, variance diminishes with it. Studies by Hart (1962), Mansfield (1962), Hymer and Pashigian (1959), Hall (1987) and by Dunne and Hughes (1994) enable us to confirm this. Economically speaking, it is justified, since there is less likelihood of large firms disappearing.
Type IV:	The growth variance diminishes with the age of the firm. This is confirmed by the works of Evans (1987a and b), Dunne, Roberts and Samuelson (1989) and Fariñas and Moreno (1997). Time permits a greater understanding of the firm and the sector, by obtaining the advantages derived from experience.
Type V:	Growth distribution presents a first class auto correlation, so that firms undergoing a faster growth during the previous year tend to grow more quickly in the current year. This is confirmed by the works of Kumar (1985) and Wagner (1992).

Source: Own preparation, adapted from McCloughan (1995).

The Learning Theory, where new theoretical models are developed that emphasise and highlight the importance of learning for the organisation and its executives, innovation³ and the characteristics of the activity sector.

In these models, the explanatory capacity of size as a determining factor is completed by introducing age, which includes the learning process of the executives and the organisation itself as a whole, and, in any case, constitutes an approximation to the lifecycle of the firm. Along these lines, we must highlight Jovanovic's Model (1982), which explains the fastest growth of small firms through the introduction of a mechanism of Bayesian learning, which gradually reveals the differences in efficiency of the firm when the industry evolves. The empirical evidence obtained (Dunne, Roberts and Samuelson, 1989; Evans, 1987a, b; Dunne and Hughes, 1994; and Fariñas and Moreno, 1997; among others) seems to support these approaches, whereby growth and growth variability show an inverse relation with firm age and size.

For their part, Nelson and Winter (1982) and Erickson and Pakes (1995) centre their attention on the success of R+D and executives' skills, and Sutton (1997) points out that the non-influence of size on growth is due to the inexistence of a connection between markets, while Cabral (1995) explains the greater growth of small firms through

the existence of losses or non-recoverable costs, which mean that the initial investment is only a fraction of their optimal capacity in the long term. In this respect, Mata and Machado (1996) confirm the preference of new firms for a smaller size, while only firms in which economies of scale play a crucial part opt for a larger size.

More recent studies, among which we would highlight those of Hall (1987), Evans (1987a, b) or Dunne and Hughes (1994), have completed the growth analysis with the chances of survival, by attempting to correct the problems of a lack of representation of the samples used in the empirical studies, owing to lower survival chances, which are characteristic of small firms. Their results confirm that the existence of a negative relation between growth and size is due to the fact that small firms grow more and not to sampling problems.

Within the group of studies that stress the analysis of the growth-survival binomial, we emphasise the work by Harhoff, Stahl and Woywode (1998), which differentiates between firms that disappear voluntarily and those that do so through bankruptcy. Among their results, we highlight the fact that limited firms reveal higher rates of growth and bankruptcy than the rest, while individual entrepreneurs show higher rates of voluntary abandonment, especially when the owner retires.

From a review of the different models put forward from different areas of economic science, none of the approaches can be interpreted with total satisfaction, since the reason why some firms grow and others do not remains to be determined.

3. Objectives and methodology

3.1. Objectives

The aim of this study is to contribute to a greater understanding of the factors that explain the growth dynamics of small and medium-sized firms. In order to achieve this, from a sample of firms from the province of Santa Cruz de Tenerife (S/C TFE), extracted from the Commercial Performance Information Bureau of the University of La Laguna (CPIBLL),⁴ we have considered a research process with a double objective:

1. To analyse to what extent the singularities that design the socio-economic environment of the Canaries limit or introduce differential aspects into the dynamics of expansion of local firms.⁵
2. To evaluate the degree of adaptation to the approaches of the Learning Theory of the growth processes of firms in the province of Santa Cruz de Tenerife, by analysing the influence of other factors, such as age and activity sector, as well as size. The incorporation of these other factors responds to the following criteria:
 - The incorporation of size will enable us to contrast whether growth is an independent phenomenon of Gibrat's Law, or whether on the contrary, there is some kind of relation between these variables. According to the results obtained by most of the empirical evidence, we may expect to find the existence of an inverse relation between growth and size. At the onset, firms limit their size to an operative minimum, when unaware of the levels of efficiency and profitability, with the more efficient firms showing higher growth in the following years.
 - In several empirical studies, age has been revealed as one of the factors that conditions the probabilities of growth (Dunne, Roberts and Samuelson, 1989; Evans, 1987a, b; Dunne and Hughes, 1994; and Fariñas and Moreno, 1997) and survival (Boeri and

Bellman, 1995; Geroski, 1995; and Mata, Portugal and Guimaraes, 1995), since it reflects the learning process undergone by the business organisation, as was indicated by Jovanovic's model (1982). Within this context, a negative relation between growth and age would be expected, given that, the younger the firm, the more likelihood there is of taking wrong decisions. Furthermore, with time, the degree of diversification of a firm usually increases, which reduces the risk of erroneous decision-making.

- Despite the lack of attention paid by the empirical literature (McPherson, 1996; Harhoff, Stahl and Woywodes, 1998), the inclusion of sector aims to alleviate the limitations incorporated into accounting information, in order to evaluate the influence that specific activity factors (nature, technology, management systems, corporate culture, etc.) and competitive conditions (entry of new competitors, negotiating capacity of clients and suppliers, degree of rivalry and appearance of substitute products) exercise over the growth of a particular firm. Similarly, it will enable us to reflect the sensitivity or degree of correlation of the different activities and sectorial environments with the evolution of the general economic trend, revealed through various indicators such as the Gross Domestic Product.

The usefulness of this study is justified by the importance of growth in generating and maintaining employment. Our analysis serves as a contrasting factor for the efficiency of numerous measures of economic policy. These policies, put into practice by different governments and aimed especially at small and medium-sized firms, attempt to encourage the beneficial effects of growth. This is based on the hypothesis that increments in size are transformed into greater competitiveness, thereby increasing the firm's chances of survival and stable employment

3.2. Characteristics of the sample

The sample under study is composed of 1,092 non-financial firms extracted, after a screening process,

from 1,596 firms found in the CIBLL database during the financial years 1990–1996.⁶ The choice of the CIBLL as a main source of data for this study is not only justified for the availability of individual data from an extensive group of firms, but also because the companies included in this base respond to the fundamental profile of the fabric of Canarian business, which is characterised by small firms and by the predominance of the service sector.⁷

As an initial step towards obtaining the sample, from a total population of firms in the CIBLL, we selected those that remained active throughout the period 1990–1996.⁸ Secondly, firms presenting extreme size values in any of the years were eliminated. For the elimination of these outliers, we used the non-hierarchical K-means cluster analysis (Quick Cluster),⁹ by considering four variables together: total net assets, operating income, added value, and equity.

As a result of this screening process, we have obtained samples of 1,092 common firms, whose main characteristics can be seen in Table II.

3.3. Selection of variables

The variables adopted for the analysis (Table III) consist of a group of size and growth indicators based on the accounting information of firms whose selection process responds to the following criteria:

- *size variables*. In view of the lack of agreement

in economic literature when presenting a measurement (or group of them) that would unmistakably quantify and evaluate firm size, we have opted for selecting a group of indicators: total net assets, operating income, added value, and equity,¹⁰ whose multiplicity will enable us to evaluate to what extent the results of the analysis may be influenced by the variable selected to measure the size and growth of a firm.

Similarly, and in an attempt to overcome the inherent limitations of using one single measurement as representative of corporate size, by means of the application of the factorial analysis of the main components, we have calculated a multi-criteria indicator,¹¹ which comprises the total net assets, operating income and added value, since these resulting variables were the most correlated.

In this way, we obtained one single representative factor of firm economic size, whose own value was situated around 2.4, for each of the seven years considered. The percentage of the variance explained by this factor was in excess of 80.7%, in all cases, while the correlation of the three size variables considered with the factor was situated around 90% for each of the years.

- *Growth variables*. Defined as the inter-annual variation of different size variables, including the multi-criteria variable, due to the mathematical properties of factorial analysis.

TABLE II
Distribution and characteristics of the sample per activity sector

Sectors	Number firms	%	1993 (thousands pesetas)			1996 (thousands pesetas)		
			Average TNA	Average operating income	Average equity	Average TNA	Average operating income	Average equity
Agriculture	32	2.93	101.962	72.329	58.248	175.517	145.759	97.371
Industry	90	8.24	239.167	240.051	132.081	293.923	307.357	178.257
Construction	125	11.44	193.212	153.271	58.237	239.275	171.327	98.591
Commerce	459	42.03	198.026	283.351	81.396	232.652	338.214	114.551
Hotel trade	78	7.15	283.856	201.852	117.717	360.363	263.405	200.745
Other services	308	28.21	143.230	100.802	61.976	181.567	116.014	90.653
Total	1,092	100.0	188.807	201.358	79.413	231.600	242.867	116.968

Source: CIBLL and own preparation.

TABLE III
Size and growth variables

Denomination	Identification	Formulation
Variables of size		
<i>a. Static size variables</i>		
Total net assets (thousands of ptas.)	TNA	Net fixed assets + Expenses to distribute + Net working assets
Equity (thousands of ptas)	E	Subscribed – Shareholders by pending payment – Own Shares + Reserves + Trading results – Depreciable expenses – Interim Dividends+ Income to distribute
<i>b. Dynamic size variables</i>		
Operating Income (thousands of ptas)	OPIN	Net amount of turnover + Other operating income
Added Value (thousands of ptas)	AV	Operating income – Operating consumption – Other Operating expenses
Growth variables		
Total net asset growth (%)	TNAG	Inter-annual variation rate of total net assets
Equity growth (%)	EG	Inter-annual equity variation rate
Operating income growth (%)	OPING	Inter-annual variation rate of operating expenses
Value added growth (%)	VAG	Value Added Inter-annual variation rate
Multi-criteria growth (%)	MCG	Inter-annual variation rate of multi-criteria value

Source: Own preparation.

4. Results

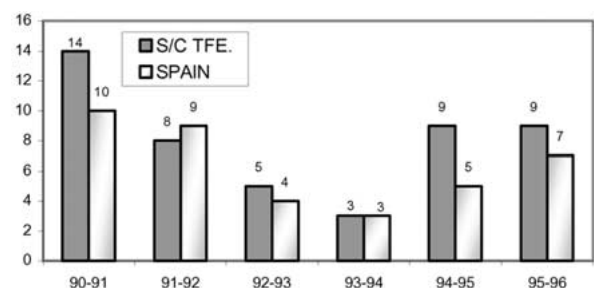
4.1. Incidence of insularity on growth

For the period 1990–1996, Table IV shows the comparative analysis of the evolution of growth rates registered by Canarian firms, in relation to Spanish firms as a whole, which form part of the database of the Commercial Performance Information Bureau of the Bank of Spain/Companies Registration.¹²

As can be observed, island firms generally demonstrate a greater inclination towards expansion than their national counterparts. Despite the negative economic effect assigned to the island condition throughout this study, it is precisely the incidence of some conditions of the island environment that explain such behaviour, namely:

- *Lower impact of the economic crisis.* Despite the fact that the evolution of growth rates in both areas shows similar tendencies, the industrial nature of the economic recession that began at the end of the eighties' and the specialisation of the Canarian economy in the service sector meant that there were fewer repercussions in Canarian firms than in national firms on the whole.¹³

- *Advantages of the Tax System (TS).*¹⁴ The profile drawn by Figure 2 demonstrate the greater effort of investment made by Canarian firms throughout the period under analysis, although it is especially noteworthy during the two-year period of 1990–1991. From this year, coinciding with the disappearance of the Provident Fund for Investments (PFI, a tax incentive for investment, which led to the non-inclusion of 90% of undistributed profits in the gross tax base of Company tax), a deceleration of growth was registered in the Islands, which



Source: Own preparation from the Commercial Performance Information Bureau of the Bank of Spain (1997) and the CPIBLL.

Figure 2. Rates of variation of net fixed assets.

TABLE IV
Growth of Canarian and Spanish firms 1990–1996 (percentages)

	1990–1991		1991–1992		1992–1993		1993–1994		1994–1995		1995–1996	
	Canaries	Spain	Canaries	Spain	Canaries	Spain	Canaries	Spain	Canaries	Spain	Canaries	Spain
Total net assets	11.49	6.98	3.45	4.89	3.28	2.69	6.08	4.68	7.94	4.91	7.13	5.56
Fixed assets	14.21	9.68	7.93	8.85	5.23	4.15	2.77	2.95	8.93	5.24	8.62	6.73
Equity	13.62	11.03	3.34	5.03	11.82	3.02	11.32	7.36	15.69	8.11	14.38	9.19
Operating income	5.51	4.08	3.04	-1.06	-0.35	-5.81	9.13	9.00	6.05	7.02	4.22	4.27
Net profit	22.26	-50.00	-70.03	-71.30	63.42	-77.11	124.19	204.0	38.67	18.94	13.83	11.05
Added valued	11.37	9.10	0.69	3.23	3.66	-2.79	12.64	7.04	7.55	8.04	1.22	6.54
Personnel costs	11.50	11.54	9.21	9.45	4.66	1.09	3.90	2.24	5.19	8.14	5.30	7.24

Source: Own preparation from the Commercial Performance Information Bureau of the Bank of Spain (1997) and the CIBIL.

showed no signs of recovery until the 1994–1995 period. This recovery coincided with the entry into force of the Reserve for Investments in the Canaries (RIC, a tax incentive similar to the PFI).

Together the PFI and the RIC are the main instruments for financing firm growth and a key factor for explaining, along with higher profitability (Figure 3), the greater growth of equity shown by Canarian firms in comparison with firms on a national scale, especially from the 1993–1994 period.

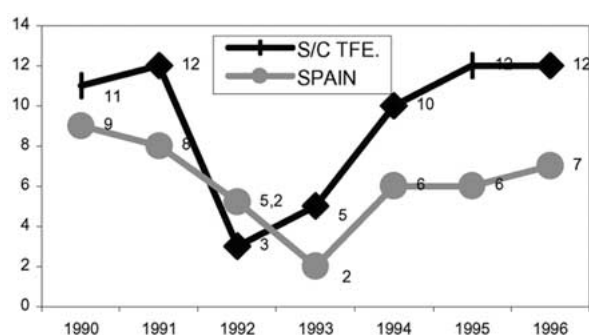
4.2. Incidence of size, age and activity sector

In order to analyse the extent to which firm growth may be explained by size, age and activity sector, we have combined regression analysis with the contrast of the hypothesis of equality of averages and variances in growth rates between groups, by considering different intervals of size and age to define those groups.

4.2.1. Regression analysis

With the aim of analysing the degree of adaptation of the growth process to the approaches of the Learning Theory and by following the methodology put forward by Dunne and Hughes (1994), we have considered a model that consists of returning the logarithm of current firm size with regard to the logarithms¹⁵ of its initial size and age, by also introducing a dummy variable representative of the activity sector.

The different economic activities present in the



Source: Own preparation from the Commercial Performance Information Bureau of the Bank of Spain.

Figure 3. Rates of yield.

island economy have been grouped together in five large branches, according to their importance in generating added value: agriculture, industry, construction, commerce, the hotel trade and other services. The equation to calculate for each of the five variables representing size (total net assets, equity, operating income, added value and multi-criteria variable, DIM) is as follows:

$$LD_t = \beta_0 + \beta_1 LD_{t-1} + \beta_2 LE_{t-1} + \sum \beta_i S_i + \varepsilon \quad (1)$$

Being:

LD_t = Decimal Logarithm of size at the current time;

LD_{t-1} = Decimal logarithm of size at the initial moment;

LE_{t-1} = Decimal logarithm of age at the initial moment;

S_i = Sectorial dummy.

In this model, if β_1 is not significant and different from one (for which we shall use the contrast $t = 1$), it could be concluded that growth and size are independent, that is, Gibrat's Law is maintained. However, most of the previous studies point to the existence of a negative relation between growth and size, even when problems in sampling selection have been corrected. Therefore, β_1 may be expected to be lower than one.

Moreover, based on the results obtained from the studies that have contrasted the Learning Theory, β_2 may be expected to be significant (for which we shall use the contrast $t = 0$) and negative, which would imply a higher growth in younger firms.¹⁶

Regression coefficients β_3 to β_7 might be expected to be significant if belonging to a specific sector implied any advantage or disadvantage for the growth of firms in the same sector.

Moreover, we have complemented the growth study registered during the seven years under analysis with the individualised study of the periods 1990–1993 on the one hand, and 1993–1996, on the other, given that growth registered during the 1990–1996 period could be influenced by disparate behaviour, in view of the evidence of different economic cycles. The different models considered have been calculated by ordinary least squares, except in cases where heteroscedasticity obliged us to use generalised least squares.

The calculation of the model considered for each of the size variables in question: total net assets, operating income, gross added value, equity and the multi-criteria variable, will enable us to analyse to what extent the results of the study may be affected by the way in which firm size is measured.

The analysis of the results¹⁷ obtained in calculating the models (Table V) gives the following:

- Contrary to what is suggested by the Learning Theory, age does not appear to influence firm growth rates, given that β_2 is not different from zero, according to Student's *t*-contrast.
- The initial size shows an inverse relation to growth, since β_1 is significantly lower than one, according to the results of the *t*-contrast, for all the variables used as representative of growth, from which we may derive that small firms are more inclined towards growth. These results seem to confirm, yet again, the non-fulfilment of Gibrat's Theories, given that the significance of the size variable in the regressions in Table V indicates that growth is conditioned by firm size.¹⁸
- As for sector, the analysis of coefficients β_3 to β_7 indicates that firm activity does not influence growth capacity, since these parameters are not significant, thereby confirming the results obtained by González and Correa (1998). The only exception occurs when the operating income in the 1990–1993 period is analysed, since the dummies representing industry, commerce and the hotel trade are significant and positive. This significance is associated with the lower impact of the crisis in these activities at the beginning of the nineties'.

Aiming for a more in-depth study of the age-size-growth relation, we proceeded to recalculate the model proposed in equation (1), by classifying 1,092 firms in the sample into five size intervals (micro-firms, small, medium, large and very large), by means of a cluster analysis, in which the multi-criteria variable (DIM) was used as being representative of firm economic size.

Thus, with the purpose of a more in-depth study of the contrast of the Learning Theory, we proceeded to cushion the effect of size against a possible interdependence with age, given that, frequently, smaller firms are also the youngest. To

this end, Jovanovic's model (1982) predicts that growth will decrease with age, when size is constant.

From this classification, the model proposed in Table V was calculated once again by ordinary or generalised least squares. In this case, we eliminated – equation (1) – the dummy variables representing sectors because of their non-significance. For practically all the variables considered, in the smallest size (micro-firms), we recurred to calculation by generalised least squares, owing to the presence of heteroscedasticity in the residue of the models calculated by ordinary least squares. With this transformation, where the inverse of size at the initial moment was used as a weighting variable, the problems of heteroscedasticity were not only solved, but the significance of the models was increased (Table VI).

The main results of these calculations are:

- the small differences in size existing between the upper and lower limits in an interval, are significant for explaining the growth registered by firms, since, according to the *t*-test, the β_1 coefficients are significantly different from one. Once again, this result ratifies the existence of a negative relation between growth and size.
- The analysis of parameter β_2 indicates that age is also significant to 5% of confidence for the smallest size category (micro-firms), showing an inverse relation to growth. If the confidence level is reduced to 1%, age is found to be inversely related to asset growth in small and medium-sized firms and with the growth of the multi-criteria value (DIM) in medium-sized firms.

These results indicate that, in the smallest size category, the youngest firms show higher growth rates, while firms that have been in operation for a longer period develop a certain aversion to growth as time passes

Despite the fact that the results obtained until now indicate size as a conditioning factor for firm growth, the values attained by the determining coefficients of the models calculated (R^2) assign it a discrete explanatory capacity.

This reason led us to recalculate the model proposed in Table 6 and to include, along with age and size, a new variable representative of the relative size of a firm or its market share

TABLE V
Results of the regression analysis

Relations	β_0 ($t = 0$)	β_1 ($t = 1$)	β_2 ($t = 0$)	β_3 ($t = 0$)	β_4 ($t = 0$)	β_5 ($t = 0$)	β_6 ($t = 0$)	β_7 ($t = 0$)	R^2 Aj %	Contrast F
$LTNA_{96} = \beta_0 + \beta_1 LTNA_{90} + \beta_2 LAGE_{90} + \sum \beta_i D_i + \varepsilon$	1.19 (10.01)*	0.79 (37.53) [†]	-4.67E-02 (-1.32)	6.47E-02 (0.75)	-9.49E-02 (-1.13)	1.38E-02 (0.18)	1.49E-02 (0.17)	-5.21E-02 (-0.67)	60.7	224.31*
$LTNA_{93} = \beta_0 + \beta_1 LTNA_{90} + \beta_2 LAGE_{90} + \sum \beta_i D_i + \varepsilon$	0.88 (10.03)*	0.83 (53.39) [†]	-6.53E-03 (-0.25)	0.13 (2.03)*	3.09E-02 (0.51)	8.26E-02 (1.46)	3.26E-02 (0.49)	2.05E-02 (0.36)	76.1	461.94*
$LTNA_{96} = \beta_0 + \beta_1 LTNA_{93} + \beta_2 LAGE_{93} + \sum \beta_i D_i + \varepsilon$	0.44 (5.00)*	0.95 (61.58) [†]	-5.84E-02 (-1.55)	-4.45E-02 (-0.72)	-0.12 (-2.07)*	-6.08E-02 (-1.11)	-1.42E-02 (-0.22)	-7.28E-02 (-1.31)	79.5	604.75*
$LOPIN_{96} = \beta_0 + \beta_1 LOPIN_{90} + \beta_2 LAGE_{90} + \sum \beta_i D_i + \varepsilon$	1.03 (7.39)*	0.78 (31.05) [†]	-2.03E-02 (-0.45)	0.13 (1.14)	2.04E-02 (0.19)	0.15 (1.50)	0.21 (1.83)	6.28E-02 (0.62)	56.7	181.67*
$LOPIN_{93} = \beta_0 + \beta_1 LOPIN_{90} + \beta_2 LAGE_{90} + \sum \beta_i D_i + \varepsilon$	0.81 (7.81)*	0.82 (44.50) [†]	3.45E-03 (0.11)	0.17 (2.26)*	2.40E-02 (0.30)	0.17 (2.26)*	0.19 (2.21)*	8.47E-02 (1.13)	73.2	375.98*
$LOPIN_{96} = \beta_0 + \beta_1 LOPIN_{93} + \beta_2 LAGE_{93} + \sum \beta_i D_i + \varepsilon$	0.49 (4.39)*	0.90 (45.91) [†]	5.39E-03 (0.10)	1.39E-02 (0.16)	2.78E-03 (0.03)	1.35E-02 (0.17)	5.58E-02 (0.61)	4.25E-03 (0.05)	71.4	376.09*
$LVA_{96} = \beta_0 + \beta_1 LVA_{90} + \beta_2 LAGE_{90} + \sum \beta_i D_i + \varepsilon$	1.06 (7.66)*	0.78 (28.85) [†]	-4.22E-02 (-0.99)	9.03E-02 (0.83)	-3.34E-03 (-0.03)	4.72E-02 (0.48)	0.11 (0.98)	4.94E-02 (0.49)	52.7	142.18*
$LVA_{93} = \beta_0 + \beta_1 LVA_{90} + \beta_2 LAGE_{90} + \sum \beta_i D_i + \varepsilon$	0.89 (7.98)*	0.80 (37.11) [†]	1.37E-02 (0.40)	0.12 (1.33)	-2.93E-02 (-0.34)	3.51E-02 (0.44)	9.50E-02 (1.05)	4.52E-02 (0.55)	65.3	243.31*
$LVA_{96} = \beta_0 + \beta_1 LVA_{93} + \beta_2 LAGE_{93} + \sum \beta_i D_i + \varepsilon$	0.56 (4.67)*	0.86 (38.38) [†]	3.06E-02 (0.55)	0.13 (1.36)	0.13 (1.35)	0.11 (1.24)	0.14 (1.41)	8.65E-02 (0.99)	64.3	252.47*
$LE_{96} = \beta_0 + \beta_1 LE_{90} + \beta_2 LAGE_{90} + \sum \beta_i D_i + \varepsilon$	1.38 (11.88)*	0.78 (37.35) [†]	-3.89E-02 (-1.02)	-3.26E-02 (-0.36)	-3.51E-02 (-0.40)	-6.42E-02 (-0.81)	-4.63E-02 (-0.49)	-5.05E-02 (-0.62)	63.8	217.90*
$LE_{93} = \beta_0 + \beta_1 LE_{90} + \beta_2 LAGE_{90} + \sum \beta_i D_i + \varepsilon$	0.99 (10.23)*	0.81 (46.46) [†]	5.05E-02 (1.61)	2.56E-02 (0.34)	-2.65E-02 (-0.36)	-3.81E-02 (-0.57)	-0.11 (-1.35)	-2.90E-02 (-0.42)	73.7	352.01*
$LE_{96} = \beta_0 + \beta_1 LE_{93} + \beta_2 LAGE_{93} + \sum \beta_i D_i + \varepsilon$	0.79 (8.81)*	0.88 (55.96) [†]	-9.81E-02 (-2.29)*	-5.54E-02 (-0.82)	-9.52E-03 (-0.14)	-2.91E-02 (-0.48)	7.08E-02 (1.01)	-3.14E-02 (-0.52)	78.7	503.11*
$LDIM_{96} = \beta_0 + \beta_1 LDIM_{90} + \beta_2 LAGE_{90} + \sum \beta_i D_i + \varepsilon$	0.70 (1.51)	0.65 (11.81) [†]	1.04E-02 (0.11)	-0.63 (-1.32)	-0.66 (-1.36)	-0.75 (-1.58)	-0.73 (-1.53)	-0.65 (-1.37)	43.1	24.55*
$LDIM_{93} = \beta_0 + \beta_1 LDIM_{90} + \beta_2 LAGE_{90} + \sum \beta_i D_i + \varepsilon$	-0.22 (-0.85)	0.74 (18.05) [†]	4.23E-02 (0.60)	0.13 (0.47)	5.67E-02 (0.21)	0.14 (0.52)	0.21 (0.77)	0.29 (1.09)	61.00	56.33*
$LDIM_{96} = \beta_0 + \beta_1 LDIM_{93} + \beta_2 LAGE_{93} + \sum \beta_i D_i + \varepsilon$	-0.16 (-0.58)	0.71 (14.33) [†]	8.79E-02 (0.76)	9.30E-02 (0.35)	5.31E-02 (0.20)	5.38E-02 (0.21)	-9.32E-03 (-0.04)	2.18E-02 (0.09)	49.6	34.57*

(...)*: t significant and different from zero to confidence level of 5%.

(...): t significant and different from one to confidence level of 5%.

Source: Own preparation.

TABLE VI
Growth-age relation by size intervals

Relations	β_0 ($t = 0$)	β_1 ($t = 0$)	β_2 ($t = 0$)	R^2Aj	Contrast	d
$LTNA_{96} = \beta_0 + \beta_1 LTNA_{90} + \beta_2 LAGE_{90} + \varepsilon$						
Micro-firms	1.77 (10.50)*	0.66 (17.04) [†]	-0.16 (-3.24)*	34.8	145.97*	2.02
Small	1.60 (5.01)*	0.71 (11.11) [†]	-1.44E-02 (-0.23)	32.9	63.83*	2.03
Medium	3.07 (5.38)*	0.48 (4.69) [†]	-0.15 (-1.67)**	20	14.62*	1.85
Large	2.39 (1.64)	0.57 (2.15) [†]	0.16 (0.82)	7.2	3.99*	1.94
Very large	5.57 (2.36)*	0.85 (2.60) [†]	-9.11E-02 (-0.23)	15.2	3.51*	2.02
$LOPIN_{96} = \beta_0 + \beta_1 LOPIN_{90} + \beta_2 LAGE_{90} + \varepsilon$						
Micro-firms	1.21 (6.93)*	0.77 (19.47) [†]	-0.12 (-2.00)*	42.7	190.71*	2.04
Small	1.42 (4.42)*	0.73 (11.52) [†]	1.92E-02 (0.24)	35.2	68.83*	1.89
Medium	4.81 (5.34)*	0.16 (0.93)	-0.26 (-1.20)	1.9	0.97	1.97
Large	3.08 (2.41)*	0.46 (2.11) [†]	6.63E-02 (0.35)	4.6	3.24*	3.96
Very large	3.55 (1.76)	0.30 (0.86)	0.54 (1.51)	5.9	1.85	2.06
$LVA_{96} = \beta_0 + \beta_1 LVA_{90} + \beta_2 LAGE_{90} + \varepsilon$						
Micro-firms	1.74 (9.03)*	0.63 (12.68) [†]	-0.16 (-2.61)*	26.1	81.51*	1.95
Small	1.54 (4.77)*	0.68 (9.34) [†]	3.96E-02 (0.55)	28.7	49.02*	2.03
Medium	1.59 (2.15)*	0.71 (4.61) [†]	-9.82E-02 (-0.68)	16.5	10.60*	2.03
Large	2.69 (1.20)	0.46 (1.03)	0.12 (0.44)	3.2	0.78	1.72
Very large	-0.53 (-0.24)	1.13 (2.66) [†]	-0.14 (-0.59)	17.6	3.56	2.06
$LE_{96} = \beta_0 + \beta_1 LE_{90} + \beta_2 LAGE_{90} + \varepsilon$						
Micro-firms	1.83 (13.21)*	0.65 (18.84) [†]	-0.18 (-3.20)*	44.4	178.94*	1.88
Small	1.53 (6.46)*	0.74 (14.15) [†]	-8.08E-02 (-1.28)	47.6	103.64*	2.09
Medium	3.21 (7.75)*	0.41 (5.01) [†]	-8.51E-03 (-0.07)	19.8	12.57*	1.74
Large	1.86 (2.79)*	0.68 (5.04) [†]	0.15 (1.03)	38.3	15.25*	1.80
Very large	1.75 (3.01)*	0.65 (5.52) [†]	0.18 (0.85)	42.7	17.20	1.89

TABLE VI (Continued)

Relations	β_0 ($t = 0$)	β_1 ($t = 0$)	β_2 ($t = 0$)	R^2 Aj %	Contrast F	d
$LDIM_{96} = \beta_0 + \beta_1 LDIM_{90} + \beta_2 LAGE_{90} + \varepsilon$						
Micro-firms	-3.47E-03 (-0.92)	0.85 (4.84) [†]	-0.14 (3.95) [*]	35.7	85.46 [*]	1.99
Small	-7.45E-02 (-0.28)	0.55 (5.52) [†]	9.14E-02 (0.35)	46.9	21.29 [*]	2.01
Medium	0.16 (0.85)	0.69 (3.01) [†]	-0.29 (-1.68) ^{**}	9.0	5.04 [*]	2.02
Large	9.19E-03 (0.07)	1.09 (2.03) [†]	2.67E-02 (0.19)	5.2	2.02	2.01
Very large	0.26 (0.42)	-0.78 (-0.48) [†]	0.18 (0.65)	3.0	0.36	2.05

(...)*: t significant and different from zero to the confidence level of 5%

(...)**: t is not significantly different from zero to 5% of confidence but it is to 1%.

(...): t u significant and different from one to confidence level of 5%.

Source: Own preparation.

(measured as the business turnover of a specific firm in relation to the entity that shows the largest business turnover in its sector), as a proxy indicator of the competitive advantages or disadvantages of a firm against its most direct rivals when facing different business trends.¹⁹ The explanatory capacity of the models did not improve with regard to the contents of Tables V and VI, since the new variable introduced was not significant. Moreover, when proposed in squared terms, the explanatory capacity of the model calculated did not improve either. The conclusions obtained pointing to the existence of an inverse relation between growth, age, and size did not vary either.

4.2.2. Contrast of the hypothesis of equality of variance and averages in growth rates

With the purpose of revalidating the conclusions obtained in the regression analysis, we proceeded to contrast the hypothesis of equality of variance and averages between groups, by considering different size and age intervals. Thus, for example, we shall contrast whether the degree of growth variance and the average rate of expansion of small firms are similar to those shown by medium or large firms.

The procedure applied to contrast variance

equality was Snedecor's F test, while the t test was used for the averages analysis.

• Contrast of Variances by Size Intervals

Depending on the results obtained in the regression analysis, the rejection of the variance equality hypothesis might be expected, at least for the smallest size category, which showed the highest rates of growth and variance.

The p -values of Snedecor's "two by two" F test given in Table VII, infer that the variance equality analysis cannot be accepted in the growth rates of the different size categories in all the variables analysed, since the small firms show greater variance.

These results confirm those obtained by González and Correa (1998), who attributed this greater variance to the higher risk undergone by smaller size firms in carrying out their activity, owing to diminished probabilities of diversification, the lack of adaptation of their organisational structure, lesser qualified management personnel and a financial structure characterised by the absence of outside finance in the medium and long term.

• Contrast of Variances by Age Intervals

The contrast of Snedecor's F test reveals at a

TABLE VII
Contrast two by two of equality of growth variances 1990–1996

	Small and medium	Small and large	Medium and large
TNAG _{90/96}	6.99E-03	8.72E-09	6.44E-07
OPING _{90/96}	1.18E-10	2.43E-27	3.17E-05
VAG _{90/96}	2.90E-70	1.78E-20	2.67E-04
EG _{90/96}	1.04E-87	7.99E-10	3.96E-09
DIMG _{90/96}	1.83E-25	4.66E-13	2.88E-05

* The variance equality hypothesis is accepted at the confidence level of 5%.

** The variance equality hypothesis is rejected at 5% confidence, but accepted at 1%.

Source: Own preparation.

5% confidence level that there are differences in the variability of growth rates for each of the age intervals considered, since practically all the pi-values shown in Table VIII are below 0.05. The exception is firms aged between 6 and 10 and between 11 and 15, since the variance equality of equity growth rates and the multi-criteria value (DIM variable) are accepted.

The greatest risk usually undergone by the youngest firms, which originates from a lower level of development in skills and techniques,²⁰ justifies the greater variance shown by these firms in their growth rates, which confirms the results obtained in the scope of the Learning Theory by

Dunne, Roberts and Samuelson (1989); Evans (1987a, b); Dunne and Hughes (1994) or Fariñas and Moreno (1997).

• Contrast of Averages by Size Intervals

After contrasting variance equality, we proceeded to contrast the equality of averages two by two in groups by means of Student's *t* test, bearing in mind whether these groups showed equal or unequal variances, as described in Table IX, which shows the pi-values.

The results obtained by means of Student's *t* test are contradictory when the hypothesis of equality of averages in the growth rates between

TABLE VIII
Two by two contrast of variance equality by age intervals

	TNAG _{90/96}	OPING _{90/96}	VAG _{90/96}	EG _{90/96}	DIMG _{90/96}
E.1 and E. 2	3.67E-15	1.08E-10	0.40*	2.70E-103	1.44E-67
E.1 and E. 3	0.03	0.04	0.04	1.10E-85	1.15E-68
E.1 and E. 4	1.63E-46	6.49E-46	4.31E-92	1.27E-38	3.65E-17
E.1 and E. 5	2.11E-37	6.13E-14	5.80E-83	9.04E-98	5.65E-31
E.1 and E. 6	7.38E-20	1.59E-14	2.29E-18	6.78E-34	2.04E-33
E.2 and E. 3	0.01	2.59E-17	2.47E-05	8.86E-04	1.07E-24
E.2 and E. 4	3.01E-152	1.29E-74	3.10E-100	4.04E-04	2.09E-12
E.2 and E. 5	1.73E-130	9.83E-36	9.78E-90	1.98E-59	1.24E-47
E.2 and E. 6	1.03E-49	8.19E-22	1.17E-19	2.25E-20	1.03E-42
E.3 and E. 4	9.18E-21	2.81E-57	2.65E-91	0.11*	0.89*
E.3 and E. 5	8.10E-15	1.12E-21	6.34E-82	3.28E-53	3.99E-09
E.3 and E. 6	3.70E-11	5.54E-17	2.61E-17	1.62E-18	1.36E-11
E.4 and E. 5	0.01	2.43E-16	0.01	2.37E-45	1.05E-03
E.4 and E. 6	0.02	0.04	5.54E-13	1.32E-16	5.03E-65
E.5 and E. 6	2.76E-03	1.09E-05	1.21E-12	0.01	2.07E-47

E1: Less than 1 year; E2: Between 1 and 5 years; E3: Between 6 and 10 years; E4: Between 11 and 15 years; E5: Between 16 and 25 years; E6: Over 25 years.

* The variance equality hypothesis is accepted at a confidence level of 5%.

Source: Own preparation.

TABLE IX
Contrast of equality of growth averages, two by two 1990–1996

	Small and medium	Small and large	Medium and large
TNAG _{90/96}	0.32*	8.17E-07	0.15*
OPING _{90/96}	0.13*	0.01	1.47E-03
VAG _{90/96}	0.01	8.06E-06	1.03E-03
EG _{90/96}	0.16*	0.52*	0.87*
DIMG _{90/96}	0.06*	0.01	0.06*

* The variance equality hypothesis is accepted at the confidence level of 5%.

Source: Own preparation.

small and medium firms is accepted for practically all the variables considered, except for value added growth. The equality hypothesis is also accepted for asset and equity growth and for the multi-criteria indicator between medium and large firms. A difference is appreciated between small and large firms is appreciated, with small firms showing expansion behaviour.

• *Contrast of Averages y Age Intervals*

We proceeded to contrast the equality of averages (Table X) by means of Student's t test, based on the existence of differences in firm growth variance by age intervals. The results enabled us to accept the equality hypothesis in

average rates of growth for almost all the variables when firms were over five years old. Therefore, the first five years seem to be the most critical, with young firms showing higher growth rates.

5. Conclusions

From the results obtained in the preceding pages, the most relevant conclusions are highlighted as follows:

1. The singularities of the socio-economic environment of the Canary Islands introduce differential aspects to firm growth dynamics, revealing a greater tendency towards expansion

TABLE X
Contrast two by two of equality of average by age intervals

	TNAG _{90/96}	OPING _{90/96}	VAG _{90/96}	EG _{90/96}	DIMG _{90/96}
E.1 and E. 2	0.04	0.01	0.04	0.02	0.01
E.1 and E. 3	3.57E-04	0.03	0.01	0.01	0.02
E.1 and E. 4	2.69E-05	6.40E-04	8.94E-04	9.36E-03	2.02E-06
E.1 and E. 5	3.07E-05	3.63E-03	9.09E-04	0.04	5.83E-07
E.1 and E. 6	1.46E-05	1.88E-03	1.48E-03	5.89E-03	4.32E-03
E.2 and E. 3	0.19*	0.04	0.04	0.03	0.05*
E.2 and E. 4	0.17*	0.01	0.01	0.04	4.03E-04
E.2 and E. 5	0.04	0.04	0.02	9.77E-03	1.62E-05
E.2 and E. 6	0.01	0.04	0.04	0.02	0.01
E.3 and E. 4	0.19*	0.11*	0.05*	0.55*	0.24*
E.3 and E. 5	0.11*	0.38*	0.05*	0.09*	0.06*
E.3 and E. 6	0.08*	0.27*	0.12*	0.14*	0.04
E.4 and E. 5	0.93*	0.34*	0.91*	0.06*	0.81*
E.4 and E. 6	0.41*	0.34*	0.57*	0.09*	0.08*
E.5 and E. 6	0.40*	0.79*	0.59*	0.70*	0.34*

E1: Less than 1 year; E2: Between 1 and 5 years; E3: Between 6 and 10 years; E4: Between 11 and 15 years; E5: Between 16 and 25 years; E6: Over 25 years.

* The hypothesis of equality of averages is accepted at a confidence level of 5%.

Source: Own preparation.

than in the rest of Spain throughout the 1990–1996 period.

To this end, and despite the negative economic effect attributed to the island condition (remoteness, territorial fragmentation, higher costs, etc.), the lower impact of the economic crisis and the existence of a differential Tax System that encourages growth through tax savings, are revealed as environmental aspects that determine this higher growth.

2. The growth dynamics of firms in the province of Santa Cruz de Tenerife shows different levels of adaptation to the approaches derived from the Learning Theory. In this way, and in line with what was obtained from other empirical works summarised in the second epigraph, we emphasise the following:

- The existence of a negative relation between growth and size, small firms revealing a greater propensity towards expansion. Similarly, this group demonstrates a greater variability in growth rates, which gradually diminish as size increases. This circumstance confirms the approaches of the Learning Theory, since there is an inverse relation between size and risk in the development of business activity. This confirms yet again the abandonment of the stochastic approaches to growth.
- Age reveals contradictory results. When the influence of non-significance is studied together with size, it is overcome when the effect of size is isolated, and age shows an inverse relation to growth for the smallest size categories (micro-firms), with no influence on the rest. This result may be explained by the reduced size of the market in the Canary Islands, which means that younger, often smaller firms grow more quickly until a certain size is reached. The frontier of this size is marked by the limitations of the island, or, at best, regional market.

The contrast of averages and variances by age intervals reveals that a firm's first five years are the most dynamic, with higher growth rates and a higher volatility. An increase of the antiquity of the firm is accompanied by a decrease of this variance,

and there is no difference in the average growth rate by age intervals.

- Contrary to what might be expected given the significant tertiary nature of the economy of the Canaries, the activity sector is not a determining factor of corporate growth dynamics.

Therefore, policies destined to promoting the creation of small firms as a weapon against unemployment should be accompanied by backup initiatives that reduce activity risks in the early phases of the lifecycle and raise the likelihood of survival to levels similar to those of already established competitors. Likewise, the development of more flexible alternatives for financing, technical support and business guidance are required. To the contrary, the efficiency of the policies destined to creating firms would not be maximised and would merely contribute to raising the rate of business failures.

Finally, we should like to highlight the fact that, despite the stability of the results obtained, the most relevant contributions of this study correspond to the methodological plane and, in particular, to the following aspects:

- The sample under analysis is characterised by the small and medium size of the firms that shape it. This circumstance is rather unusual in this kind of study, since the analysis of large firms listed on the Stock Exchange is what has monopolised the attention of researchers, owing to the greater availability of financial information.
- Secondly, we have added a multi-criteria factor representative of firm economic size to the classic variables used for measuring size and growth (total net assets, equity, operating income and added value), which resulted from the combination of three of the previous variables, according to the weightings conferred by the factorial analysis. The results do not appear to prove that this multi-criteria variable has a higher explanatory capacity than that shown by the single criterion indicators.
- Furthermore, we have evaluated the degree of incidence exercised on the results by the isolated choice of one variable or another as representative of size and growth, reporting limited influence. The results are similar, irre-

spective of the variable considered as representative of growth and size.

In any case, we are aware of the limitations of this methodology, fundamentally derived from the manifest lack of agreement in specialist literature about such relevant aspects as the very definition of the accounting nature of the information used. Nevertheless, we have aimed to provide some empirical evidence that will contribute to a greater understanding of the factors that explain the growth of small and medium firms.

Notes

¹ Economists frequently reserve the term growth to express the process of quantitative increase of production over time, while the term development is used to refer to qualitative variations that may include quantitative changes or not. In this sense, Penrose (1962, p. 3) opts for an indifferent use of these terms, considering that "... *development is the result of the reciprocal action of a series of internal changes leading to size increase, accompanied by changes in the characteristics of the object of growth*".

² Among the most recent, we may quote Das (1995), McCloughan (1995), Sutton (1997), Fariñas and Moreno (1997), González and Correa (1998) and Correa (1999).

³ See, among others, Acs and Audretsch (1988), Amirkhalkhali and Mukhopodhyay (1993) and Brouwer (1998).

⁴ The CPIBLL was formally constituted on 13th June 1994. Its basic objective was the creation of a database to include all non financial firms in the province of Santa Cruz de Tenerife, from the annual accounts presented at the Companies Registration Office in this province, which would contribute to the better understanding of corporate reality, in itself and as a source of information for other research. For more knowledge of its characteristics, methodology and results, please consult the Spanish Society of Registrars of Deeds and Companies (1996).

⁵ The peculiar geographical situation of the archipelago of the Canaries (located at over 1,800 km from Madrid and almost 3,000 km from Brussels, being the second region furthest from the European Continent among 14 existing island regions), notably conditions the commercial relations of local companies with the big continental markets both in the purchase of inputs and in the sale of outputs, limiting the size of the market, which in most cases, is not even regional, but simply local. Furthermore, the discontinuity of markets implies a rise in the costs and time required for incomings and outgoings, as well as a limited power of attraction for the location of numerous productive activities, owing to the absence of economies of scale and location. Moreover, the remoteness from the centres of production of raw materials and from external markets generates the need for greater stocks of raw materials and manufactured products, which results in higher production costs.

⁶ All the companies that have fulfilled the precept established in Act 19/1989 of 25th July, by depositing the annual accounts at the Companies Registration Office, with a minimum level of quality in the accounting information, are grouped in the CPIBLL, according to the National Classification of Economic Activities (NCEA) of 1993 (two digits).

⁷ The degree of coverage of the CPIBLL, measured in terms of gross value added to the cost of the factors, rose in 1995 to 18.3% of the total number of firms in the province of Santa Cruz de Tenerife, according to data from the BBV Foundation (1997). The scope of this coverage should be valued by bearing in mind that almost 72% of the Canarian business fabric is composed of entrepreneurs and natural persons exempt from the obligation of presenting the annual accounts at the Companies Registration Office.

⁸ The consideration of panel data introduces certain advantages for modelling and analysing evolution. Maravall (1976, p. 83) pointed out that a large part of a sector's developmental process is determined by firms that have remained for the period under study.

⁹ With this method the group of individuals is divided into conglomerates, so that at the end of the process each case belongs to the cluster whose centre is closest to it. The Euclidean distance is the measure used for establishing the proximity between each case and the centre of its respective cluster.

¹⁰ The accounting nature of the basic information has prevented us from incorporating a wider range of variables to constitute this indicator, such as indicators representing the degree of diversification of the firm or the complexity of its organisational structure (AECA, Asociación Española de Contabilidad y Administración de empresas, 1996, p. 27–30).

¹¹ In this regard, see: Bueno and Lamothe (1986); González and Correa (1998) and Correa (1999).

¹² The coincidence in the origin of the data (accounting data from the archives of the Annual Accounts of the Companies Registration Office), along with the similar characteristics of the information gathered (corporate size, sectorial distribution, etc.) justify the choice of this base as the best option for the comparative analysis (Commercial Performance Information Bureau of the Bank of Spain, 1997).

¹³ The profile of the Canarian economy has traditionally shown a certain asynchronism in relation to the behaviour of the Spanish economy overall. Thus, the Canaries seem to initiate phases of recession and expansion ahead of time (Gil, 1995). This circumstance can be explained by the sectorial structure of the economy of the archipelago, with a predominance of activities closely related to the international economy: tourism, and to a lesser extent, agriculture for export. This means that cyclical variations in the Canaries have been traditionally linked, in a basic way, to fluctuations registered in the international economy (Alonso et al., 1995, p. 50).

¹⁴ The exposed geographical features of the archipelago (remoteness, territorial fragmentation, relief and difficult climate, lack of raw materials), have, by way of compensation, traditionally provided the Islands with special economic and tax conditions, different to those applied to the rest of the nation. However, the inclusion of Spain into the European

Community in 1986 led to numerous changes in the Canarian economic and tax system. Such measures resulted in *Act 20/1991*, in which a series of fiscal measures was established with a view to encouraging productive investment by firms, in the shape of incentives such as the reserve for investments, deductions for investments in company tax and other incentives. Due to their singular nature and special incidence in the decisions of the financial managers of firms, we highlight the measures referring to the provision of the Reserve for Investment in the Canaries (*Act 19/1994t, Modification of the Tax System of the Canaries*), which led to the non-inclusion of 90% of undistributed profits in the gross tax base of Company tax, and which became one of the principal instruments for financing growth and the renewal of investments for the Canarian firm.

¹⁵ In the regression analysis, the rejection of the null hypothesis of the Rainbow linear test for the growth-size relation confirmed the empirical evidence available concerning a non-linear relation between these variables, which led us to opt for the logarithmic model.

¹⁶ See Dunne and Hughes (1994).

¹⁷ The test by Goldfeld and Quandt (1972) and the colinear test ensure that the calculations obtained are unbiased and efficient, since there are no problems of heteroscedasticity in the residue, nor multi-colinearity among the explanatory variables.

¹⁸ The only exception when age contributes to the reason for growth results from size being measured through equity, when size is inversely related to the volume of assets in the 1993–1996 period. This lack of significance for age contradicts most of the empirical evidence obtained in this field, among others, Evans (1987a, b); Dunne, Roberts and Samuelson (1989); Dunne and Hughes (1994) and Fariñas and Moreno (1997).

¹⁹ When studying the explanatory factors of growth over a period of time, variables representative of the evolution of the economic cycle, such as the Gross National Product, are often included. However, in our case, when considering a cross section analysis to explain the factors that have most conditioned the growth of a broad sample of firms in the 1990–1996 period, the inclusion of these variables is not significant, as all the firms are affected by the same trend, and the most relevant variable is the different firms' capacity of adaptation to this trend.

²⁰ Just as Grant (1991) pointed out, productive activity requires the cooperation and coordination of resource teams, which implies the development of complex patterns of interaction among them, which is transformed into specific firm capacity, denominated by Prahalad y Hamel (1991 as "essential competences" by referring "to those that arise from the collective learning of the organisation, and especially those related to the manner in which to coordinate different production skills and to integrate multiple technological currents", which enable a group of resources to undertake some task or activity. Skills required to manage a factory, distribution outlet, to capture the financial resources needed, selection, socialising and to encourage human resources, to manage the commercial brand, to discover customer needs and new ways of satisfying them. These are some examples to illustrate the concept of capacities.

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