

Persistence of profitability in Latin America: Explaining the differences among countries, industries and firms.

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Abstract

This article determines the level of persistence of profits econometrically, and the differences in such a level, for different Latin American countries (Argentina, Brazil, Chile, Mexico and Peru) and for USA. Furthermore, the article also evaluates persistence coefficients for individual companies and industries in each country and explains these coefficients. These comparisons are interesting since the questions about the determinants of performance and its persistence have been central to strategic management for several years, and there are no convincing explanations or empirical work that evaluate the variables that explain the possible variations in profit persistence across countries. Among our conclusions, we found that, at the country level, external debt, openness to international trade, country risk and foreign investment have a significantly negative impact on persistence of profits.

Key words: Persistence of profits, Competitiveness in Latin America, Strategic Management

I. Introduction

From 1986, when Mueller proposed a first-order autoregressive model to calculate the persistence coefficients of a company's profits, a line of work aimed at determining the persistence of firm profitability has been developed. Examples of papers in this line of research are Geroski and Jacquemin (1988), Schwalbach (1989) Mueller (1990), Geroski (1990), Odagiri and Yamawaki (1990), Schol (1990), Khemani and Shapiro (1990), Kambhampati (1995), Goddard and Wilson (1996), Smith, Madsen and Dilling-Hansen (2005) and Ben Jelili (2005).

On the other hand, several authors have sought to explain, by using business and industrial characteristics, the differences in firm's and industry's persistence coefficients. Examples for these works are Smith *et al.* (2005), Geroski *et al.* (1988) and Yurtoglu (2004) for persistence coefficients at the firm level, and Kambhampati (1995) for persistence coefficients at the industry level.

More specifically, Smith *et al.* (2005) analyze the determinants of profit persistence focusing on the effects that industries' and firms' characteristics may have on the magnitude of the persistence coefficients for firms of that country, concluding that the size of a firm, its age, ownership concentration and initial profits influence positively the persistence of profits at the firm level, although the explanatory power of their results is low (R^2 equal to 0.07).

Geroski and Jacquemin (1988), in turn, study the persistence of profits in the United Kingdom, France and West Germany, and compare its magnitude, concluding that there are differences among these countries, although they do not attempt to explain such differences. In terms of firm-level persistence, these authors find significant and positive effects for specialization, metal production and the fact that the firm belongs to the United Kingdom, while they find significant and negative effects for the export rate, the firm's age and industry concentration. The explanatory power of their regression is equivalent to an R^2 of 0.166.

Yurtoglu (2004), in a study about firms in Turkey, analyzes profit persistence and its determinants. He uses a first-order autoregressive model to estimate the persistence coefficient of firm's profits, and then uses a simple regression to analyze the determinants of long-term profit differences in different firms. His study finds that industry growth and industry exporting intensity have a marginal influence on the persistence of profits, obtaining an R^2 of 0.21 in the regression of persistence.

Kambhampati (1995), for his part, studies the persistence of industrial profitability in India, concluding that strategic barriers to entry and market power increase the persistence of business profits, whereas institutional barriers reduce them. This author

obtains an R^2 of 0.39 for his study on the influence of industry characteristics on industrial persistence.

The objective of this article is to calculate persistence coefficients at the firm, industrial and country levels, for five Latin American countries that are not analyzed in the literature, as well as for USA. Likewise, we econometrically examine the characteristics that would explain the differences in persistence at each one of these levels. In order to calculate the persistence coefficients for each firm, we use a first-order autoregressive model. Coefficients obtained at a firm level are used to obtain persistence coefficients, both at the industry level and the country level, for each country under study.

Once the different persistence coefficients have been obtained, a robust regression is used to study a) the influence of certain characteristics of the country on the differences in country's persistence coefficients, b) the influence of explanatory variables on industrial persistence coefficients at the industry level, and c) the influence of explanatory variables on business persistence coefficients at the firm level. So far as our knowledge goes, there are no studies that estimate the variables that would explain the persistence of profitability at the country level.

This article is organized as follows: after this introduction, Section II presents the methodology that is used in this paper, while Section III presents the selection of data and the variables and information sources used. Section IV, in turn, presents the results obtained, while Section V discusses the conclusions. Additionally, an appendix gives general information about the results.

II. Methodology

1. General Background

Following Mueller (1986), the persistence coefficient of firm i is obtained from equation 1:

$$ROA_{it} = \alpha_i + \lambda_i ROA_{it-1} + u_{it} \quad (1)$$

where ROA_{it} and ROA_{it-1} correspond to the abnormal return on assets i for periods t and $(t-1)$ respectively, and λ_i is the parameter that shows the persistence coefficient of the profitability of firm i . Thus, λ_i is an estimation of the speed of erosion of short-term profitability, where a greater λ_i indicates a slower erosion of profitability.

The ROA_{it} variable of equation 1 is obtained after eliminating the variations in profitability produced by the economic cycle, according to the transformation performed using expression 2 (Ben Jelili, 2005):

$$ROA_{it} = ROATOT_{it} - ROA_t \quad (2)$$

where ROA_t is the average annual return on assets of firms in the country to which firm i belongs in period t , and $ROATOT_{it}$ is the return of each firm i for each period t .

After obtaining the persistence coefficient of each firm, we determine the industry-level persistence coefficient as the simple average of the persistence coefficients obtained for the firms belonging to each industry (Smith *et al.*, 2005). Likewise, we obtain the persistence coefficient at the country level calculating the simple average of the persistence coefficients of firms based on that country (Yurtoglu, 2004; Geroski *et al.*, 1988).

2. Explanation of persistence of profitability at the country level

After obtaining the persistence coefficient of profitability for each country, we seek to determine the country's characteristics that explain the differences in persistence at the country level (equation 3):

$$\bar{\lambda}_p = \delta_p + \gamma_p \cdot Z + u_p \quad (3)$$

where $\bar{\lambda}_p$ is the average persistence coefficient for country i , δ_p is the constant, γ_p is the parameter vector and Z is the matrix of explanatory variables that contains the characteristics of the country. The explanatory variables used are the per capita GDP

(GDP_{PC}), country risk (CR), foreign investment (FI), exports (EXP) and the external debt of each country (ED) (these variables are defined and explained in Section III). In this manner, equation 3 converts into equation 4:

$$\overline{\lambda}_p = \delta_p + \beta_1 \cdot GDP_{pc} + \beta_2 \cdot CR + \beta_3 \cdot FI + \beta_4 \cdot EXP + \beta_5 \cdot ED + u_p \quad (4)$$

3. Explanation of the persistence of profitability at the industry level

Once the persistence coefficient at each industry level is obtained for each country, we evaluate the influence of the different characteristics of the industry in said coefficient's magnitude, according to equation 5:

$$\lambda_i = \alpha_i + \beta_i X + u_i \quad (5)$$

where λ_i is the average persistence of the industry, α_i is the constant, β_i are the parameters and X is the explanatory variables matrix of the industry. The explanatory variables used are industry concentration level (CON), the number of firms belonging to such industry ($Nemp$), entry of firms into the industry (ENT), exit of firms from the industry ($EXIT$), and the annual average growth of industry sales (AIG). Thus, equation 5 converts into equation 6:

$$\lambda_i = \alpha + \beta_1 \cdot CON + \beta_2 \cdot Nemp + \beta_3 \cdot ENT + \beta_4 \cdot EXIT + \beta_5 \cdot AIG + u_i \quad (6)$$

4. Explanation for the persistence of profitability at the firm level

In order to evaluate the factors that would explain the differences in persistence at the firm level in each country, we used equation 7:

$$\lambda_i = \alpha_i + \beta_{1i} X + \beta_{2i} Z + u_i \quad (7)$$

where λ_i is the persistence coefficient of profitability of firm i , α_i is the constant, vectors β_{1i} and β_{2i} are the parameters, X is the explanatory variables matrix relating to the characteristics of the industry where the firm is, and Z is the matrix of explanatory variables related to the firm's characteristics.

The explanatory variables at the industry level are equivalent to those used in equation 6, while the explanatory variables to be used at the firm level are firms' age (*AGE*), market share (*MS*), size (*SIZ*), export approach (*EA*), specialization level (*SPE*), sales growth (*SG*) and the variance of the return on assets (*VARROA*). Considering the explanatory variables, equation 7 converts into equation 8:

$$\lambda_i = \alpha + \beta_{1i}AGE + \beta_{2i}MS + \beta_{3i}SIZ + \beta_{4i}EA + \beta_{5i}SPE + \beta_{6i}SG + \beta_{7i}VARROA + \beta_{8i}CON + \beta_{9i}Nemp + \beta_{10i}ENT + \beta_{11i}EXIT + \beta_{12i}AIG + u_i \quad (8)$$

III. Data, Explanatory Variables and Information Sources

Following Yamawaki (1990), Kambhampati (1995), Glen and Singh (2001) and Yurtoglu (2004), we used the ROA obtained by firms of the different countries analyzed as the endogenous variable. Firms considered are those included in the Economatic database, and the period is from 1996 to 2006. In order to determine where each firm belongs to an industry we used the NAICS classification with two-digit industrial disaggregation of the Economatic database.

A two-digit industrial disaggregation level was selected, since with one-digit disaggregation, the number of industries would be insufficient to establish a comparison among them, and a three-digit disaggregation would leave many industries with a single firm, which would not allow to define whether the return obtained by the firm is due to its characteristics or rather to the industry it belongs to.

1. Explanatory Variables

At the firm level, the explanatory variables considered in this study are as follows:

- a) *Age of firms that compose the industry*: is calculated as: (2007 minus year of firm foundation). One hypothesis is the greater the age the lesser the firm's capacity to adapt to change, which would reduce the persistence of profits. An

alternative hypothesis is that a greater age involves a steadier position obtained over time, which should increase the persistence of profitability.

- b) *Market share*: corresponds to the firm's annual sales divided by the total sales of the industry for each period. A positive relation is expected between market share and persistence of profitability.
- c) *Sales average growth*: is obtained from the firm's sales information. A positive relation is expected between average growth and persistence of profitability.
- d) *Size of firms*: corresponds to the book value of the firm's assets. An explanation for a positive value of this coefficient would be stability in the results that could be obtained by a firm whose size enables it to have access to greater resources to keep innovating, improving products, or absorbing crises in a better way. A negative value for this coefficient could be explained by high bureaucratic costs and by a lack of communication between different teams and hierarchies within the firm.
- e) *Export approach*: corresponds to the proportion of the firm's sales that are made abroad. This variable is used as a proxy of the country's openness to international trade, which should affect negatively the persistence of profits given the greater competition it involves.
- f) *Specialization*: corresponds to the number of industries in which the firm is present. Lesser specialization is expected to increase the persistence of profitability if it allows the firm to diversify risks and save costs by means of economies of scope. On the other hand, the sign of the persistence coefficient should be negative if a lesser specialization entails considerable extra costs (for example: bureaucratic, loss of focus or other costs).
- g) *ROA Variance*: is obtained from the firm's ROA variance. The coefficient of this variable may be positive if firms with a higher profitability also have a higher variability of profitability, but above a minimum return.

At the industry level, the explanatory variables included in this study are as follows:

- a) *Concentration*: is calculated from the market share obtained for each firm of the industry using the Herfindhal index. A positive sign for this variable implies that a greater concentration would lead to greater persistence (e.g. for lesser competition among firms of the industry). On the other hand, a negative sign for this coefficient implies that a greater concentration would result in lesser persistence of firm's profitability.
- b) *Entry of firms*: obtained by dividing the number of firm's entries to each industry in the period under study by the number of firms in the industry. This variable is used to estimate barriers to entry, where a relatively greater number of entries would be associated with lesser barriers to entry. It is expected that the lesser the entry of firms, the greater the persistence of profitability.
- c) *Exit of firms*: obtained by dividing the number of firm's exits from each industry in the period under study by the number of firms in the industry. One hypothesis is that a higher number of exits would imply lesser barriers to exit, which would lead to a greater persistence of profits. An alternative hypothesis is that a higher number of exits is the result of a more competitive industry (i.e. firms not able to compete abandon the industry) which would reduce persistence of profitability.
- d) *Average industry growth*: is obtained from sales growth for all firms belonging to each industry. A hypothesis is that a greater industry growth would lead to greater persistence, since incumbent firms take advantage of that growth.
- e) *Number of firms*: the average number of firms present in each industry for the period under study is calculated. A hypothesis is that the greater the number of firms the lesser the persistence of profitability, because of higher competition. It should be noted that the number of firms is not necessarily correlated to industry concentration, since the number does not consider the market share of each one.

At the country level, the explanatory variables considered in this study are as follows:

- a) *Per capita GDP*: an average per capita GDP for the period for each country is calculated. Per capita GDP is expected to positively affect the persistence of profitability, since a greater income should translate into a greater demand, facilitating the maintenance of profitability.
- b) *Country risk*: is calculated from the average of annual country risk indices for the period under study. Greater country risk is expected to be associated with greater uncertainty about the economic conditions of the country and its firms, reducing the persistence of profitability.
- c) *Foreign investment*: the average foreign investment is divided by the population. Higher foreign investment could decrease the persistence of profitability to the extent that it is associated with a greater competition, or could increase persistence if it is associated with more resources available to the firm.
- d) *Exports*: higher exports are expected to reflect greater trade openness and lesser persistence of profitability, fundamentally owing to greater competition with producers from all over the world.
- e) *Logarithm of external debt*: A negative effect of external debt on the persistence of profitability is expected, since greater external debt results in increased uncertainty over the future performance of the country and its firms.

Table 1 summarizes the explanatory variables used and the expected sign for its coefficients.

Table 1
Main explicative variables

At Firm Level	At Industry Level	At Country Level
Age (<i>AGE</i>)	Concentration (<i>CON</i>)	GDP Per capita (<i>GDP_{pc}</i>)
Market Share (<i>MS</i>)	Entry of Firms (<i>ENT</i>)	Country Risk (<i>CR</i>)
Average Sales Growth (<i>SG</i>)	Exit of Firms (<i>EXIT</i>)	Foreign Investment (<i>FI</i>)
Firm Size (<i>SIZ</i>)	Average Industry Growth (<i>AIG</i>)	Exports (<i>EXP</i>)
Export Approach (<i>EA</i>)	Number of Firms (<i>Nemp</i>)	Logarithm of external debt (<i>ED</i>)

Specialization (<i>SPE</i>)		
ROA Variance (<i>VARROA</i>)		

2. Information sources for firm and industrial explanatory variables

Table 2 shows the information sources for explanatory variables at the firm and the industry level, while Table 3 shows the information sources for explanatory variables at the country level.

Table 2
Information sources for explanatory variables at the industry and the firm level

Information source	Information obtained	Variables
Economic database	Sales	Market share Industrial concentration (Herfindhal) Average firm and industry growth
	Assets	Firm size
	ROA variance	ROA variance
	Number of firms	Number of firms
Internal Revenue Service	Specialization	Non specialization
Prochile, Mercantil.cl	Exports	Export approach (exports/sales)
Web pages	Year of foundation	Age

Table 3
Information sources for explanatory variables at the country level

Information source	Information obtained	Variables
World Bank	Foreign investment (in US\$)	Foreign investment/population
	Exports (% of GDP)	Average exports
	External debt (in US\$)	Average external debt
Economic Research Service, United States Department of Agriculture	Per capita GDP	Average per capita GDP
	Population	Foreign investment/population
Kompass	Country risk classification	Country risk (value from 1 to 7)

3. Filters

Following Porter and McGahan (2003) records for firms belonging to finance, insurance, and funds were eliminated, since they show an anomalous behavior in all countries. In addition, the records for industries that have only one firm were also eliminated, since they do not allow differentiating between the firm and industry effects on profit persistence.

Additionally, we eliminated possible outliers. For this purpose we removed from the sample the records corresponding to the 2.5% up or down for each country. With this, we sought to eliminate from the sample the records that could affect the results because of being very different from the others. Moreover, we eliminated records of firms that had information available for less than 4 consecutive years. Although the lack of data in some periods was allowed, a minimum of 4-year data of the firm was required to calculate a more robust persistence coefficient. With less than 4 years of data the actual persistence of a firm or industry in the long term may be mistaken for one obtained from abnormal results for the years involved, which may have been caused by external shocks.

Finally, after obtaining the persistence coefficients, we proceeded to eliminate firms with persistence coefficients greater than 2, because they were considered outliers. After these adjustments, the data used in our study have the characteristics that may be seen in Table 4 of descriptive statistics.

Table 4
Descriptive statistics (in average values for the period 1996 to 2006 inclusive)

	Argentina	Brazil	Chile	Mexico	Peru	USA
Number of observations	590	3,332	1,614	1,147	986	8,146
Average ROA (annual)	0.32	-1.19	4.17	3.35	3.23	4.59
Standard Deviation ROA (annual)	8.16	12.92	7.06	7.28	6.90	6.94
Minimum ROA (annual)	-24.4	-71.6	-22.24	-21.9	-17.2	-28.8
Maximum ROA (annual)	14.8	17.7	22.17	16.4	20.4	20.6

IV. Results

1. Results for persistence of profitability at the country level and its determinants

The persistence coefficient at the country level is obtained by computing the average of the persistence coefficients for firms located in that country (Yortuglu, 2004 and Geroski et al. 1998). Table 5 presents the persistence coefficients obtained for the different countries under study.

Table 5
Persistence coefficients of the countries analyzed

Country	Average coefficient
Chile	0.32
Peru	0.29
Brazil	0.23
Argentina	0.20
Colombia	0.33
Mexico	0.26
USA	0.27

As we may note in Table 5, the persistence coefficients of country-level profitability obtained range between 0.20 for Argentina and 0.33 for Colombia. Consistent with the results obtained by Glen, Singh and Lee (2001), most of the developing countries of Latin America, 4 of 6, have a persistence coefficient lower than that of the only developed country in the sample: the United States.

Comparing the countries in the sample with the results obtained in previous studies, we conclude that the countries considered in this article present a persistence coefficient greater than the one obtained in the previous works for Denmark (Smith 2005), and lesser than the one obtained for Turkey (Yurtoglu 2004), Japan (Yamawaki 1989), France, Germany and the United Kingdom (Geroski and Jacquemin, 1988).

On the other hand, Table 6 presents the results for the determinants of firm persistence at the country level. In order to have a larger statistical sample and be able to properly estimate the persistence determinants, the persistence coefficients obtained in previous works for Turkey¹, Tunisia², Jordan, Malaysia and Zimbabwe³ were added to the seven countries analyzed in this sample. These countries were selected because the studies carried out for them use periods of time and methodologies relatively close to ours.

Table 6
Determinants of persistence of profitability at the country level⁴

Variable	Coefficient
Country Risk	-0.04 *
Per capita GDP	6.6e-06
Exports	-0.003 **
Log External Debt	-0.09 **
Foreign Investment	-0.0006 *
Constant	1.62 **
R Square	0.70

*: Significant at 5%

** : Significant at 10%

As observed in Table 6, country risk, external debt, exports and foreign investment have a negative and significant effect on the determination of average persistence of firm profits at the country level. The negative effect of a country risk on the persistence of profitability of firms present in a said country would be explained because a greater country risk is equivalent to more instability in the economy and, consequently, in the results of firms of a said economy.

The negative effect of exports on persistence of profitability has the expected sign, since this is associated with the country's trade openness level and, consequently, with the competition level that its firms face with the rest of the world. The negative effect of external debt is according to what is anticipated for this variable, since a greater debt is

¹ Firat Demir (2007)

² Riadh Ben Jelili (2005)

³ Jack Glen, Kevin Lee, Ajit Singh (2001)

⁴ Surpasses test of omitted variables, homoscedasticity (white), variance (vif) and normality (skewness-kurtosis test).

associated with a greater risk. Likewise, the fact that foreign investment shows a negative and significant effect is also expected, since a greater foreign investment implies the possibility of a greater competition. Lastly, the per capita GDP variable turned out to be positive (expected sign) but not significant.

2. Determinants of persistence of profitability at the industry level for each country

Table 7 summarizes the coefficients and statistical significance of industrial persistence determinants for the different countries analyzed in our sample. A summary of persistence coefficients for each country's industries is shown in the appendix.

Table 7

Determinants of the persistence of industrial profitability for each country

Variable/Country	Chile	Peru	Mexico	Brazil	Argentina	USA
Concentration	-0.54 *	-0.43	0.09	-0.47 *	1.06 *	0.10
Number of firms	-0.01 **	-0.02	-0.01	-0.005 **	-0.02	-0.002 *
Entries	-0.05	0.08	-0.24 **	-0.006	-0.51	0.27 *
Exits	0.03	0.19	0.03	0.10	-0.12	-0.08
Industry average growth	0.24 *	0.008 *	-0.01 *	-0.027 **	-0.38	-0.33 **
Constant	0.60 *	0.44	0.40 *	0.40 *	0.47	0.25 *
R square	0.38	0.28	0.35	0.15	0.73	0.23
N. of observations	26	18	24	37	17	56

* : Significant at 5%

** : Significant at 10%

As we may see in Table 7, concentration has a negative and significant effect to explain the persistence of industrial profits in Chile and Brazil, and a positive and significant effect for Argentina. The foregoing result means that a greater concentration in Chile and Brazil involves lesser profitability persistence, which indicates that the greater industrial concentration does not necessarily imply lesser competition.

The number of firms has a negative effect for determining industrial-level persistence for all the countries in the sample, the coefficient being significant for Chile, Brazil and USA. This result is as expected and indicates that a larger number of firms in a same industry results in lesser persistence of abnormal results over time. It should be noted

that the concepts of concentration and number of firms are not equivalent, since, for example, there may be a greater number of companies with a greater concentration to the extent that a few firms account for a great part of that industry's sales.

Entry of firms shows (except for USA and Peru) a negative persistence coefficient, which indicates that more entries lead to lesser persistence of industry-level profitability, probably due to lesser barriers to entry into such industry. On the other hand, exits of firms do not show a significant effect on the persistence of profits in none of the countries studied.

Finally, the average growth of industry has a positive effect for Chilean industries and a negative effect for Mexico, Brazil and the United States. The result obtained for Chile is expected, since a greater industrial growth allows for the entry of competition or an increase in sales of firms belonging to the industry, without necessarily impairing the profitability persistence of the industry. The negative results obtained for Mexico, Brazil and the United States could be explained by the fact that a growth in industry sales encourages the entry of new competitors, promoting a greater competition.

3. Determinants of profitability persistence at the firm level for each country

Table 8 shows the main results of the regressions obtained for profitability persistence at the firm level, and its determinants for the different countries under study. Robust regression is used to correct any possible correlation existing among firms of the same country. Robust regression is an alternative to minimum least ordinary squares, which enables to assume independence among firms correcting any possible problem of non independence among firms. The appendix to this article presents a summary of persistence coefficients for firms of each country.

Table 8
Determinants of profitability persistence at the firm level

Variable/Country	Chile	Peru	Mexico	Brazil	Argentina	USA
Concentration	- 0.57*	-0.31	0.08	-0.20	-0.85	0.22**
Number of firms	- 0.01*	0.003	- 0.02	-0.004**	-0.03	-0.0007
Entries	- 0.22	0.16	-0.28**	0.07	0.02	0.13
Exits	0.09*	- 0.04	0.015	-0.02	0.38	-0.16
Industry Aver. growth	0.40*	0.006**	- 0.01	-0.02	-2.50	-0.28
Share	- 0.24	0.36	- 0.15	0.08	0.43	-0.14
Assets size	2.4E-09	1.1E-07	4.9E-09	5.7E-09	-1.5E-08	3.2E-10
ROA variance	0.0007	0.0009	-0.0003	0.0001	-0.003**	0.0003
Firm Average growth	-0.03	0.02*	0.006	-0.0004*	0.01	-0.0003*
Constant	0.68*	0.18	0.53*	0.31*	0.90	0.28*

* : Significant at 5%

** : Significant at 10%

The industry average growth variable is an auxiliary variable to solve the problem of omitted variables in Argentina.

Note: The result for the variables “Age”, “Export approach” and “Non specialization” are not shown because data are available for Chilean companies only and the results are not statistically significant.

Industrial concentration shows a negative and significant effect for Chile and a positive and significant effect for USA. For Peru, Brazil and Argentina, the sign turned out to be negative but not significant. Such result strengthens the idea that greater concentration is not necessarily associated with lesser competition. The number of firms present in the industry, in turn, showed a negative and significant effect for Brazil and Chile, which implies that the larger the number of firms in the industry the lesser the persistence of their profitability.

The entry variable turned out to be significant only for Mexico, presenting a negative sign coefficient. This result is consistent with what is expected for this variable, since a greater entry of firms could be associated with lesser barriers to entry. On the other hand, the exit variable turned out to be significant only for Chile, with a positive coefficient, which is expected since more exits can be associated with fewer barriers to exit.

The average growth of industry had a significant effect for Peruvian and Chilean firms only, where the coefficient of this variable turned out to be positive. The foregoing

would indicate that a greater average growth of the industry would support persistence of firm profitability.

The ROA variance has a significant effect only for firms in Argentina, and the coefficient of this variable turned out to be negative, which is consistent with the idea that instable profitability results in lesser persistence of profitability. The average growth of firms, in turn, presented a significant and positive effect for Peruvian firms and a significant and negative effect for US and Brazilian firms.

V. Conclusions

Knowing the determinants of firm profitability persistence is a key issue for strategic management, since such persistence evidences the capability that firms will have to maintain their competitive advantage.

In this article we saw that the persistence coefficient for the Latin American countries studied is within a range that goes from 0.2 to 0.33, which indicates some degree of persistence of business profits, although generally a little lower than the one found in other more developed countries.

Beyond the calculation of the persistence coefficients, the principal new contribution of this article is advancing in the determination of the variables that explain persistence coefficients, mainly at the country level, which to the best of our knowledge has not been performed with statistical thoroughness in previous studies. In this regard, we conclude that country risk, external debt, exports and foreign investment have a statistically significant influence, with a negative coefficient, on the persistence of firm profitability at the country level, which indicates that there are country factors that explain a relevant part of firms' capabilities to sustain their profitability. This result supports the idea that the geographical location of firms influences their performance.

Among the principal results obtained for persistence of profits at the industry and firm level, are that, in general, its determinants are not the same for the different countries analyzed, although certain trends do exist, such as the fact that for Chile and Brazil

greater industrial concentration influences negatively the persistence of industry profitability, and that the number of firms belonging to the industry and barriers to entry affect negatively the persistence of profits for practically all the Latin American countries analyzed. Exits of firms and industrial growth, instead, tend to favor persistence of profitability. Notwithstanding the foregoing, the results are not identical for all Latin American countries analyzed.

Among the future lines of research that emerge from this work we deem it interesting to explore those causing the differences among countries in persistence of profitability within a same industry. Thus, for example, one could seek to determine what explains the differences in profit persistence of the electric power generation sector or of the telecommunications sector across different countries. There may be factors specific to these sectors that are not captured in the total sample. Additionally, one could continue to advance in the explanation of persistence of firm profitability at each country level. Another possible subsequent study may relate to considering the effect of interaction among the diverse variables considered to determine persistence of firm profitability, and working more in depth with each country separately, to see if the set of explanatory variables to be considered in any country should be broader than the one considered in this study.

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Appendix

This appendix provides additional information about the ranges of persistence coefficients at the firm level by country as obtained from the calculations made and summarizes persistence coefficients at the industry level.

Table 1A

Country-wise summary of ranges of persistence coefficients at the firm level (% of total firms of the country's sample)

Coeff/country	USA	Chile	Peru	Argentina	Brazil	Colombia	Mexico
$\lambda \leq 0$	0.23	0.21	0.22	0.35	0.31	0.21	0.25
$0 < \lambda \leq 0.2$	0.18	0.21	0.23	0.28	0.17	0.00	0.14
$0.2 < \lambda \leq 0.5$	0.30	0.25	0.26	0.15	0.27	0.21	0.37
$0.5 < \lambda \leq 0.8$	0.20	0.21	0.16	0.15	0.17	0.47	0.18
$0.8 < \lambda \leq 1$	0.04	0.06	0.09	0.03	0.04	0.11	0.05
	0.04	0.06	0.05	0.03	0.04	0.00	0.02

The high percentage of firms that have negative coefficients, especially for Argentina, Brazil and Mexico stands out, which implies that many firms in these countries had returns with considerable fluctuations in the period, perhaps influenced by the economic instability of these countries.

Table 2A

Country-wise summary of persistence coefficients at the industry level by country

Ranges	Argentina	Brazil	Chile	Colombia	Mexico	Peru	USA
$\lambda \leq 0$	6	5	1	1	1	1	1
$0 < \lambda \leq 0.2$	4	10	8	2	10	6	6
$0.2 < \lambda \leq 0.5$	4	20	12	2	10	9	39
$0.5 < \lambda \leq 0.8$	2	2	5	3	3	2	10
$0.8 < \lambda \leq 1$	0	0	0	0	0	0	0
$\lambda > 1$	1	1	0	0	0	0	0
Total	17	38	26	8	24	18	56