

KEYWORDS

Small enterprises
 Medium enterprises
 Competitiveness
 Exports
 Evaluation
 Technological change
 Surveys
 Statistical data
 Argentina - Chile - Colombia

Developing competitive advantages: successful export SMEs in Argentina, Chile and Colombia

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This article analyses the specialization patterns of export SMEs in Argentina, Chile and Colombia in the 2001-2004 period with a view to identifying the factors that influence the level of success achieved by such companies. To this end, an indicator of export success is applied to the universe of export SMEs in the three countries and two groups of agents are differentiated: the successful and the unsuccessful. These factors are identified using information from surveys applied to some 300 export SMEs (both successful and unsuccessful) in the countries studied, covering trade, production, technology and the institutional environment. This study compares the relative situation of these countries and analyses the potential contribution their successful export SMEs can make to modifying their exportable goods baskets.

I

Introduction

The purpose of this article is to carry out an analysis for the 2001–2004 period of the specialization patterns of small and medium-sized enterprises that export to outside markets (hereinafter “export SMEs”) in Argentina, Chile and Colombia, together with the factors that determine how successful these businesses are in export markets. To this end, it compares the relative situation of the three countries and provides information illustrating the potential contribution that dynamic export SMEs can make to modifying the basket of exportable goods, particularly following the post-reform crises and the profound macroeconomic changes of the late 1990s. The analysis of these issues is based on foreign trade data and on information about trade, production and technology factors affecting export performance drawn from surveys of some 300 export SMEs (successful and unsuccessful) in those countries.

This article is part of the new literature on innovation and growth that emphasizes the importance of increasing returns to scale, multiple equilibria, network externalities, the potential for accumulating capabilities and the key role of specialization profiles in the development of technological and organizational capabilities that can drive dynamic competitive advantages (Reinert, 2000; Amsden, 2004; Ocampo, 2005; Palma, 2005; Ross, 2005; Cimoli and Correa, 2005). It is also part of the debate on the need for structural change to drive innovation processes and

complementarities between agents, and to reduce the structural dualism characterizing the economies of the countries studied (Ocampo, 2005).

Strategies for developing the technological and organizational capabilities of economic agents have a vital role to play in generating successful routes to development and changes in external specialization profiles (Lall, 1994). The role that SMEs might play in this process by bringing a higher level of complexity and sectoral diversification to the external profile of the region’s countries is now starting to be reappraised.

In the sections that follow, this article presents the analytical framework and main hypotheses underlying the work done (section II). It examines the macroeconomic context of the countries analysed and their export structure, focusing particularly on smaller agents (section III). It describes the methodology used to identify export success among SMEs and the main results of its application to the external trade data of Argentina, Chile and Colombia (section IV). It identifies the main features of the firms surveyed and uses descriptive statistics and non-parametric tests to conduct an exploratory analysis of the principal determinants of a company’s export success (section V). It then presents a binary logistic regression model for multivariate identification of export success factors among SMEs (section VI). Lastly, it sets forth the main conclusions (section VII).

II

Analytical framework

The evidence available on the factors determining export activity at the firm level relates almost exclusively to industrialized countries (including newly industrializing Asian countries). Developing countries, particularly

those of Latin America, have been less studied. Most of the information on the subject has been produced on the basis of an evolutionary approach to economics that stresses the role of technology and knowledge in the development of dynamic competitive advantages. Some stylized facts relating to the incidence of these factors on companies’ export activity can be summarized into four main points.

First, at the aggregate level the evidence shows that differentiated and higher-technology goods

□ This article is part of a wider investigation into export SMEs in Argentina, Chile and Colombia by FUNDES Internacional. The authors are grateful for the comments of an anonymous referee on an earlier version of this paper.

(Pavitt, 1984; Hatzichronoglou, 1997) are the most dynamic in international trade (Dosi, Pavitt and Soete, 1990; Guerrieri and Milana, 1995; Lall, 2001, among others). Consequently, firms that produce these goods tend to have a greater propensity to export.

Second, innovation theory suggests that, besides differences between industries resulting from different productive specialization profiles, technological differences within industries are also very important (Dosi, 1988; Nelson, 1991; Freeman, 1994). Against this background, the evidence available on the relationship between innovation and exports at the firm level systematically shows that the former (measured by innovative inputs, innovative outputs or both) is positively associated with the likelihood of the firm being an exporter (Aw, Chung and Roberts, 1998; Barrios, Görg and Strobl, 2001; Basile, 2001; Chetty and Hamilton, 1993; Brouwer and Kleinknecht, 1993, among others).

Third, while innovation measured as an input or an output refers to flows, the evolutionary literature highlights the possibility of knowledge (learning) being accumulated so that not only flows but stocks too play a decisive role in generating dynamic competitive advantages. These stocks, generally known as technological capabilities, involve aspects such as the qualifications of human resources (skills), the way work is organized and the existence of formal and informal research and development structures (Bell and Pavitt, 1995; Pietrobelli, 1996). The evidence from studies on export determinants once again reveals a positive relationship between these capabilities and exporting (Estrada and Heijs, 2003). These capabilities are more important still for developing countries, where they are less widespread than in the developed countries (Lall, 1994). This being so, technological capabilities can be a significant discriminating factor for export activities by firms in developing countries.

Lastly, economic activity is systemic in character. This means that competitiveness at the firm level depends on a wide variety of external sources which strongly impact the range of activities that firms operating in a specific environment can hope to carry out successfully. Thus, vertical interactions with customers (Von Hippel, 1978; Lundvall, 1988) or providers (Lundvall, 1988) and horizontal interactions with competitors and colleagues (Yoguel and Moori Koenig, 1999), together with the activities of institutions and specific policies to support companies' operations in external markets, become vitally important to competitiveness.

At the same time, while the evolutionary literature stresses product and process innovation (technological

innovation), exporting also requires a specific type of management and particular organization and marketing skills. According to RICYT (2001), the Latin American countries are better positioned with these than with technological innovation. The non-technological factors affecting exports are the central concern of the well-known Uppsala model. According to that model, the internationalization of a firm is a process whereby it becomes increasingly involved in export activity (Johanson and Wiedersheim, 1975; Johanson and Vahlne, 1977; Welch and Luostarinen, 1988). This process generally takes place through successive stages in which increasing financial and human resources are committed to exporting.¹ The successive stages may be reflected, among other things, in an increasing presence in distant markets,² in a shift from indirect channels (trading companies or representatives) to more complex ones requiring greater investment and closer links with customers (direct presence in the form of warehouses and offices, formal agreements with companies abroad), and in a gradual formalization of the arrangements used to operate the export business.

Compelling though it is, this approach has been challenged recently by the impact of globalization and the behaviour of firms. There are now new studies focusing on firms conceived as global from their foundation ("born global"), having been created from the outset to supply the international market (Luostarinen and Gabriellsson, 2002; Westhead, Wright and Ucbasaran, 2001, among others). Thus, time or the temporal duration of the learning process, which is crucial for the evolutionary framework and the Uppsala model, could be losing importance because the globalization of the economy is facilitating access to information and speeding up the knowledge acquisition process.³

¹ Taken to the extreme, the firm's internationalization may involve producing in the destination market so that, at a very advanced stage in the process, the transnationalization of production may partly displace exports. This stage in the internationalization process is more likely to be found among large enterprises than among SMEs, however.

² The concept of distance does not relate strictly to geography here, but refers rather to cultural, political and religious differences that impede the penetration of particular markets by companies with only limited exporting experience, but that can be overcome by firms which do have such experience and are prepared to invest resources in learning the codes of these markets.

³ However, a recent study of the export dynamic and job creation in Argentina since the late 1990s shows that the contribution of companies "born global" to export growth has been very small, even since the 2002 devaluation of the peso (Rivas and Yoguel, 2007).

This article considers most of the approaches mentioned and introduces some new perspectives on the factors determining the export performance of firms. While many studies compare exporters with non-exporters, in the countries analysed the mere fact of being an exporter may not be a good indicator of SME performance, since most such enterprises in the region do not have a stable presence in external markets (Moori Koenig, Milesi and Yoguel, 2001; Moori Koenig, Rodríguez and others, 2005; Moori Koenig, Yoguel and others, 2004). Accordingly, in this case it was considered more helpful to compare successful exporters with unsuccessful ones, and for this it was necessary to identify a set of quantitative and qualitative indicators that could be used to ascertain the degree of exporting success. It should be pointed out that the firms which are categorized as unsuccessful in this article and constitute the control group form part of the target group in most normal studies distinguishing between exporters and non-exporters.

This special focus is justified by the goal of obtaining results that are as relevant as possible for the

countries studied while at the same time highlighting the importance of identifying the determinants of different levels of export performance rather than of the mere fact of being an exporter.⁴

On the basis of this analytical approach and a large body of material on the position of SMEs in the countries considered (Garay, 1998; Gatto, 1995; Grecco, 2001; Iannariello-Monroy, León and Oliva, 1999; Moori Koenig and Yoguel, 1996; Agosin, 1999; Benavente, 2001; Ocampo, Sánchez and Hernández, 2004; Silva, 2001), the following five hypotheses are proposed in relation to the factors determining a strong export performance: (i) export success is an evolutionary process that takes time, (ii) export success is underpinned by the development of substantial technological and production capabilities, (iii) export success is based on the creation of significant commercial and organizational capabilities, (iv) successful exporters interact intensively with public and private bodies that promote technological development in production and business methods, and (v) successful exporters have greater access to financing.

III

Some characteristics of the trade profiles of the countries studied and firms within them

The three countries considered have different-sized economies and differ too in their export orientation and in their openness to trade (table 1). While Colombia

TABLE 1

Argentina, Chile and Colombia: Macroeconomic indicators

Variable	Argentina	Chile	Colombia
Gross domestic product (2005, at constant 1990 prices, millions of dollars)	215 961	72 395	69 087
Export ratio (2003)	25	36	21
Index of openness (2003)	39	70	44

Source: Prepared by the authors using data from institutions in the countries studied. For Argentina, National Institute of Statistics and Censuses (INDEC) and Chamber of Exporters of the Argentine Republic (CERA); for Chile, Export Promotion Bureau (PROCHILE); and for Colombia, National Administrative Department of Statistics (DANE), Export Promotion Office (PROEXPORT) and Foundation for Sustainable Development (FUNDES Colombia).

and Chile have similar-sized economies, Argentina's is about three times as large. Chile is the strongest exporter, with a ratio of 36%, followed by Argentina (25%) and then Colombia (21%). The index of openness also shows that Chile is the most exposed to international trade (70%), followed by Colombia (44%) and Argentina (39%).

The trend in the export totals of these countries between 2001 and 2004 shows that Chile was the most dynamic of the three, with a cumulative annual growth rate of 15%, approximately double the figures for Colombia (8%) and Argentina (7%).⁵

⁴ This is not to say that placing products in external markets is an unimportant achievement for a firm; rather, it is a case of focusing on export sustainability over time.

⁵ In the case of Argentina, the growth rate rises to a little over 9% if the 1998-2005 period is taken.

Against this background, differences can be identified in the composition of total exports when broken down by major aggregates. Around 2004, manufacturing industry accounted for a particularly large share in Argentina (69%), and commodities were also important (24%). Exports in these categories grew faster than the average in the period studied, tending to reinforce this specialization profile.

Manufacturing also dominates in Colombia (62%), followed by mining and extraction (29%), which grew more slowly than the Colombian economy as a whole. Extractive exports were of particular importance in Chile (54%), and manufacturing industry accounted for a smaller share than in the other two countries (39%). In this case, mining exports, mainly copper, were the most dynamic, suggesting an entrenchment of this external specialization profile (table 2).

SMEs generate only a small proportion of industrial exports in the three countries (table 3); Chile leads here, since the SME share of 15% is higher than in Argentina (11%) or Colombia (9%). Nonetheless, this group of export SMEs includes a large proportion of all companies participating in external trade: 34% in Argentina, 46% in Colombia and 58% in Chile.⁶ In all three countries, conversely, industrial exports are heavily concentrated among a small number of major firms, which accordingly conduct export business on a much larger scale: between 16 and 53 times as great, depending on the country (table 3).

⁶ The differences in the SME share of each country's total exports need to be treated with caution, as the criteria for categorizing firms by size vary from one country to another in accordance with the classifications employed in each.

TABLE 2

Argentina, Chile and Colombia: Total export composition and growth
(Percentages and millions of dollars)

	Composition in 2004			Annual growth rate (2001-2004)		
	Argentina	Colombia	Chile	Argentina	Colombia	Chile
Agriculture, hunting, fisheries and forestry	24	8	6	8	5	8
Mining and extraction	7	29	54	-4	6	21
Manufacturing	69	62	39	8	8	9
Other goods	0	1	1	-	51	13
<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>7</i>	<i>8</i>	<i>15</i>
<i>Total in millions of dollars</i>	<i>34 550</i>	<i>16 483</i>	<i>30 641</i>			

Source: Prepared by the authors using data from INDEC and CERA (Argentina), PROCHILE (Chile), DANE, PROEXPORT and FUNDES Colombia (Colombia) and ECLAC.

TABLE 3

Argentina, Chile and Colombia: Manufacturing exports, by size of firm, 2004
(Amount exported in millions of dollars and number of firms)

Firms by size	Argentina		Colombia		Chile	
	Amount exported per firm	No. of firms	Amount exported per firm	No. of firms	Amount exported per firm	No. of firms
Large	32.40	649	8.59	1 026	13.11	697
SMEs	0.61	4 196	0.20	4 300	0.77	2 090
Microenterprises	0.01	7 432	0.02	3 659	0.02	814
Other	1.14	267	0.69	277	0.32	393
<i>Total</i>	<i>1.91</i>	<i>12 544</i>	<i>1.10</i>	<i>9 262</i>	<i>3.00</i>	<i>3 994</i>

Source: Prepared by the authors using data from INDEC and CERA (Argentina), PROCHILE (Chile) and DANE, PROEXPORT and FUNDES Colombia (Colombia).

TABLE 4

Argentina, Chile and Colombia: Sectoral concentration of manufacturing exports by company size,^a 2004
(Percentage of the total in each stratum)

Company size	Argentina	Colombia	Chile
Large	Foods	Foods	Foods
	Chemicals	Oil refining	Paper and paper products
	Oil refining	Chemicals	Wood products
	Transportation equipment	Iron and steel	Oil refining
	Iron and steel	Non-ferrous materials	Beverages
	(77% of stratum)	(58% of stratum)	(80% of stratum)
SMEs	Foods	Wearing apparel	Foods
	Non-electrical machinery	Textile products	Beverages
	Chemicals ^b	Leather products	Wood products
	Chemicals	Foods	Non-electrical machinery
	Metal products	Other manufactures ^b	Plastic products
	(56% of stratum)	(50% of stratum)	(78% of stratum)

Source: Prepared by the authors using data from INDEC and CERA (Argentina), PROCHILE (Chile) and DANE, PROEXPORT and FUNDES Colombia (Colombia).

^a Five main sectors to three digits of the International Standard Industrial Classification of All Economic Activities (ISIC/Rev. 2).

^b Previously unclassified.

The share of SME industrial exports in the export structure has tended to diminish in recent years, particularly in Argentina and Colombia, as they have grown more slowly than those of large exporters.

The sectoral profile of SMEs in external markets differs from that of large exporters.⁷ Whereas most of the latter's sales are in capital—and natural resource-intensive sectors with large economies of scale, in the case of SMEs there is a greater presence of sectors that make intensive use of labour (skilled or unskilled), manufacture differentiated products subject to economies of scope, and have more linkages with local suppliers of goods and services (table 4). In any event, when the classification proposed by HatziChronoglou (1997) and applied by the Organisation for Economic Co-operation and Development (OECD) is employed, exports are dominated by medium- and low-technology products.⁸

Exports by SMEs in the three countries present similarities and differences in respect of the shares of the different sectors and the diversification of supply, partly because of the productive specialization profile in each country. Over half of Chile's exports are foods, especially fish and seafood and wine; different leather manufactures and wearing apparel feature heavily in Colombia's (40% of the whole stratum); and Argentina's are more diversified, with food products, chemicals and metallurgical products well represented (table 4).

The distribution of SME exports by trade bloc tends to be similar to that of large firms, showing that smaller exporters in the three countries do not just export to easily accessible markets nearby.⁹ As might be expected, the composition by destination of SME exports also differs between the three cases analysed (table 5).

⁷ The index of similarity in sectoral export structures between SMEs and large firms is high: between 0.35 and 0.5, depending on the country. This index is calculated as the sum of the differences in structures (absolute values) divided by 2. Its value ranges from 0 when the structures are the same to 1 when they are wholly unlike.

⁸ The share of low-technology products in the export total of the SME sector in 2004 was 69% in Chile, 51% in Argentina and 42%

in Colombia. The figures are 85%, 73% and 76%, respectively, when manufactures with a medium-low technology content are included. The situation with the manufacturing exports of large firms is similar, however.

⁹ The index of similarity in export structure by trade bloc between SMEs and large firms is low: depending on the country, it ranges from 0.09 to 0.17.

TABLE 5

Argentina, Chile and Colombia: Composition of manufacturing exports by destination, 2004
(Percentages)

Trading bloc	Argentina		Colombia		Chile	
	Large firms	SMEs	Large firms	SMEs	Large firms	SMEs
MERCOSUR	28	39	3	2	6	8
Andean Community	6	8	28	30	11	11
NAFTA ^a	16	17	33	36	29	32
European Union	19	16	11	8	17	26
Other America	3	5	13	17	6	4
Other Europe	3	4	2	1	1	2
Asia and Oceania	18	7	7	3	26	16
Africa and other	7	4	3	3	5	2
<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>

Source: Prepared by the authors using data from INDEC and CERA (Argentina), PROCHILE (Chile) and DANE, PROEXPORT and FUNDES Colombia (Colombia).

^a North American Free Trade Agreement.

Argentina's SMEs make most of their external sales in MERCOSUR, the North American Free Trade Agreement (NAFTA) countries and the European Union; Colombia's in the NAFTA countries, the Andean

Community and other American countries; and Chile's in the NAFTA countries, the European Union, and Asia and Oceania.

IV

Identifying export success

To identify SMEs that were highly dynamic and well positioned in external markets, an export performance index (EPI) was constructed and applied to the universe of export SMEs in the three countries.¹⁰ Information on companies' exporting activity in the 2001-2004 period

was used to differentiate between two groups of agents: the successful and the unsuccessful.

The EPI classifies companies' exporting activity in 2001-2004 on the basis of a weighted combination of six qualitative and quantitative indicators previously

¹⁰ Other than in Chile, company size classifications were based on the legal definitions in each country and the information available. In Colombia, the classification is based on the parameters laid down in Law 905/2004: employees and assets. In the case of Chile, the upper limit established by the Production Development Corporation (CORFO) was raised so that the stratum of medium-sized enterprises included those with annual turnover of up to US\$ 7.5 million, taking into account the conclusions of the "Re-examen de las pymes exportadoras chilenas" seminar of 15 May 2003. This definition was also recommended by PROCHILE (see Moori Koenig, Yoguel and others, 2004). Note that the CORFO size stratification based on the development unit (UF) was switched to the dollar equivalent in 2001.

In the case of Argentina, a number of proxies were used to produce the stratification. The first of these was the amount exported, taking into account the criteria applied by the Department of Small and Medium-sized Enterprises and Regional Development to categorize the SME stratum by total turnover (resolutions No. 24 of 15 February 2001, No. 22 of 26 April 2001 and No. 675 of 25 October 2002). Second, because this definition could include large firms with a low export ratio, the original classification was corrected using secondary data on the country's large firms. In Colombia and Chile, the amount exported was taken when the information used for the official definition was unavailable.

TABLE 6

Argentina, Chile and Colombia: Average values of the components in the export performance index (EPI)

Components of the EPI	Argentina	Chile	Colombia
Continuity	7.6	7.8	6.0
Dynamism	5.9	4.6	3.6
Sustained dynamism	5.5	4.7	3.7
Diversification	6.2	5.1	4.2
Complexity	5.1	6.1	6.4
Change in complexity	1.0	0.4	0.2
Average export performance	5.9	5.7	4.9

Source: Prepared by the authors using data from INDEC and CERA (Argentina), PROCHILE (Chile) and DANE, PROEXPORT and FUNDES Colombia (Colombia).

used in other studies (Moori Koenig, Milesi and Yoguel, 2001; Moori Koenig, Rodríguez and others, 2005; Moori Koenig, Yoguel and others, 2004). These indicators are: (i) export continuity, which measures stability in the export trade (weighting factor 0.25); (ii) export dynamism, which measures growth in the amount exported between the first year taken and 2004 (0.15); (iii) sustained export dynamism, which measures the stability of growth in the amount exported (0.1); (iv) market diversification, which rates firms by the number of external markets served in 2004 (0.2); (v) market complexity, which rates firms by the percentage of exports going to their regional market and to destinations outside this in 2004 (0.25);¹¹ and (vi) the change in destination market complexity between the first year with data available and 2004 (0.05). Different weightings were tested and this structure proved to be the one that best explained the changes in the number of firms considered. This weighting structure also reflects the fact that continuity, market diversification and market complexity are the factors that best account for export performance.

A general finding from the EPI calculation is that Argentine and Chilean SMEs performed better than Colombian ones in the period considered. Argentine SMEs recorded the highest values for the export dynamism, sustained export dynamism and external market diversification variables, while Chilean and Colombian SMEs appear to have exported to more

complex markets. However, the complexity of the destination markets served increased by more in the case of Argentine firms than in that of Chilean and Colombian firms, something that may have been influenced by the depreciation of the real exchange rate in Argentina from 2002 onward.¹² Lastly, while continuity is high in the three countries, it is higher in Argentina and Chile than in Colombia (table 6).

To identify successful and unsuccessful firms in the universe of export SMEs in each country, firms were considered successful if they scored 6.5 or more on the EPI and unsuccessful if they scored less. This cut-off point was arrived at by considering a weighted average ideal type of exporter achieving what could be considered successful scores in each of the components of the EPI. Thus, the cut-off point of 6.5 follows the probability distribution of successful firms in the original studies from the three countries analysed. For example, this EPI score will be achieved by a firm: (i) which exported in three of the four years considered; (ii) whose exports have grown by over 12%; (iii) whose external sales showed positive growth in the last two years; (iv) which exports to three or more countries; (v) which sends more than 30% of exports by value to destinations outside the region; and (vi) which has increased the complexity of its destinations. The successful exporters identified are a minority among export SMEs (between 40% and 24%, depending on the country), but account for some

¹¹ By regional markets are meant the enlarged MERCOSUR for Argentina and Chile and the Andean Community for Colombia.

¹² The low value of the indicator for the change in complexity is explained by the fact that in the short period covered (four years) most companies did not see any significant change in the make-up of their exports by destination.

TABLE 7

Argentina, Chile and Colombia: SME manufacturing exports, by level of success, 2004
(Millions of dollars and number of firms)

Degree of success	Argentina		Colombia		Chile	
	Amount per firm	No. of firms	Amount per firm	No. of firms	Amount per firm	No. of firms
Successful SMEs	0.87	1 769 (42%)	0.46	1 036 (24%)	1.46	802 (38%)
Unsuccessful SMEs	0.42	2 426 (58%)	0.12	3 264 (76%)	0.33	1 288 (62%)
<i>All SMEs</i>	<i>0.61</i>	<i>4 196</i>	<i>0.20</i>	<i>4 300</i>	<i>0.77</i>	<i>2 090</i>

Source: Prepared by the authors using data from INDEC and CERA (Argentina), PROCHILE (Chile) and DANE, PROEXPORT and FUNDES Colombia (Colombia).

60% of exports in the stratum. This is reflected in an average export amount per firm that is between twice and four times the amount exported by those classified as unsuccessful according to the criteria synthesized in the EPI (table 7).

Other than the obvious differences in performance, the sectoral profile of successful export SMEs is similar to that of unsuccessful ones in the three cases studied. The same is not true of their destination profile, as is obvious from the construction of the EPI.

V

Export SMEs and the factors underlying export success

This section first describes the criteria used to select the export SMEs that were to be surveyed in the three countries in order to collect information on the factors influencing export performance. It then presents the stylized results arising from analysis of this information, with special emphasis on the microeconomic and mesoeconomic aspects that most influence the differentiated dynamic of companies in external markets. These results are based on the use of descriptive statistics and non-parametric tests and are in the nature of an exploratory foray yielding information that is helpful in constructing the binary logistic regression model given in section VI. The purpose of this model is to conduct a multivariate identification of the factors determining export success among SMEs.

1. The company selection criteria

The SMEs considered were manufacturing exporters that were still exporting at some point during the fieldwork

stage. After the EPI had been applied to the entire universe of export SMEs, firms were classified using a sectoral criterion and random samples were selected within the sectoral strata. On this basis, interviews were conducted with a group of successful export SMEs (210) and a smaller control group of unsuccessful SMEs (81) located in the largest metropolitan and industrial areas of the three countries (table 8). The number of firms interviewed varied from one country to another, but in all cases a rough proportion of seven successful firms to three unsuccessful ones was maintained. The surveys were conducted in the second half of 2003 in Chile, the first half of 2005 in Colombia and the fourth quarter of 2005 in Argentina. Although the fieldwork was conducted two years earlier in Chile than in Colombia and Argentina, the stability of the Chilean macroeconomic and institutional environment suggests that the business practices and behaviour differentiating successful export SMEs from the rest did not vary significantly.

To carry out the fieldwork in each case, use was made of a similar questionnaire that was completed in personal interviews. This questionnaire asks for detailed information on a wide range of aspects of each company's business, with particular stress on the development of their commercial and technological capabilities. Of course, there are specific aspects in each country that are not strictly comparable, concerning particularly the business environment and the instruments used to promote production and exports, although patterns are comparable for the purposes of the study.

The representativeness of the sample is ensured by the random selection method. The high level of variance in the type of firms interviewed (diversity of SME sectors and size), ensured in part by stratified sampling, is evidence of this representativeness. The sectoral profile of exports by the group of successful export SMEs is similar to that of the other firms in the stratum in all three cases studied. The situation that the sample does not reproduce (given the object of the study) is the proportion between successful and unsuccessful firms. As we have mentioned, strongly performing, well-positioned export SMEs are a minority of such firms, whereas they make up some 70% of the panel of SMEs interviewed.

2. Microeconomic and mesoeconomic factors influencing SME export performance

The comparative analysis of the business practices and structural characteristics of export SMEs in the three countries, based on the information collected in the surveys and employing descriptive statistics and bivariate non-parametric tests, showed that it was possible to distinguish in a stylized way between two types of situations.

Firstly, there are factors that are common to all exporters, successful and unsuccessful. This reveals that certain structural features of company organization and certain business practices are necessary if exporting is to take place with any regularity, but are not sufficient for successful positioning in external markets as measured by the indicators of success employed (continuity in external trade, export dynamism, diversification and complexity of the external markets served). The results also reveal that, apart from their export performance and country of origin, firms are constrained in their ability to internationalize further by factors of a mainly macroeconomic nature.

Secondly, there are factors that are associated with export success in at least two of the three countries studied. These factors, however, are heavily

TABLE 8

Argentina, Chile and Colombia: Basic fieldwork information

	Argentina	Chile	Colombia
Number of export SMEs interviewed	88	88	115
Successful	62	63	85
Unsuccessful	26	25	30
Interview type	Personal interviews to complete a comparable form		
Period in which interviews held ^a	2 nd half 2005	2 nd half 2003	1 st half 2005
Sample selection method	Random sampling stratified by sectoral structure (two-digit ISIC/Rev. 2) of exports by all export SMEs in each country		
Geographic location of firms	Metropolitan Region of Buenos Aires	Regions V, VI and VIII and Metropolitan Region	Barranquilla, Bogotá, Cali, Bucaramanga and Medellín

Source: Prepared by the authors.

^a In the case of Chile, the two-year time difference does not constrain the comparison since changes in the country's economic environment have not been great enough to alter the business practices of export SMEs.

influenced by the specialization and external trade pattern of the country concerned, and by its particular macroeconomic and mesoeconomic conditions. This explains why specific factors are also associated with good export performance by SMEs in each country. In other words, the factors determining performance are linked to the characteristics of the country—not just its firms, but different business scenes, internationalization of the economy, regional and international negotiations, regulatory arrangements, macroeconomic predictability, support systems to stimulate the creation of competitive advantages, and the degree of intrasectoral heterogeneity.

Table 9 gives a stylized presentation of both types of factors, organized into seven levels: (i) structural variables (branch of activity and company size);

(ii) evolutionary path (time for which firm has been exporting); (iii) production and trade measures taken in order to be able to export; (iv) trade promotion; (v) technological and production capabilities (research and development team, certification of quality standards, investment in machinery and equipment); (vi) trade management and intelligence (foreign trade team, marketing channels, knowledge of the external market and performance monitoring); and (vii) influence of the business environment (use of promotional instruments and access to export financing).

The variables mentioned will now be reviewed:

(i) *Structural variables.* The results indicate that the sectoral profile of the successful export SMEs group is similar to that of export SMEs generally in the three cases studied, so that it is not possible to establish a

TABLE 9

Argentina, Chile and Colombia: Influence of different variables on export success, by country^a

Variable ^b		Argentina	Colombia	Chile	Total sample
Structural variables	Branch of industry ^c		**	***	***
	Size (number of employees)	*		*	*
Evolutionary path	Length of time exporting	*			
Measures taken for export purposes	Number of production and trade measures	*	***	**	***
Trade promotion	Number of promotion measures		*	**	***
Technological and organizational capabilities	R&D team	***	**	**	***
	Size of R&D staff ^d	***		*	***
	Investment in machinery		*		
	Quality certification			*	
Commercial skills and foreign trade management	Foreign trade team				
	Size of foreign trade staff ^d	*			***
	Number of channels		***	*	***
	Complex channels	**	**	**	**
	Number of customers	***		**	***
Institutional environment	Market knowledge		**	**	***
	Use of production development instruments			*	
	Use of export incentives			*	
	Access to financing			***	***
	Linkages with firms and institutions			*	

Source: Prepared by the authors.

^a Chi-square test: *differences significant at 10%, **differences significant at 5%, *** differences significant at 1%.

^b See the text box in section VI for a description of the variables.

^c Using the Organisation for Economic Co-operation and Development (OECD) classification.

^d As proportion of all staff working at the company.

significant relationship between the type of product exported and a company's export success, either for the sample as a whole or for each of the countries studied. Significant relationships have been detected between the technology content of individual industries and their export success, however, particularly in the cases of Chile and Colombia, since high-performing companies are distinguished from the rest by the fact that they export low-technology manufactures. Company size, meanwhile, would also appear to be a variable that makes a difference;¹³ this seems to suggest a need for minimum size thresholds to achieve scales of operation which are sufficient in terms of both production and trade to allow firms to maintain a sustainable foreign presence according to the criteria of success employed.

(ii) *Evolutionary path.* The data indicate that a fairly extensive export learning process is required for firms to consolidate external sales as a more or less routine activity. Although not a factor of discrimination, this does emerge as a necessary precondition for the ability to export, partly because companies have to develop operational capabilities and skills to understand and satisfy customers with needs and cultures different from those of the home market, even when the products exported have a clear price advantage and go to easily accessible markets. The amount of time for which a company has been producing, meanwhile, is not a factor associated with success in two of the three countries studied (Chile and Colombia) and is generally long in all cases, with an average of 21 years' production experience. The evidence gathered shows that successful export SMEs in all three countries are more likely to have exported from the outset, i.e., to have incorporated export activities into their business strategy at an earlier stage.

(iii) *Measures taken in order to be able to export.* To be able to export at all, export SMEs have had to improve their basic capabilities, irrespective of the degree of success achieved in external markets. This probably creates externalities for the domestic market, since the improvement would be unlikely to have taken place had it not been for the pressure of competition in external markets. This is manifested particularly in certain measures commonly taken to improve products, comply with technical and quality standards, train staff,

assign human resources permanently to external trade activities, use different sources to detect opportunities, and employ methods entailing personal contact with potential customers to promote products abroad. The results suggest that exporting requires a specific type of management, particular organization and marketing skills and certain technological capabilities.

However, the main conclusion from the fieldwork in the three countries is that successful exporters applied a larger number of measures in the spheres of production, technology and trade; this indicates not only that they made more effort, but also that they had a more comprehensive external positioning strategy to allow them to participate sustainably in foreign markets. One finding is that certain measures taken with a view to exporting are associated with export success in general, while others, complementary in character, are only associated with export success in one or two of the countries. The former include, for example, bringing out Web pages (Argentina and Colombia), arranging for warehousing abroad (Argentina and Chile) and improving product design (Argentina, Chile and Colombia). Among the latter, efforts to train technical staff, build up local suppliers and obtain certification from the United States Food and Drug Administration (FDA) are particularly important in Chile. In Argentina, the need for packaging changes is more significant, while Colombia needs to target efforts on product advertising.

(iv) *Export promotion.* The efforts put into export promotion are a significant distinguishing feature of successful export SMEs, especially in Chile and Colombia, and may possibly be associated with a higher value of the indicator for the complexity of the markets served, revealing a more comprehensive and systemic strategy. Successful firms are characterized by the prevalence of practices centred on fluid and continuous communication with customers abroad, manifested in a larger number of visits and invitations to potential customers and a greater presence in trade fairs and missions.

(v) *Endogenous technological and organizational capabilities.* As they have internationalized, export SMEs have developed endogenous capabilities in the areas of technology and organization and trade intelligence. Different variables used to evaluate these capabilities serve as differentiating factors of success (see numbers vi and vii). Where technological and organizational capabilities are concerned, successful SMEs as a group are differentiated from the rest by having in-house research and development (R&D) teams and

¹³ Differences that are statistically significant for the panel as a whole and for the cases of Argentina and Chile (see table 9).

large numbers of staff assigned to the area; by their investment in machinery and equipment as a proportion of the total invested by them; by the introduction of changes in production processes and product design; by certification of quality standards; by technical training for staff; by the participation of operatives in process, product and design improvements; and by their willingness to enter into cooperation agreements with other companies both locally and abroad. However, the degree to which these factors are in place in successful SMEs differs between the three countries, revealing once again the existence of national specificities in these areas.

(vi) *Endogenous commercial and foreign trade management skills.* The first point to be made is that the export SMEs studied (especially in Colombia and Chile) are alike in their tendency to make a high proportion of their external sales to one main customer and to market their products by means of direct sales and distributors. Successful ones, however, operate with a more diversified customer portfolio (13 customers on average, as against 9), use more marketing channels and, in particular, deploy other more complex methods requiring greater investment and closer ties to customers (direct presence through warehouses and offices and formal agreements with companies abroad). All this influences the exporting success of SMEs in the three countries studied.

Second, it can be concluded that success is associated with greater knowledge of destination markets and performance monitoring of the products exported. This is seen particularly in the cases of Colombia and Chile, although the emphasis in the two countries is on different aspects, especially where markets are concerned.

(vii) *Influence of the institutional environment.* The greater commercial and productive capabilities of successful export SMEs reveal the importance of the microeconomic factors involved in the export trade, over and above the specific characteristics of the country concerned. For the development of operational capabilities that generate dynamic competitive advantages in external markets, however, certain macroeconomic and mesoeconomic elements (institutional environment) need to be in place, given the systemic nature of competitiveness.

The evidence analysed indicates that, in the countries considered, these elements are viewed by the businesses surveyed as constraints rather than as factors that can enhance companies' competitiveness. Generally speaking, the export SMEs studied are faced

with limitations that they perceive as major obstacles to the maintenance and further development of their external profile, most of them macroeconomic in nature (the level of the exchange rate, high tax burden, instability in the economic and political framework, etc.). Within this framework, access to financing is one of the stumbling blocks most often mentioned by exporters generally and, albeit only in the case of Chile, a factor that influences their success or lack of it.

Nonetheless, export success proved to be influenced neither by familiarity with the development policies asked about in the questionnaire nor by the degree to which advantage was actually taken of them. Export tax incentives are taken up by most firms, not just with a view to improving their export performance, while production and technology development incentives have had limited reach. Only in Chile are successful SMEs distinguished by greater recourse to the benefits of development policies in general. The density of linkages with other firms and with public and private institutions to improve on exporters' endogenous capabilities is also limited, indicating that these features of the institutional environment, with all their potential to enhance a company's foreign trade position, are somewhat lacking.

Thus, that the findings of the exploratory analysis brought to light the factors that have a statistically significant influence on the export success of SMEs, irrespective of their country of origin. These factors often have a reciprocal influence upon one another, however, making it harder to describe the determinants of export success systematically.¹⁴ In section VI we propose the use of a *Logit* model to study these determinants, both for the whole sample and for each of the countries analysed individually, with a view to obtaining a better general understanding of SME export success in Latin American countries.

¹⁴ This is because the type of analysis used deals exclusively with the relationship between two variables and thus does not evaluate the possibility of spurious relationships owing to the presence of multicollinearity. Consequently, the results yielded by this section should not be seen as conclusive but as a necessary input for specifying the model presented in section VI.

VI

The model

1. The econometric model

The logistic regression is used when the dependent variable is dichotomous, i.e., may have the value one or zero when some characteristic is present or absent; these values are determined with reference to a series of predictors or independent variables. In essence, the logistic regression is similar to a model of linear regression where the dependent variable is dichotomous. The coefficients yielded by the logistic regression can be used to estimate the quotient of the probabilities of occurrence/non-occurrence for different values of the independent variables. In models of this type, the dependent variable has to be dichotomous, while independent variables can be defined as continuous, interval or categorical variables¹⁵ (Long, 1997).

It must be remembered that the model does not directly estimate the likelihood of success or failure for any event. This regression model predicts the natural logarithm of the quotient of probabilities for the occurrence/non-occurrence of an event. This is:

$$\ln \left(\frac{p}{1-p} \right) = a + B_1x_1 + B_2x_2 + \dots + B_kx_k,$$

where p is the estimated probability of success and $(1-p)$ the estimated probability of failure, and x_1, x_2, \dots, x_k are the predictor variables.

Both to carry out estimations and to interpret the B_i coefficients, it is thus necessary to apply a logarithmic transformation of the model estimated.

$$p = 1 / \left(1 + e^{-(a + B_1x_1 + B_2x_2 + \dots + B_kx_k)} \right)$$

2. The model specification

The model encompasses four dimensions that group a number of interrelated variables yielded by the exploratory analysis and the theoretical framework

discussed in the previous section. These four dimensions are: (i) technological capabilities, (ii) commercial capabilities, (iii) the learning path and (iv) the institutional environment. The definitive forms of presentation of the variables were settled upon after a number of trial runs. Different ways of approximating to the concepts defined in the theoretical framework were tried out, allowing us to discard less effective ways of determining the dependent variables, such as those that presented colinearity problems. Besides the variables included in the four dimensions referred to, the model specification encompassed a set of variables that, while they do not conclusively account for exporting success, can be used to control the results of the regression and avoid distortions due to sample bias.

To determine the influence of the technological dimension, a stock variable and a flow variable were used. The stock variable chosen was a proxy variable for the cumulative technological capabilities of a firm: the size of the R&D team as a proportion of all staff working there. The flow variable used was the number of specific strategic production-related actions that firms had to undertake to be able to export with some degree of regularity.

The trade dimension also included stock and flow variables. In the first case, the variable used was the number of people working directly in the foreign trade area. In the second case, alongside the variable for the technological dimension, use was made of the number of specific strategic actions relating to the marketing area that firms had to implement to be able to sell their products in external markets.

It seemed appropriate, given the importance assigned to it by studies on capability-building, to include a dimension that would capture the learning process of export firms. Different proxies were tried out, but it was the length of a firm's exporting evolutionary path, measured by the year exports began, that came closest to explaining the dependent variable. It should be pointed out that in unstable macroeconomic contexts like those of the Latin American countries, the decision to begin exporting may depend more on the domestic business cycle and the vagaries of the exchange rate than on the outcome of the learning process over the course of a company's development.

¹⁵ By contrast with the analysis of discriminating factors, the logistic regression does not require assumptions about the distribution of the variables, making it a more versatile tool.

Something similar is true of the dimension encompassing the institutional environment variables. While the specialist literature treats this dimension as crucial to capability-building, the weakness of the local institutional environment and the low level of linkage between firms prevent it from being a determining factor in export success. Accordingly, use was made of three institutional environment variables that proved to have little influence on the dependent variable: a firm's linkages with other firms and with technology, production and trade promotion institutions; the take-up of export promotion instruments designed and implemented by the State or private organizations; and access to financing.

Three control variables were included in the model to eliminate the possible influence of sample bias on the results. These variables are the branch of industry

as defined by technology content; company size; and the existence or otherwise of quality standards.¹⁶

The following box shows the model variables included in the four dimensions examined, plus the control variables. Consequently, the model is specified as follows:

$$\ln(p/(1-p)) = \text{Constant} + B_1\text{PSRD} + B_2\text{PRODME} + B_3\text{NPEXTR} + B_4\text{TRAME} + b_5\text{EXBEG} + B_6\text{LINK} + B_7\text{EXPROM} + B_8\text{FINANC} + B_9\text{BRATECH} + B_{10}\text{SIZE} + B_{11}\text{QUAL}$$

where p is the probability of export success and B_i the coefficients accompanying each of the variables.

¹⁶ The inclusion of this variable as a control is justified because it is a necessary condition for exporting to begin.

Box
MODEL VARIABLES

Technology dimension

PSRD	Stock variable: proportion of staff employed on R&D (in five intervals: no R&D staff; up to 3%; between 3% and 6%; between 6% and 10%; over 10%)
PRODME	Flow variable: number of production measures that had to be taken for exporting to begin

Trade dimension

NPEXTR	Stock variable: number of people involved in managing external trade (in three intervals: up to 2; 3 or 4; 5 or more)
TRAME	Flow variable: number of trade measures that had to be taken for exporting to begin

Evolutionary path

EXBEG	Year exporting began (in three periods: before 1980, between 1980 and 1990 and after 1990)
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Institutional environment

LINK	Linkages with other firms and institutions (in three intervals: no linkages, linkage with one institution or firm, linkages with more than one institution and/or firm)
EXPROM	Use of export promotion instruments
FINANC	Export financing used or not used

Control variables

BRATECH	Branch of industry by technology content (two levels: low and high)
SIZE	Company size by number of employees
QUAL	Existence or otherwise of quality standards
Constant	Constant

Source: Prepared by the authors.

The model was estimated for all the panel data and separately for each country considered. This econometric exercise provides a way of comparing the importance of the dimensions included in the model in each of the different institutional environments.

3. Findings

As can be seen from table 10, which summarizes the results of the model estimates, the variables involved in the first three dimensions are important

for understanding a firm's export success. Conversely, as indicated in the previous section, the institutional environment variables do not emerge as significant.

Where the general model is concerned, the first three hypotheses of the study are confirmed insofar as the proxy variables taken have a significant influence on a company's export success. Conversely, of the five hypotheses put forward at the end of section II, the fourth and fifth could not be corroborated; this shows that success is achieved in the face of an unhelpful institutional framework and the very isolated position of

TABLE 10

Argentina, Chile and Colombia: Significance of the parameters estimated in the logistic model
(Dependent variable: level of success)

Independent variable	Total		Colombia		Argentina		Chile	
	β	Significance	β	Significance	β	Significance	β	Significance
Technology dimension								
PSRD	0.443	0.000	0.23	0.209	1.005	0.003	0.528	0.023
PRODME	0.336	0.018	0.113	0.659	0.875	0.035	0.037	0.883
Trade dimension								
NPEXTR	0.432	0.072	0.432	0.225	0.931	0.147	-0.451	0.496
TRAME	0.222	0.052	0.492	0.02	0.094	0.761	0.251	0.214
Development path								
EXBEG	-0.521	0.101	-0.551	0.468	-1.502	0.031	0.921	0.189
Institutional environment								
FINANC	-0.518	0.177	0.044	0.935	-0.242	0.839	3.329	0.009
LINK	-0.077	0.702	-0.23	0.511	-0.984	0.156	0.422	0.262
EXPROM	0.019	0.932	-0.284	0.441	0.176	0.77	0.422	0.392
Control variables								
BRATECH	0.73	0.026	1.071	0.04	-0.182	0.845	0.655	0.352
SIZE	0.002	0.275	0.001	0.785	0.003	0.476	0.021	0.045
QUAL	0.465	0.248	-0.044	0.951	1.251	0.243	0.432	0.592
Constant	-1.045	0.499	0.245	0.941	-2.459	0.533	-0.121	0.971
Number of cases and statistical tests								
No. of cases	256		103		69		84	
Missing data	35		12		19		4	
Percentages explained by model	74.8		72.5		90.6		85.0	
-2 log-likelihood ^a	242.5		101.65		43.9		63.8	
Cox and Snell's R ²	0.202		0.17		0.38		0.37	
Nagelkerke's R ²	0.292		0.24		0.57		0.52	
HoSMER-Lemeshow test	0.158		0.51		0.60		0.64	

Source: Prepared by the authors on the basis of surveys conducted in Argentina, Chile and Colombia.

^a A measure of how well the model fits the data, also known as deviation. The lower the value, the better the fit. In "step-by-step" methods, the change of -2 in the logarithm of the likelihood function tests the null hypothesis that the coefficients of the terms eliminated from the model are equal to zero.

firms, something that clearly limits the development of long-term systemic competitive advantages. This model predicts about three quarters of successes and failures.

The general model used manifests itself differently in each of the three countries. Colombia is characterized by the influence of the trade dimension in determining export success, which could have something to do with a sectoral profile dominated by low-technology activities (such as wearing apparel and leather manufactures) for which it is usually important to consolidate a long-term

commercial image, have a constant presence at fashion and design events, develop and renew good advertising material, and keep up a flow of communication with customers to adapt products to their designs. In Argentina, technology and the evolutionary path to date emerge as leading factors. In Chile, lastly, company-specific factors such as technology content and size predominate, while the institutional environment factor of financing also helps to account for export success.

VII

Conclusions

The findings obtained indicate that there are factors associated with the export success of SMEs that are common to all three countries studied, while others are peculiar to each country. They also reveal the existence of factors not associated with success, some of which are so generally encountered that they would appear to be a necessary precondition for exporting at all, while others are generally absent and so would appear to be disadvantages rather than advantages.

The technology dimension is a crucial determinant of export success for Chilean and Argentine SMEs, while the trade dimension is critical in the Colombian case. This outcome may be due in part to the different production and trade specialization profiles of these countries. As already pointed out, whereas foodstuffs represent over half the exports of Chilean SMEs, various leather manufactures and garments account for a large share of Colombia's exports while Argentina's are more diversified, with foods, chemicals and metallurgical products all well represented.

The learning path, which the specialist literature identifies as a key factor in corporate competitiveness, does not seem to be especially associated with export success in the countries analysed, since a learning process is required for exporting to take place at all. This process is a necessary condition for selling products more or less regularly in external markets, but is not enough for exporting success as manifested in the attributes chosen to measure this (export continuity, export dynamism, diversification and complexity of external markets). In the case of Argentina, the high

level of macroeconomic volatility that characterized the country until recent years would seem to be lengthening the process of accumulating knowledge with a view to participating successfully in external markets.

A similar situation is found with institutional environment factors. In the countries analysed, firms operate very largely in isolation, irrespective of how successful they are in external markets. Given the systemic character of competitiveness, this shortcoming is a constraint on the development of dynamic competitive advantages and thus on the growth of companies' exports.

In short, export success comes basically from microeconomic differentiation, whether in technology or trade practices, but always in a limited time frame. Conversely, the shortcomings of national innovation systems in the countries examined constrain the workings of competitiveness as a systemic phenomenon integrating the microeconomic, mesoeconomic and macroeconomic levels. In consequence, the situation is mainly one of isolated efforts and powerful constraints on the scope for generating increasing returns to scale, spillover effects and production linkages.

These findings should lead us to reflect on the difficulty of generating processes of structural change that involve innovation and complementarities between agents. These appear to be a necessary condition for changing the external trade profile of these countries so that they can appropriate stable Schumpeterian quasi-rents in the international market.

(Original: Spanish)

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