

## **INDUSTRY AND ECONOMIC DEVELOPMENT IN LATIN AMERICA, 1980-2002**

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### ***Abstract***

We analyse the evolution of Manufacturing Value-Added per inhabitant in 20 Latin American and Caribbean countries during the period 1980-2002, and present a comparison with more industrialized countries. We find that very few Latin American countries have experienced an increase in this variable during the sample period, corresponding the most outstanding increases of this variable to the following countries: Dominican Republic with 70%, Chile with 46%, Costa Rica 28% and Mexico with 22%. Other countries in this area have experienced very small increases, or even stagnation or decrease, in this variable. Argentina follows to be the Latin American country with the highest value of this variable, although far below the levels of Spain, the USA and other industrialized countries. We estimate a cross-section econometric model for Latin America which shows the positive impact of manufacturing on non-manufacturing sectors. The main conclusion is the great importance of manufacturing on economic development.

JEL classification: C51, L6, O1, O54

Key words: Industry, Latin American, Manufacturing, Development

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### **1. Introduction**

Latin America has experienced during the last decades of the 20th century an important growth of population and production, but with small increase in income per inhabitant. This stagnation implies many difficulties to eradicate poverty, which is the highest social priority in these countries. The development of successful policies to

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reach this goal and get a substantial increase in real income per inhabitant should give a great priority to the increase of manufacturing real value per inhabitant and to increase foreign trade particularly among the neighbouring countries and countries of this area, although also with other international markets.

This study analyses the evolution of manufacturing in 20 Latin American and Caribbean countries for 1980-2002. In section 1 we analyse some interesting quantitative studies related with industrial development in Latin America, in section 2 we analyse the evolution of manufacturing in Latin American countries during the period 1980-2002 and compare this evolution with those of two OECD countries. In section 3 we present a cross-country model to measure the impact of manufacturing on non-manufacturing real value-added. and in section 4 we summarize the main conclusions.

## **2. Review of the literature for the period 1995-2005.**

Some interesting quantitative studies related, directly or indirectly, with industrial development in Latin American countries are the following ones:

Canudas(2001) and Rajagopal(2005), among others, analyse the increases in productivity per worker in the case of Mexico, and Revenga(1999) has into account the effects of trade liberalization on employment and wages in Mexican manufacturing. Other studies analyse the role of education and foreign trade on industrial development, as in Guisan and Aguayo(2001) and Guisan, Aguayo and Exposito(2001).

Calderon and Serven(2004) analyse the trends in infrastructure in Latin America for the period 1980-2001, which is a key question to have into account in order to foster industrial development in this area. Guell and Richards(1998) analyse the relationship between regional integration and intra-industry trade in Latin America for the period 1980-90.

Guasch and Spiller(1995) analyse the consequences of regulation on private sector. Some studies focus on the important inter-sector dynamics of economic growth, such in the studies by Dorte and Fiess(1999) for Ecuador, Guisan and Cardim-Barata(2003) for Brazil, and Guisan, Malacon and Exposito(2003) for Mexico, among others. Finally there are some interesting reports edited by Kosacoff(1998) Palazuelos (2001), IADB(2000), and other authors and institutions focused on Latin American development which include references to several factors related, directly or indirectly, with the increase of industrial value-added per inhabitant.

In spite of some attempts by economists and other experts to foster economic development in Latin American, the question is that there has been little advance during the period 1980-2002, and we should recommend a high degree of communication between press, researchers, politicians and public opinion. All the advancements in this regard will be good news for Latin American development.

### **3. Evolution of Manufacturing, 1980-2002**

Table 1 shows real Value-Added of Manufacturing per inhabitant in 20 Latin American and Caribbean countries, during the period 1980-2002, in dollars at 1995 prices and exchange rates. We notice a low degree of advancement which could induce to a false impression of growth stagnation. Total Manufacturing has grown little during the period 1980-1990 (only a 2.20% in ten years) but it has been higher during the period 1990-2002 (20.11% in twelve years).

Graph 1 shows the percentage of increase of total Value-Added of Manufacturing in Latin American countries for the periods 1980-1990 and 1990-2002, in the same order that in table 1, while the last bar (number 21) correspond to the sum of the 20 countries.

The percentage of increase of Manufacturing in this group of countries for 1980-90 was only 2.20% and the evolution improved for 1990-2002 with an increase of 22.11%. Population has experienced a higher growth in those years: 22.28% for 1980-1990 and 21.20% for 1990-2002, and real Value-added of Manufacturing

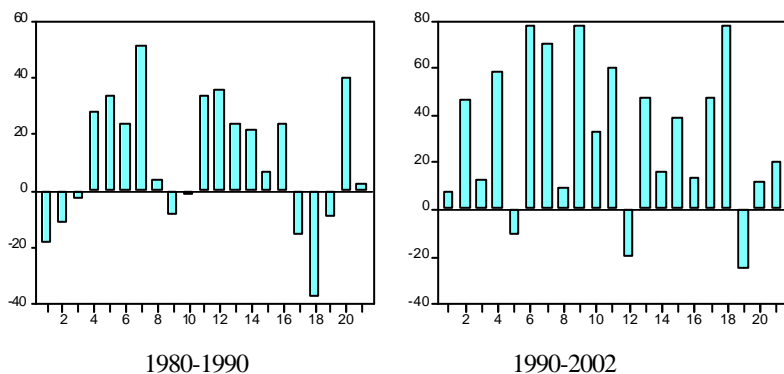
per inhabitant decreased for 1980-1990 and got stagnation for 1990-2002, evolving from 813 in year 1980 to 679 in 1990 and 673 in 2002, in dollars at 1995 prices and exchange rate.

Table 1. Real Value Added of Manufacturing, 1980-2002  
(dollars per inhabitant at 1995 prices and Exchange Rates)

No.	Country	1980	2002	(3)	No.	Country	1980	2002	(3)
1	Argentina	1561	1055	0.68	11	Honduras	108	122	1.12
2	Bolivia	193	152	0.79	12	Jamaica	327	288	0.88
3	Brazil	1144	874	0.76	13	Mexico	618	754	1.22
4	Chile	526	766	1.46	14	Nicaragua <sup>1</sup>	376	252	0.67
5	Colombia	402	311	0.77	15	Panama	248	245	0.99
6	Costa Rica	633	811	1.28	16	Paraguay	325	258	0.79
7	Dominican R.	203	346	1.70	17	Peru	429	343	0.80
8	Ecuador	334	236	0.71	18	Trinidad & Tobago	597	552	0.92
9	El Salvador	368	427	1.16	19	Uruguay	1546	910	0.59
10	Guatemala	266	199	0.75	20	Venezuela <sup>1</sup>	527	495	0.94

Source: Elaboration from World Bank statistics. <sup>1</sup> For Nicaragua and Venezuela in 2002 data are own estimations, based on the evolution during the period 1990-99 analysed by Guisan and Aguayo(2001). Last column is the ratio between figures for year 2002 and 1980. No. is number of order.

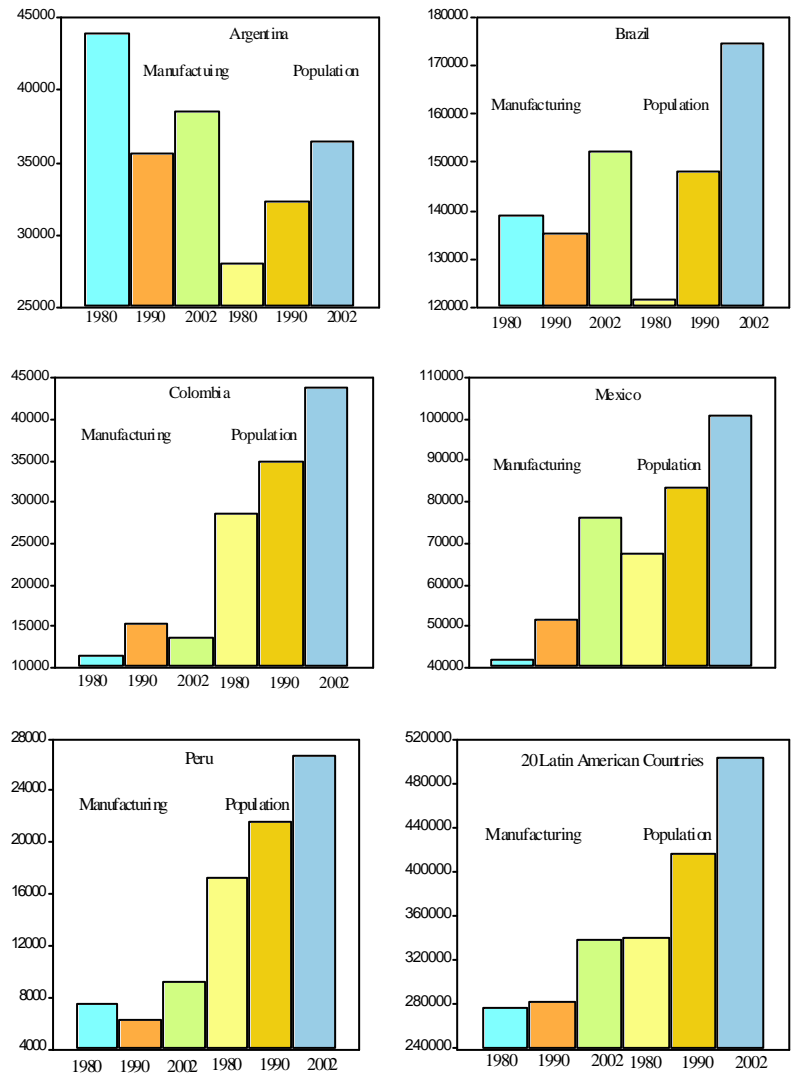
Graph 1. Evolution of real Value-Added of Manufacturing in 20 Latin American countries (% of increase) in 1980-90 and 1990-2002



Note: The order of the countries is the same that No. in table 1. Number 21 correspond to the total of 20 Latin American and Caribbean countries.

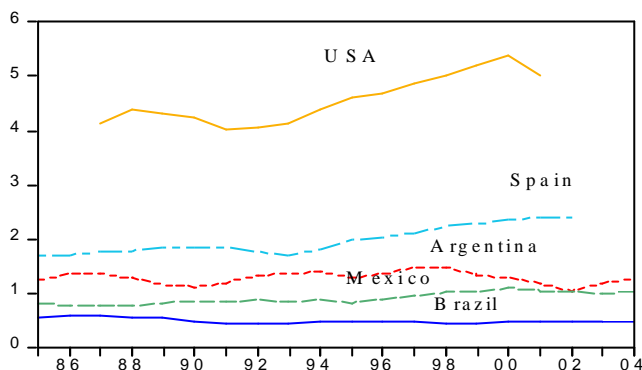
Graph 2 presents the evolution of Manufacturing in the five most populated countries of Latin America.

Graph 2. Manufacturing Value-Added (million \$ at 1995 prices and exchange rates) and Population (thousand inhabitants)



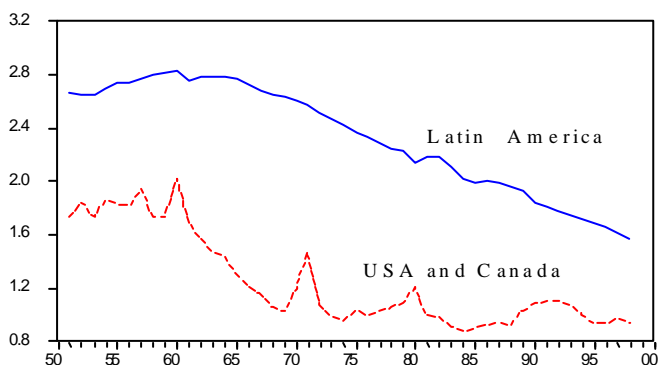
Real Valued-Added of Manufacturing per inhabitant is very low in Latin American countries in comparison with more industrialized countries, as it may be seen in graph 3.

Graph 3. Real Value-Added of Manufacturing per inhabitant (thousand dollars at 2000 prices)



For the first decades of the 21<sup>st</sup> century there are positive perspectives to increase real Valued-Added per inhabitant in Manufacturing if we have into account that the increase in the educational level of population has moderated fertility rates and population growth as it may be seen in graph 4.

Graph 4. Annual rates of population growth, 1950-2000



#### 4. Econometric models of Manufacturing in Latin America

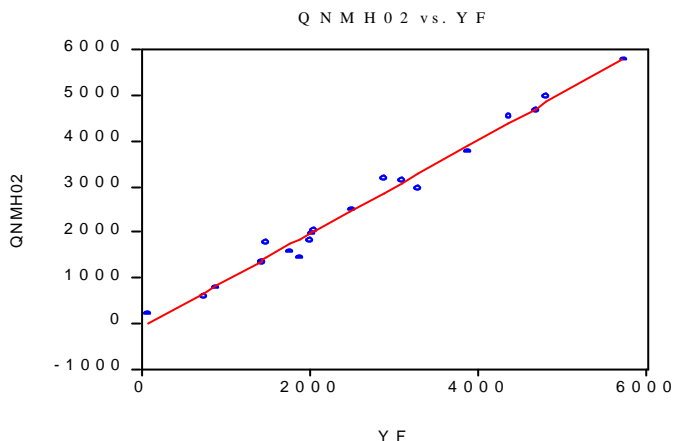
We have estimated the following equation between real Value-Added of Non-Manufacturing sectors per inhabitant in year 2002 (QNMH02) and real Value-Added of Manufacturing per inhabitant. The relationship is dynamic because there is a propagation effect through time, as the increase in QMH during the period 1990-2002 increases QNMH in year 2002 and this effect will be transmitted into the future, thanks to the significant coefficient of the lagged dependent variable. The model includes two dummy variables to have into account some special features of Chile (D4) and Venezuela (D20).

Table 2. Dynamic relationship between QNMH and QMH

Dependent Variable: QNMH02				
Method: Least Squares. Sample 1 20				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
QNMH90	1.232287	0.021116	58.35763	0.0000
QMH02-QMH90	0.809115	0.349433	2.315509	0.0342
D4	1180.776	225.1026	5.245501	0.0001
D20	-883.6907	215.4314	-4.101958	0.0008
R-squared	0.985363	Mean dependent var		2519.080
Adjusted R-squared	0.982618	S.D. dependent var		1562.910
S.E. of regression	206.0536	Akaike info criterion		13.67101
Sum squared resid	679329.7	Schwarz criterion		13.87015
Log likelihood	-132.7101	Durbin-Watson stat		2.325667

Accordingly to this model we can expect, on average an increase of 0.80 dollars in Non-manufacturing Value-Added per each dollar of increase in Manufacturing Value-Added. Although there are another factors, such as Tourism, Energy and other activities, which can explain a part of the increase in Non-manufacturing, the main source of increase for this variable is usually the increase in Manufacturing real Value-Added. Graph 5 shows the goodness of fit with an scatter of actual and fitted values of QNMH02 in the model of table 2.

Graph 5. Actual value of QNMH02 and fitted YF)



The estimated equation may be summarized as follows:

$$\text{qnmh02} = 1.2323 \text{ qnmh90} + 0.8091 (\text{qnmh02-qnmh90})$$

(58.4)                      (2.32)

Similar results were found in another studies of Latin American, as in Guisan, Malacon and Exposito(2003) estimation for Mexico, and in Guisan and Cardim-Barata(2003) for Brazil. The latter study presents also an interesting analysis of bilateral causality between QNM and QM, by means of the following model and Hausman test:

- (1) QNM / QNM(-1) D(QM)
- (2) QM / QM(-1) D(QNM(-1))

We found that there is a significant bilateral relationship between both variables, with some degree of lagged effect of the increase in QNM on QM, while the effect of QM on QNM is contemporaneous.

The role of foreign trade is also important, because industrial development usually implies a high degree of openness, both to import and export, so complementary goods and services are useful for economic development as seen in Guisan, Aguayo and Exposito(2001) and other studies.



## 5. Conclusions

Industrial development must be fostered in Latin American countries as the main way to increase real income per inhabitant and eradicate poverty. Some positive changes are clearly demanded by the society, and to get these goals it is of great help to improve communication between press, politicians, public opinion and economics researchers. A high degree of social consensus should be addressed to favour security for persons and investments which is of uppermost importance to attract both domestic and foreign investment. Education and social capital are also important factors to favour the process of industrialization.

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<sup>1</sup> At: <http://ideas.repec.org> and <http://www.usc.es/economet/eea.htm>