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The relationship between population growth, capital formation and employment opportunities in under-developed countries

Dr. Raul Prebisch 1/

Summary

This paper discusses the rate of economic growth in Latin America and the absorption of population increase. The assimilation of technical progress and the transfer of active population employed in primary production and other activities of low productivity to industry and services are analyzed as essential factors in this process. The rate of absorption and change in the structure of employment are shown as being largely determined by the rate of investment. The paper demonstrates that domestic savings must be supplemented by a considerable amount of capital inflow in order to attain an adequate rate of development. Lastly, estimates are given of the amount of capital required to absorb a given number of immigrants.

1/ The author of this article is the Executive Secretary of the United Nations Economic Commission for Latin America, but the opinions given herein are purely personal. The author is particularly grateful for the collaboration of Mr. Alexander Ganz, Chief of Analysis and Projections of Economic Development in the Commission.

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* General distribution of this document is limited to the introductory summary. Participants who have been invited to take part in the meeting referred to above will receive also the full text of the paper. Other participants in the Conference will receive the full text upon request.

Pour la traduction française voir au verso.

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Rapports entre l'accroissement de population, la formation de capital et les possibilités d'emploi dans les pays insuffisamment développés

par Raul Prebisch[1/]

Résumé. Dans ce document, l'auteur analyse le rythme de l'expansion économique de l'Amérique latine, ainsi que l'absorption de l'accroissement de la population. L'assimilation du progrès technique et les transferts de population active du secteur primaire et des autres branches d'activité à faible productivité vers l'industrie et les services sont étudiés en tant que facteurs essentiels de cette évolution. L'auteur montre que le taux d'absorption et les modifications dans la structure de l'emploi sont largement conditionnés par le niveau des investissements. Il démontre que l'épargne nationale doit être complétée par un apport considérable de capitaux, si l'on veut que le rythme de développement soit satisfaisant. Enfin, l'auteur donne des estimations sur les capitaux dont il conviendrait de disposer pour absorber un nombre déterminé d'immigrants.

1/ L'auteur du présent article est le Secrétaire exécutif de la Commission économique des Nations Unies pour l'Amérique latine, mais les vues qui y sont exprimées dans cette étude sont purement personnelles. L'auteur est particulièrement reconnaissant de l'esprit de coopération témoigné par M. Alexander Ganz, chef de la Section de projection et d'analyse qui relève de la Division du développement économique de la Commission.

* Seule, la présente analyse d'introduction fait l'objet d'une distribution générale. Les participants qui ont été invités à assister à la séance mentionnée ci-dessus recevront en outre le texte intégral du document. Les autres participants au Congrès recevront le texte intégral sur leur demande.

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THE RELATIONSHIP BETWEEN POPULATION GROWTH, CAPITAL FORMATION AND EMPLOYMENT OPPORTUNITIES IN UNDER-DEVELOPED COUNTRIES

Dr. Raul Prebisch [1]

1. On this occasion I shall refer particularly to economic development in Latin America. The problem of development has essentially two main aspects; firstly, the absorption of the rapid growth in population and, secondly, the low productivity of labour.

Latin America as a whole has the highest rate of demographic growth in the world. At present (1954), the population of the region stands at 170 millions; the recent annual rate of icrease has been 2.2 per cent, or 3.7 million inhabitants, of which 1.5 millions are incorporated into the labour force.

As regards the low productivity of a relatively large proportion of the population, this is a result of the primitive or out-of-date technical methods used both in primary production for domestic consumption and in rudimentary manufacturing activities of an artisan nature. It is essential to achieve an increase in this productivity through assimilating and adapting the productive techniques of the more developed countries. During this process, there is a decline in the proportion of the active population employed in primary production and other activities of low productivity, while the percentage employed in industry and services continues to rise.[2] In this respect, great differences exist between the various Latin American republics. In countries

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2/ It may be recalled that Rosenstein-Rodan, Colin Clark and H. Singer have drawn attention to this problem on several occasions.

such as Honduras and Nicaragua, between 70 and 80 per cent of the active population is still employed in primary production, mainly agriculture, while in Argentina, basically an agricultural country, this proportion barely amounts to 25 per cent. This is due, among other factors, to Argentina's relatively late colonization, the absence of the dense population that for centuries has occupied the land in other Latin American countries, and, thirdly, to technical progress in rural activities. Between these two extreme cases, a whole range of intermediary situations and degrees of under-development exist.

As the population employed in primary production approaches a relatively low proportion of the total active population, it is more difficult to draw a dividing line between under-developed and advanced countries, because, even in the latter, there are sometimes important sectors with a low productivity in relation to the technical knowledge available in the world. With this in mind, the process in the under-developed countries may be characterized by the assimilation and adaptation of the existing techniques in order to increase per capita gross product, while in the more advanced countries a rise in the gross product is principally the result of successive innovations in productive techniques.

2. This process of gradual assimilation and adaptation of techniques is taking place in both densely populated countries and those that are relatively sparsely populated. The fact that this latter situation is prevalent in Latin America is well known. But it is also necessary to distinguish between countries, and even between areas in the same country. There are republics such as Mexico, Ecuador or Guatemala where areas sparsely populated but offering great possibilities for exploitation, contrast with others which have been cultivated for centuries and are now exhausted and over-populated. Brazil, with its vast

possibilities, also shows a similar contrast on a large scale. The consequent necessity for internal migration is a factor which further complicates the problem of immigration from overseas.

3. With regard to the relatively sparsely populated countries with land available for cultivation, it might be assumed that the need for transferring the active population from primary production to industry and services concomitantly with the expansion of technical progress, is not as acute as in countries with a relative scarcity of land. Without denying that here again there is a question of degree, it would be erroneous to suppose that a considerable proportion of the annual manpower increase will find employment in agriculture. This fact is mainly due to the slow increase in foreign demand for primary commodities. In the United States, for example, the coefficient of the income elasticity of demand for Latin American exports is barely 0.7, while in Latin America the elasticity of demand for manufactured goods is 1.6. This explains why only a relatively small proportion of the increment in labour force can be absorbed into primary export activities. A similar phenomenon occurs within a country once the initial stage of the process has terminated. 3/ While productivity and per capita gross product in the Latin American countries increase, needs also tend to diversify and the demand for primary commodities expands at a slower rate than that for manufactured goods or services. Thus, Latin America does not escape from this phenomenon of a universal nature.

3/ In fact, if certain countries are excepted, Latin American consumption is relatively low, especially in calories and proteins of animal origin. As a consequence, in the initial stage of a rise in per capita income, domestic consumption of agricultural products can increase as much as, or to a greater extent than, that for manufactured goods or services.

4. The stage in which Latin American growth was directed almost exclusively towards the overseas market has now come to an end. This does not imply that full utilization is being made of every opportunity for increasing exports, nor that grave errors are not sometimes committed in wasting such opportunities. But, even in the best cases, the shift of the active population from primary production to industry and services is an inevitable feature of development. Hence the dynamic significance of industrialization in Latin America.

In general this is still an incipient process. Between 1940 and 1953 the industrial labour force in the region as a whole increased by 3.7 per cent annually, while the annual rise in the agricultural labour force was barely 1.4 per cent. Notwithstanding, approximately 58 per cent of the active population still remained within the agricultural sector in 1953, as compared with 62 per cent in 1940.

This shift has been the most important element in the growth of per capita gross product. In fact, there is a marked disparity between the per capita gross product of 300 dollars[4/] in agriculture estimated for 1953 and the 1,100 dollars in industry and construction. For services, the average is 1,335 dollars. The highest average corresponds to mining, with a per capita gross product of 2,800 dollars, but barely 0.6 per cent of the active population of Latin America is employed in this sector and minerals are also not exempt, except in the case of petroleum and some of minor importance, from the characteristic of slow export expansion.

5. Let us now turn to the growth of the per capita gross product. Between 1940 and 1953, the annual rate of increase was 2.6 per cent, and this, combined with a rise of 2.2 per cent in the population each year, provides an aggregate

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4/ All these calculations have been made in dollars at constant 1950 prices.

rate of 4.9 per cent in the gross product of Latin America as a whole. This growth is exceptional and has been influenced by temporary factors whose recurrence appears improbable. The principal element was the improvement in the terms of trade, following the serious deterioration during the thirties. Approximately one fifth of the overall rise in the gross product is due to this factor and, if its influence is eliminated, the rate of increase would be reduced from 4.9 to 4.0 per cent.

The improvement in the terms of trade has not only directly influenced the gross product, but it has also done so indirectly by permitting larger capital investments. The gross investment rate 5/ during this entire period averaged 14.5 per cent of the gross product. During the thirties this average coefficient was barely 11.1 per cent.

6. At present there are no indications that Latin America's terms of trade will again improve within the near future; on the contrary, they are tending to deteriorate. Furthermore, consumption has been absorbing an increasing proportion of the effects of this improvement upon the gross product. Thus the investment coefficient tends to become weaker, as also the unusual rate of growth during recent years.

In order to accelerate the rate of growth once more, an inflow of foreign capital is required because it is very difficult, in fact practically impossible, to reduce consumption substantially in favour of investment in Latin American countries. This additional capital contribution is required until such time as the region's gross product rises sufficiently to provide a satisfactory investment coefficient. This point is of fundamental importance. An increase in the coefficient is not usually a spontaneous phenomenon. Nor has inflation proved to be an adequate means of raising it, except during short periods and

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5/ The gross investments referred to in this article only include those carried out in construction and equipment.

with consequent social disturbances. As a result, it is indispensable that a series of measures should be adopted to achieve this goal; without them the dynamic effects of the inflow of foreign capital might, to a great extent, be wasted.

7. What is the size of the additional inflow of foreign capital required to accelerate growth? Only an approximate estimate can be made to indicate the order of magnitudes involved. Furthermore, the estimate must necessarily be based on suppositions which facts may later prove to be erroneous. Firstly, let it be assumed that the terms of trade will not vary and, secondly, that the output-capital ratio will be 0.46, or the same relation registered in 1953,[6/] which is below the 0.49 corresponding to the entire period 1940-1953. Lastly, the amount of foreign capital will also depend upon the rate of growth which Latin America wishes to achieve.

Merely for purposes of illustration, let us assume an annual rate of growth in the per capita gross product of 4.1 per cent; this would permit Latin America to reach, within a period of 25 years, a per capita gross product of one-third the present level in the United States, that is, 670 dollars. This rate is undoubtedly high, but it has already been achieved in Latin America between the years 1945 and 1951, when, as already noted, the terms of trade were extremely favourable. To reach this level, a gross investment coefficient of

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6/ In accordance with footnote 5, the ratio of 0.46 refers only to investment in construction and equipment. 2.18 capital units would thus be required to obtain an additional unit of the gross product. If circulating capital is added to fixed capital, the coefficient of capital would be around 3 units per unit of income.

20 per cent would be necessary,[7/] which is equivalent to a net rate of 13.3 per cent. In order to understand its significance, it is necessary to recall that, during the years of the most favourable terms of trade, investment reached a maximum gross coefficient of 18 per cent for Latin America as a whole.

Of that net coefficient of 13.3 per cent, approximately 4.4 per cent would be needed to absorb the growth of population in the various activities, and the remaining 8.9 per cent would be required to increase productivity and the per capita product in the manner referred to above.

8. Let us now look at the probable size of foreign capital requirements. It would not be advisable to calculate an actual savings coefficient higher than 14 per cent of the gross product, that is, approximately the 1940-1953 figure. As a consequence, in order to obtain an investment coefficient of 20 per cent, a substantial initial contribution of foreign capital would be needed, equivalent to 6 per cent of the gross product during the first years, that is, 2,000 million dollars annually over and above the yearly average of 500 million dollars of foreign capital invested during the period 1945-1953.

Obviously, this initial contribution could be diminished, as the rise in income permits a higher coefficient of domestic savings which could with time reduce to a low level or entirely eliminate the imperative need for foreign capital to achieve a specific rate of growth. This is the second essential condition if a Latin American development policy is to be carried out efficiently.

7/ In order to obtain an annual growth in the per capita gross product of 4.1 per cent, it would be necessary to increase the aggregate gross product (allowing for population increase) by 6.2 per cent. This, in turn, requires a rate of net investment of 13.3 per cent (6.2 divided by 0.46, which is the output-capital ratio). To this net investment should be added the depreciation of the existing capital stock, which is estimated at 3.1 per cent of the latter and, in consequence, 6.7 per cent of the gross product (3.1 divided by 0.46). The necessary annual gross investment would therefore be 20 per cent of the gross product (6.7 plus 13.3).

9. The continuation for some time of the proposed rate of development would lead to important changes in the distribution of manpower. Certain projections may be made to indicate the size of these changes. We shall start with the active population in agriculture, which, in 1953, represented 58.1 per cent of the total, as noted earlier. In order to estimate what this percentage would be at the end of the twenty-five year period considered above, we should have to make two basic assumptions: a) that income elasticity of domestic and foreign demand for agricultural commodities has a coefficient of 0.6,[8/] and b) that the rise in productivity of the agricultural labour force is 4.1 per cent annually, or a higher rate than the economy as a whole (3.7 per cent annually) since the difference between the levels of productivity must be reduced. Based on these assumptions, the share of the agricultural labour force would drop from 58.1 per cent in 1953 to 35.9 per cent in 1978, i.e., at the rate of 1.3 per cent annually.[9/] Simultaneously the share of the industrial labour force would increase from 16.5 to 26.3 per cent and that of services from 24.4 to 36.8 per cent between 1953 and 1978.

8/ The income elasticity of demand for domestic foodstuffs and agricultural raw materials in Latin America was estimated at 0.6 during the period 1940-53. It may be anticipated that the income elasticity of demand for foodstuffs will tend to decrease while that for agricultural raw materials for industry will rise, so that the average coefficient will remain at a more or less constant level. (See ECLA, Preliminary Study on the Technique of Programming Economic Development (E/CN.12/292), Santiago, Chile, 1953). Other recent studies also indicate that it is improbable that per capita exports in Latin America will exceed their present level. (See Resources for Freedom, report to the President by the President of the Materials Policy Commission, Vols. I and II, Washington, June 1952; Inter-American Economic and Social Council, Secretariat Report on the Long-Term Prospects of Latin American Exports to the United States, Washington, Pan American Union, 9 September 1953; The Economic Report of the President, Washington, January 1953.)

9/ A change of similar proportions took place in the agricultural labour force of the United States during the thirty-five year period following 1870. It is possible that the need for agricultural labour in Latin America during the next twenty-five years will be relatively lower than that of the United States in the above-mentioned period.

In absolute figures, during the quarter century some 23 millions of the active population would have to be transferred from agriculture to industry and services, if the proposed increase in per capita gross product is to be achieved. This figure is sufficient to indicate the impressive size of the problem. 10/ This is not the time to refer to the other obstacles which hinder this process, apart from those already mentioned relating to the necessary capital formation.

10. This displacement of manpower would largely imply a shift of population from the rural areas to the urban centres. The problem of Latin America's capacity to absorb European immigrants must necessarily be analyzed with this process in mind. Internal migration which accompanies economic development requires both capital investment in agriculture to increase productivity and investment in industry and services in order to employ the displaced labour force, apart from the capital needed by industry and services for increasing productivity and absorbing the normal growth in manpower. In Latin America, the size of the labour force which can be shifted from present employment without requiring a rise in the existing capital stock, is relatively small. In consequence, every foreign immigrant needs a corresponding amount of additional capital, so that he may be absorbed by the economy without adversely affecting the absorption of the internal manpower migrations to which I have just referred. Since the stock of capital per worker was estimated at 1,550 dollars in Latin America during 1953, which would rise to 3,835 dollars in 1978, it is easy to estimate the substantial investment required for a large inflow of immigrants. For each one million immigrants within the next twenty-five years, a capital inflow of 2.3 to 3 thousand million dollars would be needed in Latin America.

10/ It may be shown that the lower the rate of productivity growth per agricultural worker, the greater will be the need for agricultural labour and the slower the relative shift of this labour force to industry. It would involve a decline in the rate of growth which has been assumed in the illustration for the gross product and productivity. At the same time, the expansion of the labour force and the gross product in industry is necessary to provide the capital goods for industry and services which cannot be imported.

11. Previous migratory experience is no longer applicable under present circumstances. Until the world crisis, large migratory masses poured into certain Latin American countries and immediately found work without any need for an investment plan. Such countries developed rapidly due to the strong impetus of their exports, which showed a steady and strong rate of expansion, while there was an abundant inflow of foreign capital to stimulate this type of development, which was complementary to the European economy and subordinate to its needs. If Venezuela above all is excluded, the dynamic role of Latin American exports has considerably weakened, and as already mentioned, the need for industrialization has consequently arisen. But such a process no longer interests the large industrial centres overseas in the same way, nor do these countries in general show a clear understanding of the structural changes in the economy and foreign trade of Latin America which must accompany this process. Furthermore, an adequate system of international investment for promoting this type of development is still far from having been achieved.

Hence the difficulties that Latin America encounters in aiding the solution of the demographic problem of certain European countries. This certainly does not imply that immigration should be neglected until such time as this vast problem has been resolved. On the contrary, immigration of qualified labour and skilled workers, of which there are still only limited numbers in Latin America, would represent an unquestionable advantage.

12. The relatively low stock of capital with which the average Latin American worker operates (about 1,550 dollars) has been noted. Even when

such an intense rate of growth is reached as a 4.1 per cent increase in the per capita gross product, the capital per worker would only amount to 3,840 dollars in twenty-five years. At present the United States worker has a capital of 8,000 dollars, while at the end of the period it will have increased to 13,200 dollars, if the historical cumulative rate of growth continues. Even under the most favourable of the hypothese which today seems at all realistic, a very extended period of time would be required (a good number of generations) before the capital density of the United States could be achieved.

Nevertheless, the Latin American countries are naturally endeavouring to assimilate more and more the techniques of the United States, its forms of capitalization, and - a disturbing factor - its patterns of consumption, in spite of the considerable disparity between the respective levels of per capita gross product. A technology based mainly on the necessity for economizing manpower in favour of abundant capital, is tending to be imitated by countries with limited capital and a relatively good supply of labour. This phenomenon of a relative abundance of labour is not only found in over-populated countries. It is also present in fairly sparsely populated countries, as they have a large potential labour force in primary production with very low productivity, and have small capital resources to employ the manpower in occupations of a higher capital density and greater productivity. 11/ So far,

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11/ This problem has been examined in Problemas teóricos y prácticos del crecimiento económico (E/CN.12/221; United Nations Publication, Sales No. 1952. II.G.1.) See Chapter III, pp. 25 ss. There is a mimeographed English version of this document entitled Theoretical and Practical Problems of Economic Growth, ECLA (E/CN.12/221).

this problem has not received all the attention it deserves. 12/

13. The nature of this paper only permits a very general outline to be given of some of the aspects of the problem of population and capital formation in the process of economic growth. Naturally, the accumulation of capital is only one requisite, although a fundamental one. Nevertheless, it does not necessarily follow that Latin America will be able to expand during the next twenty-five years at the proposed rate even if the requisite capital is available. There are other formidable obstacles to be overcome, such as the proper utilization of the land, the training of the labour force and the preparation of experts. In the last instance, an accelerated rate of development will not be a spontaneous phenomenon, but will largely be the result of deliberate measures and a firm development policy in countries which have the necessary resources.

12/ There is a further important aspect of the problem of raising investment. The assumption of an annual rate of growth of 4.1 per cent of the per capita gross product, and the corresponding capital requirements, have a considerable influence on the composition of industrial output. Since approximately one third of current investment in Latin America is based on imports of capital goods, and as it will be difficult to increase per capita imports of such commodities, the projected increase in investment per worker would have to be entirely based on domestically produced capital goods, unless Latin America benefits from a substantial inflow of net foreign capital, or carries out a policy of import substitution on a large scale. This expansion in domestic output of capital goods presupposes a correlative increase in the share of capital goods output in relation to the aggregate gross product of from 10 per cent in 1953 to 18 per cent in 1978.

STATISTICAL APPENDIX

Table 1

LATIN AMERICA: POPULATION, GROSS PRODUCT, OUTPUT AND AVAILABLE CAPITAL, 1940 - 53

	1940	1953	Annual rates of change 1940-53 (percentage)
Total population (millions)	125.0	166.9	2.2
Active population (millions)	44.3	58.3	2.1
Percentage of active population to total population	35.0	35.0	-
Gross product (millions of dollars at 1950 prices)	22,387.0	41,577.0	4.9
Effect of the terms of trade in relation to 1953 (millions of dollars at 1950 prices)	-2,100.0	-	-
Effect of the terms of trade in relation to 1953 (per centage of the gross product)	-9.4	-	-
Output (millions of dollars at 1950 prices)	24,937.0	41,577.0	4.0
Existing stock of capital (millions of dollars at 1950 prices)	53,300.0	90,446.0	4.2
Output per unit of capital	0.47	0.46	-
Per capita gross product (dollars at 1950 prices)	179.0	249.0	2.6

SOURCE: See United Nations Economic Commission for Latin America, Economic Survey of Latin America, 1951-52 (E/CN.12/291/Rev.2); Preliminary Study on the Technique of Programming Economic Development (E/CN.12-292); and preliminary studies not yet published.

Table 2

LATIN AMERICA: INVESTMENT, CAPACITY FOR EXTERNAL PAYMENTS IMPORTS AND DOMESTIC OUTPUT OF CAPITAL GOODS, 1940 - 1953
(millions of dollars at 1950 prices)

	1940	1953	1940-53 (annual rates of exchange)	1940 (percentages of gross product)	1953
Gross investment	2,774	5,954	6.0	12.4	14.3
Net investment	1,120	3,119	8.2	5.0	7.5
Capacity for external payments	3,195	7,242	6.5	14.3	17.4
Capacity for external payments a/	5,295	7,242	2.4	23.6	17.4
Imports of capital goods	692	1,650	6.9	3.1	4.0
Domestic output of capital goods	2,082	4,304	5.9	9.3	10.3
Gross product from industry and construction	5,491	10,639	5.2	24.5	25.6
Gross investment per active person b/	63	102	3.8	-	-
Existing capital stock per active person b/	1,204	1,552	3.0	-	-

SOURCES: See Table 1.

a/ Excluding the effect of the terms of trade

b/ Dollars at 1950 prices

Table 3

LATIN AMERICA: GROWTH OF ACTIVE POPULATION, GROSS PRODUCT AND PRODUCTIVITY BY SECTORS OF ACTIVITY, 1940 - 1953

	Active population		Gross product		Gross product per active person	
	1940	1953	1940	1953	1940	1953
	(millions of persons)		(millions of dollars at 1950 prices)		(dollars at 1950 prices)	
Agriculture and livestock	27.5	33.9	5,995	10,284	216	303
Mining	0.4	0.6	674	1,680	1,511	2,800
Industry and construction	6.0	9.6	5,491	10,639	916	1,108
Transport and public utility services	1.3	1.9	1,559	2,903	1,165	1,528
Trade, government and other services	9.0	12.3	8,708	16,071	966	1,307
Total	44.3	58.3	22,387	41,577	505	713
	(percentage of each sector in the total)				(all activities = 100)	
Agriculture and livestock	62.1	58.1	26.6	24.7	42.8	42.5
Mining	1.0	1.0	3.0	4.0	289.5	392.7
Industry and construction	13.5	16.5	24.5	25.6	181.5	155.4
Transport and public utility services	3.0	3.3	7.0	7.0	230.7	214.3
Trade, government and other services	20.4	21.1	38.9	38.7	191.3	183.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
	(annual rates of change, in percentages between 1940 and 1953)					
Agriculture and livestock	1.4		4.0		2.6	
Mining	2.4		7.3		4.9	
Industry and construction	3.7		5.2		1.5	
Transport and public utility services	3.0		4.9		2.1	
Trade, government and other services	2.4		4.8		2.3	
Total	2.1		4.9		2.7	

SOURCES: See Table 1.