CURRENT TRENDS AND DIFFERENTIALS
IN FERTILITY AS REVEALED BY OFFICIAL DATA

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Since the 1950 Census of the Americas, an international cooperative effort under the sponsorship of the Pan American Union, official statistics on the population of Latin American countries have improved rapidly. Prior to that time it was difficult if not impossible to judge the completeness or accuracy of vital statistics when they were reported, and censuses were generally unreliable and infrequent. Between 1947 and 1963, every one of the 20 independent countries of Latin America took at least one census, and many have published the results of two. By 1960, vital statistics, while still by no means complete,[1] were adequate to serve as the basis for relatively accurate estimates of fertility and mortality in the region.

The purpose of this report is to summarize the general patterns of recent trends and differentials that can be inferred from the official statistics of these 20 countries. Before proceeding to the findings, a note on methodology is in order.

THE ESTIMATING TECHNIQUES

Although Latin American population statistics cannot be accepted at face value, a great deal can be learned by subjecting them to an extensive critical analysis. Only certain highlights of the procedure followed in developing the estimates can be described here. A full explanation of the methodology as well as the complete findings and detailed notes on the countries studied have been published in the monograph, *Birth Rates in Latin America*.

The principal types of information used in the estimates were the following, grouped into five-year periods beginning January first of years ending in zero or five:

1. The population at the beginning of each period.
2. Net international migration.
3. Registered deaths.
4. Registered infant deaths.
5. Registered deaths of children aged one to four years.
6. Registered births.
7. Survivors of birth cohorts enumerated in censuses.

Essentially, the method is one of reconstructing complete demographic histories, thus placing the birth estimates in the context of the larger picture of natural increase, mortality, international migration and age and sex composition of the population. The final result is a model representing the development of a population during the historical period for which data are available.

The three most important tools used to develop the model of population movements for each country were a semilogarithmic graph, a set of equations relating births and child deaths to survivors at age five, and a population balance sheet.

The graph provides a visual display of the development of a population over time. On it are shown the curve of total population growth, the number of births registered in each five-year interval and, immediately below these, the number of survivors of each cohort enumerated in subsequent censuses. Of particular importance in the examination of the graph is the ratio between the number of births registered and the number that survived to the age of five as indicated by censuses.

The second tool is a set of equations. The first states that natural increase (G) during a given five-year period equals births during the period minus deaths of children under five and of persons five years old and over. Letting D represent all deaths, p the proportion of deaths under five and q the proportion of deaths at ages five and over, this is expressed as $G = B - pD - qD$. The second equation states that the number of members of a birth cohort who survive to their fifth birthday (S_5) is equal to the number born minus the number who die before the age of five. Assuming that the number in a cohort

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who will die before age five is equal to the number of deaths of children under five during the five-year period during which the cohort was born, this is expressed as $S_5 = B - pD$. In cases where the total number of deaths is not known, but the age-distribution of deaths is known from partial registration, estimates of the numbers of births and deaths can be made as follows:

$$\dot{S}_5 = B - pD$$

Subtracting, $$G = B - D$$

$$S_5 - G = D - pD = qD$$

The estimate of deaths is $$D = \frac{S - G}{q}$$

And of births, $$B = G + D$$

As a final step, all calculations were checked and corrected to the last digit by a population balance sheet in which a complete accounting is made of total population, population change, net migration, natural increase, births and deaths during the historical period for which data are available. Thus the estimated birth rates are made consistent with these other elements as well as with the population age distributions reported in censuses and the age distributions of registered deaths. The method of estimation makes use of all available data and does not introduce distortions from artificial smoothing formulas or model life tables. With this method one assumes that the best model for the population of a country is the one derived directly from that country's official statistics.

To facilitate comparisons, standardized birth rates were calculated wherever the age-sex data were obtainable for this purpose. The method of indirect standardization was used, assuming that the age-specific birth rates of women 15-19, 20-24, 25-29, 30-34, 35-39 and 40-44 respectively are in the proportions $1:7:7:6:4:1$.

THE ESTIMATED BIRTH RATES

The complete series of findings varies in coverage from over a century for Chile to a rough approximation for one point in time for other countries. The following discussion is organized in relation to three periods: 1900-1929, 1930-1959 and 1960-1964.

1900-1929

The general level of fertility in Latin America at the beginning of the century was high.[2] Uruguay was the only country with a birth rate

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below 40 per thousand. The birth rate in Argentina was still in the low 40's. Chile's was 45. Cuba, recovering from a devastating revolution, was at the beginning of a baby boom that would last until 1920. Panama then, as now, had relatively low fertility compared with neighboring countries. The birth rate in Venezuela dropped to about 42 at the turn of the century. Birth rates of 44 and over generally prevailed among the other countries, as they do to this day.

From 1900 to 1929, the birth rate in Uruguay continued to decline steadily and by the late 1930's it had reached its modern level of about 22. In Argentina, fertility held steady until 1914, after which it dropped sharply and the gap between Argentina and Uruguay gradually narrowed. Cuba's birth rate fell steeply after 1920, but leveled off at about 30 within two decades. The birth rate in Chile declined very slowly during the first third of the century, and was below 40 by the early 1930's. Fertility held steady in Panama throughout the period. Birth rates in the other countries remained high, with only the normal cyclical fluctuations in response to economic and social disturbances.

1930-1959

In 1930, an economic disturbance struck with unusual severity. The impact of the Great Depression varied from country to country, probably depending on the degree of dependence on foreign markets and the inflow of capital from abroad.[3] Mexico, economically isolated at that time, showed hardly any reaction. Chile, Guatemala and Venezuela all experienced reductions of about three per thousand in their crude birth rates between 1925-1929 and 1930-1934. Evidence indicates that a postponement of marriages accounts in part for the 1930-1934 birth depression.[4] Doubtless, widespread unemployment and economic dislocations also disrupted normal family life for many couples, whether in consensual or legal unions.

Whatever the causes, most of the countries studied reached their lowest levels of fertility during the 1930's. From that time on, and especially since 1945, the trends have been generally upward, except in Argentina, Uruguay and perhaps Cuba, although data from Cuba have been unavailable since 1953. The estimated crude and standardized birth rates for 1930-1959 are shown in Table 1.

The general upward trend of fertility is obscured in the crude rates because the combination of rising fertility and falling infant and child mortality has swelled the proportion of children in these

TABLE I. ESTIMATED CRUDE AND STANDARDIZED BIRTH RATES* FOR LATIN AMERICA

	Average Annual Rates					
	1930–1934	*1935–1939*	*1940–1944*	*1945–1949*	*1950–1954*	*1955–1959*
Argentina	28.9	25.7	25.7	25.2	25.4	24.1
	28.2**	24.8**	24.4**	23.7**	24.5**	23.8**
Bolivia			45.1	47.0	42.4	
				45.1**	40.7**	
Brazil					(44)	
Chile	40.2	38.4	38.3	37.0	37.0	37.6
	37.8**	36.2**	36.3**	35.3**	35.6**	38.7**
Colombia	43.3	42.6	42.4	43.4	44.0	45.1
	42.3**	42.3**	42.3**	43.4**	44.2**	45.4**
Costa Rica	44.6	43.3	42.8	42.7	45.0	45.3
	45.3**	43.9**	43.4**	43.3**	46.4**	48.5**
Cuba	31.3	30.9	31.9	30.0	(30)†	
	32.5**	30.7**	30.3**	28.9**		
Dominican Republic					(46)	
Ecuador	38.5	47.7	46.0	45.9	46.4	46.5
					47.8**	
El Salvador	46.5	45.4	45.2	44.8	47.9	47.9
	44.0**	43.4**	43.6**	43.7**	47.6**	49.1**
Guatemala	46.2	44.2	45.2	49.1	50.9	49.0
			46.8**	50.1**		
Haiti					(35)	
Honduras	42.0	41.9	43.8	44.5	46.0	46.0
	40.9**	41.9**	44.8**	46.1**	48.6**	49.9**
Mexico	44.1	43.5	43.8	44.5	45.0	45.8
	40.7**	41.8**	43.3**	44.6**	46.0**	48.2**
Nicaragua					(46)	
Panama	37.4	37.8	39.5	38.3	38.5	40.5
	36.0**	36.7**	39.0**	38.8**	40.3**	43.9**
Paraguay					(43)	
Peru			44.5	44.9	45.5	46.2
			46.2**	46.9**	48.0**	49.0**
Uruguay					(22)	
Venezuela	39.9	40.2	41.5	43.6	44.2	44.3
		37.5**	40.0**	43.5**	45.7**	47.8**

Source: Collver, O. A., BIRTH RATES IN LATIN AMERICA, Berkeley Institute of International Studies, University of California, 1965, pp. 26-28.

* Average annual births per thousand total population. Standardized rates are controlled for the effects of age and sex composition.

** Standardized rates.

† Figures in parentheses are rough approximations from inadequate data for 1950-1954.

populations. The effect is to raise the denominator of the crude birth rate without adding proportionately to the annual number of births. Once the rates are standardized to remove the effect of changing age and sex composition, it can be seen clearly how fertility has increased over the 30-year period. The outstanding increase appeared in Venezuela, where the standardized birth rate rose from 37.5 to 47.8. Even in Panama the standardized rate rose. Among the high fertility countries, Chile was the only one to experience a prolonged decline of fertility into the late 1940's before showing an increase. Argentina continued to follow the pattern of a country that has made its demographic transition. The trend of the birth rate there very closely parallels the trends in the United States and Canada. Although the data are still not complete enough to present figures for Uruguay, the indications are that Uruguay has followed the same pattern.

Because of deficiencies in the data, complete sets of estimates cannot yet be made for all of the countries in Table 1. Even so, in some cases it is possible to have a fairly clear idea of trends and fluctuations in the birth rates without knowing the precise level of fertility. The age distribution of the 1950 census indicates that Bolivia's birth rate was extremely depressed in the 1930's. In the 1940's the birth rate rebounded sharply, remained high during the decade and then fell again after 1950. Brazil's birth rates were probably very close to those of Colombia, for since 1920, the two countries have had similar rates of population growth, age distributions and intercensal survival probabilities. In Brazil, as in Colombia, the response of the birth rate to world wars, depressions and international prosperity has been moderate. The average annual birth rate in the Dominican Republic between 1935 and 1950 was probably above 46 per thousand. The census age distributions show that the Dominican Republic had a birth depression in 1930-1934. The age distribution of Haiti from the 1950 census suggests that the birth rate fell quite low, perhaps to 34, during the 1930's, rose again around 1940, and then dropped sharply after 1945. Nicaragua, like its neighbors in Central America, has had a birth rate around 45 since the beginning of the century. It is distinguished by the steadiness of its birth rate in contrast to the wide fluctuations in Guatemala. The estimated birth rate for Paraguay is placed in the low 40's because of the low proportion of child deaths among all deaths registered in that country.[5] If the birth rate were very high, one would expect this proportion to be higher than it is. On the other hand, provisional results of the 1962 census show that

45 per cent of the population was under 15 years of age, a condition typical of the high-fertility areas.

1960-1964

Some new data have become available since the estimates in Table 1 were made three years ago.[6] However, the new information is not yet published in sufficient volume to warrant an extensive revision of the estimates at this time. If the trends showed any indication of change an immediate revision and updating might be in order, just for its news value if for no other reason. But no evidence can be found of substantial deviations from previous trends in the 1960-1964 period. Registered birth rates fell slightly in a few countries, but with the exception of Argentina, where a decline was well under way in 1955-1959, it is too early to say whether these changes represent the beginnings of any substantial reduction.

CONCLUSIONS

Although official statistics of the Latin American countries have many deficiencies, they need not be rejected for that reason. Because of the interrelatedness of the demographic variables as a system, it is possible to correct the errors in official data and arrive at reasonably good estimates of population developments. The analysis of these statistics leads to the following conclusions.

1. Only Argentina, Uruguay and Cuba have made permanent transitions to birth rates of 30 or lower. These transitions were made rather rapidly and completed by about 1935.

2. Panama and Chile are the only other countries that have had birth rates below 40 for any extended period of time.

3. Since 1930, the prevailing trend of fertility among the remaining countries has been upward.

4. Fluctuations of birth rates in Latin America have occurred in response to changes in economic and social conditions, there being a positive relation between economic conditions and the birth rate.

Because of an important difference between the three countries that have made fertility transitions and the remaining 17 that have not, these three cannot be regarded as forerunners of a general fertility reduction in the region. All three had extremely high rates of immi-

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gration from southern Europe after 1870.[7] The immigrants undoubtedly brought with them the culture and behavior of modern Europe, including the practice of birth control. In the other countries, most of the inhabitants are native descendants of the indigenous peoples or of early colonists. When fertility control is adopted in these countries, it will be by a different process from the one that operated in Argentina, Uruguay and Cuba.

Among the 17, where should one look for tendencies toward fertility decline? First, consider Panama and Chile. Panama had the lowest birth rate at the beginning of the present century and Chile has had the most persistent trend of declining fertility. Yet, Panama joined the general upward trend since 1930, and Chile's standardized birth rate was slightly higher in 1955-1959 than in 1930-1934.

Second, look at the countries with the strongest trends of economic development and modernization, for example Mexico and Venezuela. In Mexico between 1921 and 1960, as the percentage of the male labor force in nonagricultural occupations rose from 24 to 41, the standardized birth rate increased from 41 to 49. In Venezuela, the percentage of the male labor force in occupations other than agriculture increased from 52 to 62 between 1950 and 1960, but the standardized birth rate went from 45 to 48. Apparently fertility reduction is no automatic byproduct of economic development. On the contrary, what is being seen in most of Latin America today has the appearance of the normal response to relative prosperity. Birth rates began to rise in the same way in the 1920's when heavy investments from abroad were being made in the region but fell sharply when the depression struck.

If economic development *per se* does not bring about the adoption of fertility controls, but actually has the opposite effect, what, then, will reduce birth rates and bring population growth to a manageable level in Latin America? Speculating beyond the range of the official statistics considered in this report, one could say that the required forces are now being generated in the international family planning movement. If in the next few years birth rates begin to fall in Latin America without the inducement of a widespread economic depression, the explanation will probably be found in the increased volume of news and publicity concerning family planning that has come from abroad, the programs of technical assistance that have been introduced by international agencies and, finally, the clinical and educational programs that are developing within each country under the sponsor-

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ship of governments, churches and private organizations. What one would expect to see in Latin America is not a series of independent discoveries of family planning by couples facing the financial stress of urban life, but the diffusion of an idea that has been fully developed elsewhere. Birth rates are high in the region today because channels for such diffusion have been blocked until very recently.

SUMMARY

Thanks to recent improvements in censuses and vital statistics in Latin America, a basis is now available for reliable estimates of population development in the region. Errors and gaps still exist in the data, but these can be overcome to a considerable extent by taking advantage of the fact that demographic variables are tightly inter-related as a system. Techniques for analyzing data are described.

The analysis shows that: 1. only Argentina, Uruguay and Cuba have made permanent transitions to birth rates of 30 or less. These occurred before 1935. 2. Panama and Chile are the only other countries that have had birth rates below 40 for any extended period of time. 3. The prevailing trend of fertility since 1930 among the remaining countries has been upward. 4. Fluctuations of birth rates in Latin America have occurred in response to changes in economic and social conditions, there being a positive relation between economic conditions and the birth rate.

Argentina, Cuba and Uruguay are unique in the fact that they received large volumes of immigration from Europe since 1870, and their history should not be taken as an example of what is to be expected in the rest of Latin America. Nor do urbanization and economic development appear to have any depressing effect on fertility. Countries with high rates of development have rising birth rates.

REFERENCES

[1] Estimates of the completeness of birth and death registration are given *in* Collver, O. A., BIRTH RATES IN LATIN AMERICA: NEW ESTIMATES OF HISTORICAL TRENDS AND FLUCTUATIONS, Berkeley, Institute of International Studies, University of California, Research Series, No. 7, 1965, Table 6, pp. 38-39.

[2] Estimates of birth rates before 1930, not shown in Table 1, will be found *in* Collver, *op. cit.*, Table 5, pp. 26-28.

[3] *See* Collver, *op. cit.,* pp. 25-41 for some of the evidence concerning the relation between economic conditions and birth rates.

[4] *Ibid.,* pp. 52-54.

[5] *Ibid.,* pp. 23-24. Comparative data are presented on the age distribution of registered deaths in the countries studied.

[6] The most convenient source for these data is United Nations, Statistical Office, *Demographic Yearbook.*

[7] The ratio of net international migrants in the first quarter of the twentieth century to the population at the beginning of the century was .43 in Argentina, .36 in Cuba and .39 in Uruguay. In the 1914 census, 30 per cent of the population of Argentina was foreign born. The Cuban census of 1919 showed 18.5 per cent foreign born, and by 1931, the percentage had increased to 23.0.

[8] For sources of these figures, *see* Collver, *op. cit.,* notes 12 and 13, p. 37.

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