

ASSESSMENT OF REGISTRATION AND CENSUS DATA ON FERTILITY

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The importance of the study of fertility and the interpretation of fertility changes and trends justifies all efforts to increase and improve the sources of basic information. In the fulfillment of these aims, an appraisal of the statistical situation in relation to the types of data available can help to single out the most urgent needs, giving priority to those which it may be most feasible to satisfy.

An attempt along these lines is made in this paper, the purpose of which is to present an overall view of the possibilities for the study of fertility in the Latin American countries on the basis of the vital statistics on live births and the fertility data that were specially collected in the latest population censuses.

To become acquainted with the situation by means of the most complete and up-to-date information possible, a special inquiry was directed to the national offices of statistics and censuses in 19 Latin American countries.¹ Replies were received from 16: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, Nicaragua, Panama, Peru, Uruguay and Venezuela. The information for each of these countries was obtained from the respective replies. For the other countries, the information was obtained from the relevant national statistical publications, which may be a limitation in ascertaining the types of data available there. This applies to Guatemala, Haiti and Paraguay.

STATISTICS OF LIVE BIRTHS

The Civil Registration offices are the sources of the basic information for statistics of live births in all the Latin American countries

except Brazil and Colombia. In Brazil, births are recorded in the *cartórios*, agencies that function under authority granted by the government, and in Colombia the data are obtained from parish records.

Completeness of Birth Registration

Omissions in the registration and late registration are problems that affect all Latin American countries, although to different extents, and influence the coverage and usefulness of the statistics of live births. Table 1 permits a general evaluation of the deficiencies of registration for 20 Latin American countries over the periods 1945-1950 and 1955-1960, arrived at by comparing the observed crude natality rate, calculated from registered births, with a value obtained from estimates made by the Economic Commission for Latin America (ECLA).² The latter (estimated) value is the average of the lower and upper limits within which the actual rate will probably be found. The observed value is the average annual rate calculated from birth registration figures for the years of the periods under consideration. The deviation of the observed value from the estimated one—assuming the latter to be the more adequate of the two—indicates the order of magnitude of the error of the rates calculated from registered births. This error is not necessarily ascribable to omissions in registration, as it may also stem from deficiencies in the population estimates that enter into the calculation, or to a combination of the two factors.

Comparison of the situation of the 20 countries shows that the percentage difference of the observed value from the estimated value varied in the period 1945-1950, between +0.4 per cent and -35.8 per cent, these limits corresponding to Guatemala and Paraguay, respectively. The variation for the period 1955-1960 is greater, the extremes being +0.9 per cent and -52.2 per cent, corresponding to Mexico and Brazil, respectively. Information for the first of the two periods was not available for Brazil. For Haiti, no information was available for either period; however, no systematic compilations of vital events, covering the entire national territory, are in existence in that country. If a variation of ten per cent or less indicates that the statistics of a country are acceptable, it is found that for the period 1955-1960, ten of the 20 countries under comparison are in the acceptable category: Argentina, Chile, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Mexico, Panama and Venezuela. Certain reservations, however, should be attached to the figure for Cuba, since the comparison may have been adversely affected by the fact that

TABLE 1. COMPARISON OF ESTIMATED AND OBSERVED VALUES OF AVERAGE ANNUAL BIRTH RATE IN 20 LATIN AMERICAN COUNTRIES

Country	Crude Birth Rates (per 1000 Population)							
	ECLA Estimates				Percentage			
	Extremes of Deviation		Estimated Average Annual Value		Observed Average Annual Value		Deviation from Estimated Value	
	1945-1950	1955-1960	1945-1950	1955-1960	1945-1950	1955-1960	1945-1950	1955-1960
Argentina	25-26	23-24	25.5	23.4	25.1	23.8	-1.6	+1.7
Bolivia	41-45	41-45	43.0	43.0	40.3	30.2	-6.3	-29.8
Brazil	43-47	43-47	45.0	45.0		21.5*		-52.2
Chile	34-37	35-38	35.5	36.5	33.1	35.8	-6.8	-1.7
Colombia	44-47	43-46	45.5	44.5	34.3	39.8	-24.6	-10.6
Costa Rica	44-48	45-50	46.0	47.5	44.2	49.0	-3.9	+3.2
Cuba	32-36	30-34	34.0	32.0	24.3	28.9*	-28.5	-9.7
Dominican Republic	48-54	48-54	51.0	51.0	37.0	39.0	-27.5	-23.5
Ecuador	45-50	45-50	47.5**	47.5	46.5	46.9	-2.1	-1.3
El Salvador	44-48	44-48	46.0	46.0	45.0	49.4	-2.2	+7.4
Guatemala	48-52	48-52	50.0	50.0	50.2	48.7	+0.4	-2.6
Haiti	42-50	42-50	46.0	46.0				
Honduras	45-50	45-50	47.5	47.5	39.4	42.3	-17.1	-10.9
Mexico	44-48	44-47	46.0	45.5	45.0	45.9	-2.2	+0.9
Nicaragua	45-52	45-52	48.5	48.5	35.7	43.5	-26.4	-10.3
Panamá	38-42	39-42	40.0	40.5	35.4	39.9	-11.5	-1.5
Paraguay	45-50	45-50	47.5	47.5	30.5	29.9	-35.8	-37.1
Perú	42-48	42-48	45.5	45.5	29.3	36.8	-35.6	-19.1
Uruguay	20-23	19-22	21.5**	20.5	18.7	22.9	-13.0	-11.7
Venezuela	44-48	45-50	46.0	47.0	39.4	44.1	-14.3	-6.2

* For the period 1957-1960.

** For the period 1948-1950.

Source: *Boletín Económico de América Latina*, Vol. 7; United Nations, DEMOGRAPHIC YEARBOOK, 1952, 1956 and 1965, Santiago; Inter American Statistical Institute, AMERICA EN CIFRAS, 1965, Washington, Pan American Union.

TABLE 2. TOTAL POPULATION OF 20 LATIN AMERICAN COUNTRIES, ACCORDING TO QUALITY OF BIRTH STATISTICS, BY SUBREGIONS, 1960

Subregions and Countries	Population as of June 30, 1960					
	Number (thousands)			Per Cent		
	Total	Acceptable Statistics	Questionable Statistics	Total	Acceptable Statistics	Questionable Statistics
Latin America (20 countries)	205,787	91,433	114,354	100.0	44.4	55.6
South America	143,865	40,108	103,757	100.0	27.9	72.1
Central America						
Panama and Mexico*	61,922	51,325	10,597	100.0	82.9	17.1
Central America and Panama*	25,876	15,279	10,597	100.0	59.0	41.0

* Includes Caribbean countries (Cuba, Dominican Republic, Haiti).

Source: *Statistical Bulletin for Latin America*, Vol. 12, New York, United Nations.

the crude birth rate figures for all the years within the period of reference were not available. Also, some objections may be raised regarding the limit of variation set as the dividing line for the classification; but, in any case, it does show the order of magnitude of the differences. On the basis established, the statistics of the remaining countries can be considered "questionable." Of these countries, Uruguay is a case where the registration of births seems to be quite complete,³ so that the deficiency of the birth rate is more likely to be ascribable to the population estimate.

The information in Table 2 shows for 1960 the proportion of the total population of the 20 countries considered that is accounted for by the group of countries looked upon as having acceptable statistics, with similar information for certain subregions.

Data Collected Relating to Live Births

Table 3 presents for 19 Latin American countries the items for which statistics relating to live births are collected.

Information on a few basic items relating to time and geographic location is collected by all the countries that although not of direct relevance to the study of fertility, may be mentioned because of its possible bearing on the coverage and quality of the basic information in general: date of birth, date of registration, geographic place of birth, place of registration and mother's place of residence. It may be seen in Table 4, which indicates what data are available on sex and legitimacy of the child born, that the criterion utilized for collecting information on the time and the geographic place is not uniform for all the countries. Also, judging by the replies of the countries to the inquiry, and by the statistical tables in the national publications, very few countries make use of the other items as well as the item that constitutes the criterion of compilation in either of these cases, so as to obtain the supplementary information to enable them to make some sort of evaluation of the extent of certain problems such as those of delayed registration and of births that occur and are registered in places other than the mother's usual residence. Thus, Brazil, Chile, Costa Rica, Mexico, Panama and Venezuela possess the data that permit them to make some type of analysis of the promptness of birth registration, while Chile, Dominican Republic, El Salvador, Honduras and Panama are interested in the second of the two problems mentioned, knowledge of which may have an important bearing on the study of fertility for different areas within the same country.

TABLE 3. TYPES OF DATA COLLECTED WITH RESPECT TO LIVE BIRTHS
IN 19 LATIN AMERICAN COUNTRIES

Type of Data	Number Col- lecting Infor- mation	Argentina	Bolivia	Brazil	Chile	Colombia	Costa Rica	Dominican Rep.	Ecuador	El Salvador	Guatemala	Haiti	Honduras	Mexico	Nicaragua	Panama	Paraguay	Peru	Uruguay	Venezuela
LIVE-BIRTH ITEMS																				
Birth order																				
(for multiple births)	6	-	-	-	-	X	X	X	-	X	-	-	X	-	-	X	-	-	-	-
Color of child	1	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-
Condition of delivery (normal, pathological)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
Date of occurrence*	19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Date of registration*	19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Gestation period	8	-	X	-	-	-	X	-	-	X	X	-	-	-	-	X	X	X	X	X
Legitimacy*	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Name of child	13	-	X	X	X	X	X	X	X	X	-	-	X	-	-	X	-	X	X	X
Place (geographic) of occurrence	18	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Place of registration	19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sex*	19	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Type of birth (single or multiple)*	15	-	-	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	-
Weight at birth	5	-	-	-	-	-	X	-	-	-	X	-	-	-	-	X	X	X	X	-
ITEMS RELATING TO MOTHER																				
Attendant at birth*	11	-	X	-	X	-	X	X	X	X	X	-	-	-	-	X	X	X	-	X
Branch of economic activity	6	-	-	-	X	X	-	-	-	X	-	-	-	X	-	X	X	-	-	-
Date of birth or age*	17	X	X	-	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X
Date of marriage	4	-	-	-	-	X	-	X	-	-	-	-	-	-	-	X	-	X	-	X
Hospitalization	10	-	-	-	X	-	X	X	X	X	X	-	-	-	-	X	X	X	-	X
Level of education	2	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
Literacy	5	-	X	-	-	-	-	-	X	-	-	-	-	-	-	-	X	X	-	X
Marital status	12	-	X	-	-	X	X	X	-	-	X	X	X	X	X	X	X	X	X	X
Name	9	-	-	-	X	X	X	-	X	X	-	X	-	X	-	X	-	X	X	-
Nationality	5	-	-	-	-	-	X	X	-	X	X	-	-	-	-	X	-	-	-	-
Number of abortions	1	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
Number of children born alive including the present birth*	12	-	-	-	X	X	X	X	X	X	X	-	-	X	-	X	X	X	-	X
Number of children now alive	6	-	-	-	X	X	-	-	X	-	-	-	-	-	-	X	-	X	-	X
Number of children born alive who have since died	8	-	-	-	X	X	X	X	-	X	-	-	-	-	-	X	-	X	-	X
Number of children stillborn	7	-	-	-	X	-	X	X	-	X	-	-	-	-	-	X	-	X	-	X
Occupation	9	-	X	-	-	X	X	X	-	-	-	X	-	X	-	X	X	-	-	X
Occupational status	5	-	-	-	X	X	-	-	-	-	-	-	-	X	-	X	X	-	-	-
Place of birth	4	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	X	-
Place (geographic) of usual residence*	16	X	-	-	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X
Race	3	-	-	-	-	-	X	X	-	X	-	-	-	-	-	-	-	-	-	-
ITEMS RELATING TO FATHER																				
Branch of economic activity	6	-	-	-	X	X	-	-	-	X	-	-	-	X	-	X	X	-	-	-
Date of birth or age*	15	-	X	-	X	X	X	X	-	X	X	-	X	X	X	X	X	X	X	X
Level of education	2	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
Literacy	5	-	X	-	-	-	-	-	X	-	-	-	-	-	-	X	X	-	X	-

TABLE 3. (CONTINUED)

Type of Data	Number Col- lecting Infor- mation																		
		Argentina	Bolivia	Brazil	Chile	Colombia	Costa Rica	Dominican Rep.	Ecuador	El Salvador	Guatemala	Haiti	Honduras	Mexico	Nicaragua	Panama	Paraguay	Peru	Uruguay
Marital status	8	-	-	-	-	X	X	-	-	-	-	-	X	X	X	X	X	-	X
Name	7	-	-	-	-	X	X	-	X	-	-	X	-	-	X	-	X	X	X
Nationality	5	-	-	-	-	X	X	-	X	X	-	-	-	-	-	X	-	-	-
Occupation	11	-	X	-	-	X	X	X	-	X	-	X	X	-	X	X	X	X	X
Occupational status	6	-	-	-	X	X	-	-	-	-	-	-	-	X	X	X	X	X	-
Place of birth	4	-	-	-	-	X	-	-	X	-	-	-	-	-	-	-	X	X	-
Race	3	-	-	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-	-

X: data collected. -: data not collected.

* Items recommended as of first priority in *Principles for a Vital Statistics System*, United Nations Statistical Papers, Series M, No. 19, August, 1953.

Source: Inter American Statistical Institute, *Inventario de Las Estadísticas Nacionales: Estadísticas Vitales*, Washington, Pan American Union, 1960, p. 4, Table 1 for Guatemala, Haiti and Paraguay; for the remaining countries the information is derived from replies to the Inter American Statistical Institute document 5318a.

Data for the Study of Fertility

A small number of all the characteristics for which information is collected are of the greatest interest for the study of fertility. These relate to female fertility, the study of which, as is known, presents unquestionable advantages as compared to the study of male fertility. The selection of the characteristics follows from the needs for information to make it possible to calculate the measures that, by their nature, are most appropriate for estimating the level of fertility and analyzing its structure. This is the case of rates that take the mother's age and the birth order into account. From age-specific fertility rates the total fertility rate and the gross reproduction rate are derived as summary measures. These indexes are usually the most satisfactory ones for estimating the fertility level, studying the evolution of fertility and analyzing differences in fertility between two or more populations, quite independently of the sex and age composition of the populations concerned. This gives these rates one of the greatest advantages they have over other more simple measures such as the crude birth rate and the general fertility rate.

Information on the number of children born permits classification of births by order, which constitutes basic information for calculating the specific fertility rates for this variable, assuming information is available for the corresponding groups of the female population. Tables 5 and 6 present the possibilities that exist in the Latin American

TABLE 4. DATA ON LIVE BIRTHS, BY SEX AND LEGITIMACY OF CHILD AND GEOGRAPHIC BREAKDOWN * WITH WHICH DATA ARE PROCESSED AND PUBLISHED, ACCORDING TO TIME AND PLACE (GEOGRAPHIC).

Country by Quality of Birth Statistics**	Criteria for Compiling Live Births				Breakdown of Annual Total Live Births					
	Year Beginning With Informa-tion is Available	Date of Occurrence	Date of Registration	Place of Occurrence	Place of Mother's Residence	Place of Registration	Both Sexes			
							Both Sexes	By Sex and Legiti-macy		
ARGENTINA	1938	X	-	-	1 X	-	² AB	-	AB	
Chile	1956	X	-	-	X	-	ABCD	-	AB	
Costa Rica	1952	-	X	-	X	-	³ ABCD	-	⁵ ABCD	
Ecuador	1956	-	X	-	X	-	-	-	⁶ (AB) CD	
El Salvador	-	X	-	-	X	-	(AB)	(ABC)	-	
Guatemala	-	X	-	X	-	-	-	AB	-	
Mexico	1964	-	X	-	X	-	-	⁷ AB	⁸ (ABC)	
Panama	1952	X	-	-	X	-	-	(A) BCD	ABCD	
Venezuela	1941	-	X	-	X	-	ABC	-	AB	
QUESTIONABLE STATISTICS										
Bolivia	1956	-	X	-	-	X	-	-	-	ABC
Brazil	1959	-	X	-	-	X	-	-	-	ABC
Colombia	1940	-	X	-	-	X	-	(ABC) D	-	(A)
Dominican Republic	1937	-	X	-	-	X	-	-	-	ABC
Honduras	1951	-	X	-	-	X	-	⁹ ABC	-	ABC
Nicaragua	1950	-	X	-	-	X	-	(ABC) D	-	AB
Paraguay	1950	-	X	-	X	-	-	-	-	ABD
Peru	-	-	X	-	-	X	-	-	-	AB
Uruguay	1963	-	X	-	X	-	-	-	A	-

* A: Country as a whole; B: Major civil divisions; D: Principal cities (in Ecuador: Quito, Guayaquil and Cuenca; in Panama: capitals of the provinces; in Paraguay: Asuncion); O: Geographic area with breakdown by urban and rural.

- ** Based on Table 1.
 1 Criterion adopted beginning in 1962.
 2 Data available beginning with 1914.
 3 Data published for country as a whole and for major civil divisions.
 4 Information also available on place of occurrence and place of registration.
 5 Not published.
 6 Beginning with 1965, urban and rural breakdown and data for minor civil divisions and the city of Cuenca.
 7 Data available beginning with 1940.
 8 Data for the country as a whole and major civil divisions available since 1922, and are the only data published.
 9 Data available beginning with 1926.

Source: for Guatemala, *Trimestre Estadístico*, Dirección General de Estadística, octubre, noviembre, diciembre, 1963; for Paraguay: *Boletín Estadístico del Paraguay*, Dirección General de Estadística y Censos, Año 7, diciembre, 1964, No. 19/21; for the remaining countries, the replies to Inter American Statistical Institute document 5318.

TABLE 5. DATA ON LIVE BIRTHS RELATING TO FERTILITY, BY AGE OF MOTHER AND GEOGRAPHIC BREAKDOWN *
WITH WHICH DATA ARE PROCESSED AND PUBLISHED

Countries by Quality of Birth Statistics**	Year Beginning With Which Information is Available	Breakdown of Annual Total Live Births						Birth Order, Age of Mother and Duration of Marriage
		Age of Mother	Legitimacy and Age of Mother	Sex and Age of Mother	Legitimacy and Age of Mother	Birth Order and Age of Mother	Sex, Legitimacy and Age of Mother	
ACCEPTABLE STATISTICS								
Argentina	1954	AB	-	-	-	-	-	-
Chile	1952	-	-	-	A	-	1A	-
Costa Rica	1956	2ABC	-	3AB	-	-	4,5ABC	-
Ecuador	1956	-	-	-	-	-	1,6(AB) CD	-
El Salvador	-	AB	-	-	-	-	7A	-
Mexico	1952	AB	-	-	-	-	-	-
Panama	1952	-	-	-	-	-	1,8(A) BD	9(A) D
Venezuela	1945	-	-	-	AB	-	10AB	-
QUESTIONABLE STATISTICS								
Bolivia	1956	AB	-	-	-	-	-	-
Colombia	1940	-	-	-	(ABC) D	-	8(ABC) D	-
Dominican Republic	1937	AB	A	-	-	-	4,11A	-
Honduras	1951	A	-	-	-	-	-	-
Nicaragua	1950	A	-	-	-	-	-	-
Peru	-	-	-	-	AB	-	1A	-
Uruguay	1963	-	A	-	-	-	-	-

* A: Country as a whole; B: Major civil divisions; C: Minor civil divisions; D: Principal cities (in Ecuador: Quito, Guayaquil and Cuenca; in Panama: capital of provinces; in Paraguay: Asuncion); (): Geographic area indicated, with breakdown by urban and rural.

** Based on Table 1.

¹ Birth order of live births.

² Data are published for the country as a whole and for major civil divisions.

³ Data available beginning with 1966.

⁴ Stillbirths included in birth order.

⁵ Only data for the country as a whole are published.

⁶ Urban and rural breakdown and data for minor civil divisions and city of Cuenca became available beginning with 1965.

⁷ Birth order considered with respect to live births and separately for live births and stillbirths.

⁸ Data available beginning with 1954.

⁹ Data available with 1955; not published.

¹⁰ Data available beginning with 1957.

¹¹ Data available beginning with 1964.

Source: Replies to Inter American Statistical Institute document 5318.

* Only data for three countries are available for a whole area establishment.
 † Urban and rural breakdowns are not available for the minor civil divisions and data are not available for the total population.
 ‡ Data available for the total population for the total population.
 § Data available for the total population for the total population.

TABLE 6. DATA ON LIVE BIRTHS RELATING TO BIRTH ORDER, AND GEOGRAPHIC BREAKDOWN * WITH WHICH DATA ARE PROCESSED AND PUBLISHED

Country by Quality of Birth Statistics**	Year Beginning With Which Information is Available	Births for Which Order is Established		Birth Order	Breakdown of Annual Total Live Births			National Origin of Mother and Birth Order
		Live Births	Live Births and Stillbirths		Legitimacy and Birth Order	Age of Mother and Birth Order	Years of Marriage of Mother and Birth Order	
ACCEPTABLE STATISTICS								
Chile	1952	X	-	-	A	-	-	-
Costa Rica	1956	-	X	AB	-	-	¹ ABC	-
Ecuador	1956	-	X	-	-	-	² (AB) CD	-
El Salvador		X	X	-	-	-	³ A	-
Mexico	1960	X	-	⁴ AB	-	-	-	-
Panama	1954	X	-	-	⁴ (A)	⁵ (A) BD	⁶ (A) D	-
Venezuela	1957	X	X	-	¹ AB	² AB	¹ AB	A
QUESTIONABLE STATISTICS								
Colombia	1940	-	X	-	(ABC) D	(ABC) D	-	-
Dominican Republic	1964	-	X	-	-	A	-	-
Peru		X	-	-	-	A	-	-

* A: Country as a whole; B: Major civil divisions; C: minor civil divisions; D: Principal cities (see Table 5); O: Geographic area indicated with breakdown by urban and rural.

** Based on Table 1.

¹ Data published for country as a whole.

² Urban and rural breakdown and data for minor civil divisions and the city of Cuenca became available beginning with 1965.

³ Separate data for each birth order group.

⁴ Not published.

⁵ Since 1952, data have been available for the country as a whole with urban and rural breakdown and for the cities of Panama and Colon establishing birth order with respect to live births and stillbirths. These data are not published.

⁶ Also classified by age of mother; not published.

⁷ Birth Order with respect to live births.

Source: Replies to Inter American Statistical Institute document 5318.

countries of analyzing fertility in relation to the age of the mother and birth order.

Four countries consider birth order in relation to live births only; four others establish birth order taking into account the total births (live births plus stillbirths); and two countries obtain separate data, using both of these criteria. In this respect, it is of interest to note that use of the first criterion offers advantages over the second. By establishing the order in relation to the number of children born alive only, reference is made to effective fertility, the study of which is generally of greater interest than is that of total fertility. Also, the possibilities of error in the statement of the number of children born is usually greater if the number includes stillbirths. These considerations accordingly give rise to doubt regarding the justification that the countries may have for classifying live births by birth order by the two criteria stated (see Table 6). Particular emphasis should be given to the importance for the study of fertility of having the data on the age of the mother cross-classified by birth order, principally when changes begin to be observed in the voluntary behavior of the couples with respect to the size of the family, since the number of children already born may have decisive importance in such cases.⁴

In a more detailed study of fertility, it may be of interest to separate legitimate fertility from general fertility. In this case, the analysis of the specific rates according to the variables mentioned and their relation to the length of the marriage may contribute to a more adequate interpretation of fertility trends.

CENSUS STATISTICS FOR THE STUDY OF FERTILITY

The population census is an important source of information for the study of fertility, and accordingly it is desirable to differentiate between two types of data: those obtained from the general census information and those collected expressly for the study of fertility. Taking into account the aims of the present paper, no special reference is made here to the data of the first group (sex and age structure of the population), since it is assumed that these data will generally be available for all countries that have population censuses. As regards the data corresponding to the second group, the basic information is derived mainly from the question on the number of children born alive, which may be supplemented by other questions on the total fertility, age of the mother at the birth of first child and the number

of children alive on the date of the census, and may be linked with other questions referring to the marriage, such as age of the participants at marriage or age at which the *de facto* union began, and the length of the marriage or union.

The possibilities of studying general and differential fertility from the census results on family composition have not been adequately developed by the Latin American countries, owing principally to limitations of the basic information (omission, generally large, in the enumeration of children under five years of age and difficulties in identifying the family nuclei and consequently the "own children"). In addition, although data on family composition are generally intended to serve somewhat different purposes than those corresponding to the number of children born alive, for the study of fertility this latter information is usually much more correct and greater in coverage than the former information.⁵

Statistics on the number of children born alive are particularly valuable for the study of fertility in the total population and of marriages up to the date of the census. They make it possible to ascertain what proportion of married couples have not had children and to analyze the fertility structure through the average number of children born with reference to different sectors of the population, in order to identify some of the factors determining fertility changes and to assess their relative importance. These factors may be found upon studying fertility by marital status, level of education, economic activity, occupation, urban and rural residence and the level of income, which are the most known characteristics although not necessarily the most important ones.

However, the information yielded by these data are not without limitations. Among such limitations, the most important ones are the possibility of erroneous statements by women of more advanced age regarding the number of children they have had and the fact that the characteristics of the mother relate to the census moment rather than to the moment of the birth of the child, a problem the magnitude of which depends, of course, on how permanent are the characteristics analyzed in the life of the women.

The world level recommendation formulated by the United Nations for the 1960 censuses of population and those of the Committee on Improvement of National Statistics (COINS) at the American regional level stressed the desirability of including in the census schedule a question on the number of children ever born:⁶

Information on the number of children born should include all children born up to the census date and be restricted to children born alive (i.e., excluding stillbirths or foetal deaths). The total should include all live-born children, whether legitimate or illegitimate or whether born of the present or of prior marriages. Information on total number of live-born children should be collected from all women who are married (including consensually married), widowed, divorced or separated. Where it is considered desirable and feasible, the information should be collected from all women, regardless of marital status.

Questions in Recent Censuses on Items Relating to Fertility

Table 7 indicates the countries that included in their latest population censuses specific questions of interest to the study of fertility and gives details as to the nature and the scope of the topics investigated.

Of the 18 Latin American countries that took population censuses between 1960 and 1964, nine investigated fertility with reference to

TABLE 7. ITEMS RELATING TO FERTILITY THAT WERE INVESTIGATED IN THE POPULATION CENSUSES, 1960—1964, IN LATIN AMERICAN COUNTRIES

Country	Year of Census	Population Sector Covered	Number of Children Born				
			Live Births	Live Births and Still Births	Number of Children Alive on Census Date	Age at Which First Child was Born	Year in Which or began de facto Union
Argentina	1960	Married females and females who have been married	X	-	-	-	X
Brazil	1960	Males and females ten years of age and over in population sample	-	X	X	-	X
Chile	1960	All females 12 years of age and over	X	-	-	-	-
Guatemala	1964	Females who have borne children	X	-	-	X	-
Mexico	1960	All females	X	-	-	-	-
Nicaragua	1963	Females who have borne children	X	-	-	-	-
Panamá ¹	1960	All females	X	-	-	-	-
Paraguay	1962	Females 12 years of age and over	X	-	-	X	-
Perú	1961	Females who have borne children	X	-	-	X	-
Venezuela	1961	Females 12 years of age and over	X	-	-	X	-

¹ Living with spouse. ² Indian areas only.

Source: The national census schedules.

the total population of the country, although the scope of the investigation differed according to the way in which the questions were formulated, and in one country (Panama) only the Indian population was investigated.

In seven Latin American countries the question as to the number of children born alive was put to all women in the population regardless of marital status. These countries were Chile, Guatemala, Mexico, Nicaragua, Paraguay, Peru and Venezuela, of which Guatemala, Paraguay, Peru and Venezuela also included the question as to the age of the mother at the birth of her first child. Brazil, the only Latin American country to investigate fertility by a census sample of the population in its most recent population census, did so by means of a question on the total number of children born alive plus children born dead, addressed to a selected sample group of men and women.⁷ Argentina investigated the number of children born alive for married women or women who had been married, which constituted a definite limitation on the results since, according to the vital statistics of live births, the proportion of illegitimate births in the annual total registered in the entire country is approximately 24 per cent for the years in or around the census year.⁸ It is of interest to point out that Argentina investigated the duration of married life in a general way by means of a question on the year of the marriage or in which the *de facto* union began. However, this information does not appear processed in relation to the data for the study of fertility (see Table 8).⁹

Tabulations of the Data on the Number of Children Born Alive

Table 8 indicates some of the types of data obtained or planned to be prepared in seven of the nine countries that asked questions on the number of children born.

In addition to the data indicated in the table, Chile, Nicaragua, Peru and Venezuela have included in their respective programs the following specific tabulations:

Chile

Females economically active and not economically active, by age group, marital status and number of children born alive (country as a whole and major civil divisions).

Female population by number of children born alive, and by present age and level of education (country as a whole, major and

TABLE 8. DATA ON FEMALE FERTILITY INVESTIGATED IN MOST RECENT CENSUSES BY GEOGRAPHIC BREAKDOWN* WITH WHICH THEY ARE TABULATED

Country	Year of Census	Data by Which Female Population is Classified				
		Number of Live Born Children	Age and Number of Live Born Children	Marital Status and Number of Live Born Children	Number of Live Born Children and Age at Birth of First Child	Age, Marital Status, and Age at Which was Born
Argentina	1960	-	AB	-	-	-
Brazil	1960	-	AB	¹ (AB)	-	-
Chile	1960	-	(ABC)	-	-	-
Mexico	1960	-	(ABC)	-	-	-
Nicaragua	1963	-	(ABC)	-	-	-
Paraguay	1962	² D	D	-	-	-
Peru	1961	-	(ABC)	(A)	³ (AB)	-
Venezuela	1961	-	(AB)	-	-	(B)

* A: Country as a whole; B: Major civil divisions; C: Minor civil divisions; D: Principal cities (in Nicaragua: Managua, Leon and Granada; in Paraguay: Asuncion); O: geographic area indicated with breakdown by urban and rural.

¹ Separate information on the number of children alive.

² By enumeration segments.

³ Individual years from ten years on.

Source; For Paraguay, *Censo de Población y Vivienda, 1962*, Dirección General de Estadística y Censos, Asunción, Paraguay, 1965, cuadros 15 y 16. For the remaining countries the information comes from replies to Inter American Statistical Institute document 5381.

minor civil divisions with breakdown according to urban and rural areas and the cities of Managua, León and Granada).

Peru

Population of mothers, by marital status (country as a whole and major civil divisions with breakdown into urban and rural areas). Population of mothers, by age (country as a whole and major civil divisions with breakdown into urban and rural areas).

Venezuela

Total number of children born alive to women 12 years of age and over who stated that they have had children and their number, classified by present age of the mother, and by the age at which the first child was born (major civil divisions with breakdown into urban and rural areas).

Number and percentage of women 45 years of age and over, classified by the number of children born alive and the age at which the

first child was born (major civil divisions with breakdown into urban and rural areas).

To analyze fertility in the Indian population (the only sector of the population investigated in this regard), Panama prepared a tabulation classifying mothers by age and the number of children born alive, for the total and the major civil divisions.

In the case of Paraguay, the only information available for ascertaining the possibilities of studying fertility with the 1962 census results relates to the city of Asunción. This information does not include any tabulation that takes into account the age of the mother at the birth of the first child, although this item was investigated in the census questionnaire.¹⁰

Information is not available on the types of data that could be obtained with the results of the latest population census of Guatemala.

Use of Data on Number of Children Born Alive in Latin American Countries

The census information on the number of children born permits study of the fertility in two different ways as a function of the age of the mother, through longitudinal analysis or analysis of cohorts, and through transverse analysis for periods. The first records the reproductive experience of a generation of women and the second shows the annual behavior of the fertility of women at different ages in the child-bearing period.

1. An example of the use of census data for the investigation of cohorts is the study of fertility in the city of Buenos Aires, carried out by utilizing the results of the Fourth General Census of Population taken in that city in 1936. One of the aims of that study was to learn whether or not the way in which the data were collected and the available tabulations were useful for the detailed analysis of fertility and if the cost of obtaining such information was justified.¹¹

In that census, questions on fertility were put to married women, widows, separated and divorced women (identified in the census as "not single"), residing in the city of Buenos Aires. Information was requested on age in completed years at the time of the marriage (first marriage if married several times), duration of the marriage (excluding years of widowhood, legal separation or divorce), total number of children ever born (live births plus stillbirths, excluding fetal deaths of less than six months gestation period) and the number

of children alive on the date of the census (including those not living with the person enumerated). The census publication includes 20 tables for the study of fertility and presents, among other aspects, the distribution of the "not single" women according to the number of children ever born, classified by the following characteristics: marital status, age at the moment of the census, years of marriage, place of birth, age at marriage, "time period when married" (that is, the groups of years within which the marriage took place) and children alive at the moment of the census.¹²

Among the different features covered by the study referred to is the analysis of the cumulative fertility rates (average number of children ever born since the beginning of the marriage up to the date of the census) for different cohorts of women, which made it possible to study the effect of age as an isolated factor, of age at the time of marriage and of the length of the marriage. This analysis was principally based on the census table that included the distribution of women by time period when married and age groups at which the marriage was contracted, groups of years of marriage and number of children ever born.

As a result of the evaluation of the utility of the types of data investigated in the Fourth Census of the City of Buenos Aires, the study brings out the importance of the items included in the census schedule for the investigation of fertility and the desirability of not limiting the possibilities of the analysis to married women or those who have been married, addressing the questions to all women. With regard to the investigation of the number of children born, a preference is shown for relating this item exclusively to children born alive, thus permitting the study of effective fertility and at the same time decreasing the likelihood of errors in statements by the respondent. By excluding from the reply the periods of separation or of widowhood the question on duration of marriage makes it possible to study fertility in relation to the periods that come nearest to the idea of the actual time of exposure to the risk of pregnancy. The age at the time of marriage and length of married life, together with the age on the census date and the number of children born alive, are perhaps the demographic factors that influence fertility most.

2. Another use of data on total number of children born for the study of fertility according to cohorts is an analysis of the results of the 1950 population census of Mexico, by computing the probabilities of increase in family size on the basis of the distribution

of women whose fertile period had ended, classified according to the number of children born alive.¹³

The analysis of these probabilities, calculated for different cohorts of women can be an important aid in the interpretation of the changes observed in fertility. Also, in an attempt to improve methods for the preparation of population projections, it is of interest to take into account that these probabilities offer the opportunity for projecting fertility considering separately the women of each age with respect to the number of children they have had.

3. Census data on children born alive also permit studying fertility by a transverse analysis, or one of periods, with the same meaning as that of the classical measures of fertility calculated with vital statistics on live births. To fulfill this aim, the condition that should be borne in mind is that, in the 30 years preceding the census, changes in the fertility of the population under study should not have been extensive.

The studies directed by Mortara, utilizing the 1940 and 1950 census data of Brazil, are important examples of the investigation of fertility from the aspect indicated, especially since birth statistics in Brazil cannot be utilized owing to their serious deficiencies. Each of the two censuses mentioned has, on the contrary, made it possible to estimate and analyze, in an independent way, the frequency of births in relation to age, number of children born, age at birth of first child, marital status, color, economic activity, residence and so forth.¹⁴

SOME FINAL THOUGHTS

In Relation to Statistics of Live Births

Two aspects should be distinguished: the completeness and quality of the registration and the types of data available. Both are highly relevant to the study of fertility. The former is a problem that stems mainly from late registration and omissions in registration. Evaluation of this problem can be a first step toward reaching a solution and adequate tabulations on registered births can be of help to this end.

In relation to the types of specific data for the study of fertility, aside from those necessary for computation of the classical measures (births by sex, legitimacy, and by age of the mother), data relating to age of mother to birth order are of principal importance, and in second priority are the duration of the marriage and the interval between successive births.

A general evaluation of the statistics that are collected in relation to live births should give priority to the topics indicated in the preceding point, and aside from the special interest that certain countries may have in collecting information with respect to some characteristics such as nationality and race, it would be important to take into account the limitations of birth statistics referring to educational characteristics and, even more so, of those on the economic characteristics, for the study of fertility. The lack of consistency of this information with the population data to which they must be related makes it difficult to use live births as a starting point for an analysis of differential fertility.

The geographic breakdown with which the data on live births are prepared in some cases should also be the object of special evaluation in each country, depending on the variability of the information and the scope and quality of the statistics compiled.

In Relation to Census Data for the Study of Fertility

Since the censuses can provide supplementary information that is much more ample than the registration documents can, it would be of greatest interest for the countries that collected specific fertility data in their most recent population censuses to increase the possibilities of analysis by making as much use as possible of the basic information available. This could be achieved by adequate tabulations that relate fertility data to other demographic and socioeconomic variables. In this case, the possibility of isolating the effect of certain factors opens new perspectives for the study of differential fertility, which is of fundamental importance to obtain the knowledge for a critical analysis of the future prospects of fertility in the developing countries.

Although in the most recent population censuses a greater number of countries collected specific data for the study of fertility as compared to the censuses of 1950, a large number did not include this material and it is of interest to note that among them are countries whose statistics of live births are clearly deficient. It would accordingly be desirable that, in the next population censuses, the investigation be carried out by all the countries and that at the time the census schedule is drawn up and the specific questions, or the questions that relate to the topic, are prepared, the experience of other censuses with respect to the limitations stemming from shortcomings in formulation should be borne in mind.

SUMMARY

This paper presents an overall view of the possibilities of studying fertility in the Latin American countries through the vital statistics information on live births and the fertility data that were especially collected in the most recent censuses of population. An inquiry to the national offices of statistics and the census in these countries revealed that 14 countries obtain data on live births classified by age of mother, and ten obtained these statistics according to birth order. Only eight countries possess data cross-classifying age of mother and birth order; one cross-classifies these two characteristics and duration of marriage, and two classify births by birth order and duration of marriage. The kind of information available is affected by limitations as to the completeness of the registration and the coverage and quality of the resulting statistics. In general, of a total of 20 Latin American countries, only ten—accounting for less than 45 per cent of the population of all 20 countries taken together—can be considered to have acceptable statistics in this regard.

As for the census data available that were specifically collected for the study of fertility, of the 18 countries that took population censuses between 1960 and 1964, eight investigated the topic by means of a question on the number of children born alive; four of the eight collected information on age of mother at birth of the first child; and one investigated the year of marriage. One country related the question to total children born (live births plus stillbirths) and rounded out this information with figures on the number of children alive on the census date and the year of marriage of mothers living with their spouses. Appraisal of the possibilities of analysis offered by programmed tabulation of the information collected points to the desirability of making them more extensive so as to permit the study of differential fertility by means of tabulations that relate fertility data to other demographic and socioeconomic variables.

Because of the limitations of statistics on live births in the Latin American countries and bearing in mind that censuses can furnish additional information that is much more ample than that obtained from registration records, it would be desirable for all countries to include the investigation of fertility in their next censuses.

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² Comisión Económica para América Latina, *Boletín Económico de América Latina*, Suplemento Estadístico, Santiago, Chile, Vol. 7 No. 1, Octubre de 1962.

³ United Nations, POPULATION BULLETIN OF THE UNITED NATIONS, No. 7, 1963, with special reference to conditions and trends of fertility in the world, New York, United Nations, 1965, p. 89.

⁴ Tabulation of live births cross-classifying birth order and the interval between successive births makes it possible to compute coefficients that show what proportion of the births of a given order occur n years after births of the preceding order. These weighting coefficients enter into the computation of the probabilities of increase in family size when this computation is based on vital statistics on births. (Henry's method. See Henry, L., FECONDITÉ DE MARIAGES, Paris, Institut National d'Etudes Démographiques, Travaux et documents, Cahier No. 16, 1953.) Countries having the type of information referred to are exceptional and generally these probabilities are computed from births classified by the birth order for the population under study and the weighting coefficients used correspond to another population whose fertility behavior is similar. The study of fertility in Chile, during the period 1952-1959, is an example of the application of Henry's method in the analysis of the fertility structure of a population undergoing gradual changes characteristic of its entry into a period of demographic transition. (Arévalo, J. V., APLICACION A CHILE DE UN METODO DE MEDICION DE LA FECUNDIDAD SEGUN EL TAMAÑO DE LA FAMILIA, Santiago, Centro Latinoamericano de Demografía, Series C, 17, 1964.)

⁵ The possibilities and limitations of the study of fertility from census results on family composition are described in: United Nations, FERTILITY DATA IN POPULATION CENSUSES, Population Studies No. 6, Lake Success, New York, Department of Social Affairs, United Nations, November, 1949, pp. 6-9.

⁶ United Nations, PRINCIPLES AND RECOMMENDATIONS FOR NATIONAL POPULATION CENSUSES, Statistical Papers, Series M, No. 27, New York, United Nations, 1958, p. 17; Report of the VI Session of the Committee on Improvement of National Statistics, Buenos Aires, Argentina, November 17-28, 1958, *Estadística*, 16, December, 1958, Supplement 2; Inter American Statistical Institute, *op. cit.*, p. 717.

⁷ This criterion had already been followed by Brazil in the 1950 census, when the question excluded fetal deaths of under seven months gestation from the total number of children born. The investigations covered the entire enumerated population.

⁸ Dirección Nacional de Estadística y Censos, HECHOS DEMOGRAFICOS EN LA REPUBLICA ARGENTINA, 1954-1960, Buenos Aires, Argentina.

⁹ In reality, the criterion of selection directing the question only to married women, widows and separated and divorced women has already been followed in the population prior to the last census in Argentina, taken in 1947. In that case, the question referred to the total number of children born, that is, liveborn plus stillborn, excluding fetal deaths of less than six months gestation. The information was supplemented by a question on the number of children

alive on the census date, the years of marriage (aside from periods of widowhood, separation or divorce) and the age at the time of marriage (of first marriage in cases of several marriages). Source: *Cuestionario del IV Censo General de la Nación Censo de Población*.

¹⁰ Dirección General de Estadística y Censos, CENSOS DE POBLACION Y VIVIENDA, 1962, Asunción, Paraguay, 1965.

¹¹ Recchini, Z. L., LA FECUNDIDAD EN LA CIUDAD DE BUENOS AIRES DESDE FINES DEL SIGLO PASADO HASTA 1936, Serie C. Santiago, Centro Latinoamericano de Demografía, 1963.

¹² CUARTO CENSO GENERAL, 1936: POBLACION, CIUDAD DE BUENOS AIRES, TOMO IV. FECUNDIDAD Y FAMILIAS, Buenos Aires, Municipalidad de la Ciudad de Buenos Aires, pp. XII to XX. In the table referred to, the data on "time period when married" resulted from compiling the information on age on the census date and age at marriage, since the item was not investigated by the census schedule.

¹³ Tabah, L., La Medida de la Fecundidad y de la Reproducción a Base de Datos Censales, *Apuntes de Clase*, Capítulo VII, Santiago, Centro Latinoamericano de Demografía, *Apuntes de Clase*, Capítulo VII, Santiago, Centro Latinoamericano de Demografía, 1963.

¹⁴ Mortara, G., A FECUNDIDADE DA MULHER NO BRASIL, Rio de Janeiro, Instituto Brasileiro de Geografia e Estatística, Conselho Nacional de Estatística, 1957. ———, *Methods of Using Census Statistics* for the calculation of life tables and other demographic measures (with application to the population of Brazil). United Nations, Population Studies No. 7. Lake Success, New York, November 1949. pp. 40-60. Numerous studies on fertility, carried out by the Technical Laboratory of the National Census Service in 1940, were issued in the series "Análises de resultados do censo demográfico" and in "Aplicacoes do censo demográfico," listed in a complete index of the *Revista Brasileira de Estatística*, No. 38, 1949. (Source: Mortara, *op. cit.*)