

## URBAN AND RURAL NATURAL INCREASE IN CHILE

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Like Sweden among European countries, Chile has become popular among demographers interested in population movements in South America. In both cases, the attraction lies in the relative plenitude of historical data of fairly high quality and in the relative detail in which current data are published. Furthermore, as a "developing" country, Chile has seemed to some<sup>1</sup> to be passing nicely through the so-called demographic transition, in which a fall in the death rate precedes a fall in the birth rate with an interstitial spurt in population growth.

A great deal of optimism regarding future population trends in Chile, as in other developing countries, has attached to the process of urbanization. Given the fact that urban areas are now generally characterized by similar death rates but lower birth rates than rural areas, the implication is that as a country urbanizes, a greater proportion of the population will be exposed to the lower urban rate of natural growth and the population bomb will cease to explode.

This paper is devoted to a consideration of the urban-rural differences in the rate of natural increase in Chile, analyzing both the changes in the rates themselves and the changes in differences in those rates between the urban and rural populations over the period 1952 to 1960. The purpose of such an

analysis is to examine in greater detail the finding by Arriaga that almost 70 per cent of the total population increase of Chile's cities is currently accounted for by natural growth and only 30 per cent by migration.<sup>2</sup> In light of the fact that Chile has been urbanizing consistently over the past century (see Table 1), and in light of the fairly rapid rate of total population growth, the conclusion must follow that the cities themselves are experiencing unprecedentedly high rates of natural growth, a fact consistent with data assembled by Davis.<sup>3</sup>

#### URBAN AND RURAL POPULATIONS DEFINED

In Chile, birth and death statistics are not classified according to the same administrative regions as those used in the census. In addition, the 1960 census does not supply the same detail of information about small political subdivisions as did the 1952 census. For both of these reasons, the matching of vital registration data with census characteristics at the two dates can be achieved only for the largest political subdivisions—*provincias*—which are essentially analogous to states in the

TABLE I. URBANIZATION OF CHILE, 1865-1960\*

Year	Total Population**	Urban Population**	Urban Fraction
1865	1,820	521	28.6
1875	2,076	726	35.0
1885	2,498	1,042	41.7
1895	2,688	1,223	45.4
1907	3,221	1,392	43.2
1920	3,715	1,724	46.4
1930	4,287	2,119	49.4
1940	5,023	2,639	52.5
1952	5,933	3,573	60.2
1960	7,375	4,903	66.5

\* The definition of "urban" in Chile has no minimum size limit but rather is administratively defined. It is comprised of all provincial capitals plus other places which have an "urban" character, such as street, water supply, etc.

\*\* Population given in thousands.

Sources: Chile. Direccion General de Estadistica, *Sinopsis Geografico-Estadistica de la Republica de Chile, 1933* (Santiago, 1933), (for 1865-1930); ———, *Demografia, 1960*, (for 1940-1960 data).

United States. At the provincial level, then, some criteria had to be established for delimiting the urban and rural populations. The decision was made to utilize the definition of the metropolitan area that was developed by International Urban Research,<sup>4</sup> which includes all of the continuous urban territory but usually some rural territory as well. Clearly, in using entire provincias to define an urban or metropolitan population, one is faced with the discrepancy of an "over-bounded" city—an urban aggregate not as large as the territory that defines it. This is not a serious discrepancy, however, if the central city and its hinterlands, which would constitute a more rigorously defined metropolitan area, do in fact include most of the populations within the provincia. In Chile, three provincias are distinctly more urban and more densely settled than are all others. These three are Santiago, Valparaiso and Concepción. These provincias are between 80 and 90 per cent urban. Although that particular characteristic is also shared by four other provincias, these latter four are among the least densely settled of all the 25 provincias of Chile, whereas Santiago, Valparaiso and Concepción are by far the most densely settled provincias. Furthermore, Santiago, Valparaiso and Concepción contain the only three metropolitan areas of Chile in 1952 and 1960 as defined by International Urban Research.

To recapitulate, then, the urban population of Chile for the purposes of this paper consists of the three provincias encompassing Chile's three metropolitan areas—Santiago, Valparaiso and Concepción. The remainder of the population is not strictly rural because it does include smaller urban areas as well as truly rural populations, and will simply be referred to as the nonmetropolitan population. In terms of population growth between 1952 and 1960, the total population of Chile increased by 30.4 per cent, Santiago increased by 38.9 per cent, Valparaiso by 23.9 per cent, Concepción by 31.1 per cent and the nonmetropolitan areas by 26.7 per cent. Given these differentials in total growth, in which the metropolitan population as a whole was growing significantly faster than the nonmetropolitan

TABLE 2. CRUDE VITAL RATES FOR METROPOLITAN AND NONMETROPOLITAN AREAS OF CHILE, 1952 AND 1960

Area	Birth Rate		Death Rate		Rate of Natural Increase	
	1952	1960	1952	1960	1952	1960
Santiago M. A.	31.5	34.5	11.5	10.9	20.0	23.6
Valparaiso M. A.	29.6	32.8	12.6	11.6	17.0	21.2
Concepción M. A.	40.9	39.6	15.4	15.9	25.5	23.7
Non-M. A. Provincias	33.2	32.5	15.0	15.9	18.2	19.7

Sources: 1952 data for population from Chile, Dirección General de Estadística, *XII Censo General de Población, 1952*, Vols. I, II and V, and for births and deaths, ———, *Demografía, 1952*. 1960 data from ———, *XIII Censo de Población, 1960*, Vols. 6, 7, 15, and —, *Demografía, 1960*.

population, what differences existed in natural rates of growth, the excess of births over deaths?

#### CRUDE RATES OF NATURAL INCREASE

Table 2 presents the crude (unadjusted) birth and death rates and the difference between these two rates, the rate of natural increase, for the metropolitan (M.A.) and nonmetropolitan (non-M.A.) populations for the two dates that circumscribe this study, 1952 and 1960. Between these years, the crude rate of natural increase rose in Santiago and Valparaiso by 18 and 25 per cent, respectively, declined by seven per cent in Concepción and rose by eight per cent in the non-M.A. provincias. In Santiago, the increase in natural growth was occasioned by a ten per cent increase in the crude birth rate and a five per cent decline in the death rate; thus, both the birth and death rates contributed to the increase in natural growth. In Valparaiso, a similar situation prevailed, but in a more exaggerated way, the birth rate increasing by 11 per cent while the death rate declined by eight per cent. Thus, the higher rate of natural increase in Valparaiso than in Santiago was the result of differential levels of both birth and death rates. Concepción differed from the pattern of the other two metropolitan areas by exhibiting a decline of three per cent in the birth rate accompanied by an equal increase in the death rate. The non-

M.A. provincias exhibited still a third pattern, indeed the expected pattern for the country as a whole, of a decline in the birth rate (two per cent) trailing a decline in the death rate (15 per cent).

The picture that emerges from the crude or unadjusted vital rates is that the largest urban areas were growing from natural increase at a more rapid rate than was the rest of the country. This is certainly contrary to the historically observed pattern among developed countries in which the cities grew through rural to urban migration instigated in part by the rural population's greater natural increase. Furthermore, the high rate of natural growth is caused by not only a decline in mortality, but even more importantly by a rise in the birth rate. Before lending too much credence to such observations, however, it would be well to examine two possible sources of misinterpretation: (1) the possibility of changes in the completeness of registration of births and deaths, and (2) the influence on the vital rates of the age and sex structures of the different populations.

The first question is answered quickly by Collver<sup>5</sup> who claims that deaths in Chile were completely registered between these two dates, and that even though the registration of births is only about 86 per cent complete, it was fairly constant at that level between 1930 and 1960. Official estimates in Chile put the birth underregistration figure at five per cent, but again no significant difference is noted for this figure between 1952 and

TABLE 3. AGE AND SEX-ADJUSTED VITAL RATES FOR METROPOLITAN AND NONMETROPOLITAN AREAS OF CHILE, 1952 AND 1960

Area	Birth Rate		Death Rate		Rate of Natural Increase	
	1952	1960	1952	1960	1952	1960
Santiago M. A.	27.4	30.4	11.8	11.0	15.6	19.6
Valparaiso M. A.	27.3	30.2	12.6	11.7	14.7	18.5
Concepción M. A.	40.4	40.6	15.5	16.3	24.9	24.3
Non-M. A. Provincias	36.8	36.1	14.8	12.8	22.0	23.3

Sources: see Table 2.

TABLE 4. CHANGE IN THE CRUDE VITAL RATES WHEN ADJUSTED FOR AGE AND SEX, METROPOLITAN AND NONMETROPOLITAN AREAS OF CHILE, 1952 AND 1960

Area	Percentage Change in				Rate of	
	Birth Rate		Death Rate		Natural Increase	
	1952	1960	1952	1960	1952	1960
Santiago M. A.	-13%	-12%	+3%	+1%	-22%	-18%
Valparaiso M. A.	-8	-8	0	+1	-14	-13
Concepción M. A.	-1	+2	+1	+3	-2	+3
Non-M. A. Provincias	+11	+11	-1	0	+21	+18

Source: Percentage change calculated from identical cells in Tables 2 and 3, where percentage change =  $\frac{\text{Table 3} - \text{Table 2}}{\text{Table 2}}$

1960.<sup>6</sup> No attempt has been made in this paper to adjust for underregistration of births. The conclusion is that changes in the completeness of registration did not likely affect the crude vital rates between 1952 and 1960, and that, if anything, the crude rates of natural increase are underestimated, but not in such a way as to alter the nature of the comparisons.

#### AGE- AND SEX-ADJUSTED VITAL RATES

The birth, death and natural growth rates adjusted for age and sex structures are given in Table 3. Here it can be seen that the feminine sex ratio and the greater numbers of people in the young adult ages resulted in the crude rate of natural increase being higher in the metropolitan population than in the nonmetropolitan population. The age- and sex-adjusted vital rates show more nearly the urban-rural differentials that would have been expected, with the exception of Concepción, where the age and sex structure was apparently little different from that of the total population of Chile, which was used as the standard population for adjusting the crude rates.

Table 4 shows the percentage change and the direction of that change in the crude vital rates that result from standardization of the age and sex structures at each date. The birth rate in both 1952 and 1960 declined in the metropolitan areas, as points of migrant destination, and increased in the nonmetro-

politan areas, as migrant points of origin. The opposite was true for the death rates in 1952, whereas, in 1960, the death rates did not seem generally to be affected by age or sex. For that reason, age and sex had less influence on the crude rate of natural increase in 1960 than in 1952. The degree of variation in the crude rates of natural increase brought about by differences in age structure are, of course, rather closely related to the migration streams, which alter the age and sex structures at the points of origin and destination. A study done for CELADE by Conning<sup>7</sup> showed that between 1952 and 1960, the net migration of people aged 15 years and over was higher in all provincias for females than for males. Table 5 shows the net migration rates for the metropolitan provincias and verbally summarizes the rate for the nonmetropolitan provincias. The table also relates migration rates to the ratio of women of reproductive age to the total population. Both variables follow similar gradients. Santiago had the highest rate of in-migration and thus experienced a peak in the number of reproductive age females relative to the total population. The nonmetropolitan provincias, on the other hand, showed a net out-migration between 1952 and 1960 and also had the lowest ratio of women to total population.

#### ACCOUNTING FOR CHANGES IN THE VITAL RATES

Thus far it has been shown that in both 1952 and 1960 Greater Santiago had a higher crude rate of natural increase than did the nonmetropolitan provincias; Valparaiso and Concepción fell between those two. Standardizing for the age and sex structure reversed the metropolitan-nonmetropolitan differential in the vital rates. Tables 2 and 3 indicate, however, that an even more important phenomenon was occurring between 1952 and 1960: the rate of natural increase was rising in both the metropolitan and the nonmetropolitan areas. This rise was more rapid in the former than in the latter, and the rise appeared to be caused more by an increase in the birth rate than by a decrease in the death rate. Indeed, the death rate was

TABLE 5. RATES OF NET INTERNAL MIGRATION, 1952-1960 AND RATIOS OF WOMEN AGED 15-49 TO THE TOTAL AND NONMETROPOLITAN AREAS OF CHILE

Area	Rate of Net Internal Migration, 1952-1960		Ratio of Women Aged 15-49 to Total Population	
	Males	Females	1952	1960
Santiago M. A.	.1170	.1300	.2883	.2675
Valparaiso M. A.	.0184	.0391	.2756	.2598
Concepción M. A.	.0174	.0280	.2544	.2413
Non-M. A. Provincias	19 of the remaining 22 provincias have negative rates of net migration		.2338	.2217

Sources: Migration data from Conning (see References) and Population data from same sources as in Table 2.

TABLE 6. ACCOUNTING FOR THE CHANGE IN THE CRUDE BIRTH RATE BETWEEN 1952 AND 1960

Area	Increase in 1952 Birth Rate that			
	Occurred Between 1952-1960	Would Have Occurred Due to Fertility Change Only	Would Have Occurred Due to Age Distribution Change Only	Would Have Occurred Due to Interaction of Fertility and Age Distribution
Santiago M. A.	+9.5%	+21.0%	-9.5%	-2.1%
Valparaiso M. A.	+11.1	+21.1	-8.0	-2.0
Concepción M. A.	-1.0	+6.3	-7.0	0.0
Non-M. A. Provincias	-2.3	+5.9	-7.5	-1.0

Source: Data from Table 7 and from the appropriate Chile census volumes. For a discussion of the method by which these figures were obtained, see Keyfitz, Nathan, INTRODUCTION TO THE MATHEMATICS OF POPULATION, 1968, Chapter 7.

declining slightly, except in Concepción (where the rise is not clearly explicable), and it was, to be sure, contributing to an increase in the rate of natural growth as would be expected. But what would not have been expected was the general rise in the birth rate, particularly if Chile is considered as being in the midst of a modernizing decline in fertility. Because the standard population for each date was the total Chilean population for that year, the changing age structure between 1952 and 1960 might account for the increase in the birth rate. This is not the case, however, as Table 6 shows. In this table it can be



seen that in the metropolitan areas as well as the nonmetropolitan areas, the changes in the age structure alone should have lowered the crude birth rate rather than raised it. It will be recalled from Table 5 that the ratio of reproductive age women to total population declined in all population categories between 1952 and 1960. That was largely because of a rejuvenation of the age structure resulting from continued positive growth rates. In all cases, but particularly in Santiago and Valparaiso, the crude birth rate would have declined as a result of changes in the age structure, but would have increased even more than it did if fertility alone had been operating on the crude rate. The age structure was, in truth, a depressant to the increase of the crude birth rate.

#### DEMOGRAPHIC COMPONENTS OF THE RISING BIRTH RATE

A rise in the crude birth rate demands further explanation. Therefore, discussion will center on the changes in the fertility schedules by age and by marital status and also whether changes in the marriage pattern could have affected fertility levels.

##### *Fertility Schedules by Age*

Except in the advanced years of reproduction fertility went up in each age group in both the metropolitan and nonmetropolitan populations between 1952 and 1960 (see Table 7). In general, women in their thirties showed the greatest percentage increases in their fertility, followed by women in their late twenties. In cohort terms, the women who were of prime reproductive ages, 17 to 32, in 1952, contributed most heavily to the higher birth rate in 1960. Of great significance is the fact that at each age, women in Santiago and Valparaiso increased their fertility levels more between 1952 and 1960 than did the women in the smaller metropolitan area of Concepción or the women in the nonmetropolitan provincias. Because the birth rates at each age were still higher in 1960 in Concepción and the nonmetropolitan provincias than in Santiago and Valparaiso,

TABLE 7. AGE-SPECIFIC FERTILITY RATES FOR METROPOLITAN AND NONMETROPOLITAN AREAS OF CHILE

Age	Age-Specific Fertility Rates		Percentage Change 1952-1960
	1952	1960	
<i>Santiago M. A.</i>			
15-19	.0636	.0640	6.3
20-24	.1659	.1972	18.9
25-29	.1820	.2270	24.7
30-34	.1384	.1773	28.1
35-39	.0872	.1144	31.2
40-44	.0391	.0424	8.4
45-49	.0073	.0071	-2.7
	.6835	.8924	21.3
<i>Valparaiso M. A.</i>			
15-19	.0679	.0716	5.4
20-24	.1737	.2038	17.3
25-29	.1735	.2214	27.6
30-34	.1348	.1698	26.0
35-39	.0813	.1065	30.1
40-44	.0367	.0389	6.0
45-49	.0090	.0064	-28.9
	.6799	.8184	20.4
<i>Concepción M. A.</i>			
15-19	.0916	.1055	15.2
20-24	.2232	.2390	7.1
25-29	.2521	.2533	4.8
30-34	.2238	.2441	9.1
35-39	.1499	.1626	8.5
40-44	.0710	.0701	-1.3
45-49	.0167	.0130	-22.2
	1.0283	1.0876	5.8
<i>Non-M. A. Provincias</i>			
15-19	.0705	.0735	4.3
20-24	.1973	.1979	3.0
25-29	.2226	.2393	7.5
30-34	.2063	.2551	23.6
35-39	.1508	.1557	3.2
40-44	.0805	.0709	-11.9
45-49	.0245	.0178	-27.3
	.9525	1.0102	6.1

Sources: Same as Table 2.

TABLE 8. AGE-SPECIFIC, MARITAL-SPECIFIC FERTILITY RATES FOR METROPOLITAN AND NONMETROPOLITAN AREAS OF CHILE

Age	Age-Specific Fertility Rates for					
	Married Women			Single Women		
	("Casadas" + "Separadas")					
	1952	1960	% Change	1952	1960	% Change
<i>Santiago M. A.</i>						
15-19	.5127	.5720	11.6	.0214	.0207	-3.3
20-24	.3473	.4212	21.2	.0528	.0536	1.5
25-29	.2540	.3032	19.4	.0713	.0774	8.6
30-34	.1701	.2107	23.9	.0668	.0916	37.1
35-39	.1033	.1325	28.4	.0478	.0646	35.1
40-44	.0485	.0492	1.4	.0183	.0245	33.9
45-49	.0097	.0083	-14.1	.0030	.0028	-5.6
	1.4457	1.6972	17.4	.2814	.3357	17.4
<i>Valparaiso M. A.</i>						
15-19	.5716	.6022	5.4	.0219	.0224	2.3
20-24	.3517	.4257	21.0	.0544	.0541	-0.6
25-29	.2326	.2973	27.8	.0750	.0863	15.1
30-34	.1594	.1989	24.8	.0733	.0888	21.1
35-39	.0935	.1203	28.7	.0481	.0658	36.8
40-44	.0351	.0445	26.8	.0188	.0238	26.6
45-49	.0114	.0076	-33.3	.0042	.0035	-16.7
	1.4553	1.6965	16.6	.2957	.3447	16.6
<i>Concepción M. A.</i>						
15-19	.7304	1.0377	42.1	.0306	.0291	-4.9
20-24	.4601	.4737	3.0	.0736	.0746	1.4
25-29	.3496	.3430	1.9	.0977	.0876	10.3
30-34	.2801	.2884	3.0	.0888	.1177	32.5
35-39	.1806	.1893	4.8	.0682	.0834	22.3
40-44	.0902	.0822	8.9	.0266	.0358	34.5
45-49	.0233	.0156	-33.0	.0037	.0067	81.1
	2.1143	2.4299	14.9	.3892	.4349	11.7
<i>Non-M. A. Provincias</i>						
15-19	.6190	.7052	13.9	.0273	.0260	-4.8
20-24	.4067	.4624	13.7	.0729	.0566	-22.4
25-29	.3160	.3954	25.1	.0935	.0639	-31.7
30-34	.2594	.3809	46.8	.0845	.0707	-16.3
35-39	.1826	.2182	19.5	.0745	.0472	-36.7
40-44	.1010	.1037	2.7	.0342	.0196	-42.7
45-49	.0310	.0277	-10.6	.0112	.0051	-54.5
	1.9157	2.2935	19.7	.3982	.2891	-27.4

Sources: Same as for Table 2.

the implication might be that as Chile continues to urbanize, its total birth rate will increase to the previous nonmetropolitan level rather than decrease to the previous metropolitan level.

### *Fertility Schedules by Marital Status*

If the age-specific rates are broken down according to marital status, changes can be observed in the legitimate birth rate versus the illegitimate birth rate. Did marital fertility alone rise or was it a more general trend toward rising fertility, encompassing illegitimate fertility as well? It appears from the data in Table 8 that for the metropolitan population the total rise in fertility was a product of increases in illegitimate as well as legitimate fertility, except at the older ages, where signs appear of a decline in marital fertility. In the nonmetropolitan areas, an increase in the legitimate birth rate at each age was offset by the decline in the illegitimate birth rate. An explanation that can be offered, although without any further substantiation, is that single women in nonmetropolitan areas who were about to have illegitimate children were more likely to move to the big cities to have their children in 1960 than they were in 1952. A motivation for doing so would have been the better welfare services provided in the cities than in the outlying areas of Chile.

### *Changes in Marriage Patterns*

Although the marriage-specific birth rates discussed above hold constant any changes that might have occurred in the

TABLE 9. MEDIAN AGE AT MARRIAGE IN METROPOLITAN AND NON-METROPOLITAN AREAS OF CHILE, FEMALES

<i>Area</i>	<i>Median Age at Marriage</i>	
	<i>1952</i>	<i>1960</i>
Santiago M. A.	23.55	23.09
Valparaiso M. A.	24.15	23.10
Concepción M. A.	23.13	22.78
Non-M. A. Provincias	23.18	23.05

*Sources:* Same as for Table 2.

proportions marrying it is still of interest to see from Table 9 that the median age at marriage for females declined between 1952 and 1960, thus exposing a larger number of couples to the already high levels of marital fertility. Along with the drop in the age at marriage has come, as would be expected, an increase in the proportion of women at any age who are legally married (or separated). In Santiago, for example, between 1952 and 1960, the proportion of women who were married increased in all age groups but the very youngest (15-19), an age group that also showed generally small increases in marital fertility and even decreases in illegitimate fertility. The probable explanation for all three phenomena lies in the prolonged educational careers of women in 1960 as compared to 1952.

#### WHY THE RISE IN THE BIRTH RATE?

##### *Social and Economic Factors*

Cruz-Coke has tried to account for the increasing population in Chile by reference to the blatantly pro-natalist policy of the Chilean government.<sup>8</sup> He cites as an example the fact that, in 1953, the Chilean Parliament approved family allowances for every child. According to Cruz-Coke this raised the marriage rate from 7.7 to 8.4 per 1,000 population in just one year. No particular criticism can be leveled at this argument except to note that it perhaps cannot account for all the changes in the birth rate.

An additional explanation for the rise in the birth rate, particularly in the urban areas of Chile, is that the slow growth of the economy, relative to population increase between 1952 and 1960, reduced the opportunities for women to work between those two dates. The sluggishness of the Chilean economy has been documented in several sources. Herrick notes that "income per capita rose by 1.9 per cent per year between 1940 and 1952, while in the subsequent period 1952-1960 it actually declined by 0.5 per cent per year."<sup>9</sup> The United Nations substantiates the claim of economic lethargy in Chile during the

1950's with data indicating that the outflow of Chilean capital led to a decline in gross domestic investments as a percentage of gross national product.<sup>10</sup> Table 10 shows, for each of the three metropolitan provincias, the drop in all ages in female labor force participation between 1952 and 1960. No appreciable difference occurred in the census definition of economic activity in 1952 as compared to 1960; therefore, the changes in female activity rates are not a statistical artifact, but are social and economic realities. A decrease in the labor force activity of females could be the result of a general decline in the demand for labor affecting both males and females. It was noted above that the per capita income rose between 1940 and 1952 and dropped between 1952 and 1960. A similar trend may be expected to occur in the pattern of employment. Although the

TABLE IO. LABOR FORCE PARTICIPATION RATES FOR FEMALES IN METROPOLITAN AREAS OF CHILE

<i>Metropolitan Area</i>	<i>Age</i>	<i>Labor Force Participation Rates</i>	
		<i>1952</i>	<i>1960</i>
Santiago	15-19	36.3	30.2
	20-24	45.3	43.2
	25-29	40.3	37.3
	30-34	37.2	32.3
	35-39	36.4	31.1
	40-44	35.8	30.6
	45-49	33.1	28.8
Valparaiso	15-19	28.7	22.8
	20-24	36.6	33.8
	25-29	31.8	39.3
	30-34	29.0	24.7
	35-39	29.1	23.9
	40-44	29.1	23.4
	45-49	28.1	23.2
Concepción	15-19	27.4	22.8
	20-24	33.6	30.1
	25-29	29.2	26.2
	30-34	28.0	21.4
	35-39	27.0	20.3
	40-44	26.4	21.2
	45-49	25.4	20.0

Sources: Same as for Table 2.

TABLE II. LABOR FORCE PARTICIPATION RATES FOR MALES AND FEMALES AGED 20 AND OVER, METROPOLITAN AREAS\*

Metropolitan Areas	Labor Force Participation Rate			Change in Rate	
	1930	1952	1960	1930-52	1952-60
<i>Males</i>					
Santiago	81%	90%	88%	11%	-3%
Valparaiso**	85	90	86	6	-4
Concepción	87	92	89	5	-3
<i>Females</i>					
Santiago	18	35	30	91	-14
Valparaiso**	16	28	24	75	-14
Concepción	15	27	21	82	-21

\* 1930 data were utilized because of the lack of availability, to the author, of the 1940 census.

\*\* 1930, Valparaiso was a departamento within the provincia of Aconcagua, accounting for 63 per cent of that provincia, and so the 1930 data refer to Aconcagua, not explicitly to Valparaiso.

Sources: Chile. Direccion General de Estadistica, *X Censo de la Poblacion, 1930*, Vol. III, *Ocupacion* (Santiago, 1933), \_\_\_\_\_, *XII Censo de la Poblacion, 1952*, Vols. I, III, and V. and \_\_\_\_\_, *XIII Censo de la Poblacion, 1960*, Vols. 6, 7, and 15.

data are not strictly comparable, Table 11 tends to bear out this expectation for the metropolitan areas. Additionally, it appears from Table 11 that the demand for female labor is more elastic than is the demand for male labor. Thus, the percentage increase in employment was more rapid for females than for males during the decades of the 1930's and 1940's, and the percentage decrease was greater for females than for males during the 1950's.

As was shown in another paper,<sup>11</sup> economically active women of all ages have significantly lower levels of fertility in Chile than do inactive women. Women who work are generally involved in extrafamilial activities that tend to increase the opportunity costs of having additional children. Requena has, in fact, shown that economically active women surveyed in Santiago have a higher rate of induced abortions than do nonworking women,<sup>12</sup> an indication that economically active women more acutely perceive the costs of an additional child than do inactive women. As the proportion of women actively employed decreases, a larger number of women are left to devote themselves to families, and fertility will tend to rise.

Another important factor in the rise of urban fertility is

probably also related to the lethargic economic growth of this period: rural-urban migration was not as heavy as it had been in previous periods.<sup>13</sup> It could be argued that the decline in migration is the result of urban natural increase, which minimizes the urban opportunities for rural migrants. This may be true, but it can also be argued that the decline in migration in theory could have minimized the depressing effect migration seems to have on fertility, at least in Santiago. Both Herrick<sup>14</sup> and Elizaga<sup>15</sup> have published survey data from Santiago that indicate that female migrants to that city have higher rates of labor force participation than do women who were born in Santiago. Furthermore, among employed women, the migrants have a higher proportion of full-time employed than do native women. Elizaga also notes that migrant women have lower fertility rates than do native women, which fits in well with their pattern of economic activity.

Economic sluggishness and the consequent decline in migration have perhaps thus affected the proportion of women who work—because migrant women tend to work more than do native women—and have possibly affected fertility levels—because migrant women and women who work tend to have fewer children than do native born women and women who do not work.

#### NATURAL INCREASE AS A COMPONENT OF CITY GROWTH

The avowed purpose of this paper has been to examine in detail Arriaga's claim that 70 per cent of the growth of Chile's cities was accounted for by natural increase alone. That claim may now be evaluated quantitatively and its causes and consequences may be reviewed.

The contribution to total growth that is attributable to natural increase may be calculated from the ratio of the rate of natural increase to the total rate of population growth between 1952 and 1960. If this ratio were 1.00—that is, if the rate of natural increase were identical to the rate of total population



TABLE 12. NATURAL INCREASE AS A COMPONENT OF CITY GROWTH

<i>Metropolitan Area</i>	<i>Average Intercensal Rate of Total Annual Population Growth (Rates per thousand population)</i>	<i>Average Intercensal Rate of Natural Increase Per Year*</i>	<i>Rate of Natural Increase as Per Cent of Total Population Growth</i>
Santiago	38.2	21.8	57%
Valparaiso	24.8	19.1	77
Concepción	31.5	24.6	78

\* Calculated as the mean of the rates for 1952 and 1960, data from Table 2.

growth—100 per cent of the growth of the area in question was attributable to natural increase. At the other extreme, a ratio of zero or less would indicate that none of the growth was caused by the excess of births over deaths, but rather was attributable entirely to migration. Table 12 shows that between 1952 and 1960, natural increase alone accounted for more than half of the growth in Santiago, and more than three-fourths of the growth in both Valparaiso and Concepción. This is in general accord with Arriaga's findings. Of significance is the fact that migration played a larger role in the growth of Santiago than it did in the growth of either Valparaiso or Concepción. This, of course, was anticipated by the data on migration rates presented in Table 5, where it can be observed that the net rate of migration into Santiago was much higher than into either Valparaiso or Concepción.

#### SUMMARY

The rate of natural increase rose in Chile between 1952 and 1960, and it did so in both metropolitan and nonmetropolitan areas, more so in the former than in the latter. This rise was partially the result of a decline in the death rate, but more importantly of a rise in fertility. The demographic mechanisms through which the rise in fertility was transacted were a lowering of the age at marriage, an increase in the proportions marrying and a general tendency for women, within marriage and

without, to bear more children. The rise was prompted socially by a pronatalist government policy and economically by a sluggish increase in economic development that reduced female participation in the labor force and reduced female mobility. The social and economic factors had their greatest impact on the metropolitan areas because family welfare programs are concentrated in the cities and because most nonagricultural female employment is in the cities. Therefore, the rate of natural increase grew more in the cities than in the rest of the country.

In looking toward the future, latest United Nations figures suggest no appreciable change in the rate of growth of the population of Chile;<sup>16</sup> it has remained high since 1960, and the high fertility has continued to be encouraged by increased family allowances, including, in 1964, the addition of prenatal bonuses to pregnant women.<sup>17</sup> City growth in Chile appears increasingly to be a function of sheer population growth rather than a result of the interacting processes of urbanization and economic development.

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