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Recent Fertility in Mexico: Measurement and Interpretation

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Mexican fertility has remained at a high level (a crude birth rate of 42-46) in spite of rapid economic development and its concomitants: rising levels of urbanization, education, income, and female labor force participation, and falling levels of infant mortality and agricultural population, combined with rural to urban migration. All of these changes are theorized to exert downward pressure on a nation's birth rate. The theory of the "demographic transition" (DT) may have to be modified to fit the Mexican case.[1] Proponents of the theory of the DT have calculated "thresholds" for variables such as percent of population in agriculture, percent literate, and per capita newspaper circulation. Exceeding these thresholds will supposedly result in rapid fertility decline, although no particular causal mechanism in identified.[2] Mexico has reached or is very close to all of the "thresholds" with an unchanging birth rate. The result, in the face of rapidly declining death rates, is an acceleration of the Mexican population growth rate to over 3% per year. The most recent vital statistics for Mexico (1972) show a crude birth rate of 43.8 and a crude death rate of 8.8.[3]

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*Earlier drafts of this paper were improved substantially by the comments of Simon Kuznets, Harvard University, and Mark Rosenzweig and T. Paul Schultz, Yale University. I also received capable research assistance from Jose Antonio Ocampo. Any remaining errors are due to some sinister force.

[1]This theory was developed ex-post to explain the demographic experience of the now-developed countries. It is still not completely clear whether birth and death rates fell or rose in England in the latter part of the eighteenth century. In France, the birth rate decline may have preceeded the decline in the death rate.

[2]Dudley Kirk, "A New Demographic Transition?" in Rapid Population Growth Vol. II, pp. 123-147.

[3]Office of Population Research, Population Index (July, 1973), p. 480 and graph on back cover.

Rapid population growth in Mexico is certainly no longer a blessing, if it ever was. Isbister has recently calculated, in a aggregative framework, the substantial benefits to Mexico of a reduced rate of population growth.[4] The source of these benefits is a reduction in the dependency ratio which will generate more savings. L. Belmont and F.A. Marolla have also shown recently the costs at the household level of large families, in terms of decreasing ability of high-order children to absorb human capital.[5]

In order to shed light on the Mexican puzzle of a high birth rate coexisting with rapid economic development, this paper will examine the following two questions: Are aggregate fertility measures masking a decline in age- or region-specific fertility? and, if fertility has not declined, can we interpret this phenomenon by explaining cross-sectional variations in fertility, which do exist, in terms of the demographic transition variables?

The Data

The three sources of data in this study are: the 1960 Census of Population,[6] the 1970 Census of Population,[7] and the Statistical Annual for 1968-1969.[8] The quality of Mexican demographic data is considered to be

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[4] "Birth Control, Income Redistribution, and the Rate of Saving: The Case of Mexico," Demography (February, 1973), pp. 85-98.

[5] "Birth Order, Family Size, and Intelligence," Science (December 14, 1973), pp. 995-1003. The variable actually measured is IQ test performance

[6] VIII Censo General de Poblacion, 1960. Direccion General de Estadistica, Mexico City, 1963.

[7] IX Censo General de Poblacion, 1970. Direccion General de Estadistica, Mexico City, 1971.

[8] Anuario Estadistico de los Estados Unidos Mexicanos, 1968-1969. Direccion General de Estadistica, Mexico, 1971.

above average by LDC standards.[9] Nonetheless, there are errors in measures of fertility: estimates of crude birth rates suffer from under-reporting and delayed registration; numbers of children 0-4 may be heavily under-enumerated and reflect also the incidence of infant mortality which may also be under-reported. Neither a crude birth rate nor a ratio of children 0-4 to women 15-49 allows us to attack the problem of trends in age-specific fertility rates, either at the national level, or at the state level.[10] However, the number of children-ever-born (CEB) to women in various age groups is available from the 1960 and 1970 Censuses. Women still in their fertile years are less likely to "forget" children, and the CEB measure avoids the problem of the direct effect of infant mortality.[11]

In Table 1 on page 4, unadjusted child-woman ratios (CWR) are reported for Mexico and for all the states of Mexico for 1960 and 1970. The increase in the ratio for all the Mexico cannot be completely explained by declining infant mortality and underenumeration.[12]

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[9] See D. Andrew Collver, Birth Rates in Latin America: New Estimates of Historical Trends and Fluctuations (Berkeley, 1965) pp. 138-149.

[10] Mexico is divided into 32 federal entities (states) which are the units of cross-sectional analysis in this study.

[11] Infant mortality may be either positively or negatively related to fertility: positive, if parents set a target number of surviving children, but perhaps negative, if the investment good nature of children overwhelms the first effect.

[12] Overall infant mortality for Mexico fell from about 78 per thousand live births in 1955-59 to 64 in 1965-69. See Population Index, op. cit., p. 482. Inflating the CWR's by these figures gives 786 and 813, respectively, probably too large a differential to be accounted for by reductions in underenumeration.

Table 1

Child-Woman Ratios for the States of Mexico

1960 and 1970

	1960 Children 0-4	1960 Females 15-49	1960 Ratio	1970 Children 0-4	1970 Females 15-49	1970 Ratio
A. CALIEN.	40,884	53,475	765	59,946	72,785	824
B. CALIF.	93,849	113,830	824	145,406	197,483	736
B. CAL(TER)	14,081	17,435	808	21,948	26,678	823
CAMPECHE	27,273	37,981	718	41,045	56,734	723
COAHUILA	148,397	203,368	730	186,026	244,647	760
COLIMA	27,848	36,053	772	41,137	51,250	803
CHIAPAS	205,431	273,168	752	267,913	350,529	764
CHIHUAHUA	210,519	276,043	763	273,046	252,665	772
D.F.	785,071	1,240,075	633	1,054,123	1,742,568	605
DURANGO	132,228	164,452	804	169,165	193,092	876
GUANAJUATO	294,937	377,610	781	401,501	476,774	842
GUERRERO	193,906	271,032	715	275,269	348,021	791
HIDALGO	163,344	220,349	741	202,836	253,359	801
JALISCO	420,152	551,959	729	571,229	719,837	794
MEXICO	322,517	409,537	788	705,677	821,583	859
MICHOACAN	307,859	407,331	756	401,044	487,602	822
MORELOS	63,653	86,559	735	102,067	136,087	750
NAYARIT	65,598	85,115	771	94,016	111,708	842
NUEVO LEON	172,968	254,612	679	287,153	383,383	749
OAXACA	267,504	398,967	670	327,264	445,329	735
PUEBLA	320,501	444,263	721	415,002	553,148	750
QUERETARO	60,314	77,471	779	88,121	100,659	875
QUINTANA ROO	9,332	10,330	903	16,648	18,481	901
SANL. POTOSI	179,995	230,165	782	223,328	270,236	826
SINALOA	141,192	182,980	772	221,361	265,531	834
SONORA	134,061	176,128	761	180,038	242,940	741
TABASCO	89,649	107,432	834	139,606	161,809	863
TAMAULIPAS	167,800	237,603	706	244,446	327,402	747
TLAXCALA	58,886	73,101	805	71,277	85,442	834
VERACRUZ	441,154	628,586	702	642,566	857,772	750
YUCATAN	88,585	140,999	628	114,923	173,433	663
ZACATECAS	145,279	174,745	831	181,383	188,570	962
TOTAL	5,776,767	7,963,154	725	8,167,510	10,718,537	762

Source: 1960 and 1970 Census of Population

There are, however, 3 states which show significant declines in CWR's between 1960 and 1970: the Federal District, Baja California, and Sonora. Given reductions in infant mortality and underenumeration, this appears to show a definite decline in fertility in these states. However, measuring fertility in these states by numbers of children ever born to women of various ages seems to tell a different story. In Appendix Table A1, the distribution of women by numbers of children-ever-born, for 5-year age groups, for 1960 and 1970, is reported for the Federal District and for Baja California. The identical tables for a less advanced state are also reported for comparison. Also measured is the mean number of children ever born ($\bar{CEB}$) for the 25-29 year olds in 1960 and 1970. Before concluding that fertility has risen in Baja California and the Federal District, it must be noted that rural migration to these states has no doubt influenced the $\bar{CEB}$ figures. Estimating gross migration flows as a percent of resident population, and measuring $\bar{CEB}$'s in backward states, makes it likely that migration flows cannot account for the entire rise in fertility, or at best, resident fertility remained constant between 1960 and 1970.[13, 13a] This evidence of constant fertility in states whose child-woman ratios

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[13] If in each state resident fertility, as measured by the $\bar{CEB}$ in 1960 remained constant through the 1960's, it is possible to calculate the $\bar{CEB}$ of migrants 1960-1970 that would raise the 1960 $\bar{CEB}$ of the Federal District and Baja California to their 1970 levels. Using the Census data on page 6, it is easily seen that net migration to the Federal District for 25-29 year olds in 1970 was very small: 261,054 15-19 year olds in 1960, and 270,963 25-29 year olds in 1970. Gross migration 1960-1970 to the city was higher, perhaps 10% of the 1970 population. It is easy to calculate that the migrants (10%) would need a $\bar{CEB}$ of 3.920 to raise the D.F. $\bar{CEB}$ to 2.395, and for Baja California, with 30% migrants, a $\bar{CEB}$ of 3.787 would be required. The two states which sent the most gross migrants 1960-1970, to the Federal District and Baja California, were Jalisco ($\bar{CEB}$ = 3.073) and Mexico ($\bar{CEB}$ = 3.264).

[13a] The largest changes in Table 2 between 1960 and 1970 are declines in the percentages childless. Increasing fecundity and reductions in natural child spacing among Mexican women could offset tendencies toward fertility reduction. The biological approach is stressed by R.B. Tabbarah, "Toward a Theory of Demographic Development", Economic Development and Cultural Change (January, 1971), pp. 257-276.

seems to have fallen could be explained by interstate migration of women of childbearing ages who leave their young children behind.[14]

It is probably true that age-specific or region-specific fertility declines are not being masked by the constant crude birth rate.[15] It may be possible to shed light on this phenomenon of constant fertility over time by explaining the cross-sectional fertility differentials that do exist in Mexico. Using as explanatory variables measures of characteristics associated with the DT, we may be able to determine if these variables have their hypothesized effects on fertility, at least in cross-sections in 1960 and 1970.

Child-woman ratios for the states of Mexico have been chosen as the dependent variable for cross-sectional fertility analysis. I believe these ratios, when corrected by estimated underenumeration and infant mortality, are superior to the CĒB statistics for women in the childbearing years. Although young women are less likely to "forget" children, "forgetting" still exists and probably not randomly. In particular, mothers may be prone to "forget" children who die in infancy. In light of the deficiencies

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[14]This phenomenon may explain some of the rises in the advanced states, but the CĒB for all of Mexico also rose between 1960 and 1970. For the 25-29 year olds, CĒB in 1970 was 3.065, compared with 2.664 in 1960. This 15% rise is also further proof that age-specific fertility has not been declining in Mexico. There were also rises for the 20-24 year olds and 30-34 year olds.

[15]The evidence of constant fertility in Mexico is strengthend by corrected estimates of the child-woman ratio for Mexico for 1960 and 1970 of 859 and 883. (Dinamica de la Poblacion de Mexico, [Mexico City, 1970], Cuadro III-13, p. 60). Correcting for infant mortality decline in the interim still leaves a small increase. It is possible that the 1960's saw some decline in age-specific rates in Mexico City for the 30-34 year olds. See Dinamica de la Poblacion de Mexico, op. cit., p. 65. Raul Benitez Zenteno and Gustavo Cabrera Acevedo, Proyecciones de la Poblacion de Mexico 1960-1980, (Mexico, 1966), have estimated age-specific fertility rates for the states of Mexico for 1960, (pp. 104-106) based on official birth statistics. In general the rates are very similar to the unadjusted 1960 CWR's. Estimates of underenumeration of the 0-4 1960 population are also made (pp. 77-80). I believe these estimates are inferior to those used by Roberts (see below). Two examples are Federal District 12% underenumeration, and Quintana Roo 30% overenumeration. Clearly insufficient allowance has been made for underreporting of births (Quintana Roo) and underestimates of inmigration (Federal District).

noted above, however, it is necessary to adjust child-woman ratios to ratios to reflect the "true" and unobserved fertility. It has also been noted that official statistics of infant mortality are not reliable. But Roberts[16] has recently reported on corrected levels of infant mortality by the state in Mexico in 1960. These corrected rates can be used to directly inflate the reported child-woman ratios to account for infant mortality.[17]

Regional variations in underenumeration, which are substantial, are more difficult to deal with. Roberts[18] has also measured the degree of underreporting of infant mortality in Mexico in 1960. These estimates may be good proxies for the degree of underenumeration of children 0-4 in Mexico. The dependent variable, after adjustment, is:

$$ACWR_j = [\ CWR_j/(1-m_j)\ ] \cdot (1 + u_j) \qquad (1)$$

where: $ACWR_j$ = adjusted child-woman ratio for state j in 1970 (or 1960)

CWR_j - measured child-woman ratio for state j in 1970 (or 1960)

m_j = corrected infant mortality rate for state j in 1970 (or 1960)

u_j = percent of underreporting of infant mortality for state j in 1960.[19]

Rather than simply use both of Roberts' estimates to inflate the 1970 CWR's, it is possible to allow for changing infant mortality in the interim period by combining Roberts' underenumeration estimates with official infant mortality rates averaged over 1965-1967. Thus

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[16] Robert E. Roberts, "Modernization and Infant Mortality in Mexico," Economic Development and Cultural Change (July, 1973), pp. 655-669.

[17] Mortality at ages 1-4 years is low enough to be safely ignored.

[18] Op. cit.

[19] Schultz has argued that lagged values of infant mortality have a positive influence on current fertility. Love and Life Between the Censuses: A Model of Family Decision Making in Puerto Rico, 1950-1960, Rand Corporation, Santa Monica, 1970. Unfortunately, adequate time series for infant mortality by state do not exist. Thus the one observation on infant mortality for 1960 has been used to inflate the child-woman ratios for 1960 and 1970. Mexican infant mortality has been declining for 70 years (from 300 per thousand live births to 64 per thousand) with no apparent effect on birth rates. It is true that its influence on fertility could be more subtle, but I prefer to attack the problem with child-woman ratios, forfeiting an opportunity to test the cross-sectional effect of infant mortality.

$$m_{j\ 1970} = \overline{m}_{j\ 65\text{-}67}/(1 - u_{j\ 1960})$$

where: $\overline{m}_j$ = mean reported infant mortality rate for 1965-1967.

Unfortunately, it is not possible to inflate the 1970 CWR's by a 1970 measure of underenumeration, and thus the 1960 measure is used in 1970. This may introduce a small bias in the results, in that the overall degree of underenumeration has declined a little between 1960 and 1970. The advanced states had already in 1960 0% underenumeration, while the most backward probably had decreases in this measure. The probable effect of this bias on the 1970 regressions is discussed below.

The unadjusted and adjusted child-woman ratios for each state are presented in Table 2 on page 9 with the estimated infant mortality rates and underenumeration percentage for each state for 1960 and 1970.

A cursory examination of the ACWR's for 1960 and 1970 reveals that Mexico City, essentially the Federal District, has the lowest fertility, and two of the backward states the highest: Queretaro and Quintana Roo. It is clear that there is some general negative relationship between "modernity" and fertility. More detailed findings require the estimation of the independent effects of the various indicators that comprise modernity and that have some hypothesized influence on fertility. Measuring the independent effects, that is, the effect of each variable holding all others constant, may help explain the puzzle of the Mexican birth rate.

Multiple regression analysis has been employed to measure the influences on fertility of the following variables: level of education of the population, income, occupational structure, industrial structure, degree of urbanness, rate of female labor force participation, and the sex ratio.

Regressions have been performed on 1960 and 1970 data. Thus in addition to determining differentials in each census year, it is also possible to determine how these differentials are changing over time, if at all.

Table 2

UNADJUSTED AND ADJUSTED CHILD-WOMAN RATIOS
AND ESTIMATED INFANT MORTALITY AND UNDERENUMERATION,
FOR EACH STATE, 1960 AND 1970.

	1960				1970			
STATE	CWR	m	u	ACWR	CWR	m	u	ACWR
A. CALIEN.	765	84.4	7.3	896.5	824	71.7	7.3	952.5
B. CALIF.	824	62.4	0.0	878.8	736	64.4	0.0	786.7
B. CAL(TER)	808	62.2	0.0	861.6	823	56.0	0.0	871.8
CAMPECHE	718	72.1	27.4	985.8	723	63.4	27.4	983.4
COAHUILA	730	68.2	0.0	783.4	760	59.7	0.0	808.3
COLIMA	772	82.8	0.0	841.7	803	63.1	0.0	857.1
CHIAPAS	752	104.3	40.9	1182.9	764	93.6	40.9	1187.6
CHIHUAHUA	763	75.5	0.0	825.3	772	66.3	0.0	826.8
D.F.	633	85.5	0.0	692.2	605	70.2	0.0	650.7
DURANGO	804	88.7	36.4	1203.4	876	73.3	36.4	1289.3
GUANAJUATO	781	111.4	14.5	1006.4	842	98.1	14.5	1069.0
GUERRERO	715	85.5	40.5	1098.5	791	60.2	40.5	1182.5
HIDALGO	741	101.2	30.7	1077.5	801	82.0	30.7	1140.4
JALISCO	729	84.6	0.0	796.4	794	68.6	0.0	852.5
MEXICO	788	134.6	16.0	1056.3	859	117.4	16.0	1129.0
MICHOACAN	756	75.0	28.3	1048.6	822	61.6	28.3	1123.9
MORELOS	735	74.1	27.5	1012.1	750	60.4	27.5	1017.7
NAYARIT	771	74.2	13.7	946.9	842	55.4	13.7	1013.5
NUEVO LEON	679	57.0	0.0	720.0	749	46.5	0.0	785.5
OAXACA	670	144.2	52.2	1191.6	735	125.3	52.2	1278.9
PUEBLA	721	131.0	27.9	1061.2	750	111.8	27.9	1080.0
QUERETARO	779	132.3	39.8	1255.1	875	105.0	39.8	1366.7
QUINTANAROO	903	75.0	46.0	1425.3	901	65.7	46.0	1408.0
SANL. POTOSI	782	92.2	30.0	1119.8	826	84.4	30.0	1172.8
SINALOA	772	60.9	21.6	999.6	834	48.0	21.6	1065.2
SONORA	761	72.8	0.0	820.8	741	65.7	0.0	793.1
TABASCO	834	76.4	30.1	1174.8	863	66.0	30.1	1202.0
TAMAULIPAS	706	56.3	1.0	755.6	747	54.4	1.0	797.9
TLAXCALA	805	116.3	4.0	947.4	834	96.6	4.0	960.1
VERACRUZ	702	82.1	38.6	1060.0	750	72.0	38.6	1120.1
YUCATAN	628	78.9	11.0	756.8	663	60.4	11.0	783.3
ZACATECAS	831	82.1	10.5	1000.4	962	71.3	10.5	1144.6

Source: CWR -- VIII and IX Censo General, _op. cit._
m_{1960} + u -- Robert E. Roberts, _op. cit._
m_{1970} + ACWR -- see text .

Stability of the significant coefficients of the equation over time would provide further confirmation of significance. It is still a great leap from cross-section results to time-series effects, however. I will try to look before leaping. Each of the independent variables in the regressions is discussed below, followed by a presentation of the results for 1960 and 1970, a comparison of the sets of coefficients, and a great leap forward.

Education

The level of education of a population has been shown to influence fertility in a variety of studies.[20] It is not clear, however, why this negative relationship exists: it is possible that education is a proxy for knowledge and efficiency in use of contraceptive techniques. It may also be true that education of women represents a proxy for human capital, providing an opportunity cost to bearing children.[21] Education may also influence parents' tastes for children, giving them the knowledge of and opportunities for alternate forms of satisfaction.[22] In the Mexican case, it is not unreasonable to assume that Mexicans with no education will be unaware of the possibility of limiting family size and/or unable to limit it very efficiently. Thus a variable measuring the percent of the population aged 15-29 with no education (E) has been entered in the regressions. The selection of the 15-29 age group is dictated by the statistical breakdowns

[20] Schultz, op. cit., p. 25, and Alden Speare, et. al., "Urbanization, Non-Familial Work, Education, and Fertility in Taiwan," Population Studies (July, 1973), pp. 323-334. Speare, et. al. find education to be the only variable with a significant effect on fertility. Enough studies have been published on LDC fertility so that any of the explanatory variables in this study have a documented influence on fertility somewhere in the world.

[21] This approach is exemplified by the work of Robert J. Willis, "A New Approach to the Economic Theory of Fertility," Journal of Political Economy, (March/April Sup. 1973) pp. S14-S64.

[22] Other possibilities are outlined by R. Michael, "Education and the Derived Demand for Children," JPE Sup., pp. S128-S164.

of educational attainment provided by the Censuses: ages 6-14, 15-29, and 30 or over. The 15-29 group is clearly the closest approximation of the fertile population.

Income

The relationship between income and fertility has been of great interest to economists in recent years.[23] Most of the theoretical and empirical work has centered on rational households in developed countries, and thus may not be directly applicable to Mexico.[24] One point that economists have been making and remaking since at least 1910,[24a] however, may be applicable: that is, families with high incomes substitute "quality" for quantity of children. These families invest resources in their children intensively rather than extensively, with a negative effect on fertility. This phenomenon could also exist in an environment in which children are considered investment goods.[25] Findings on the income-fertility relation in LDC's vary greatly. Schultz' results are quite mixed.[26] A cross-national fertility study by I. Ekanem[27] found per capita income to be relatively

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[23]For examples see the Supplement of the Journal of Political Economy, op. cit.

[24]A recent addition to the literature on income and fertility which does contain discussion of LDC's is J. Simon, The Effects of Income on Fertility, Monograph 19, Carolina Population Center, Chapel Hill, 1974.

[24a]L. Brentano, "The Doctrine of Malthus and the Increase of Population in the Last Decades," Economic Journal (September, 1910), pp. 384-390, as quoted by Coontz, Population Theories and the Economic Explanation (London, 1961), pp. 67-69.

[25]Psychic benefits and costs of children are in general overlooked by economists because they are not quantifiable, not because they are unimportant. A first attempt to deal with this problem has been made by R.J. Blandy, "The Welfare Analysis of Fertility Reduction," Economic Journal (March, 1974), pp. 109-129.

[26]Op. cit., p. 48-49.

[27]"A Further Note on the Relation Between Economic Development and Fertility," Demography (August, 1972) pp. 383-398.

insignificant as an independent variable. Yet B. Janowitz has shown that Ekanem's data show a significant negative effect of per capita income on fertility over time.[28,28a] Per capita measures of income are not available for the states of Mexico: the only state income information is the income distribution of those reporting income, on a monthly basis. Somewhat arbitrarily the top three classes of income earners (income over 1500 pesos/month) have been grouped together as the high **income** portion of the state most likely to substitute "quality" for quantity in fertility decisions. Thus a variable measuring the percent of the population of each state earning over 1500 pesos per month (Y) is included in the regressions. Although means or medians of the distributions may be preferable, they are not available. The right tail of the income distribution is probably correlated fairly closely with them, especially the mean.

Occupation

Sociologists have long been concerned with occupational mobility and status and its effects on fertility.[29] Supposedly, higher status occupations influence parents to invest in their children more intensively, and the attempt to achieve higher status encourages the parents to limit the number of children. Recent and historical U.S. data show the classic inverse relation between occupational status and fertility.[30] Whether this status differential survives after controlling for education and income is another matter. There is some evidence for an independent effect in the U.S.

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[28] "Cross-Section Studies as Predictors of Trends in Birth Rates: A Note on Ekanem's Results", Demography (August, 1973), pp. 479-481.

[28a] David Heer has previously reported on findings showing a positive relation of per capita income to fertility. " "
Daedalus (Spring, 1968), pp. 447-461.

[29] A recent example is Monica Boyd, "Occupational Mobility and Fertility in Metropolitan Latin America," Demography (February, 1973), pp. 1-18 and Refs.

[30] C. Kiser, et. al., Trends and Variations in Fertility in the United States (Cambridge, 1968), Chapter 10.

in 1959
/ contained in a table in Simon, op. cit.[31] Controlling for color, marital status, residence, wife's age at marriage, husband's education, and husband's income, a mild inverse relation between status and fertility persists. A measure of the percentage of the population of each state engaged in white-collar occupations (W) has been included in the regressions to test the occupation-fertility hypothesis.

Industry

It is commonplace to note that farm families derive positive economic benefits from children in the form of farm labor at an early age. M. Rosensweig has developed a comprehensive theoretical model to explain farm fertility behavior in the United States.[32] Children (and the farm wife) can and do serve as substitutes for hired farm labor. This benefit disappears in a non-agricultural setting, and thus is no doubt partly responsible for the well-known urban-rural fertility differential. To measure this phenomenon, I have included in the regressions a variable measuring the percent of the economically active population engaged in farming (A).

Residence

Rural-urban fertility differentials have been observed for many years.[33] They are not unrelated to occupational-industrial differentials, but they

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[31] Table 9, pp. 44-45.

[32] "The Economic Determinants of Population Change in the Rural and Urban Sectors of the United States", Ph.D. dissertation, Columbia University, 1973.

[33] For example, Simon Kuznets, "Rural-Urban Differences in Fertility: An International Comparison," Proceedings of the American Philosophical Society, Vol. 118, No. 1, February 1974.

have additional elements: relative crowding, higher housing costs, and increased opportunities for female participation in the labor force exist in cities which should have a negative influence on fertility. Better communications and transportation might also make birth control knowledge and devices more easily available. In Kuznets' words, "the rationale for distinguishing urban population is that the implied density of residence--a large number of families in a relatively limited area--is associated with distinctive patterns of living of the population..."[34] I have measured the degree of urbanness (U) in Mexican states by the percent of the population living in places with 2500 or more inhabitants.

Female Labor Force Participation

There has always been a strong yet not well understood inverse relation between female labor force participation and fertility. This chicken-egg problem has not been solved as yet.[35] Either women curtail their fertility in order to join the labor force, or vice-versa, or a simultaneous decision on labor force participation and fertility is made. The wage a woman could earn in the labor force has, in developed countries at least, an inverse relationship to her fertility.[36] Wage information for women is not available to test this hypothesis in Mexico.

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[34] Kuznets, op. cit., p. 10.

[35] An example of the difficulties encountered in determining causality is O. Andrew Collver, "Women's Work Participation and Fertility in Metropolitan Areas," Demography, 5, 1, pp. 55-60. (1968)

[36] This was first documented by J. Mincer in "Market Prices, Opportunity Costs, and Income Effects", in Measurement in Economics (Stanford, 1963), pp. 75-79.

In any case, simply entering a labor force participation variable (LF) as I have done, may not be particularly enlightening.[37] The labor force participation of the 20-24 year old age group was chosen partly because it varied slightly more than any other 5 year age group, and partly because participation at these ages should have a marriage-retarding as well as a fertility-reducing effect.

Sex Ratio

The sex ratio has an important independent effect on fertility through its influence on age-at-marriage and marriage rates. A shortage of males, whether due to natural causes, or sex-specific migration, can have a negative influence on fertility. This effect on fertility is separate from the short-run migration effect on child-woman ratios which has been noted above. The two cannot of course be sorted out in a single measure of the sex ratio, but by using the ratio of males to females in the key 20-29 age groups(S), when most men and women marry, the short-run migration effect would be minimized. This sex-ratio variable was used by Heer and Turner to explain cross sectional differentials in Latin American fertility in 1960.[38]

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[37]Services and agriculture are employments which probably conflict only slightly with childbearing and rearing. A better measure of participation would eliminate these activities. The 1960 Census unfortunately does not have the necessary information to make this adjustment. In order to keep the regressions comparable, I have not made the correction for the 1970 data.

[38]"Areal Differences in Latin American Fertility", Population Studies (March, 1965), pp. 279-292.

They found it to be have a significant positive effect on fertility, and considered it to be a result of the sex ratio's influence on nuptiality.

All of the variables discussed above have secular trends in Mexico identified with declining fertility in the theory of the demographic transition. It has been shown that fertility in Mexico as yet has not declined in response to these changes. We are now prepared to determine whether these explanatory variables can explain the fertility differentials which existed in Mexico in 1960 and 1970. While on the surface it appears that each of the independent variables varies in the expected direction with fertility, it may be that their independent effects, holding all others constant, may reveal a different pattern, which also may be changing over time. The state values of all the independent variables are recorded in Appendix tables A2 (1960) and A3 (1970).

The following linear additive model was tested:

$$(2) \quad ACWR_j = \beta_0 + \overset{+}{\beta_E} E_j + \overset{-}{\beta_Y} Y_j + \overset{-}{\beta_W} W_j + \overset{+}{\beta_A} A_j + \overset{-}{\beta_U} U_j + \overset{-}{\beta_{LF}} LF_j + \overset{+}{\beta_S} S_j + \varepsilon$$

where: $ACWR_j$=Adjusted child-woman ratio for state j in 1970 (or 1960)

E_j=% of population 15-29 with no education

Y_j=% of population reporting income with income over 1500p per month

W_j=% of economically active population in white-collar occupations

A_j=% of economically active population in agriculture

U_j=% of population in places of more than 2500 inhabitants

LF_j=labor force participation rate of 20-24 year old females

S_j=ratio of males to females aged 20-29

ε=error term

and the signs above the coefficients indicate expected effects.

Employing all the independent variables in an ordinary least-squares regression (OLS) gives the following results:

<u>1970</u>

ACWR = 435.9 + 5.88 E + 2.25 Y - 12.62 W - 2.38 A - 5.63 U + 0.33 LF + 1.06 S

(t) (0.55)(1.81) (0.38) (0.72) (0.53) (2.32) (0.03) (1.67)

R^2 = .733 F(7,24) = 9.39

<u>1960</u>

ACWR = 209.4 + 5.09 E + 6.98Y + 3.45 W - 3.04 A - 5.23 U - 6.24 LF + 1.21 S

(t) (0.26) (2.15) (0.78) (0.20) (0.52) (1.70) (0.80) (1.95)

R^2 = .722 F(7,24) = 8.89

Although the collection of independent variables appears to explain a large portion of the variation in adjusted child-woman ratios both in 1960 and 1970, only three variables have coefficients exceeding their standard errors: the urbanization variable, the education variable, and the sex ratio. Several other variables have the wrong sign, even though they are insignificant: agriculture and income (1960 and 1970), labor force participation (1970), and occupation (1960). Part of the estimation problem is that many of the independent variables are highly correlated with each other. In fact, 92% (1970) of the variation in labor force participation can be explained by the other independent variables, 91% (1970) for agriculture, and 95% (1970) for occupation. This is less true for the income variable, which is discussed below.

The overall relationship is fairly stable between 1960 and 1970 for the significant variables, with the coefficient of the sex ratio shrinking a little, and that for education and urbanization rising a little. Part of these changes are due to the fact that the dependent variable in 1970 has been inflated by the 1960 underenumeration estimates; the backward states made some progress in reducing underenumeration in 1970 which is not accounted for. Thus the effects of education and urbanization, which are correlated with underenumeration estimates, are enlarged.

Excluding from the regressions all the insignificant variables, and thus suppressing multicollinearity,[38a] gives the following result:

<u>1970</u>

$$ACWR = 280.0 + 6.32\ E - 6.09\ U + 0.98\ S$$
$$(t) \quad (0.46)(2.25) \quad (4.00) \quad (1.72)$$
$$R^2 = .722 \quad F(3,28) = 24.3$$

<u>1960</u>

$$ACWR = -124.5 + 4.74\ E - 4.45\ U + 1.25\ S$$
$$(t) \quad (0.21)(2.15) \quad (2.52) \quad (2.33)$$
$$R^2 = .707 \quad F(3,28) = 22.6$$

These results, with the larger t-ratios for the variables, suggest that 71-73% of the variation in fertility in Mexico in 1960 and 1970 can be accounted for by variations in the percent of the population with no education, percent living in urban areas, and the sex ratio. The sex ratio is not really a policy variable, and yet it is the only one of the three with a large elasticity, that is, in 1970, a 1% change in the sex ratio is associated with a 1.5% change in fertility, while 1% changes in the other two

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[38a] $\bar{R}^2$ is actually a little higher in these regressions with only 3 independent variables. But regressions with education and urbanization omitted still show large R^2, suggesting that multicollinearity is the problem, and not simply that the other variables provide no explanatory power.

variables are associated with .25% changes in the dependent variable.[39] Again, the relationship is fairly stable between 1960 and 1970; part of the increase in magnitude of the coefficients is due to the relative underenumeration effect noted above.

The other variables no doubt suffer from a variety of difficulties: in addition to the multicollinearity problem, LF may not be measured properly, as noted above. If labor force participation is an intermediate variable, including in the regression those variables such as education and income, which influence LFP, and through LFP, fertility, may insure that its coefficient will be insignificant. The states with the highest percent of labor force in agriculture have large numbers of Mexican Indians, some of whom do not even speak Spanish. To the extent that Indians are more likely to be underenumerated, part of the negative A sign may be explained.[40] But income (Y) is not as highly collinear as the other variables, and may perhaps indicate that the higher income families, ceteris paribus, do not have smaller numbers of children. Perhaps Mexican families do not have any incentive to substitute quality for quantity, and thus over time, rising incomes do not have a negative impact on fertility.

It may be true that the regressions reported above are inefficient due to the presence of heteroscedastic errors. Indeed, those states whose fertility observations are farthest from the regression plane all have relatively small populations.[41] If the nature of the heteroscedasticity is known,

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[39] These 1970 elasticities represent the coefficients of a weighted log-linear regression. The relative magnitudes of the elasticities suggest that age- and sex-specific migration patterns have a crucial bearing on differential fertility. The 1960 elasticities were .52 for the sex ratio, .28 for urbanization, and .09 for education, suggesting that education and the sex ratio were more important in 1970 than 1960.

[40] Heer and Turner, op. cit., p. 286, get the same unusual result.

[41] More sophisticated tests for heteroscedasticity seem no more powerful. See Kmenta, Elements of Econometrics (New York, 1971), Chapter 8.

there are simple weighting procedures to correct for it.[42] The correct weights to be applied in this case are the square roots of the populations of the states.[43] This procedure of course gives the greatest weight to the Federal District, but on a scale with the weight of the least populous state = 1, the weights of the largest states in 1970 in descending order are: 8.8, 6.6, 6.6, 6.1, 5.3, 5.1, 5.1, ..., indicating that the weighting adjustment is not that one-sided toward the Federal District.

In combination with the weights, a loglinear form[43a] of equation (2) was also estimated; the results of the weighted loglinear model are as follows:[44]

<u>1970</u>

$$ACWR = e^{-3.90}E^{0.12}Y^{0.18}W^{-0.58}A^{-0.03}U^{-0.12}LF^{0.11}S^{1.71}$$

(t) (0.99)(1.53)(1.62)(1.70)(.070)(1.19)(0.60)(2.89)

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[42] See Johnston, <u>Econometric Methods</u> (New York, 1963), pp. 207-211.

[43] For each family within each state, the micro relation estimated is an average: $\frac{F_j}{N_j} = a+b\frac{X_j}{N_j} + w_j$, where $\frac{F_j}{N_j}$ is the fertility of the jth household, and $\frac{X_j}{N_j}$ are the averages of the independent variables. The w_j have variance σ_w^2. The variance of the errors in the state equation is then $\sigma_u^2 = \frac{N_j}{N_j^2}\sigma_w^2 = \frac{1}{N_j}\sigma_w^2$. Strictly speaking, the N_j's within a household are not equal. The most balanced weighting scheme is N_j = total population.

[43a] Regressions were run for both linear additive and loglinear forms. The loglinear seemed to give a better overall fit. Both weighted and unweighted regressions were run for both functional forms and the weighted versions were superior in both cases.This suggests that the "best" of the linear forms is the weighted loglinear. Without a formal model, I have no theoretical justification for preferring one form over another.

[44] The R^2 statistic and F-test are biased upward by the weighting process and therefore not reported. The "true" R^2 lies somewhere between .759 and 1.0 (1960).

1960

$$ACWR = e^{1.21}E^{0.14}Y^{0.19}W^{-0.28}A^{-0.05}U^{-0.14}LF^{-0.02}S^{0.91}$$

(t) (0.32)(2.47)(3.26)(3.49)(1.56)(1.96)(0.32)(1.64)

The major changes are in the significance of the occupation (negative) and income (positive) signs in the equation. The argument for a positive income effect on fertility is strengthened, and the sociological arguments for the negative effect of white-collar occupations on fertility also appears to be confirmed. The sign on agriculture is persistently negative, although its absolute size and significance both are much smaller in 1970. Interpretations of the other coefficients are unchanged. The equation appears remarkably stable over time for the significant coefficients; the major changes are the increased absolute sizes of the occupation and sex ratio variables, which have offsetting effects on fertility.

The model tested above on state data is difficult to apply to municipio data.[45] It is impossible to correct child woman ratios for either infant mortality or underenumeration at the municipio level. The municipios of the state of Nuevo Leon were selected for study since the state itself requires no underenumeration adjustment and its 1970 infant mortality rate was 46.5, the lowest in Mexico. While distortions in municipio CWR's are thus perhaps less than for other states, they still could be significant. Also, the variance in the population size of municipios is enormous, and the weighting scheme devised above would give a highly skewed set of weights, with Monterrey having about 45 times the weight of the smallest municipio, and more than double that of the second largest municipio. To deal with heteroscedosticity in the face of this problem,

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[45] Each state has between 4 and 222 municipios which are analogous to county divisions.

a non-weighted version of the model was estimated after municipios with a total population of less than 5,000, and Monterrey, were eliminated. The loglinear model again gave slightly better results, and regression for the three key variables for 1970[46] is reported below:

$$CWR = e^{2.124} E^{0.14} U^{0.03} S^{0.63}$$

$$(t)(1.53)(2.87)(1.81)(3.16)$$

The equation is quite similar to those estimated in the state regressions. It is difficult to know, however, how the use of unadjusted CWR's influences the results: an equation with the other explanatory variables included gives income and agriculture negative significant coefficients.

What have we learned from these cross-sectional investigations? The two most important findings are the positive sign of the income coefficient, which may partly explain the failure of the Mexican birth rate to decline, income increases offsetting declines induced by increasing urbanization (U) and declining numbers of the uneducated (E). Also revealing is the explanatory strength of the sex ratio (S). This is a disturbing finding, inasmuch as it cannot be expected to vary much over time, responding in a cross-section mainly to migration patterns. It does suggest, however, that another key to the cross-sectional differentials which do exist is contained in age-sex-specific migration patterns. The sex ratio for all of Mexico did increase a little between 1960 and 1970, from about 912 to about 923, reflecting differential mortality declines among the young according to sex. The sex ratio at birth in 1969 was 1060,[47] so it is almost certain that the rising trend in the (20-29) sex ratio will continue. Considering the large

[46]The equation was not estimated for 1960.

[47]Anuario Estadistico, op.cit., p. 65.

elasticity of this variable, it is evident that its secular rise has had a positive effect on Mexican fertility. Its effect over the next decade should not be underestimated. The sex ratio in 1970 of the 10-19 year old population was 1013.[48] Using the 1959-1961 life table mortality estimates,[49] the ratio will only shrink to about 1007 for the 20-29 year olds in 1980. Applying the 1970 cross-section elasticity estimate for the sex ratio (1.71) suggests a ceteris paribus 15% rise in fertility.

A forward extrapolation of the 1970 results gives a rather gloomy picture. This is directly traceable to the fact that fertility in Mexico City, which is 96.7% urban, with 33% of the economically active population in white collar occupations, and only 7.4% with no schooling, is about 33 births per thousand population, extrapolating from the adjusted fertility ratio of 651. The small reduction in fertility that might have been generated by increasing urbanization and educational attainment 1960-1970 appears to have been offset by the positive effects of rising income and the sex ratio.

The results and implications of this study can be summarized briefly. First, it is clear from the data on child-woman ratios and children-ever-born statistics, for Mexico and each state, that the constant crude birth rate is not masking age-or region-specific declines in fertility. This

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[48] Ibid, p. 33.

[49] Raul Benitez Zenteno and Gustavo Cabrera Acevedo, Tablas Abreviadas de Mortalidad de la Poblacion de Mexico (Mexico, 1967), pp. 59-60. Illegal and legal emigration to the United States would of course lower the sex ratio, making the estimated fertility effect an upper bound. It is quite difficult to predict or measure these emigration flows. Benitez and Cabrera, Proyecciones..., op. cit. actually claim that emigration is not responsible for the otherwise inexplicably low sex ratio for the 20-29 year olds.

constancy is surprising in light of the theory of the demographic transition (DT): levels of education and income have risen, infant mortality has fallen, and there has been substantial rural-urban migration. Having posed what is essentially a time-series problem, cross section regressions are employed by necessity in an attempt to explain Mexico's paradoxical fertility behavior. Using measures of income, education, urbanization, occupational status, industrial composition, labor force participation, and the sex ratio, in a weighted log linear form, a large portion of the variation in state adjusted child-woman ratios is explained by the "demographic transition" variables. The only two which might possibly explain the trend in Mexican fertility are the income variable and the sex ratio, which have positive influences on Mexican fertility in 1960 and 1970. Demographic transition theory does not seem to fit the Mexican case well. Classic cross-sectional fertility differentials exist in Mexico and yet the trend of Mexican fertility is constant. The most advanced state in Mexico has a birth rate of 33 per thousand, suggesting that the demographic transition has not begun in Mexico, nor is it about to begin.

Table A1

RECENT AGE-SPECIFIC FERTILITY IN MEXICO

A. DISTRITO FEDERAL 1970

		% DIST. BY # OF CHILDREN (BORN ALIVE)							
AGE	# of Women	0	1	2	3	4	5	6+	CĒB
15-19	414,375	90.5	5.9	2.2	0.5	-	-	-	
20-24	359,959	55.8	15.6	13.1	8.4	4.1	1.6	1.4	
25-29	270,963	29.0	12.8	15.2	13.9	11.2	8.2	9.7	2.395
30-34	208,097	17.4	8.7	11.4	12.8	12.4	10.9	26.4	
35-39	197,430	13.6	7.4	9.1	10.3	10.9	10.2	38.5	

DISTRITO FEDERAL 1960

		% DIST. BY # OF CHILDREN (BORN ALIVE)							
AGE	# of Women	0	1	2	3	4	5	6+	CĒB
15-19	261,054	91.3	5.4	2.2	0.6	-	-	-	
20-24	240,054	57.4	13.4	13.1	8.9	4.4	1.7	1.1	
25-29	207,322	35.3	9.9	13.1	13.4	11.4	8.1	8.8	2.226
30-34	171,832	26.6	7.5	10.1	11.5	11.1	10.1	23.1	
35-39	153,073	24.6	7.4	8.8	9.7	9.6	8.7	31.2	

CWR = 605 1970
= 633 1960

Source: 1960 and 1970 Census of Population

Table A1(cont'd)

B. BAJA CALIFORNIA 1970

AGE	# of Women	% DIST. BY # OF CHILDREN (BORN ALIVE) 0	1	2	3	4	5	6 +	$\overline{CEB}$
15-19	48,860	88.4	6.3	2.7	0.8	-	-	-	
20-24	39,367	49.7	14.5	14.1	9.9	5.8	2.8	3.1	
25-29	30,404	23.2	9.3	13.1	14.1	12.9	10.4	17.0	3.090
30-34	24,680	13.4	5.7	8.1	10.3	11.4	11.8	39.3	
35-39	22,497	10.7	5.0	6.0	7.3	8.9	9.9	52.1	

BAJA CALIFORNIA 1960

AGE	# of Women	% DIST. BY # OF CHILDREN (BORN ALIVE) 0	1	2	3	4	5	6 +	$\overline{CEB}$
15-19	24,746	88.5	6.5	3.1	1.0	-	-	-	
20-24	18,644	46.6	13.9	14.5	12.1	7.0	3.4	2.5	
25-29	19,595	28.4	8.0	11.4	13.5	13.5	10.8	14.4	2.791
30-34	17,184	23.2	6.4	7.8	9.7	10.7	10.8	31.5	
35-39	14,592	23.1	6.5	6.7	7.7	8.6	8.5	38.8	

CWR = 736 in 1970
= 824 in 1960

Table A1(cont'd)

C. MORELOS 1970

AGE	# of Women	% DIST. BY # OF CHILDREN (BORN ALIVE) 0	1	2	3	4	5	6+	CEB
15-19	31,641	83.9	10.0	3.9	1.0	-	-	-	
20-24	25,325	41.7	16.3	17.2	13.0	6.7	2.8	2.3	
25-29	20,875	19.7	9.2	12.7	15.4	15.4	12.4	15.2	3.124
30-34	17,243	13.3	5.9	7.9	10.3	12.2	13.8	36.6	
35-39	17,914	11.0	5.0	5.9	7.8	8.9	10.3	51.1	

MORELOS 1960

AGE	# of Women	% DIST. BY # OF CHILDREN (BORN ALIVE) 0	1	2	3	4	5	6+	CEB
15-19	19,044	85.3	9.0	3.7	1.1	-	-	-	
20-24	16,493	45.1	14.8	17.1	12.3	6.6	2.4	1.7	
25-29	15,168	29.7	7.9	11.8	14.8	14.0	10.9	10.9	2.596
30-34	12,032	23.4	5.2	8.2	9.5	11.4	11.8	30.5	
35-39	10,517	22.9	5.1	6.6	7.4	8.5	9.3	40.2	

CWR = 750 1970
= 735 1960

TABLE A2: VALUES OF INDEPENDENT VARIABLES, 1960

STATE	E	Y	W	A	U	LF	S
A. CALIEN.	20.1	5.2	9.4	49.2	59.8	17.2	872.0
B. CALIF.	9.4	22.0	16.5	39.4	78.0	25.4	983.0
B. CAL(TER)	15.4	8.9	11.1	56.3	36.1	24.1	1009.0
CAMPECHE	29.2	4.2	9.5	54.6	63.3	15.0	890.0
COAHUILA	14.5	7.1	12.0	44.8	66.7	20.2	924.0
COLIMA	22.8	6.0	10.4	53.9	61.8	22.1	932.0
CHIAPAS	54.5	3.6	4.3	79.7	24.4	11.2	898.0
CHIHUAHUA	18.6	10.1	12.2	50.0	57.3	20.8	948.0
D.F.	13.3	15.2	27.0	2.7	95.8	41.2	862.0
DURANGO	17.5	6.4	4.1	70.3	35.5	14.9	975.0
GUANAJUATO	46.2	4.1	5.6	64.5	46.5	14.0	926.0
GUERRERO	63.8	3.4	4.1	81.4	25.8	12.2	900.0
HIDALGO	48.1	2.9	4.9	71.1	22.4	14.4	946.0
JALISCO	30.5	5.9	9.6	51.9	58.6	17.6	893.0
MEXICO	38.3	4.4	5.8	61.4	38.7	16.8	948.0
MICHOACAN	47.0	3.7	4.4	74.0	40.6	10.6	898.0
MORELOS	32.3	5.1	8.7	60.5	53.1	21.7	918.0
NAYARIT	28.1	4.2	6.4	70.9	42.8	17.9	946.0
NUEVO LEON	14.9	10.1	15.6	32.2	70.4	27.0	954.0
OAXACA	54.6	3.4	3.5	81.8	24.5	10.6	909.0
PUEBLA	43.4	4.7	6.2	67.1	39.2	14.9	896.0
QUERETARO	55.4	4.5	5.6	69.8	28.0	12.4	925.0
QUINTANAROO	30.4	6.7	9.0	69.2	31.4	14.1	1077.0
SANL. POTOSI	43.6	4.8	6.4	68.8	33.7	12.1	931.0
SINALOA	30.2	8.3	9.1	64.6	38.1	15.8	963.0
SONORA	18.2	10.9	13.1	53.5	57.6	20.3	948.0
TABASCO	31.7	5.6	7.0	70.9	26.7	9.8	906.0
TAMAULIPAS	17.5	10.1	12.0	50.1	59.8	18.5	894.0
TLAXCALA	32.3	2.6	5.3	68.4	43.8	14.6	931.0
VERACRUZ	41.7	7.1	7.0	64.5	39.5	13.0	914.0
YUCATAN	29.5	3.9	9.8	59.0	59.8	11.9	922.0
ZACATECAS	30.9	3.5	4.0	80.2	27.1	9.2	921.0

Source: Derived from VIII Censo General, op. cit.

TABLE A3: VALUES OF INDEPENDENT VARIABLES, 1970

STATE	E	Y	W	A	U	LF	S
A. CALIEN.	12.1	8.3	14.0	36.9	64.5	24.5	908.0
B. CALIF.	12.7	38.1	21.1	22.2	85.6	29.7	870.0
B. CAL(TER)	13.5	22.0	18.1	34.5	45.3	24.7	1005.0
CAMPECHE	21.1	7.7	12.9	45.8	63.9	19.2	937.0
COAHUILA	11.7	14.9	17.1	29.6	52.6	22.3	949.0
COLIMA	17.6	9.1	13.6	43.8	69.3	25.0	954.0
CHIAPAS	43.1	4.2	6.5	72.8	27.7	11.8	901.0
CHIHUAHUA	12.8	15.3	15.6	36.4	65.4	23.4	930.0
D.F.	7.4	29.3	33.0	2.2	96.7	44.2	926.0
DURANGO	14.2	7.7	11.1	55.0	41.4	16.6	958.0
GUANAJUATO	35.8	7.5	9.5	49.0	52.1	16.8	936.0
GUERRERO	44.7	6.2	8.0	62.2	35.6	15.3	873.0
HIDALGO	36.6	5.8	7.7	61.2	21.2	14.8	936.0
JALISCO	17.8	12.0	14.8	34.1	68.5	26.5	922.0
MEXICO	22.9	13.8	14.1	30.3	62.1	22.3	950.0
MICHOACAN	33.9	5.9	8.1	59.0	46.2	14.0	904.0
MORELOS	23.1	8.8	13.2	43.0	70.0	23.6	929.0
NAYARIT	19.2	7.5	9.7	59.4	50.0	19.4	984.0
NUEVO LEON	8.1	20.3	22.0	17.3	76.5	35.0	969.0
OAXACA	40.4	3.2	5.9	71.6	28.3	14.2	877.0
PUEBLA	28.7	6.6	9.1	56.0	46.6	17.9	914.0
QUERETARO	36.0	7.8	10.4	48.0	32.7	18.6	946.0
QUINTANAROO	21.7	11.5	11.5	53.4	36.4	14.4	1053.0
SANL. POTOSI	27.1	6.7	9.5	53.3	39.0	17.6	934.0
SINALOA	19.7	8.9	13.3	51.3	43.2	24.2	994.0
SONORA	12.9	19.8	18.4	38.5	65.9	25.6	927.0
TABASCO	21.7	9.2	9.4	59.1	33.5	14.0	927.0
TAMAULIPAS	13.9	18.9	17.0	33.1	69.0	24.4	879.0
TLAXCALA	17.2	4.3	7.5	54.5	47.3	14.1	944.0
VERACRUZ	28.7	11.1	10.6	53.1	47.1	16.0	930.0
YUCATAN	26.9	5.8	10.9	55.1	63.9	15.3	917.0
ZACATECAS	18.2	5.1	7.9	64.1	24.9	13.2	907.0

Source: Derived from IX Censo General, op. cit.