SOCIOECONOMIC INEQUALITY IN THE U.S.-MEXICO BORDERLANDS: MODERNIZATION AND BUFFERING

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ABSTRACT

This paper analyzes differences in socioeconomic inequality -in particular, marginality- between the Mexican and U.S. borderlands. The analysis is based on a theoretical model of binational border inequality. Marginality indicators, based on the COPLAMAR studies, reflect lack of benefits from national growth, socioeconomic development, and wealth for much of Mexico. Analysis of variance reveals differences for marginality indicators between border regions, non-border regions, and the Mexico City metropolitan zone. Results show that marginality varies greatly within Mexico, varies slightly within the United States, and varies most substantially between Mexican and U.S. regions. The results confirm the postulated role of the Mexican borderlands as a buffer region in inequality levels between the two nations.

RESUMEN

Este documento analiza diferentes desigualdades socioeconómicas -la marginalidad en particular- entre las fronteras de México y Estados Unidos. El análisis está basado en un modelo teórico de desigualdad fronteriza binacional. Los indicadores de marginalidad, basados en estudios de COPLAMAR, reflejan los escasos beneficios debido a la falta de crecimiento nacional, desarrollo socioeconómico y riqueza para la mayor parte de los mexicanos. Los análisis de variaciones revelan diferencias en los indicadores de marginalidad entre regiones fronterizas, no fronterizas y la zona metropolitana en la Ciudad de México. Los resultados muestran que la marginalidad varía, en gran forma dentro de México, ligeramente dentro de Estados Unidos. Los resultados confirman a las regiones fronteras de México como zonas de conflicto en niveles de desigualdad entre las dos naciones.

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The U.S.-Mexico Borderlands

This study is an investigation into levels of socioeconomic inequality in the U.S.-Mexico borderlands. It examines inequality in its lower range, i.e., focusing on dimensions of marginality. Marginality indicators reflect lack of benefits from national growth, socioeconomic development, and wealth for much of Mexico. The present paper has the objectives of formulating a preliminary theoretical model of inequality for binational border regions; measuring inequality for aggregated areas, in regions as a whole and states; comparing levels of inequality in the U.S. and Mexican borderlands with each other and to the non-border parts of each nation; and discussing the inequality findings in terms of Type 3 of the theoretical model. The U.S.-Mexico borderlands is defined as consisting of the six Mexican border states (Baja California, Sonora, Chihuahua, Coahuila, Nuevo León, Tamaulipas) and the four U.S. border states (California, Arizona, New Mexico, Texas) plus the state of Colorado. Colorado is included because of its high percentage of Spanish-origin population.[1]

The concept of border employed is that of a "wide band" of states. Many other studies have adopted this concept of border (e.g., Beegle *et al.,* I960;
Smith *et al.*, 1983; Williams *et al.,* 1983; West and James, 1983; Bath, 1983;
Stoddard, 1983; *Pick et al.,* 1986; Martínez, 1988; Salas-Porras, 1989). An alternative "narrow" concept of the "border strip" of border-adjacent counties and *municipios* has sometimes been utilized in U.S.-Mexican border studies (e.g., Dillman, 1983; Brook, 1986; Peach, 1984, 1985). Basically, the choice of "wide," "narrow," or other border concept depends on the purposes of the observer or research investigator. The "wide" concept is chosen for the following reasons: (1) some of the study's COPLAMAR-based variables are unavailable at the county and *municipio* level; (2) if a "narrow" border concept is adopted, statistical comparisons for the entire nations would be difficult computationally, since in 1980 there were 2,331 Mexican *municipios* and over 3,100 U.S. counties. Also, Mexican *municipios* nationally have a highly skewed and irregular geographic size distribution; and (3) the "wide" border concept is more appropriate to the present theory than the concept of a "narrow" border strip. As will be seen, this is because the theory focuses on broad economic and social interactions of border areas, which, for the United States and Mexico, extend beyond the "border strip" of counties and *municipios.* For instance, the broad phenomena of manufacturing base, public income, health care, and modernization are more appropriately measured, in the present context, for border states than "border strip."

The total population of the U.S.-Mexican borderlands in 1980 was 55.5 million persons, of whom 10.7 million were in Mexico and 44.8 million in the United States. This large, populous region is subject to many binational social, economic, political, and environmental interactions (Stoddard,

1978,1987,1988; Stoddard *et al.,* 1983; Martínez *et al.,* 1988; Salas-Porras, 1989; Tamayo and Fernández, 1983), as well as interactions between each nation's border region and the remainder of the nation. For instance, the Mexican border region serves Mexico as both a beef supplier and a commercial area. This is substantiated by the Mexican borderlands accounting for about a quarter of Mexico's beef production, while only containing a sixth of the nation's population. Furthermore, in 1980 it had a high percentage of commerce labor force (11.2 percent), *versus* the national level of 8.5 percent (Pick *et al.,* 1989). On the other hand, it depends on the non-border areas of Mexico for oil and maize. Likewise, the U.S. border region has major social and economic interactions with the rest of the United States. For instance, it was a major destination region for U.S. internal migration in the 1970s, gaining an estimated *4.6* million net migrants during the decade (Bogue, 1985).

The present study examines inequality in the binational borderlands in order to better understand comparative marginality, both cross-nationally and within each nation. Although some characteristics -such as employment (Brook, 1986) and income (Peach, 1985)- have been examined for the binational borderlands and poverty was studied for 1970 (Stoddard, 1978), no recent, systematic study of this region focuses only on inequality dimensions. The study findings are examined *vis-á-vis* a model of marginality at national borders.

U.S.-Mexico Border Comparisons

This section reviews several prior research efforts that analyzed socioeconomic indicators for the U.S. and Mexico border regions, especially those emphasizing marginality. Marginality indicators reflect lack of benefits from national growth, socioeconomic development, and wealth. One of the most thorough comparisons of the binational borderlands examined demographic and socioeconomic characteristics at the state and *municipio* (county) levels, based on the 1950 population censuses in both countries (Beegle et al., I960). Versus its Mexican counterpart, the U.S. borderlands had a younger age structure, lower fertility, substantially higher education, and lower average demographic growth, 1940 to 1950. However, for many other characteristics, including rural-urban residence, marital status, labor force, place of birth, and nutrition, only the Mexican borderlands were analyzed at both the state and *municipio* levels. Among the dimensions analyzed were several measures of marginality, including percents of living quarters without water, persons going barefoot, and persons not eating wheat bread. These showed considerable variation. For example, the percent that do not eat wheat bread varied from 6.9 percent for Baja California to 13.8 percent in Sonora and over 25 percent in the other four states. Likewise, the percent going barefoot varied from 0.5 percent in Baja California to over 4 percent in Chihuahua and Nuevo León.

Municipio maps were presented for selected characteristics (no easy task in the 1950s!). The distribution for nutritional and footwear characteristics indicated the most severely marginal areas in the Mexican borderlands were located in southern Chihuahua and eastern and southeastern Tamaulipas. On the U.S. side, the study emphasized the geographical distribution of Spanish-surname population by state and county.

Stoddard (1978) examined poverty in the Mexican-U.S. borderlands. Based on 1970 data, he analyzed poverty for border counties and states, concluding that close to the border there were higher poverty levels than for the rest of Mexico and that selected counties had severe poverty, especially ones with large Latino populations. On the other hand, the Mexican northern states had less poverty than the rest of the country, which Stoddard ascribed to economic development of the northern border, including concentration of *maquiladora* industry. He also offered policy recommendations to alleviate the borderlands poverty situation, stressing the importance of binational policies.

Analysis of socioeconomic dimensions at the *municipio* level was extended to 1980 data (Peach, 1984, 1985; Brook, 1986; Pick *et al.*, 1986). A study of nine socioeconomic variables -including demographics, education, and economics- analyzed geographic patterns for the 272 *municipios* in the Mexican borderlands in 1980 (Pick *et al.*, 1986). Several variables relating to marginality were examined, including literacy, primary education, and unemployment. Illiteracy and unemployment reached their highest levels in areas of southern Chihuahua and southeastern and central Tamaulipas, patterns in concert with Beegle's Findings twenty years earlier.

Another study focused on comparisons of labor force participation for the binational borderlands, limited to the Mexican *municipios* and U.S. counties immediately adjacent to the border (Brook, 1986). In Brook's study, the Mexican census definition of economically active is matched as closely as possible to the U.S. census definition of labor force participation. The definitions are still slightly different, as Mexican economically active applies to the population 12 years and older, whereas U.S. labor force participation applies to the population 16 years and older. Labor force participation rates were compared between the two nations, and participation comparisons were done for each nation between 1970/1980, border/non-border, and male/female. The most rapid growth for Mexican labor force participation in 1970-80 occurred in border cities, followed by the nation as a whole and border states. Comparing the 1980 male and female labor force participation, male rates were slightly higher for the nation than for the border states and cities, while 1980 female participation was highest in the border cities, followed by border states and the nation. Although the study included thorough and careful comparisons, in the present context labor force participation is not considered a measure of marginality.

Some studies have examined other socioeconomic dimensions in the U.S.-Mexican borderlands, including demographic and economic change

in Mexico (Peach, 1984), income distribution in both countries (Peach, 1985), contraceptive use and maternal health care in both countries (Smith *et al.*, 1983), and fertility and infant/maternal health in Mexico (Núñez, 1987).

In the United States, major differences in measures of socioeconomic inequality were evident in 1980 for the Spanish-origin population, versus other population segments (Bean and Tienda, 1987). Within the Spanish-origin portion of the population, differences were apparent for Mexican versus Puerto Rican and other designations. The present research takes into account the Spanish/non-Spanish differences by examining data for both ethnic segments in the United States.

A *Theoretical Approach to Binational Inequality for National Border*

This section presents a conceptual model of levels of inequality in border and non-border parts of nations. The model emphasizes inequality in its lower range, i.e., marginality. The model takes into consideration the development status of nations on both sides of the border, remoteness of border regions, economic interaction and integration, and modernization.

Background

The theoretical nature of borders has been under-researched relative to the economic, cultural, and historic importance of national borders. Several ideas relevant to the proposed model are drawn from the literature on border theory. One crucial concept is that of *central place,* sometimes also termed "focus" or "center of gravity" (Kutsche, 1983). The central place is a geographic center of both culture and economic power. A nation may have one or more central places. Often the influence of a nation's central place(s) on the border is reduced, due to long distances and geographical barriers between the central place (s) and the border. This is commonly true for both sides of a national border, so border populations often face each other with reduced central influences-with the result that border populations tend to have many traits in common with each other (Kroeber, 1953). An examination of this theory for the borders of northern China indicated that in many ways the border zones showed greater similarity with each other than with central places, that there were many illegal exchanges at the border, and that the border allegiances to central places varied historically in unpredictable ways. In addition, Hudson (1977) characterizes border populations as innovative and points to unique geographic and historical circumstances.

A number of examples of configurations of central places and borders are discussed by Stoddard (1986). For instance, the Chinese-Russian border in Mongolia is turned into an impermeable barrier by remoteness, accentuated by the uninhabitable Gobi Desert. Obviously, there is greatly

reduced contact with central places, as well as lack of border interaction and exchange. Another example discussed is Nigeria's national borders, along which there are many local interactions, even though the bordering nations are adversarial. An important concept discussed by Stoddard (1986) and originated by Momoh (1985) is the hypothesized range of border interactions from "zero" to "maximal." This concept was originally applied to African tribes, but pertains to nations as well. Three types of border interactions are postulated: (1) *Zero borderlands,* in which two nations have major ethnic, religious, and political differences and are hostile. The border serves as a solid line of demarcation of totally separate populations;
(2) *Minimal borderlands,* with neither affinity nor differences in cultural and political features. There is some integration of economic activities, with a zone of interaction extending 1-3 miles inside each border: (3) *Maximal borderlands,* with substantial cooperation and greater economic integration between the two populations. There exists a much larger zone of interaction extending well inside the two borders.

Bustamante (1989) added to these ideas other theoretical concepts, with special focus on the U.S.-Mexican border. One is the concept of *internationalism* at national borders. Internationalism is characterized by an international atmosphere, which differs from the interior of the two bordering nations. Internationalism is proportional to the number of interactions of, individuals on the two sides. It is also conditioned by intensity of interactions and extension, i.e., the geographic scope of the interaction. Internationalism not only characterizes border regions, but sometimes also central places, large tourist centers, etc.

Another concept *is power asymmetry* (Bustamante, 1989; also Ojeda, 1982). This postulates that power relationships between two bordering nations can be asymmetrical, and that this affects many micro- and macro-dimensions of border interactions. An excess of power applied unilaterally by one side will either exclude the possibility of reaction by the other side or will result in a weak reaction. This concept is pertinent to the U.S.-Mexico border, where the U.S. side has demonstrated much greater power. By contrast, some other types of border power relationships include great strength on both sides, meeting of equal powers, and a human society confronting a non-human environment (Kutsche, 1983).

A Preliminary Model for Marginality at National Borders

The following conceptual model distinguishes four types of inequality, i.e., marginality, between nations and their border and non-border regions:

Type 1. *Bordering nations both advanced or both developing; minimal or maximal borderlands.* In this case, two advanced nations border each other or two developing nations border each other, with moderate to high levels of interaction and internationalism (see figure 1). There are several central places in each nation, far removed from the borders. Marginality

levels for border and non-border regions are similar. The two nations' marginality levels are roughly equivalent. However, this smooth transition would be altered if either border region became depressed economically.

Type 2. *Bordering nations both advanced or both developing; zero borderlands.* Here, the two bordering advanced nations or two bordering developing nations have very low interaction and internationalism. Central place locations are as in Type 1. As in Type 1, marginality levels for border and non-border regions, and between the two nations, are assumed to be roughly equivalent. The nations, however, have sharply reduced economic and cultural exchanges across the border.

Type 3. *Advanced nation bordering developing nation; minimal or maximal borderlands.* For this type, an advanced nation directly borders a developing one (see figure 1). The central places are removed from the border. In the developing nation, the central place is assumed to have a substantially better standard of living and lower marginality than the nation as a whole. In the advanced nation, the central place is assumed to be similar to national averages on marginality.

The marginality level in the border region of the advanced nation is postulated to correspond to the non-border region of the nation. The marginality level in the border region of the developing nation is postulated to be *intermediate* between the marginality level of the advanced nation and that of the non-border region of the developing nation (i.e., non-border, non-central-place region). The developing nation's border region serves as a buffer in economic modernization and standard of living. The reason for these marginality relationships is economic asymmetry. Specifically, in the developing nation's borderlands, there is probably substantial investment, economic development, and modernization, stimulating productivity levels that approach those of the advanced nation. The impetus of this investment and development may come from the advanced nation and usually from the developing one as well. The reasons for the economic development relate to the availability and low cost of labor, establishment of production bases in new markets, etc. (see discussion of world systems theory, Wallerstein, 1974). Educational and health service levels are also improved because of a better economy and adjacency to the advanced nation's health and educational institutions. Economic development, along with health and educational advance, serves to reduce marginality in the developing nation's borderlands. On the other hand, marginality levels in the borderlands of the advanced nation are roughly equivalent to the remainder of the nation, since the developing nation's border region does not substantially influence the advanced country's borderlands economy. Educational and health levels in the advanced nation's borderlands are not changed, since the border economy is unaltered.

Type 4. *Advanced nation bordering developing nation; zero borderlands.* In this case the marginality levels in each borderlands region is

postulated to reflect the marginality of each nation as a whole. Hence, the level of marginality changes sharply at the international border (but not between the borderlands and their remainders). The zero borderlands situation implies that the economic effects on the developing nation's border region discussed in Type 3 cannot take place. The very great marginality gap at the international border would appear to portend discontent and even hostility; however, the closed nature of the border and lack of internationalism and interactions preclude manifestation of these problems.

While the preliminary theoretical model postulates four types of marginality relationships between nations, the present paper does not attempt to statistically validate the full model. Rather, only Type 3 is tested for the U.S.-Mexico border.

The COPLAMAR Study

The research design of the present study regarding marginality indicators is largely based on the most ambitious study of socioeconomic inequality in Mexico. Conducted in the late 1970s, the COPLAMAR study, sponsored by the president of Mexico, was based on governmental data from the early 1970s, including the 1970 census of population (COPLAMAR, 1982). It detailed marginality based on nineteen dimensions for all of Mexico's *municipios.* Marginality was defined as characterizing those groups that remained at the margin of the benefits of national growth and prosperity, but not necessarily at the margin of generating this wealth nor the conditions that make it possible. The research showed that about half of Mexico's *municipios* did not achieve the national average of minimal well-being on measures of food, education, health, and housing, i.e., they were marginal. The study proposed that the maldistribution of income in Mexico was a major cause of such extensive marginality. It also pointed out that, although the federal government had salary and price controls, those measures were mainly directed toward the non-salaried urban population.

The study acknowledged that there was not a unique, universally accepted concept of marginality. Hence, the methodology was intended to heuristically select a set of marginality indicators applicable to the state and *municipio* levels. Next, principal components analysis was applied to extract major components from the indicators. A weighted sum of the principal components was utilized to calculate an index of marginality. Using the major component(s), regions were classified *vis-à-vis* marginality.

The nineteen marginality measures are shown in table 1. These range widely, from demographics to health, housing, and lifestyle. At a national level, results of the study allowed the classification of the regions of Mexico into grades of marginality, from very high to very low, depending on the index of marginality. The regions were classified as follows:

Marginality Level	Region
Low	Federal District
Low-Medium	Pacific North
	North
Medium	West
	Central
	Pacific Central
High	Southeast
	Gulf Central
	West Central
Very High	North Central
	East Central
	Pacific South

The Federal District had the lowest marginality in spite of its many urban and environmental problems and poor living conditions in certain areas (Schteingart, 1988). The reason is largely ascribable to the overall economic prosperity and productivity of the central metropolis, as indicated by numerous economic dimensions (see Pick *et al.*, 1989). Next lowest were the Pacific North and North regions, containing the borderlands as defined in the present paper. These regions are also prosperous according to a variety of economic indicators. The COPLAMAR study also identified smaller marginality "zones" and "nucleuses" at the *municipio* level within states. For high marginality, there were several zones in the borderlands, principally in southeastern Sonora, southwestern Chihuahua, and southwestern and central Tamaulipas.

The COPLAMAR study examined the overlap between zones/nucleuses of marginality and the geographic pattern of indigenous population and found a significant overlap of about 50 percent. In the borderlands, this overlap was especially apparent in the marginal zones of Sonora and Chihuahua.

Methods

The present study analyzes measures of inequality, based on the COPLAMAR framework. Indicators of inequality that are similar to many of the COPLAMAR variables are constructed for both nations. Data sources are the 1980 U.S. census, 1980 U.S. vital statistics, the 1980 Mexican census, and other U.S. and Mexican government sources (U.S. Bureau of the Census, 1982, 1983, 1986; NCHS, 1986; SPP, 1981, 1982-84; Rabell *et al.*, 1986). Indicator choice was constrained by a desire to approximate

COPLAMAR's variables while also achieving equivalent definitions between the U.S. and Mexican censuses and other data sources. Although the COPLAMAR studies were conducted in a developing nation, the COPLAMAR variables, with the possible exception of numbers 5 and 19, are considered applicable to a wide range of development, including advanced countries. Variable definitions used for Mexico and the United States are shown in tables 2 and 3, along with the data sources and correspondence to the COPLAMAR variables in table 1.

One-way analysis-of-variance techniques are applied for comparisons of means for border and non-border regions within Mexico, within the United States, and for the two nations combined (Iverson and Norpoth, 1976; Pedhazur, 1982). For Mexico, results are also presented for the Central Metropolitan Zone (the Federal District and the state of Mexico). The CMZ is included as a separate region due to its low level of marginality and its large population size. For comparing three or more means with multiple comparisons of all possible pairs of means, the Scheffe method was used (Scheffe, 1959; Pedhazur, 1982). For Mexico, the groups for ANOVA consisted of the six-state border region; the CMZ; and the Mexico "remainder," i.e., the twenty-four remaining states. For the United States, the groups consisted of the five border states and the remaining forty-five states and the District of Columbia.

Results within Mexico

Overall, the border region has substantially less marginality than Mexico as a whole on all indicators, with the exception of hospitals, for which the border has a smaller per capita value than the nation as a whole or the Federal District (see table 4). Except for hospitals and overcrowding, the ordering of the other variables from highest to lowest marginality is: 1) Mexico as a whole, 2) border region, 3) CMZ. For instance, the border has 5.7 percent of population with low income, *versus* 10.6 percent for the non-border states but only 4.6 percent for the Federal District. Likewise, the mean percent of illiteracy for the border region is 8.1, versus 20.4 percent for non-border states and 5.9 percent for the Federal District. Underconsumption of milk for the border is 8.9 percent, versus 20.1 percent for the non-border states and 6.8 percent for the Federal District.

Moderate border state variation is shown on most variables, as indicated by coefficients of variation at the state level. It is important to note that border marginality indicators were often lowest for Baja California and highest for Tamaulipas.

Based on the theory of binational marginality, the following hypotheses are submitted to ANOVA tests for *within Mexico.*

Hypothesis 1. For all variables, ANOVA tests will show both overall differences and pairwise differences. For all variables, the regional ordering

of marginality will be: Mexican remainder (highest), border (lower), and central place (lowest).

Hypothesis 2. For the differences in Hypothesis 1, the ordering of pairs of values being compared is that lower values correspond to lower marginality for all variables except hospitals, for which the values are ordered in the reverse direction.

The ANOVA results for overall statistical significance largely confirm Hypothesis 1. For nine out of thirteen variables, the results are significant overall. The explanations of lack of effect for four variables are as follows:

For under/unemployment, the CMZ has under/unemployment equivalent to the border. This difference stems in part from underemployment in the northeastern border states of Tamaulipas and Nuevo León that is 40 percent lower than in the CMZ. This situation is due in part to the economic prosperity of this area, especially the manufacturing center of Monterrey.

The lack of effect for crude mortality rate is ascribable to the inherent complexities and extrinsic factors in the relationship of mortality and marginality, leading to lack of difference between the border and CMZ in mortality rates. For example, the CMZ has substantially higher respiratory mortality but lower cardiovascular mortality than the border (Pick *et al.,* 1989). The respiratory difference may be mostly due to environmental (air pollution) differences, while the cardiovascular difference may be largely due to diet and lifestyle differences.

The lack of effect for infant mortality is due in part to missing data. Since, for infant mortality only, data were missing for the Federal District (Rabell *et al.,* 1986), the CMZ values used in the AN OVA were for the state of Mexico (Rabell *et al.,* 1986). However, it is likely that the Federal District value was considerably lower. For instance, the official (and overestimated) infant mortality rates for 1980 for the state of Mexico and Federal District were 37.01 and 66.26 (SPP, 1981). Based on the proportions in the official rates, the Federal District rate is estimated at *44.*11, implying a CMZ rate of 61.5 5, roughly equivalent to the border's. Further explanation must be sought to fully explain infant mortality's lack of results.

The lack of effect for hospitals may be due to several weaknesses in hospitals as a marginality measure. First, the number of hospitals and clinics does not reveal differences between states in the size and quality of these institutions. Second, the Mexican federal government has sometimes sponsored the building of many small clinics in impoverished states; in the 1970s, for instance, Mexican federal health programs built large numbers of small hospitals in some of the poorer states, especially in the south and southeast. Such programs would counter the expected direction of effect for this variable. Alternative measures, such as COPLAMAR's residents-per-physician, were not used because of lack of available and comparable data on both sides of the border.

The pairwise results for those characteristics with overall significance reveal significant results for about half of the possible pairs. In all cases, there is lack of significant pairwise difference between the CMZ and the border; in other words, for Mexico, the central place has somewhat greater marginality and resemblance to the border than expected theoretically. However, for a few variables, this may be an artifact of definitional weaknesses (i.e., crude mortality rate and hospitals per capita). Mexico City is known to be a city of extremes of wealth and poverty (Schteingart, 1988), and further investigation of marginality *within* the metropolitan area would enable better explanation of this divergence from theory.

Results within the United States

For the United States, the mean values for the border states approximate those of the non-border states for nearly all variables (see table 5). There are only a few exceptions: rural population, the non-border being more rural by about 84 percent; agricultural occupation, for which non-border states exceed border states by 46 percent; and crowding, with the border displaying much more crowding by household. On the other hand, the border has a substantially lower proportion of households with poor or no plumbing. Among the five border states, there is substantial variation, as measured by the coefficient of variation, although, on average, it is less than the variation for the Mexican border states.

Data for the Spanish-origin and Anglo segments of the population were analyzed separately. Spanish origin adheres to the U.S. census definition, in which census respondents are asked to identify themselves as either of Spanish or non-Spanish origin or descent (U.S. Bureau of the Census, 1983); Anglo population refers to all others. For each population segment, the extent of marginality approximates the level for the segment in the United States as a whole (see tables 6 and 7). For Spanish origin, the percent poverty is lower for the border region *versus* the nation, whereas the rural proportion and percent agricultural occupations are higher. On the other hand, the percent rural population for Anglos in the borderlands is substantially lower than for Anglos nationally, while crowding is higher than for the entire nation.

Comparing Spanish -origin *versus* Anglo results, the Spanish- origin population is substantially higher on all marginality indicators, except for higher Anglo percent on the rural and unemployment measures, for which the Anglo level is slightly lower (see tables 6 and 7). Spanish-origin/Anglo differences are very large for the variables of poverty, agricultural occupation, elementary education, and crowding. These ethnic differences in the border region also apply nationally between the two ethnic categories. These results correspond to ethnic differences noted for poverty in the U.S. borderlands in 1970 (Stoddard, 1978).

Based on the theory of binational marginality, the following hypothesis is submitted to ANOVA tests for *within the United States.*

Hypothesis 3. For all variables, the U.S. border and U.S. remainder are equivalent in value.

The ANOVA results largely confirm Hypothesis 3.[2] Only three out of twelve characteristics have significant effects, and the significant probability levels are less than 0.02 (see table 9). In the case of rural population for the United States, the remainder is about twice as rural on average as the border. The reason may be that much of the southwestern United States has an arid climate and topography adverse to rural development; hence, this difference is largely ascribable to variables extraneous to location on the border. The crude mortality rate for the U.S. remainder is 17 percent higher than for the border. This difference is largely due to difference in age structure between the border region and the remainder. For instance, the border region in 1980 had an average of 23.8 percent of the population age 15 and younger, versus 22.5 percent for the rest of the nation. The significantly higher overcrowding in the border versus remainder is due to the border's higher proportion of Latino population, which is characterized by higher crowding (compare tables *4* and 5). In summary, results confirm that for the United States, the border and remainder are generally equivalent in marginality.

Results for Mexico-United States Combined

Although some differences *within* each nation are substantial, much larger differences occur *between* Mexican and U.S. regions. For instance, for the Mexican border, 35.6 percent of the population have a low level of elementary education, *versus* only 3.3 percent for the U.S. border. Likewise, in the Mexican border region, 15.3 percent are employed in agricultural occupations, versus only 2.9 percent in the U.S. border. The infant mortality rate is 64.5 in the Mexican borderlands, compared to 11.5 in the U.S. border region. Thus, even though the Mexican borderlands is a very advanced region within Mexico, dramatic differences in marginality between the two nations' borderlands reflect the contrast between a highly advanced and a developing nation.

ANOVA tests were conducted for selected variables for five regions in a pooled sample of thirty-two Mexican states, fifty U.S. states, and the District of Columbia. The five regions consist of: (1) the Mexico border, (2) CMZ, (3) Mexico remainder, *(4)* U.S. border, and (5) U.S. remainder. ANOVA comparisons utilize only the four variables which are exactly matched definitionally for Mexico and the United States. Although definitions for four other variables are similar, they do not match exactly, due to differences in data collection and compilation procedures.

Based on the theory of binational marginality, the following hypotheses are tested by ANOVA for Mexico and the United States combined.

Hypothesis 4. For all definitionally comparable variables, ANOVA tests will show both overall differences and pairwise differences, except for the equivalence between the U.S. border and U.S. remainder. For all variables, the regional ordering of marginality will be: Mexican remainder (highest), Mexican border (lower), Mexican central place (still lower), and the U.S. border and U.S. remainder (equivalent, lowest values).

Hypothesis 5. For the differences in Hypothesis 5, the ordering of a given pair of values will be that lower values correspond to lower marginality for all variables except hospitals, for which the values are ordered in the reverse direction.

ANOVA results indicate overall statistically significant differences for all four variables, but the hypothesized regional ordering applies only for agricultural population. However, the hypothesized ordering for infant mortality is also correct if the missing Federal District data value is estimated as was done earlier, resulting in a CMZ value of 61.55.

The ordering for rural population, in descending value, is: Mexican remainder, U.S. remainder, Mexican border, U.S. border, and CMZ. The non-conformance of this variable to the hypothesis may indicate that the rural variable is not a good measure of marginality *between* a developing and an advanced nation, even though results were previously correctly ordered *within* each nation. It may be that the overall urbanization differences between nations are not primarily dependent on marginality but on other factors, such as climate, history, and economic development.

For crude mortality rate, although the values within Mexico are ordered correctly, the U.S. remainder values exceed those of Mexico. Since crude mortality rate is not an age-standardized measure (Shryock *et al.*, 1975), this contrast is due mostly to age-structural differences between an older age distribution in the U.S. remainder and a younger age distribution for Mexico. On the other hand, the lower mean crude mortality rate for the U.S. border, reflecting a younger age structure than for the U.S. remainder, does not show differences from the Mexican regions. For infant mortality, there are significant contrasts between Mexico and the United States for each inter-country pair, but only for one intra-country pair -the Mexican border versus remainder. Of the four matched variables, infant mortality has by far the strongest inter-country differences.

Except for infant mortality and agricultural occupation, paired contrasts are not significant between the U.S. and Mexican borders. Rather, the contrasts are between a rural region in one nation and a non-rural region in the other. Also, the CMZ is of limited importance in distinguishing between regions in the binational sample. A further test was run for the binational sample, eliminating the CMZ and including it with the Mexico remainder. However, the outcome of this test is quite similar to those for a binational sample divided into five groups. Also, ANOVA tests for the binational sample were rerun with the outlying District of Columbia case excluded; the results were essentially unchanged.

Discussion and Conclusions

The analysis indicates that the preliminary model of border inequality between nations is largely validated for the U.S.-Mexico border. As hypothesized, the research findings show that the U.S. borderlands region does not differ from the remainder of the United States. For the Mexican borderlands, also as expected, marginality levels are intermediate between those of the U.S. borderlands and the remainder of Mexico, excluding the central place (i.e., Mexico City). The reasons for the presence of the Mexican border as an intermediate "buffer" zone are in correspondence with model Type 3, with the border zone of the developing nation serving as a buffer in economic level and standard of living.

Economically, the Mexican border region has received a number of benefits from proximity to the United States. These include: 1) the *maquiladora* industry's expanding job market and wages that are higher than in other sectors in Mexico (Stoddard, 1988; Fernández, 1989); 2) the *maquiladora* industry's generation of foreign exchange -for instance, in 1986 there were 800 plants nationally, about 90 percent located in the border region, yielding *$* 1.5 billion in foreign exchange (Fernández, 1989);
3) increased Mexican public tax revenues from the expanding *maquiladora* and tourism industries (Stoddard, 1988); 4) large volumes of trade in both directions -for example, the United States purchases over half of Mexico's exports and supplies about two-thirds of Mexico's imports, mostly in the border region (Baerresen, 1983). The presence of the *maquiladora* industry, tourism, and trade are all inherent outcomes of border proximity. For instance, 90 percent of *maquiladora* industry is located in the border region, largely because of the factors of reduced transportation and organizational distance to the United States and favorable border-area governmental regulations. These economic forces have enhanced the border region's income and capital investment relative to the remainder of Mexico. The higher economic level appears to have contributed to a higher standard of living in the border region (Pick *et at.,* 1989), although the authors are not aware of a detailed economic model that validates this linkage.

There are also economic benefits which accrue to the United States. These include: 1) the economic advantage the *maquiladora* in-bond industry offers the U.S. manufacturing process (Fernández, 1989); 2) enhanced trade and tourism in the U.S. border region (Baerresen, 1983); and 3) some increase in U.S. public revenues through border industries and trade.

A somewhat similar situation exists on another border between an advanced and a developing nation -the Hong Kong-China border (Sklair, 1986). For three decades following the Chinese Communist revolution, from 1949 to 1979, the border was closed to most social and cultural interactions, although important economic exchanges took place. In 1979, China established the Shenzen Special Economic Zone (SEZ), which includes the entire Chinese side of the Hong Kong border. This zone was set up to attract foreign capital, adopting some of Hong Kong's economic and lifestyle standards, under the rubric of experiment with "state capitalism" (Sklair, 1986). The economic experiment of Shenzen has been successful in many respects; standards of living and modernization are among the highest in southern China. However, on the Hong Kong side, the economic level of the border zone approximates that of Hong Kong as a whole.

This example again illustrates the model of a developing and an advanced nation bordering each other, with a "buffer zone" present as postulated in model Type 3. Of course, this example requires rigorous analysis, based on marginality indicators, to confirm the result.

It is important to emphasize the limitations on comparability of definitions for marginality indicators between Mexico and the United States. This problem has been confronted by other researchers of socioeconomic phenomena in the U.S.-Mexico borderlands (Beegle et al., I960; Brook, 1986) and has so far restricted research comparisons. In the present study, the definitional problem limits the potential for binational comparisons to only four out of nineteen COPLAMAR indicators. This problem limits comparisons of censuses between many nations of the world and is embedded in differences in cultural milieus, socioeconomic circumstances, and data collection procedures. Hopefully, the U.S. Census Bureau and the Instituto Nacional de Estadística, Geografía e Informática (INEGI) will open up serious discussions to enable comparability over more of these dimensions.

Another problem with analyzing inequality at national borders is the choice and comparability of geographic sub-units for statistical comparison. The present study, based on states in Mexico and the United States, applies a "wide" geographic view of "border." Alternatively, counties and *municipios* might have been selected as geographic units, changing the concept of "border" to a narrower strip. As 1990 census data become available, the geographic concept of "border" might be further refined by selecting as units aggregated census tracts in the United States and *areas geoestadísticas básicas* ("basic geostatistical areas," or AGEBs) in Mexico. However, disadvantages to reducing the size of geographic units are that fewer inequality variables are available; geographic units may have irregular distributions; and sample sizes may become very large, even unwieldy. One comprehensive and multi-dimensional set of studies of the U.S.-Mexico border variously employed each of the above concepts of "border," plus additional ones, depending on specific study objectives (Stoddard *et al.*,

1983). For other borders, e.g., the China-Hong Kong border, the "comparable" geographic units on the two sides may be so disproportionate in size and border contiguity as to preclude the present research design.

The present study underscores the importance of viewing national border areas from a *relative*, rather than an *absolute*, standpoint, a point stressed by Stoddard (1978). For instance, is the Mexican borderlands region strong or weak economically? From the standpoint of the United States it is weak, but viewed in Mexico it is very strong. Likewise, it is highly marginal looked at from the United States, but non-marginal vis-a-vis Mexico. The present type of analysis attempts to avoid a relativistic viewpoint, but asks instead what quantifiable differences exist between sets of border and non-border regions.

Conclusions

In this preliminary investigation of socioeconomic inequality, specifically marginality, for the U.S.-Mexico borderlands region, the major results are as follows:

1. As measured by marginality indicators adhering to COPLAMAR's set of indicators, the largest overall inequality difference is between the Mexican border region and U.S. border region. This difference in many ways reflects the juxtaposition of a highly advanced and a developing nation. However, it is present in spite of the Mexican borderlands' prosperity and high living standards *vis-à-vis* Mexico as a whole.

2. The Mexican border region is substantially less marginal than Mexico as a whole, but the Federal District is even less marginal than the border region.

3. The U.S. border region approximates the inequality levels of the United States as a whole.

4. When the U.S. border population is divided into Spanish-origin and Anglo components, there are consistent differences, with the Spanish-origin population being substantially more marginal. However, the magnitude of this difference is smaller than that between the borderlands of the two nations.

5. There is substantial variation in border state characteristics within both Mexico and the United States.

6. Analysis of variance within nations reveals a lack of significant difference between border and remainder for the United States. However, for Mexico, there are significant differences on most marginality indicators between the border and remainder, but only a few paired differences involving the central metropolitan zone (CMZ). Thus, the major Mexican difference in marginality is between the border and the remainder.

7. ANOVA comparisons on the four variables whose definitions could be matched exactly were performed on the binational sample having five regions. Results showed significant inter-country contrasts between U.S.

and Mexican regions but conformed to the hypothesized ordering only for agricultural population and infant mortality. Inter-country paired differences are largely between one nation's border and the other's remainder, rather than between the two border regions or involving the CMZ.

8. Generally, in terms of marginality in the present regional context, the Mexican border stands out as more distinctive as a region than the U.S. border. Also, the Mexican border is substantially less marginal than the rest of Mexico, excepting the CMZ.

9. The preliminary model of marginality at national borders presented four types, varying by development level of the bordering nations, remoteness of the border, and extent of economic modernization, interaction, and integration. The U.S.-Mexico border is evaluated for fit to Type 3. ANOVA results generally confirm the hypothesized fit. The Hong Kong-China border situation is also discussed as it conforms to Type 3 of the model.

This study presented broad-based and preliminary findings on the lower levels of socioeconomic inequality, or marginality, in the U.S.-Mexico borderlands regions. Subsequent research projects will investigate geographic patterns of marginality at the county and *municipio* levels, as well as at the census tract and AGEB levels, and utilize statistical analysis to categorize small geographic areas of marginality and their binational relationships.

TABLE 1. COPLAMAR INDICATORS OF MARGINALITY

GENERAL

1. Low income
2. Underemployment (i.e. working 9 months or less per year)
3. Rural population
4. Agricultural occupation
5. Rural population lacking communications

NUTRITION

6. Underconsumption of milk
7. Underconsumption of beef
8. Underconsumption of eggs

EDUCATION

9. Illiteracy
10. Lack of primary education

HEALTH

11. Crude mortality rate
12. Mortality of children age 1-4 years old
13. Residents per physician

HOUSING

14. Households without potable water
15. Overcrowding
16. Households without electricity
17. Households without plumbing

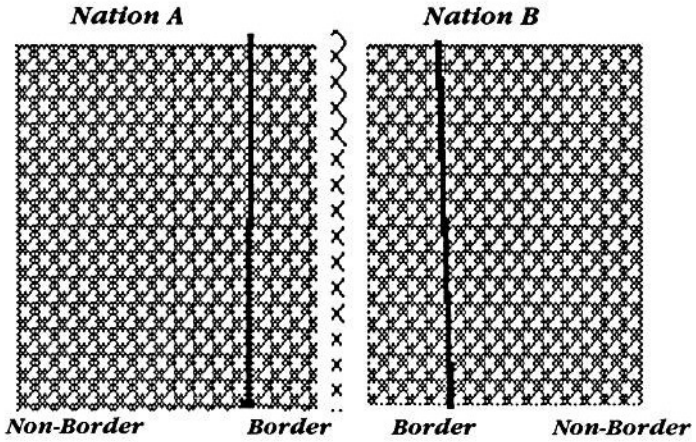
OTHER

18. Lack of availability of radio and TV
19. Lack of use of footwear

(Source: COPLAMAR, 1982)

FIGURE 1
MODEL FOR MARGINALITY AT NATIONAL BORDERS

Type 1. Bordering Nations, Both Advanced or Developing: Minimal or Maximal Bordelands



NOTE: Shading represents level of marginality, with lower marginality darker.

Type 2. Bordering Nations, Both Advanced or Both Developing: Zero Borderlands

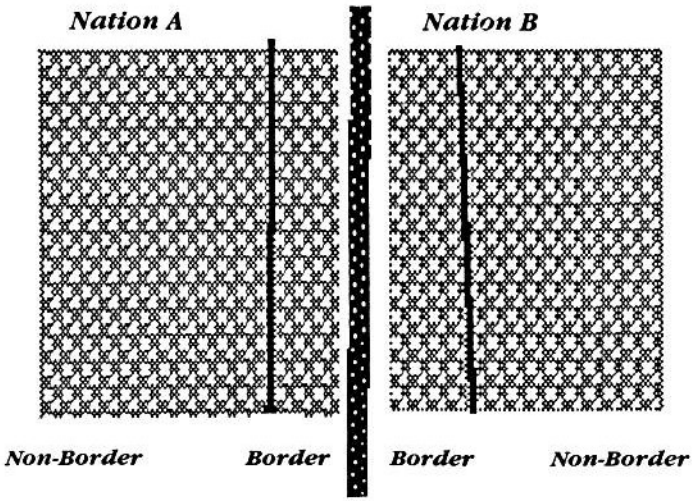
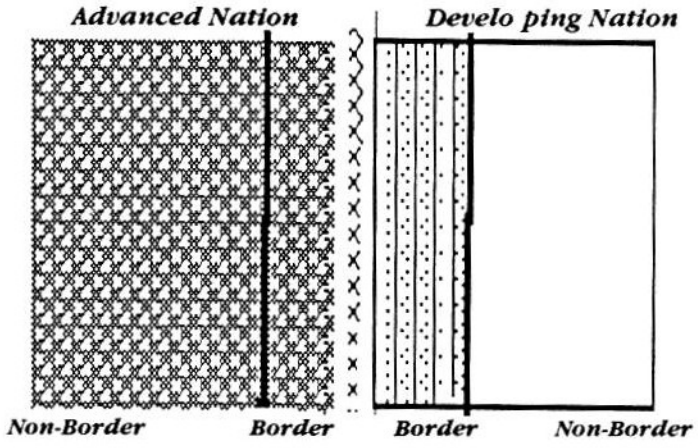


FIGURE 1 (cont.)

Type 3. Advanced Nation Bordering Developing Nation: Minimal or Maximal Borderlands



Type 4. Advanced Nation Bordering Developing Nation: Zero Borderlands

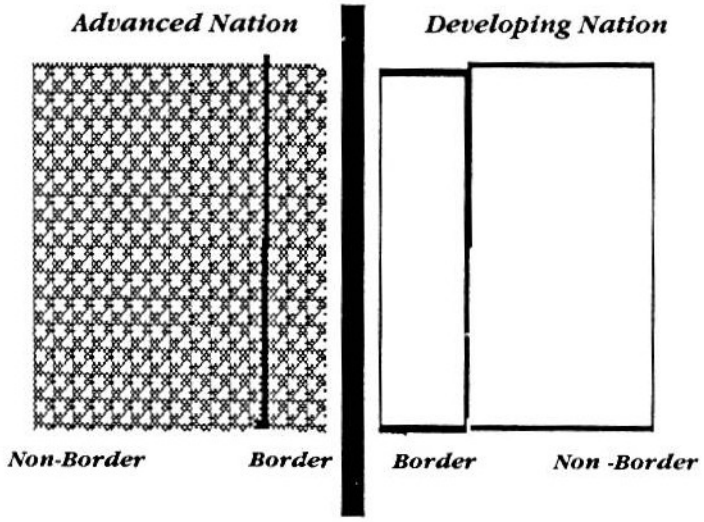


TABLE 2
INDICATORS OF INEQUALITY FOR MEXICO

	Variable[1]	Definition[2]	Source[3]
GENERAL V1/T6,T10	low income (1)	percent of persons, age 12 years and older, with income (less than 1,080 pesos per month)	SPP82, V1T6,T10
	underemployment and undemployment (2)	percent of population, age 12 and older, that is that is underemployed or unemployed*	SPP82,VI/T6,V2/T12
	rural population (3)	percent rural population (in places less than 2 500 pop.)	SPP82, V2/T12
	agric. occupation (4)	percent agricultural occupation, age 12 and older	SPP82, V1/T9
NUTRITION	underconsumption of milk (6)	percent of population, 5 years and older, with no milk consumption	SPP82,V1T6,T17
EDUCATION	illiteracy (9)	percent of the population that is illiterate	SPP82, V1/T5
	elementary educ. (10)	percent of population, age 6 and older, that has a 3rd grade education or less	SPP82, V1/T5
HEALTH	crude mortality rate (11)	deaths/1000 population	ANN81,SPP82, V1/T1
	infant mortality rate (12)	(infant deaths/births) x 1 000	RABELL86
	hospitals (13)	hospitals and clinics per one million population	SPP82, V1/T1,V2/T18
HOUSING	no potable water (14)	percent of households without potable water	SPP82, V1T22
	overcrowding (15)	percent of households with 3 or more rooms and 6 or more persons	SPP , V2/T18
	households without plumbing (17)	percent of households without plumbing pipes ("sin tubería de drenaje")	SPP82. V2/T22

Notes: [1] the number in parenthesis refers to the corresponding COPLAMAR variable in Table 1.
[2] if not indicated, the year referred to is 1980.
[3] SPP82=Secretaría de Programación y Presupuesto. 1982-4. *X Censo General de Población y Vivienda*, 1980
ANN81=Secretaría de Programación y Presupuesto. 1981. *Anuario Estadístico de los Estados Unidos Mexicanos*.
RABELL86=Rabell, Cecilia, *et al.*, 1986. *Estudios demográficos y urbanos* (1).
* Underemployed population consists of population 12+ working from less than 1 to 16 hours per week; Unemployed population consists of population 12+ working 0 hours per week. V Volume, e.g. V5=Volume 5. T Table

TABLE 3
INDICATORS OF INEQUALITY FOR THE UNITED STATES

	Variable[1]	Definition[2]	Source[3]
GENERAL	poverty (1)	percent of families below poverty level	USBC82, T104
	unemployment (2)	percent of population, age 16 or over, with unemployment in 1979	USBBC82, T101
	rural population (3)	percent rural population	USBC82, T16
	agric. occupation (4)	percent agricultural occupation, age 16 and over	USBC 82, T102
EDUCATION	elementary educ. (10)	percent of population, age 25 and over, with 0-4 years of elementary education	UBSC82,T99
HEALTH	crude mortality rate(11)	deaths/1000 population	NCH86
	infant mortality rate (12)	(infant deaths/births) x 1,000	NCHS86
	hospitals (13)	hospitals per 1,000 pop	USBC86
HOUSING	overcrowding (15)	percent of housing units with greater than 1 person per room	USBC83, T6, T15
	households with some or no plumbing (17)	households with some or no plumbing facilities	USBC83, T12
OTHER	lack of cable TV (18)	percent of households without cable TV	USBC86
	public assistance	percent of population who are recipients of public assistance	USBC86

Notes: [1] The number in parenthesis refers to the corresponding COPLAMAR variable in Table 1
[2] If not indicated, the year referred to is 1980
[3] USBC 82=U.S. Bureau of the Census. 1982. *1980 Census of Housing*. Vol. Characteristic of Housing Units.
USBC 83 = U. S. Bureau of the Census. 1983. *1980 Census of Population*. Vol. 1. Characteristic of the Population
USBC 86= U.S. Bureau of the Census. 1986. *State and Metropolitan Data Book*.
NCHS 86 = National Center for Health Statistics. 1986. *Vital Statistics of the United States, 1980.* Vol. 2. Mortality Part A.
* Rural population consists of persons living in places of less than 2,500 population outside of urbanized areas. An urbanized area consists of a central city or cities and surrounding closely settled territory or "urban fringe."
V Volume, e.g. V5=volume 5. T. Table

TABLE 4
DESCRIPTIVE RESULTS FOR MEXICAN BORDERLANDS

	MEXICO (1)	MEX. NON-BORDER STATES (1)	MEX. BORDER STATES (1)	BCN	SON	CHI	COAH	N. LEON	TAM	CMZ	COEFFICIENT OF VARIATION MEX. BORDER STATES
low income	9.35	10.65	5.74	4.20	5.22	6.12	6.77	4.55	7.58	4.64	20.92
under& unemployment	16.04	17.11	12.87	13.65	12.72	16.53	12.87	10.26	11.17	12.75	15.46
rural population	38.63	45.07	22.31	14.75	29.46	29.65	22.62	12.56	24.87	10.29	29.71
agric. occupation	29.01	34.19	15.34	9.48	20.90	20.17	15.37	8.34	17.81	7.69	31.89
underconsump-tion of milk	17.29	20.09	8.92	2.79	6.44	11.44	11.34	9.64	11.89	8.86	36.96
illiteracy	17.46	20.43	8.15	6.62	8.54	8.85	7.91	7.28	9.71	6.81	12.50
elementary edu.	47.10	50.99	35.64	35.85	35.99	38.63	36.23	31.39	38.74	34.87	7.67
crude mort. rate	6.28	6.47	5.73	5.78	6.14	6.40	5.97	4.66	5.46	5.83	9.80
infant mort. rate	73.16	75.04	64.67	56.89	62.37	78.37	66.77	58.62	65.00	78.98	10.84
hospitals	28.72	30.95	22.15	27.17	32.37	22.44	18.62	11.54	20.78	21.72	29.52
no potable water	32.20	37.02	19.48	21.91	17.05	21.97	15.14	12.50	28.28	12.64	26.76
overcrowding	51.00	52.71	45.42	42.91	48.33	43.96	48.25	46.21	42.83	47.17	5.10
households with-out plumbing	49.64	54.44	39.71	34.10	46.22	42.75	40. 85	30.88	43.48	21.72	13.66

Notes. 1. Mean values. CMZ Central Metropolitan Zone
The value for infant mortality rate for the CMZ is for the Federal District alone, since the State of Mexico value was unavailable. The CMZ value is estimated at 61.55.

(Source: SPP, 1982-84)

TABLE 5
DESCRIPTIVE RESULTS FOR U.S. BORDERLANDS

	U.S.(1)	U.S.NON-BORDER STATES(1)	US BORDER STATES(1)	CA	AZ	NM	TX	CO	COEFFICIENT OF VARIATION U.S.BORDER STATES
poverty	9.93	9.91	10.14	8.71	9.52	13.98	11.15	7.40	22.33
unemployemt	18.64	18.62	18.81	20.70	20.26	18.25	16.42	18.44	8.18
rural population	32.41	33.93	18.49	8.71	16.17	27.86	20.35	19.38	33.60
agric. occupation	4.08	4.21	2.88	2.83	2.67	3.30	2.73	2.73	8.06
elementary educ.	3.26	3.15	4.34	3.98	3.77	5.62	6.53	1.81	37.55
crude mortality rate	8.53	8.66	7.38	7.88	7.86	6.98	7.60	6.56	7.07
infant mortality rate	12.47	12.58	11.46	11.10	12.40	11.50	12.20	10.10	7.21
hospitals	38.27	38.79	33.53	23.35	29.07	41.54	39.42	34.26	19.91
overcrowding	4.43	4.19	6.67	7.40	7.24	8.61	7.23	2.85	29.65
households w/some or no plumbing	1.97	2.01	1.58	0.59	1.87	3.28	1.54	0.64	62.11
lack of cable t.v.	53.47	53.24	55.64	56.50	60.60	50.50	52.00	58.60	6.90
public assistance	5.86	5.94	5.12	8.80	3.00	6.10	4.00	3.70	41.22

Note: 1 Mean Values

(Sources: U. S. Bureau of the Census, 1982, 1983, 1986; NCHS, 1986

TABLE 6
DESCRIPTIVE RESULTS FOR U.S. BORDERLANDS, SPANISH ORIGIN POPULATION

	U.S.(1)	U.S.NON-BORDER STATES(1)	US BORDER STATES(1)	CA	AZ	NM	TX	CO	COEFFICIENT OF VARIATION U.S.BORDER STATES
poverty	18.55	18.42	19.78	16.80	18.20	20.72	24.74	18.43	14.06
unemployemt	22.93	22.84	23.76	26.64	24.13	21.69	21.33	25.03	8.47
rural population	22.66	23.42	15.34	6.46	13.60	27.63	13.94	15.09	44.69
agric. occupation	3.84	3.72	5.01	7.49	7.43	3.78	4.23	2.11	42.38
elementary educ.	10.03	9.48	15.31	16.08	14.54	11.15	25.25	9.53	35.86
overcrowding	21.50	20.06	20.06	28.67	21.45	14.00	25.17	10.99	33.15
households w/some or no plumbing	2.21	NA	2.38	1.22	1.61	3.43	4.26	1.40	51.58
percent Spanish origin	4.93	NA	21.00	19.20	16.20	36.60	21.00	11.80	44.81

NOTE 1: Mean values.
NOTE: Aggregate means are given for overcrowding and plumbing for U. S. and U. S. Non-Border States.

(Sources: U. S. Bureau of the Census, 1982, 1983; Bogue, 1985).

TABLE 7
DESCRIPTIVE RESULTS FOR U.S. BORDERLANDS, ANGLO POPULATION

	U.S.(1)	U.S.NON-BORDER STATES(1)	US BORDER STATES(1)	CA	AZ	NM	TX	CO	COEFFICIENT OF VARIATION U.S.BORDER STATES
poverty	9.23	9.42	8.03	7.13	8.16	10.59	8.22	6.05	18.75
unemployemt	17.66	17.65	17.78	19.52	19.63	16.58	15.40	17.75	9.26
rural population	32.49	33.93	19.18	9.24	16.67	27.98	22.06	19.95	32.26
agric. ocupation	3.84	4.01	2.33	1.90	1.89	3.06	2.56	2.22	18.96
elementary educ.	3.11	3.20	2.23	1.92	2.27	3.09	2.83	1.03	32.57
overcrowding	3.65	NA	4.30	4.00	5.33	6.20	3.94	2.03	32.96
households w/some or no plumbing	1.48	NA	1.45	0.49	1.93	3.21	1.04	0.57	142.30

NOTE 1: Mean values.
NOTE: Aggregate means are given for overcrowding and plumbing for U. S. and U. S. Non-Border States.

(Sources: U. S. Bureau of the Census, 1982, 1983; Bogue, 1985).

TABLE 8
ANALYSIS OF VARIANCE FOR MEXICO

Variance	SS(between)	SS(within)	D.F.	F Ratio	F Prob.	Scheffe 2-way tests significant at .05 Prob. Level[1]
Low Income	0.016	0.034	(2,29)	6.892	0.004**	MexB x MexR
Under Unemployment	0.011	0.534	(2,29)	2.978	0.067	
Rural Population	0.420	0.510	(2,29)	11.944	0.000***	MexR x (CMZ,MexB)
Agric Population	0.027	0.027	(2,29)	14.483	0.000***	MexR x (CMZ,MexB)
Underconsumption of Milk	0.750	0.183	(2,29)	5.946	0.007**	MexB x MexR
Illiteracy	0.085	0.165	(2,29)	7.462	0.002**	MexB x MexR
Elementary Educ.	0.145	0.151	(2,29)	13.923	0.000***	MexR x (CMZ,MexB)
Crude Mort. Rate	3.462	49.602	(2,29)	1.012	0.376	
Infant Mort. Rate	551.179	2,640.235	(2,28)	2.923	0.070	
Hospitals	318.524	6,791.498	(2,29)	1.407	0.245	
No Potable Water	0.229	0.424	(2,29)	7.847	0.002**	MexR x (CMZ,MexB)
Overcrowding	0.028	0.057	(2,29)	7.205	0.003**	MexB x MexR
Households without Plumbing	0.270	0.327	(2,29)	11.977	0.000***	MexR x(CMZ,MexB)

Region Abbreviation: Mex B - Mexican Border. CMZ - Central Metropolitan Zone.
Mex R - Mexican Remainder.
(1) Two way Scheffe tests are indicated between the region on the left and the regions on the right in parentheses. Regions in parentheses are ordered from left to right by descending significance level.
Significance Levels: ***0.001 **0.01 *0.05

TABLE 9
ANALYSIS OF VARIANCE RESULTS FOR THE UNITED STATES

Variable	SS(between)	SS(within)	D.F.	F Ratio	F Prob
Poverty	0.241	490.968	(1,49)	0.024	0.877
Unemployment	0.000	0.147	(1,49)	0.005	0.942
Rural Population	0.107	1.018	(1,49)	5.175	0.027*
Agric-Population	0.001	0.078	(1.49)	0.505	0.481
Elementary Edu.	0.001	0.019	(1,49)	1.651	0.205
Crude Mortality Rate	7.430	80.798	(1,49)	4.506	0.039*
Infant Mort. Rate	5.689	296.910	(1,49)	0.931	0.339
Hospitals	124.767	17,168.499	(1,49)	0.356	0.553
Overcrowding	0.003	0.028	(1,49)	4.805	0.033*
Households W/Some Or No Plumbing	0.001	0.167	(1,49)	0.237	0.628
Lack Of Cable T.V.	25.995	5,571.782	(1,49)	0.229	0.635
Public Assistance	3.058	294.921	(1,49)	0.508	0.479

Significance Levels: ***0.001 **0.01 *0.05
Note: Scheffe 2-way tests were run for each variable for two regions, U.S. Border and U.S. Remainder.
No tests were significant at the .05 probability level.

TABLE 10
ANALYSIS OF VARIANCE RESULTS FOR U.S. AND MEXICO COMBINED

Variance	SS(between)	SS(within)	D.F.	F Ratio	F Prob.	Scheffe 2-way tests Significant at .05 Prob. Level[1]
Rural population	0.603	1.527	(4.78)	7.701	0.000***	MexR x (CMZ, USB, MEX B, USR)
Agric. population	1.490	0.346	(4.78)	84.012	0.000***	MexR x (USB, USR, CMZ, Mex B)
						MexB x USR
Crude Mort. Rate	111.134	130.400	(4.78)	16.617	0.000***	USR x (CMZ, Mex B, MexR)
Infant Mort. Rate	71,575.390	2,937.146	(4.77)	469.104	0.000***	Mex R x (USB, USR, MexB)
						MexB x (USB, USR)
						CMZ x (USB, USR)

Region Abbreviation: Mex B - Mexican Border. CMZ - Central Metropolitan Zone.
Mex R - Mexican Remainder. USB - U.S. Border. USR - U.S. Remainder.
(1) Two way Scheffe tests are indicated between the region on the left and the regions on the right in parentheses. Regions in parentheses are ordered from left to right by descending significance level.
Significance Levels: ***0.001 **0.01 *0.05

NOTES

[1] Twelve percent Spanish origin, placing Colorado fifth in the United States in 1980 (Bean and Tienda, 1987).

[2] Since the District of Columbia (D.C.) values for most variables are outliers with very high marginality values, the ANOVA results were recalculated, removing D.C. The same significant differences were noted, so D.C. is included in all analyses. It is important to note that the capital cities of the two nations (i.e., D.C. and Mexico City) are at opposite extremes within each nation in marginality. One reason for D.C.'s high marginality is its city core nature. The Mexico City CMZ has low marginality, despite well-known zones of poverty, because of its concentration of industry and educated labor force.

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