

DEMOGRAPHIC CHANGES IN THE EL PASO-JUAREZ-LAS CRUCES REGION*

By
James Peach and James Williams**

ABSTRACT

The bi-national region made up of the counties El Paso, Las Cruces, and Ciudad Juárez, is one of the largest metropolitan centers along the U.S.-Mexico border. This article is an examination of the patterns and components of changes in population in this areas during the eighties decade, together with population projections by age and sex. In addition, taking into consideration the rate of migration and the birth rate, projections are shown for the United States up to the years 2000 and 2010. Based on this data, the conclusion is that the Latin migration is adding more men than women to the population, and above all, more Hispanics to the United States side of the border, while El Paso shows a non-Hispanic emigration. In conclusion, a population of 2.6 million is projected for the region by year 2010, that is to say, approximately 700,000 less than for the metropolitan region of San Diego-Tijuana in 1990.

RESUMEN

La región binacional integrada por los municipios de El Paso, Las Cruces y Ciudad Juárez es uno de los mayores centros metropolitanos en la frontera México-Estados Unidos. En este trabajo se examinan los padrones y los componentes de los cambios de población en esta área durante la década de los ochenta con proyecciones de la población por edad y sexo. Asimismo, considerando la migración e índices de fertilidad por grupos étnicos, se presentan proyecciones para los Estados Unidos hasta el año 2000 y el 2010. De donde se concluye que la migración latina está añadiendo relativamente más hombres y, sobre todo, más hispanos al lado estadounidense de la frontera, mientras que El Paso presenta una migración no hispana hacia afuera. Para finalizar se proyecta una población de 2.6 millones de gente para el año 2010 en la región, es decir, aproximadamente 700,000 menos que para la región metropolitana de San Diego-Tijuana en 1990.

* This article was received in May of 1996 to be published in *Estudios Fronterizos*.

** The authors are listed alphabetically. James Peach is Professor of Economics at New Mexico State University. James Williams is Professor of Sociology at New Mexico State University.

The U.S.-Mexico border region is a far different place from what it was fifty years ago. Among the most dramatic changes in the border region have been rapid population growth and the concentration of that growth in eight large transborder urban areas (Fernandez, 1989; Herzog, 1990). The border region, however, is not homogeneous and demographic change along the border is far from uniform (Hedderson, 1983; Dillman, 1983; Hansen, 1981; Chavez, 1992). This border-region heterogeneity makes it appropriate to concentrate our attention on a sub-region of the border lands. This paper addresses demographic change in one of the largest transborder urban areas: the El Paso (Texas) - Ciudad Juarez (Chihuahua) - Las Cruces (New Mexico) tricounty region.

More specifically, the region is defined to include: 1) El Paso County, Texas; 2) Doña Ana County, New Mexico; and 3) the *municipio* of Ciudad Juarez, Chihuahua, Mexico. A *municipio*, like a county in the U.S., generally includes a larger geographic area than a single city, and, according to the Mexican censuses, is the closest geographic unit to a county in the United States. Many authors describe a *municipio* as roughly a county equivalent (Peach, 1984:25; Weeks and Ham Chande, 1992:4).

In examining this region our concern is with historical and projected trends in population change. While the demographic variables examined here profoundly affect and are affected by economic, social, political and environmental conditions along the border, we restrict our discussion almost completely to the demographic side of the larger equation.

THE DEMOGRAPHIC BACKGROUND

Total Population Growth

The studied region is centrally located along the U.S.-Mexico border. The only urban area along the U.S.-Mexico border with a larger population than the tri-county region is the San Diego-Tijuana area. The tri-county region ranked second in terms of total population in 1940—the starting point for our analysis—as well as in 1990. We begin our demographic history of the region in 1940, because it was between 1940 and 1950 that the explosive population growth of the borderlands began. Prior to 1940, there had been significant population growth along the U.S. side of the border in the 1880's, when the railroads were being completed, and during the Mexican Revolution (1910-1920), when many Mexicans migrated to U.S. border cities to avoid the conflict, and because of the U.S. military build-up along the border. Nevertheless, until the 1940's, the border region as a whole remained a relatively sparsely-populated area.

In 1940, El Paso, with a population of 131,067, was the largest of the three counties, and was 2.5 times as large as Ciudad Juarez which had a population of 55,024 (table 1). Las Cruces (Doña Ana County) reported only slightly more than thirty thousand residents in that year. The total population of the tri-county region in 1940 was less than a quarter-million persons, but this figure accounted for the area adjacent to, and extending over the full length the 2,000-mile-long border.

TABLE 1. Population Change in the Tri-County Region: 1940-1990.

		Total Population	Percent Change (Decade)
1940	Doña Ana	30,411	
	El Paso	131,067	
	Ciudad Juarez	55,024	
	Totals	215,502	
1950	Doña Ana	39,557	30.1
	El Paso	194,968	48.8
	Ciudad Juarez	131,308	138.6
	Totals	365,833	69.8
1960	Doña Ana	59,948	51.5
	El Paso	314,070	61.1
	Ciudad Juarez	276,995	111.0
	Totals	651,013	78.0
1970	Doña Ana	69,773	16.4
	El Paso	359,291	14.4
	Ciudad Juarez	424,135	53.1
	Totals	853,199	31.1
1980	Doña Ana	96,340	38.1
	El Paso	479,899	33.6
	Ciudad Juarez	567,365	33.8
	Totals	1,143,604	34.0
1990	Doña Ana	135,510	40.7
	El Paso	591,610	23.3
	Ciudad Juarez	798,499	40.7
	Totals	1,525,619	33.4

Source: See text and Appendix A.

Between 1940 and 1950, the tri-county region's population increased to 365,833 a growth of 69.0 percent. This rate of growth was nearly five times the rate of growth of the population of the U.S., and more than double the population-growth rate of Mexico. This growth rate, however, was not unique along the border.

The tri-county region reached its peak growth rate during the 1950's (78.0 percent). By 1960, the population of Ciudad Juarez was rapidly approaching the size of El Paso, and the population of Doña Ana County exceeded 50,000 for the first time.

The 1960 to 1970 population growth rate in the tri-county region (31.0 percent) was less than half of the growth rate for the previous decade. The absolute growth in population during the 1960's (202 thousand) was, however, greater than that of the previous decade (186 thousand). By 1970, the population of Ciudad Juarez exceeded the population of El Paso for the first time.

By 1980, the population of the region reached more than a million persons. During the 1970's, the growth rates of the three counties were similar (all in the mid-30-percent range). The growth rates of the two U.S. counties (Doña Ana and El Paso) in the 1970's were considerably higher than in the 1960's, and Doña Ana County's rise in population showed the highest percent change of the three.

By 1990, the population of the region had increased to slightly more than 1.5 million persons. The growth rate of the region remained high during the 1980's (approximately 3 times the U.S. growth rate) despite depressed economic conditions along the border. Peach (1992) contains a discussion of economic conditions along the border during the 1980's.

Rapid population growth in the border region has been attributed to the Mexican Revolution (1910-1920), U.S. prohibition (1919-1932), the bracero program (starting in 1942), the end of the bracero program (1964), the maquiladora program (starting in 1965), proximity to the U.S., wage differentials between the two nations, the North American Free Trade Agreement, Mexico's economic crisis and other factors. Largely ignored, but not entirely forgotten in the discussion is natural increase (the excess of births over deaths in an area), and what demographers refer to as demographic momentum (the tendency of a population to continue to increase despite declines in fertility rates simply because of its age-sex structure). Natural increase in population is closely related to the age and sex distribution of the population, and the concept of demographic momentum has no meaning, except in relation to age and sex distribution. We now turn to an examination of the age and sex distributions of the population of the region.

AGE AND SEX

As in all modern populations, age compositions in our study areas reflect principally the effects of migration patterns and changing birth rates. Mortality rates do not change rapidly in modern populations, and so have less direct effect on age composition than do fertility changes.

Any analysis of age composition, however, may be affected by concerns about the quality of data. Age misstatement exists in census data, and more importantly, census data may be subject to undercount which is not randomly distributed across age categories. In our study areas we can not know precisely the magnitude of these possible errors.

Another data problem is unique to Mexican census data. The Mexican census for Ciudad Juarez in 1990 included sizeable numbers of persons whose ages were "not specified". In 1980, rather few persons were so identified, but in 1990 the number of such persons was more substantial. Following accepted procedures, we allocated those persons without specified ages in 1980 and 1990 into the age groups of 20 years and above (Shryock and Siegel, 1975). If there is a tendency for persons at only certain of these ages to have failed to provide age to enumerators or if children's ages went unstated, then our adjusted age data may not be accurately reflective of the distribution of the population. As is the case with undercount, no data are available to allow us to perfectly allocate persons who failed to give their age to enumerators in Ciudad Juarez.

Table 2 shows broad range of age categories for the three sub-areas of the study metropolis, as well as estimated median ages. In general, an increasing, or a steady, but large proportion of young people indicates rising of high fertility levels, while fertility decline will lower the proportions of younger-aged people. Mexico's fertility decline in past years sets the stage for increasing proportions of people of labor force ages (Garcia y Griego, 1989). We review the trends in our areas with these fertility forces in mind. There is considerable variation along the border and age and sex structure can be greatly altered by local patterns.

In 1940, the median age of the population of Ciudad Juarez was 21.02 years, two years higher than the Mexican national median of 19.33 years (table 2). The median ages of the population for the two U.S. counties were 25.17 years for El Paso, and 21.57 years for Doña Ana County, much lower than the median of 29.03 years for the U.S. as a whole.

By 1950, a sharp increase in birth rates on both sides of the border is clearly apparent. In the U.S., the post-World-War-II increase in fertility was, of course, a national phenomenon commonly referred to as the baby-boom. While no such colorful term as baby-boom has been applied

to the Mexican side of the border, the 1940-1950 increase in fertility was also a national rather than a local phenomenon in Mexico. The increased availability of antibiotics, improved water and sewage systems and other improvements in health care associated with a generally improved standard of living in Mexico, are often cited as reasons for the increased fertility in Mexico during this time period (Alba and Potter, 1986).

TABLE 2. Tri-County Region Population by Age: 1940-1990.

		Percent under 15 years old	Percent 15 to 64 years old	Percent 65 years old and older	Median age (years)
1940	Dofia Ana	36.45	58.96	4.59	21.57
	El Paso	30.52	65.0	04.48	25.17
	Ciudad Juarez	37.21	59.68	3.11	21.02
	Totals	33.10	62.89	4.01	23.65
1950	Dofia Ana	35.84	59.87	4.29	22.28
	El Paso	31.09	64.28	4.63	24.65
	Ciudad Juarez	38.75	58.43	2.82	20.34
	Totals	34.45	61.89	3.66	22.79
1960	Dofia Ana	37.63	57.88	4.49	21.78
	El Paso	37.76	57.70	4.54	22.55
	Ciudad Juarez	44.35	53.26	2.39	17.86
	Totals	40.54	55.84	3.62	20.40
1970	Dofia Ana	33.88	60.80	5.32	21.78
	El Paso	34.16	60.10	5.74	22.68
	Ciudad Juarez	46.09	50.74	3.17	16.81
	Totals	40.07	55.50	4.43	19.62
1980	Dofia Ana	26.23	66.56	7.21	24.78
	El Paso	28.90	64.51	6.59	24.98
	Ciudad Juarez	40.29	56.03	3.68	18.92
	Totals	34.32	60.48	5.20	21.92
1990	Dofia Ana	25.63	65.59	8.78	27.94
	El Paso	26.94	64.90	8.16	27.95
	Ciudad Juarez	32.74	63.72	3.54	21.87
	Totals	29.86	64.35	5.79	24.24

Source: See Appendix A.

Table 2 exhibits the continuing effects of high fertility rates in the region. By 1960, the population under age fifteen had reached 44.35 percent in Ciudad Juarez, 37.63 percent in Doña Ana County, and 37.76 in El Paso. In comparison, similar figures were 44.39 percent for the nation Mexico, and 31.11 percent for the U.S. as a whole.

In 1970, the end of the baby boom is clearly evident in the U.S. counties. The proportions at young ages have declined by 1970 in the U.S. counties, but continue to grow in the Mexican twin city, albeit at a slowing pace. Notice that for labor-force ages, population on the U.S. side has begun to grow relatively while ages under 15 grow slowly. In an effort to detail recent age and sex data, we present population pyramids for 1980 and 1990 (Figures 1 and 2). The pyramids are graphs of frequency counts of persons for each of 18 age groups. Only the largest observed male and frequencies are labeled on each pyramid.

The effects of declining fertility are evident in the 1980 pyramid for Ciudad Juarez (Figure 1). This Figure reflects a rather sudden and dramatic decline in fertility in Ciudad Juarez which beginning in the mid 1970's. Notice, for example, the size of the youngest age cohorts (those born in or after 1975) as compared to the 5 to 9 years of age cohorts. Many demographers (for example, Alba and Potter, 1986) have confirmed that fertility rates were declining throughout Mexico in the mid-1970's on the basis of a careful examination of census and other survey data.

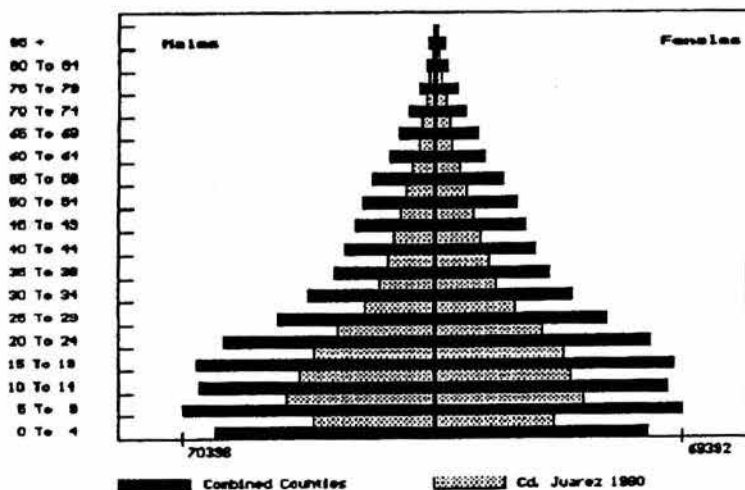


Figure 1. Combined Counties and Ciudad Juarez, 1980.

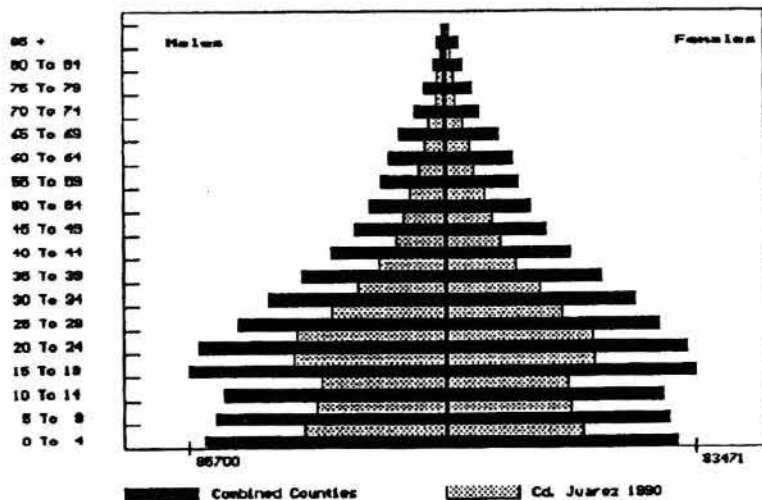


Figure 2. Combined Counties and Ciudad Juarez 1980.

By 1990 (Figure 2) the Ciudad Juarez population in each of the six youngest age cohorts was larger than in the corresponding cohorts in the combined counties on the U.S. side. Also evident in Figure 2 is the fact that the 0 to 4 year age group in Ciudad Juarez was larger than the 5 to 9 group. This, however, is the effect of demographic momentum (notice the large size of the cohorts in the child-bearing years) rather than an increase in fertility.

Fertility decline has come to Ciudad Juarez, but there are many more young people, proportionally, on the Mexican side than on the U.S. side. We will shortly examine migration patterns in order to discuss whether migration may change this pattern in the future, or whether it is perhaps the cause of this pattern.

The pyramids do not reveal any exceptional imbalances between the sexes in Ciudad Juarez, although detailed analysis reveals that migration helped to "erase" some excesses of female population that existed in 1980. By 1990, Ciudad Juarez overall had a sex ratio of 98 males per 100 females.

Ethnic Composition: 1980 and 1990

As noted earlier, the U.S.-Mexico border region is not a single homogeneous area. Large variations can be found in almost any demographic, economic, social or political variable along the length of the border.

Generally, this is true on both sides of the border. However, the ethnic composition of the population varies significantly from one part of the border to another only on the U.S. side. The ethnic composition of the population is important in a demographic context, because both fertility and migration rates vary significantly according to ethnic group, and these rates largely determine the future population patterns changes for the border region.

From west to east along the U.S. side of the border, there is an increasingly large percentage of the population of Hispanic origin. In 1990, 20.0 percent of the population of San Diego County (California) was Hispanic. At the eastern end of the border, the population of Cameron County (Texas) was 81.72 percent Hispanic. Midway along the border, Doña Ana County in New Mexico was 56.51 percent Hispanic and El Paso County, Texas was 66.65 percent Hispanic in 1990.

Figures 3 and 4 contain age-sex pyramids of the Hispanic and non-Hispanic population of Doña Ana and El Paso Counties in 1990. Two features of the census data on race and ethnicity should be noted. First, Hispanics are an ethnic group, and not a racial group. Thus, Hispanics may be of any racial group. Second, all census race and ethnicity data are now (since 1980) collected on the basis of self-identification. In earlier census years, this was not the case.

In 1980, 52.1 percent of the population of Doña Ana County was Hispanic. By 1990 (Figure 3), the Hispanic population represented 56.4 percent of the total population of Doña Ana County. In 1990, Hispanics outnumbered non-Hispanics in the eight youngest age groups (those 39 years old and younger). To be sure, the school-age population has changed dramatically in Doña Ana County in terms of ethnicity.

Figure 3 displays age and sex pyramids for the Hispanic and non-Hispanic populations of El Paso County in 1990. In 1980, Hispanics represented 61.9 percent of all persons in El Paso County. Overall, the Hispanic portion of the El Paso population rose to almost 70 percent (69.6 percent) by 1990, which represents a rather dramatic ethnic transformation, especially considering the fact that large populations are involved. In El Paso, the Hispanic population has great demographic momentum the potential for continuing large numbers of births, as there are many future mothers at young ages. As in Mexico, we do not discern any extreme imbalances between the sexes in either El Paso or Doña Ana Counties, although the military base in El Paso is notable for data on non-Hispanics of ages 20 through 30. This ethnic transformation of El Paso County will be taken up again in the following section, in which we discuss migration trends in the region.

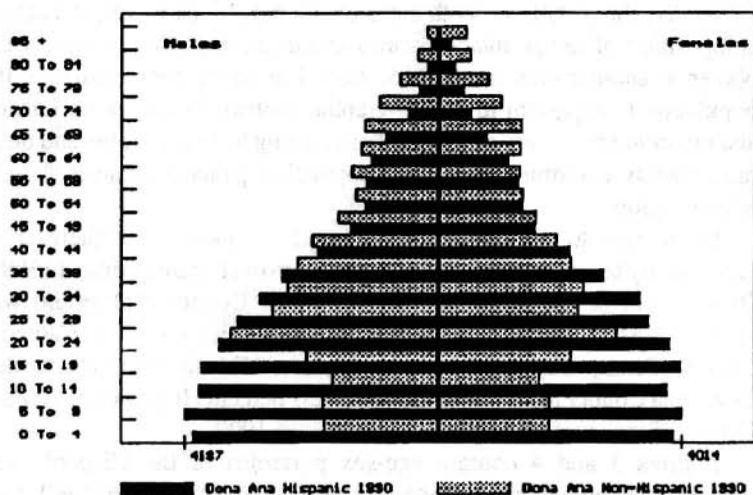


Figure 3. Doña Ana Hispanic 1990 and Doña Ana Non-Hispanic 1990.

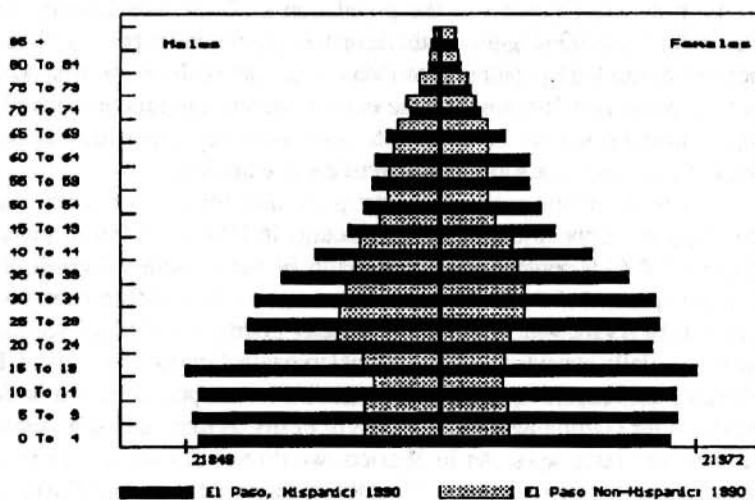


Figure 4. El Paso, Hispanic: 1990 and El Paso Non-Hispanic:1990.

MIGRATION PATTERNS IN THE 1980'S

Both the U.S. and Mexican censuses provide information related to measurement of migration patterns. Direct counts of migrants, however, are not necessarily advantageous for the study of population change due to migration, because such counts depend upon geographic and temporal definitions in order to establish a count of "migrants" in an area. These definitions are not readily comparable across the border. Moreover, sophisticated analyses of direct migration counts are needed in order to put the data into a decade-long frame of reference regarding population change. As a result of these problems, demographers often rely on the technique of residual net migration estimation (see for explanation, Shyrock and Siegel, 1975:594-596). This technique requires relatively little information, and the results are rather robust, especially when, as in our application, modern census technologies are employed and calculations involve relatively large populations.

Residual net migration estimation requires data from two censuses, and estimates of survival ratios for the populations. Our calculations employ census counts by age and sex from the 1980 and 1990 U.S. and Mexican censuses. On the U.S. side, we have also disaggregated the El Paso and Las Cruces census counts into Hispanic and non-Hispanic populations. The logic of the estimation is to "survive" an age cohort from 1980 to 1990, and compare the survived count with the actual enumerated count. If there are more people than expected, based upon survivorship in the later census, then the difference is the net immigration, and if fewer than expected are counted in the 1990 census, then outmigration has occurred. Survival rates have been obtained from three sources. For the Hispanic population in El Paso and Las Cruces metropolitan areas, survival rates were adapted from a series prepared by the U.S. Bureau of the Census (1986) using "middle series" U.S. Hispanic mortality, as estimated for 1982. For the non-Hispanic population on the U.S. side of the border, we employ survival rates, again prepared by the U.S. Bureau of the Census (1989), for the U.S. white population, "middle series" mortality, estimated for 1986. For Ciudad Juarez, survival rates have been prepared, using model life tables for Latin American countries (United Nations 1982) based upon published estimates of Mexican expectations of life, 1985-1990, 66 years for males, and 72 years for females (United Nations, 1991).

The assignment of a difference between survived and enumerated population to net migration requires an assumption that there is no net difference in the quality of a census count at two points in time. No sufficiently detailed empirical investigations are yet available for our study

areas, and indeed no local area undercount estimates by age and sex for either our U.S. or Mexican study areas are ever likely to be made. Suffice to say that various groups on both sides of the border have claimed for years, and now claim massive undercounts in the study area. These claims, however, cannot be quantified for our analyses.

In Doña Ana County we calculate a total of about 21,500 net immigrants during the decade among those alive in 1980. Residual net migration estimates do not include immigration among those not alive in the 1980 census count, and so we underestimate slightly the total migration to the county. Using actual birth and death counts, the county had a total of about 22,800 net immigrants from 1980 to 1990 (New Mexico Department of Health, 1993:6). The 1,300 difference is not identifiable as migration in our calculations, and is simply part of the 1990 count of persons under 10 years of age, in which category we cannot separately estimate migration. Among non-Hispanic males and females we find net immigration at all ages, except ages 20-24 in 1980. The net outmigration in the 20-24 year old age group reflects the impact of the university in Las Cruces. The college population results in swollen immigration at ages 10 to 14 in 1980, and thus ages 20-24 in 1990, with complementary outmigration after graduation ages have passed. Unlike the pattern for Anglos, we find for Hispanics depressed levels of net immigration at graduation ages, but we do not see absolute net outmigration. Hispanic net immigration to Doña Ana county is especially concentrated at younger ages, while non-Hispanic migration to the Las Cruces area favors the older ages. While the numbers are in the hundreds (not thousands as some local boosters suggest), Doña Ana County experienced retirement aged net immigration, especially of the Anglo population. These patterns portend an aging, and proportionately shrinking non-Hispanic population in the Las Cruces area, with a relatively young Hispanic population, and considerable future momentum as these Hispanic immigrants have children in the future. We cannot know from our analyses where these migrants are moving from, and it would be incorrect to presume all U.S. border Hispanic immigration to be from Mexico. Indeed, in the late 1970's, Las Cruces experienced its greatest share of migration from other New Mexico counties rather than from either El Paso or Ciudad Juarez (Williams, 1987:6).

In contrast to Doña Ana County, El Paso County net migration figures are sharply different for Anglos and Hispanics. Total net migration to El Paso during the 1980's was estimated as 32,739 or about only 1.5 times as much as net migration to Doña Ana County, in spite of the much larger population of El Paso. Part of the reason for the discrepancy is the fact that the Anglo population of El Paso County experienced a net outmigration

of 13,643 persons during the 1980's. This net outmigration was offset by net immigration (or perhaps inmigration) of 46,382 Hispanic persons.

In Ciudad Juarez, net migration totaled 79,021 persons, with 45,508 males and 33,514 females estimated. Thus, in Ciudad Juarez, migration was male-dominated. Net immigration is especially concentrated at younger ages (24 years old and younger) in Ciudad Juarez. In order to discern the migration impacts more clearly, we have constructed a table with migration rates by age and sex. The rates shown in table 3 relate the absolute numbers of migrants to the initial population in the appropriate age grouping in 1980. Thus, as an example from Doña Ana County, 1,883 net immigration of non-Hispanic (overwhelmingly Anglo) males ages 20 to 24 was estimated during the 1980's, based upon 1,560 10 to 14 years old in 1980, and 3,426 20 to 24 years old counted in 1990. The 1,883 net migration is a 121 percent increase for the age cohort of 10 to 14 years old in 1980, or a rate of 1.21 during the decade. Ages in the table of net migration rates are indexed according to the ages at the end of the decade.

In the Doña Ana County example, net migration was 121 percent for 10 to 14 year old becoming 20 to 24 years old in 1990. This is the highest rate observed among all groups in Doña Ana County, reflecting the impact of the university. Aside from the college experience, we find that non-Hispanic rates are highest at ages beyond family formation, particularly the fifties and sixties, while Hispanic immigration rates tend to be high at family ages, young adult ages and childhood ages. Clearly, the Las Cruces metropolitan area has grown due to net immigration of the Hispanic population in particular. However, the pattern is one of family migration, and not some distorted picture of either males or females alone, and at restricted age ranges. In contrast, non-Hispanic migration patterns are somewhat unusual, with a pattern associated with a college population, and relatively less family aged migration, and with notable "retirement" migration.

In Las Cruces, non-Hispanic migration patterns are likely to contribute relatively less to future growth potential, since there is only modest net immigration at family ages. In El Paso we see an even sharper distinction between non-Hispanic and Hispanic patterns, resulting in actual population decline among El Paso non-Hispanics in the 1980's. Net outmigration took place among both males and females for non-Hispanics at all ages except for males (15 to 24 in 1990). Among females at these ages, the net outmigration is relatively small. As in Las Cruces, El Paso contains a substantial university population, although it is proportionately smaller than that of the Las Cruces area. However, also affecting these ages is a large military base. It would appear from these data that without the college and the military, El Paso non-Hispanic outmigration would

probably have been even greater during the 1980's, exceeding our calculated estimate of a net loss of about 13,600 persons. However, the rates of outmigration at most ages are not generally over ten percent, while we find net immigration rates for other groupings in El Paso and Las Cruces frequently exceeding ten percent.

Net immigration characterized the 1980's for the El Paso Hispanic population. As we saw in the Las Cruces area, El Paso experienced substantial immigration among Hispanics, especially at family ages, the thirties and forties as well as childhood ages. There is a distinct imbalance between the sexes, with 6,000 more women net immigrants to El Paso than men. By age, the excess females are especially apparent at late teen and young adult ages. These migration flows contribute to a notably female dominant Hispanic population in El Paso.

Our analysis suggests that in Ciudad Juarez, net immigration was having its greatest impact at younger ages (under age 25). We would expect that the migration of children would be with accompanying adult family members, but it appears that the families that do come to Ciudad Juarez are large families. The rates at younger ages are higher than at the parental ages. The Ciudad Juarez data also suggest substantial teenage immigration which may not reflect familial migration.

Overall, migration accounts for a smaller portion of the decade's growth in Ciudad Juarez than does natural increase. We do not have actual birth and death counts, but more than 175,000 children under age 10 were counted in the 1990 Ciudad Juarez, census while about 79,000 persons migrated into the area at ages ten and over in 1990. With a young population, and substantial new immigrants among the young, Ciudad Juarez contains demographic momentum.

PROSPECTS FOR THE FUTURE

A population projection is the mathematical result of the application of a series of assumptions about changing population forces acting upon some population. In contrast, a population forecast suggests some judgment about the likelihood of the assumptions being true (Pressat, 1985:85 y 185). We have explored in a tentative fashion the projected results where the population forces of the 1980's held constant through the 1990's and beyond. Specifically, we have taken the 1990 population by age, sex, and ethnic origin on the U.S. side of the border, and held the survival ratios and migration rates constant for the future decade. We have used the common "child-woman ratio" technique to approximate the production of "births" for each projection group (Murdock and Ellis, 1991:124-126).

TABLE 3. Estimated Net Migration Rates by Age, Sex and Ethnicity: 1980-1990.

(end age)	Cd. Juarez	El Paso		Las Cruces	
	1980-90	Hispanic 1980-90	Non-Hispanic 1980-90	Hispanic 1980-90	Non-Hispanic 1980-90
Males (end age)					
0 to 4					
5 to 9					
10 to 14	0.24229	0.27620	-0.10549	0.46683	0.12787
15 to 19	0.23264	0.23513	0.01418	0.42607	0.46766
20 to 24	0.31453	0.02837	0.33163	0.35157	0.20680
25 to 29	0.14434	0.01468	-0.13356	0.05675	0.10919
30 to 34	0.11116	0.18479	-0.30728	0.09025	-0.21705
35 to 39	0.18324	0.18122	-0.14681	0.30267	0.08619
40 to 44	0.10488	0.16148	-0.05122	0.34651	0.16347
45 to 49	0.09504	0.15839	-0.04807	0.21218	0.27761
50 to 54	0.06025	0.09905	-0.05613	0.24730	0.20176
55 to 59	-0.00669	0.11258	-0.06050	0.16275	0.25800
60 to 64	0.01015	0.10030	-0.06012	0.18159	0.33139
65 to 69	-0.00828	0.13089	-0.02392	0.22311	0.34784
70 to 74	-0.00425	0.11578	-0.03698	0.14103	0.29421
75 to 79	-0.00192	0.10899	-0.01127	0.08862	0.19612
80 to 84	0.04724	0.09253	-0.01111	0.11848	0.10074
85 +	0.09278	0.01817	-0.07576	-0.01921	0.04109
Females (end age)					
0 to 4					
5 to 9					
10 to 14	0.23978	0.28706	-0.13105	0.44130	0.13562
15 to 19	0.19864	0.26125	-0.08386	0.47003	0.55781
20 to 24	0.27829	0.12362	-0.00823	0.39317	0.94202
25 to 29	0.09015	0.10364	-0.04140	0.06355	-0.03657
30 to 34	0.03765	0.20572	-0.11991	0.11101	-0.21225
35 to 39	0.07124	0.21051	-0.14577	0.28771	0.10605
40 to 44	0.06037	0.16711	-0.06499	0.28871	0.16267
45 to 49	0.02203	0.14920	-0.09292	0.26413	0.20632
50 to 54	0.03313	0.10800	-0.09178	0.13749	0.21207
55 to 59	-0.05966	0.10805	-0.08490	0.15493	0.19715
60 to 64	-0.01022	0.11990	-0.07431	0.12541	0.30900
65 to 69	-0.05906	0.13050	-0.04262	0.17845	0.28206
70 to 74	-0.07595	0.12641	-0.04397	0.14065	0.22633
75 to 79	-0.08115	0.12704	-0.03812	0.14437	0.15000
80 to 84	0.00557	0.08757	-0.00651	0.07506	0.15000
85 +	0.10102	0.01083	-0.08699	0.01115	0.03039

The results are projections, since they truly only extrapolate the demographic forces of the recent past, and make no judgments about whether or not fertility will fall or rise, or whether employment will grow or shrink, or whether or not death rates will fall. However, we do find that these baseline projections are useful as the starting point for forecasts (which we are not preparing), since they report on the consequences of the patterns of forces as they act upon the age distribution of 1990. Thus, if fertility, mortality and migration patterns do not change, the baseline projection will suggest the trends which are already built into the age, sex, and (in the U.S.), ethnic structure of the areas.

In 1990, as we saw earlier, about 1.5 million persons were counted in the greater border metropolitan area. We project that if the rates of the components of population growth seen in the 1980's continued into the 1990's and the next century, the area would be slightly over 2 million in total population in 2000, and have more than 2.6 million persons in 2010. El Paso's growth rates would lag behind the rates of Ciudad Juarez and Las Cruces. In spite of some slowdown in rates of population growth due to age composition changes, Ciudad Juarez would have almost 1.5 million persons in 2010 (1,484,531) and Las Cruces would grow to exceed a quarter of a million (261,288) by the same time. Based upon the trends of the 1980's, El Paso would not nearly reach a million population in this projection timeframe (900,993 in 2010).

Perhaps the most dramatic changes in the demography of this border metroplex will be the changes in ethnic balance between Hispanics and non-Hispanics in El Paso and Las Cruces. The changes in El Paso are illustrated graphically by Figures 4 (previously displayed) and 5 which show the age pyramids for the Hispanic and non-Hispanic populations in El Paso in 1990, and the projected populations for 2010. When these Figures are compared, the transformation is extraordinary. In the 1990 census in El Paso, the counts show that non-Hispanics, were still in the majority at the oldest ages. The potential for future change in ethnicity was apparent in 1990, as the relative balance of non-Hispanic and Hispanic populations was showing increasing Hispanic proportions at the younger ages. This reflects, to some extent, migration patterns but also reflects the fertility differentials between Anglo and Hispanic women. By 2010, El Paso's Hispanic population is projected overall at 82 percent and, will dominate at every age, with the school age and labor force age populations being overwhelmingly Hispanic. The non-Hispanic pyramid for 2010 approximates what demographers call a "stationary" population, with almost equal numbers of births and deaths, and consequently no growth from natural increase. In contrast, the Hispanic population in 2010 will

still show the potential for increasing numbers of persons at prime childbearing ages, and thus has the potential for considerable future growth, regardless of migration or fertility rate declines. In Doña Ana County the projection is for 65 percent Hispanic population in 2010, from 56 percent in 1990.

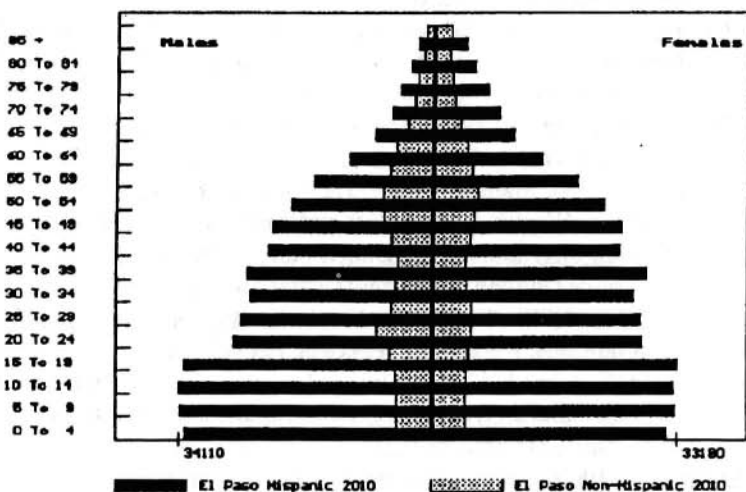


Figure 5. El Paso Hispanic 2010 and El Paso Non-Hispanic 2010.

REFERENCES

- ALBA, Francisco and J. Potter. 1986. "Population and Development in Mexico since 1940: An Interpretation". *Population and Development Review*. 12(1):47-76.
- CHAVEZ, Leo R. 1992. "Defining and Demographically Characterizing the Southern Border of the U.S.", in John R. Weeks and Roberto Ham-Chande, (eds.), *Demographic Dynamics of the U.S.- Mexico Border*. El Paso: Texas Western Press.
- DILLMAN, C.D. 1983. "Border urbanization", in E. Stoddard, R. Nostrand, and J. West (eds.), *The Borderlands Sourcebook*. Norman: University of Oklahoma Press.
- FERNANDEZ, Raul A. 1989. *The Mexican-American Border Region: Issues and Trends*. Notre Dame: University of Notre Dame Press.
- GARCIA y Griego, Manuel. 1989. "The Mexican Labor Supply, 1990-2010", in Wayne A. Cornelius and Jorge A. Bustamante, (eds.), *Mexican Migration to the United States: Origins, Consequences and Policy Options*, San Diego: Center for U.S.- Mexican Studies.
- HANSEN, Niles. 1981. *The Border Economy: Regional Development in the Southwest*. Austin: University of Texas Press.
- HEDDERSON, John. 1983. "Fertility and mortality", in E. Stoddard, R. Nostrand, and J. West (eds.), *Borderlands Sourcebook*. Norman: University of Oklahoma Press.
- HERZOG, L. 1990. *Where North Meets South: Cities, Space and Politics on the United States-Mexican Border*. Austin: University of Texas Press.
- MURDOCK, Steve H. and David R. Ellis. 1991. *Applied Demography: An Introduction to Basic Concepts, Methods, and Data*. Boulder, Westview Press.
- New Mexico Department of Health. 1993. *1991 New Mexico Selected Health Statistics Annual Report*. Public Health Division, Bureau of Vital Records & Health Statistics, Santa Fe.
- PEACH, James. 1984. *Demographic and Economic Change in Mexico's Northern Frontier: Evidence from the X Censo General de Población y Vivienda*. Las Cruces: Joint Border Research Institute.
- 1992. "Income Distribution Along the U.S.-Mexico Border", a paper presented to the 26th Annual Conference of the Regional Science Association held in Chicago, IL. (November).
- PRESSAT, Roland. 1985. *The Dictionary of Demography*. Translation by Christopher Wilson. Basil Blackwell Ltd., Oxford.

- SHRYOCK, Henry S., Jacob S. Siegel, and Associates. 1975. *The Methods and Materials of Demography*. Third Printing (rev.) U.S. Government Printing Office, Washington, D.C.
- United Nations. 1991. "Life Expectancy at Birth by Region, and Country or Area 1950-2025". In *World Population Prospects 1990*. Department of International Economic and Social Affairs, Population Studies, No. 120, New York.
- United Nations. 1982. "Ten-year Life Table Survival Ratios". *Model Life Tables for Developing Countries*. Department of International Economic and Social Affairs, Population Studies, No.77, New York.
- U.S. Bureau of the Census. 1989. "Projections of the Population of the United States, by age, sex and race: 1988 to 2080". *Current Population Reports*, Series P-25, No. 1018. U.S. Washington, D.C.: Government Printing Office.
- U.S. Bureau of the Census. 1986. "Projections of the Hispanic population: 1983 to 2080". *Current Population Reports*, Series P- 25, No. 995. Washington, D.C.: U.S. Government Printing Office.
- Weeks, John R. and Roberto Ham-Chande (eds.). 1992. *Demographic Dynamics of the U.S.-Mexico Border*. El Paso: Texas Western Press.
- Williams, James D. 1987. *New Mexico Population Migration Trends and Patterns Part II: Origins and Destinations, An Analysis of Migration Flows Within, To and From New Mexico, 1975-1980*. Agricultural Experiment Station Research Report 601, Las Cruces, New Mexico.

APPENDIX A

Sources of Census Data: The interested reader or serious scholar will find that the following outline of data sources can be used to check our figures against the original sources or to obtain more detailed data on the topics we have covered.

United States Data:

1940. U.S. Department of Commerce, Bureau of the Census, *Sixteenth Census of the United States: 1940, Population, Characteristics of the Population*, Part 5 (New Mexico: Table 22, pp. 982-988) and Part 6 (Texas: Table 22, pp. 807-857). Washington, D.C.: U.S. Government Printing Office (1943).
1950. U.S. Department of Commerce, Bureau of the Census, *Census of Population: 1950, Volume II, Characteristics of the Population*, Part 31 (New Mexico: Table 41, pp. 43-48) and Part 43 (Texas: Table 41, pp. 161-204). Washington, D.C., U.S. Government Printing Office (1952).
1960. U.S. Department of Commerce, Bureau of the Census, *Census of Population: 1960, Volume I, Characteristics of the Population*, Part 33 (New Mexico: Table 27, pp. 41-46) and Part 45 (Texas: Table 27, pp. 182-244). Washington, D.C.: U.S. Government Printing Office (1961).
1970. U.S. Department of Commerce, Bureau of the Census, *1970 Census of Population, Volume I, Characteristics of the Population*, Part 33 (New Mexico: Table 35, pp. 64 to 71) and Part 45, Section 1, (Texas: Table 35, pp. 272-336). Washington, D.C.: U.S. Government Printing Office (May 1973).
1980. U.S. Department of Commerce, Bureau of the Census, *1980 Census of Population, Volume I, Chapter B, General Population Characteristics*, Part 33 (New Mexico: Table 45, pp. 88-95) and Part 45 (Texas: Table 45, pp. 466-530). Washington, D.C.: U.S. Government Printing Office, (August 1982).
1990. U.S. Department of Commerce, Bureau of the Census. *1990 Census of Population and Housing, Summary Tape File 1A*. (CD-ROM Machine Readable Data File). Washington, D.C.: Bureau of the Census, Data User Services Division (September 1991).

México

1940. Dirección General de Estadística, México. *VI Censo General de Población y Vivienda: 1940. Microfilm, Library of Congress Photoduplication Service. Reel 4, Chihuahua.*
1950. Dirección General de Estadística, México. *VII Censo General de Población y Vivienda: 1950. Chihuahua.* Cuadro 2-B, pp. 30-31. México, D.F.: Dirección General de Estadística, 1953.
1960. Dirección General de Estadística, México. *VIII Censo General de Población y Vivienda: 1960. Chihuahua.* Cuadro 6, pp. 143-176. México, D.F.: Dirección General de Estadística, 1963.
1970. Instituto Nacional de Estadística Geografía e Informática (INEGI). *IX Censo General de Población y Vivienda, Estado de Chihuahua, Volumen I, Cuadro 3,* pp. 13-20. México, D.F.: INEGI, 1973.
1980. Instituto Nacional de Estadística Geografía e Informática (INEGI). *X Censo General de Población y Vivienda, Estado de Chihuahua, Volumen I, Tomo 8. Cuadro 1,* pp. 6-57. México, D.F.: INEGI, 1984.
1990. Instituto Nacional de Estadística Geografía e Informática (INEGI). *XI Censo General de Población y Vivienda, Resultados Definitivos Tabulados Básicos, Tomo I, Chihuahua.* Cuadro 2, pp. 3-50. México, D.F.: INEGI, 1991.