

Projecting the Population of California by Nativity and Period of Arrival to 2020

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An earlier version of this paper, titled "Projecting the Population of California by Nativity to 2020," was released in November, 2000, on projections developed for the California Housing Futures Project and sponsored by the Fannie Mae Foundation, California Department of Housing and Community Development, and the Great Valley Center, whose support is gratefully acknowledged. This paper incorporates more current information on the rate of immigration to the U.S. and California's share of U.S. immigration.

Projecting the Population of California by Nativity and Period of Arrival to 2020

A California Demographic Project Working Paper
by John Pitkin, Analysis and Forecasting, Inc.

This paper describes newly developed projections of the nativity of California's population, by whether foreign or U.S. born and by period of arrival in the U.S. The projections are benchmarked to be consistent with the 1998 projections California State Department of Finance and make it possible for the first time to track the effects of migration and aging on cohorts of immigrants in the state.

After more than tripling between 1970 and 2000, from 8.6 percent to 24.4 percent, the foreign-born share of California's population is projected to reach a plateau of slightly over 26 percent by 2020. Over the period from 2000 to 2020, substantial shifts in the composition of the foreign-born population are projected.

- Immigrants who arrived in the U.S. more than twenty years ago are projected to increase to 14.4 percent of the state's population from an estimated 7.9 percent this year.
- Conversely, the number of new immigrants, those who have been in the U.S. less than ten years, is projected to level off after more than doubling, to 3.3 million, between 1980 and 1990.
- Barring an unforeseen increase in emigration, over the next 20 years there will be large increases in the number of middle-age and older immigrants; 35 to 64 year olds are projected to rise by 58 percent and 65 year olds and older to rise by 132 percent, while no growth in the population of younger immigrants is projected.
- Barring an unforeseen increase in immigration, the population of younger, newer immigrants will level off, and the children of earlier immigrants will make up a large and increasing share of the statewide population; native-born Latinos up will be 4.8 million or 77 percent and native-born Asian-Americans up 1.6 million, or 105 percent from 2000 to 2020.

These projections adapt the cohort-component methodology for projecting the national population by nativity, origin, and duration of U.S. residence that was developed by the author for the Fannie Mae Foundation's Immigration Research Project in 1996. This methodology and its more current and specific assumptions are found to be generally consistent with the Census Bureau's recent (2000) projections of the national population by nativity, race, and ethnicity.

The new projections reveal much new information about prospective changes in the population of California. Earnings, household resources, tastes, social position and behaviors vary substantially by nativity and duration of U.S. residence. Projections of the size and composition of the foreign-born population therefore have important implications for future capital, infrastructure, human service and other needs. They are being used as inputs to the California Demographic Futures Project, the California Department of Housing and Community Development's housing needs targets and the University of Southern California's Transdisciplinary Tobacco Use Research Project, and are now being made available for use by others.

Summary of Projections

The new projections of California's population by nativity and time of arrival in the U.S. are part of a well-documented line of research that is described in this paper. The new projections are the only current state-level population projections that break out the foreign-born population or its time of arrival in the U.S. They are directly descended both from earlier (1996) national and prototype subnational projections of population, nativity, and time of arrival, by Analysis and Forecasting, Inc., ("AFI") and the 1998 projections by the Demographic Research Unit of the California Department of Finance ("DoF") of the state's population by age, sex and race or ethnicity. Both the earlier and updated national projections are very comparable with the Middle Series 1996 and 2000 projections of the Census Bureau (Day, 1996, and Hollman, Mulder and Kallen, 2000, "HMK").

Summary of the State Projections to 2020

The new projections reveal substantial shifts in the growth and composition of California's population. Some of these shifts are well underway while others are projected to emerge in the next two decades.

1. While the state's foreign-born population is projected to continue to increase at an average rate of 174,000 per year to nearly 12 million in 2020, its rate of growth is only slightly faster than the projected growth of the native-born population. As a result, the foreign-born share of the state's population is projected to increase by just 1.9 percent from 24.3 to 26.2 percent. (Table 1, third column.) This relative stability contrasts sharply with the decade between 1980 and 1990 when the foreign-born share of the state's population more than doubled.
2. The number of long-term immigrants, those who arrived in the U.S. more than 20 years ago, is projected to more than quadruple between 1990 and 2020, rising from 21.9 percent of the total foreign-born population to 55.1 percent. By contrast, over the same period, the number of newly arrived immigrants, who arrived in the previous 10 years, is projected to stable to decline to slightly below its 3.3 million peak in 1990.¹ (See Table 1.)

At the same time as cumulative increases in long-term immigrants are sustaining the growth of the total foreign-born population, the children of immigrants are projected to make large contributions to increases in the native-born population. From 1990 to 2020, native-born Latinos and Asian Americans are projected to increase their shares of the state population, Latinos by 67 percent to 24.1 percent and Asians by more than double, to 6.9 percent. (See Table 2.)

One distinctive feature of the projections is how the number of immigrants who arrived in any particular period declines over time. For example, the population of 3.32 million foreign-born residents who had arrived during the 1980s and were enumerated in 1990 is projected to fall by almost a third, to 2.32 million in 2020. As can be seen in Table 1, almost half of the decrease occurs in the 1990-2000 decade. Most of this decrease is attributable to a high rate of emigration during this

¹ Year of arrival is taken from the 1990 census for the base foreign-born population. For non-refugee legal immigrants, year of arrival is taken as the year of legal admission for the 1990-94 period and as the projected year of arrival thereafter. For refugees and undocumented immigrants, year of arrival is taken as the actual year of arrival for 1990 through 1994 and as the projected year of arrival thereafter.

part of the migration cycle when the other negative forces, domestic migration and mortality, are weaker.

Appendix 1 contains a summary of the projections by age, race/ethnicity, and nativity.

	Total	Native Born	All Foreign Born	Foreign Born by Period of Arrival							
				Before 1960	1960-1969	1970-1979	1980-1989	1990-1999	2000-2009	2010-2019	
				1980	23,725,000	20,153,000	3,572,000	956,000	806,000	1,810,000	
1990	29,942,000	23,405,000	6,537,000	678,000	755,000	1,777,000	3,326,000				
2000	34,653,000	26,187,000	8,466,000	488,000	659,000	1,585,000	2,852,000	2,883,000			
2010	39,958,000	29,572,000	10,386,000	318,000	553,000	1,430,000	2,641,000	2,672,000	2,772,000		
2020	45,449,000	33,432,000	12,017,000	181,000	417,000	1,219,000	2,346,000	2,482,000	2,585,000	2,786,000	
Percent											
1980	100%	85%	15%	4%	3%	8%	--	--	--	--	--
1990	100%	78%	22%	2%	3%	6%	11%	--	--	--	--
2000	100%	76%	24%	1%	2%	5%	8%	8%	--	--	--
2010	100%	74%	26%	1%	1%	4%	7%	7%	7%	--	--
2020	100%	74%	26%	0%	1%	3%	5%	5%	6%	6%	6%
1980 (4/1): U.S. Census, 5% Public Use Microdata.											
1990 (7/1): estimate based on U.S. Census, 5% Public Use Microdata.											
2000, 2010 and 2020 (7/1): projections for the California Demographic Futures Project											

	Total	Native Born				Foreign-Born			
		Non-Hispanic				Non-Hispanic			
		White + American	Asian, Pacific	Indian	Latino	White + American	Asian, Pacific	Indian	Latino
		Islander	Black	Islander	Black	Islander	Black	Islander	Black
1980	23,725,000	14,977,000	2,908,000	503,000	1,765,000	1,097,000	1,668,000	767,000	40,000
1990	29,942,000	16,094,000	4,329,000	957,000	2,025,000	1,222,000	3,446,000	1,789,000	80,000
2000	34,653,000	16,235,000	6,205,000	1,527,000	2,220,000	1,392,000	4,484,000	2,472,000	118,000
2010	39,958,000	16,603,000	8,279,000	2,308,000	2,381,000	1,536,000	5,685,000	3,006,000	159,000
2020	45,449,000	16,734,000	10,966,000	3,120,000	2,612,000	1,655,000	6,813,000	3,354,000	195,000
Percent									
1980	100%	63%	12%	2%	7%	5%	7%	3%	0%
1990	100%	54%	14%	3%	7%	4%	12%	6%	0%
2000	100%	47%	18%	4%	6%	4%	13%	7%	0%
2010	100%	42%	21%	6%	6%	4%	14%	8%	0%
2020	100%	37%	24%	7%	6%	4%	15%	7%	0%
Source 1980 (4/1): U.S. Census, 5% Public Use Microdata.									
1990 (7/1): estimate based on U.S. Census, 5% Public Use Microdata.									
2000, 2010 and 2020 (7/1): projections for the California Demographic Futures Project									

Methodology and Assumptions

The new projections of California's population by nativity are produced by a model that was first developed in 1996 to project the national population by nativity for the Fannie Mae Foundation Immigration Research Project (Pitkin and Simmons, 1996, "AFI-FNMAF"). These were the first national projections by nativity and period of arrival in the U.S. and have proven to be closely comparable to the Census Bureau's more recent projections of the national population by nativity (HMK 2000). The national projections of immigration, population and emigration reported here are from an updated version of the AFI-FNMAF projections and differ slightly from those reported earlier. The main changes in these "AFI" projections are to update the assumptions about the country of origin of legal immigrants and the net numbers of undocumented immigrants from Mexico and to extend the period of projection to 2020.²

In 1996, AFI-FNMAF also made trial projections of the population, by nativity, for eight subnational regions, including California, based on the national model and projections. These revised prototype projections have been updated in line with the national update and also to reflect recent shifts in the share of new U.S. immigrants who are locating in California. Comparisons of these and earlier state projections with recent estimates show that the domestic migration rate assumptions on which they critically depend are unreliable. The need for more reliable, current migration rates has now been met by linking the projections for California with the "credible central" projections put out by DoF in 1998.

The following description of the methodology describes these important earlier steps in the development of the new projections for California.

Previous Projections: U.S. Population by Nativity

Projections of the national population by nativity are useful prototypes for projecting California's population by nativity. Both at the state and national level, such projections must keep separate accounts of the native and foreign-born populations and distinguish between domestic and international migration flows. In addition, state-level projections need to split the flows of interstate migrants into foreign and native-born components. National projections are also helpful inputs to state projections because the projected national population by nativity is the preferred basis for projecting the nativity status of interstate migrants.

The 1996 AFI-FNMAF projections to 2010, by country of birth, age, and period of arrival in the U.S., were developed to meet these needs. Both the 1996 AFI-FNMAF and 2001 AFI projections are made with a five-year model that is calibrated closely, though not exactly, to the Census Bureau 1993 Series A projections (Day 1993). We compare the results of the AFI projections with the projections

² New legal immigrants are now distributed among countries of origin as all immigrants admitted in fiscal years 1996-1998 (U.S. Immigration and Naturalization Service, 1998-2000). In line with the Immigration and Naturalization Service's latest (2000) estimates, net annual inflows of undocumented immigrants from Mexico are raised by 50 thousand above the earlier estimates by Warren (1994) to 148 thousand.

recently issued by the Census Bureau³ (Hollman, Mulder and Kallen 2000, “HMK”). These are by nativity (native or foreign-born), race, and ethnicity as well as by age and sex.

AFI Series A

AFI projects the national population in ten country-of-birth categories, nine foreign plus the U.S, and by age. These projections also break down the foreign-born population by period of arrival in the United States, starting with pre-1960 and 1960-1969 and five-year intervals thereafter. In Series A, undocumented immigrants are assumed to have the same emigration rates as for legal foreign-born residents of the same age, country of origin and number of years residence in the U.S.⁴

They incorporate the following assumptions about future components of change.

1. Migration of the foreign-born population.

Legal immigration and refugee arrivals, 788,000 per year,⁵ distributed among national origins in the same proportions as all legal admissions and refugee arrivals in fiscal years 1991 through 1994 (U.S. Immigration and Naturalization Service 1995);

Illegal immigration, 310 thousand per year, gross,⁶ or 275 thousand per year net (in 1993-1995), distributed among national origins in the same proportions as the 1988–1992 increase in the population of undocumented immigrants estimated by Warren (1994); and

Emigration, projected based on fixed (1980-1990) emigration rates by country of birth, age, sex and time since arrival in the U.S.;⁷ and

2. Migration of the native-born population.

Immigration, 10,000 civilian citizens and 5,000 (net) from Puerto Rico per year;

Emigration, 25,000 civilian citizens per year; and

Armed Forces, age-specific net migration as estimated for 1990–1992 by Day (1993) assuming no net change in U.S. Armed Forces stationed abroad.

3. Births (all native-born).

³ Although they were not issued as an official Census Bureau publication in the P-25 series and underwent “a more limited review than official Census Bureau publications,” (HMK 2000) they have been posted in great detail on the Census Bureau’s web site www.census.gov.

⁴ In the Series B projection, AFI assumes emigration rates for the undocumented population of 100 percent over five years. This projection series is thought to be useful only for analytic purposes and not for planning.

⁵ This compares with an average of 784,000 per year in FY 1991 through 1994 and 771,000 per year in FY 1995 through 1998, not including legalizations under the Immigration Reform and Control Act (IRCA) (U.S. Immigration and Naturalization Service 1995 and 1999). It is .2 percent below the 800,000 per year rate in the Census Bureau’s 1993 and 1996 projections (Day 1993 and Campbell 1996).

⁶ 275,000 a year is the same as the average in 1992 through 1996 estimated by the U.S. Immigration and Naturalization Service (2000). The gross rate is estimated on the assumption of equal emigration rates for the undocumented and other foreign-born population. In AFI-FNMAF 1996 Series A, gross undocumented immigration was calibrated to yield a net average annual increase of 225,000 the same as assumed in the Census Bureau’s 1996 projections (Campbell 1996).

⁷ Emigration rates from 1980-1990 estimates by Ahmed and Robinson (1994) and applied to the projected foreign-born population result in annual average foreign-born emigration, including the undocumented residents, of 222,000 between 1995 and 2000, and 244,000 between 2005 and 2010. These flows compares with a fixed rate of 195,000 per year in the Census Bureau’s 1993 and 1996 projections (Day 1993 and Campbell 1996), not including undocumented emigration. In calibrating Series A for 1993-1995, undocumented emigration for 1993-1995 was calculated to be 35,000 annually. The Series A projection implies but does not break out future growth in this flow as the undocumented population increases.

Annual total births projected by Day (1993). As will be seen below, the differences between the population of childbearing age in 2010 in Day and AFI are negligible. Therefore, the projection is virtually equivalent to applying the Census Bureau middle series fertility rates to the projected population of women of childbearing age.

4. Deaths.

Deaths, projected using the Census Bureau's (Day 1993) middle series projected mortality rates for the entire U.S. population by race/ethnicity, age, and sex.⁸

The same schedules of fertility and mortality rates are assumed for the entire population, both foreign and native-born.⁹

The base period population for the AFI projections for 1993 is factored into the five-year projection periods by an indirect method. Starting from the 1990 census, 1990–1995 components of change are calculated as a pro-rated blend of actual migration¹⁰, births, and deaths¹¹ for 1990–1993 and the projected rates for 1993–1995. The effects of coverage error (undercount) at the rates estimated in 1990 are included in the projections by means of the Census Bureau “inflation-deflation” method (Hollman 1989 and Pitkin and Simmons 1996).

Comparison of National Projections

The Census Bureau's 2000 projections (HMK) provide a useful benchmark for the national population by nativity. HMK project three different levels of population growth based on different assumed components of change. Of these, the Middle Series is the most relevant prototype and benchmark.

The one substantial difference between the methodologies of AFI and HMK is the treatment of emigration rates of the foreign-born population. While the two projections both use emigration rates estimated by Ahmed and Robinson (1994) only AFI incorporates the variations by duration of U.S. residence found by Ahmed and Robinson. Although emigration trends upward in both series, the levels are different. For the entire period between the late 1990s and 2010, total emigration of the foreign-born is about half a million higher in HMK than AFI.

In addition to this methodological difference, there are differences in the assumed components of change. As the HMK projection is more recent than AFI, the five years of additional observed data on components of change might lead to different base and near-term assumptions. HMK also incorporates updated assumptions about long-term trends in all three components.

⁸ Race and ethnic-specific mortality schedules are applied to the different national origin groups based on the racial composition of the origin groups in the 1990 Census and other factors (Pitkin and Simmons 1996, appendix B).

⁹ It has been documented that average family sizes are larger for immigrants than for native-born women of similar ethnicity, e.g. Johnson (1999). It would be a valuable refinement of these projections to use different fertility schedules for native and foreign-born women. The near-term effects would be on the projected numbers of children. However, the impact on the population of adults forming households and needing housing in 2020 is very small, since the vast majority of this population was born before the year 2000. The evidence on differences in mortality rates between nativity classes is mixed, and there is no generally accepted alternative to the assumption that they are equal for the two groups.

¹⁰ Migration estimated at same rates as projections, above.

¹¹ Mortality rates for entire population estimated by scaling 1993 age-sex-race specific death (Day 1993) rates to pro-rated 1990-1993 reported deaths (Vital Statistics), separately for each race and sex.

Immigration is fixed in AFI at 1,078,000 per year and fluctuates in HMK from a peak of 1,272,000 in 2002 to a low of 1,036,000 in 2010, averaging 1,127,000 per year between 1999 and 2020.¹² These figures include total documented in-migration, immigration of civilian citizens, net increase in undocumented migrants, and net migration from Puerto Rico to the U.S.¹³

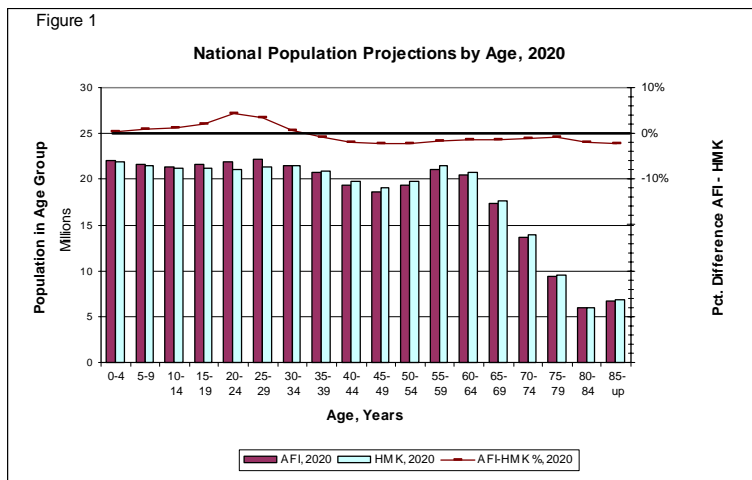
Emigration of foreign-born legal permanent residents increases with the size of the foreign-born population in both projections but is higher in HMK than AFI, as noted above.¹⁴

Fertility is very similar in the two projections.¹⁵

Mortality is very slightly higher in AFI than HMK.¹⁶

The two sets of assumptions about international migration flows for five major race groups are summarized in Table 3 (below).

The HMK Census total population is just .02 percent below AFI in 2020. However, as can be seen in Figure 1, there are differences in the age distribution. The proportional age-specific differences are plotted at the top of the figure (scale on the right axis). AFI is relatively high in the 20-29 bracket and (by a reduced amount) in the top age brackets but runs below the HMK projection by more than one percent at ages 35 to 64. For the total population in 2020 old enough to form households, age 20 and over, the HMK projection is .4 percent above AFI.



As a consequence of the different assumptions about immigration and emigration, the largest proportional and absolute differences between the AFI and HMK projections are found in the foreign-born share of the population. By 2020, the foreign-born population in the former, 37.2 million, is 2.7 percent below the 38.3 million in the latter projection. As can be seen in Table 3, the two assumptions about immigration are very similar in the benchmark years of 2010 and 2020, and emigration is consistently higher in the HMK

assumptions. Therefore, the difference in net migration results entirely from the substantially higher assumed immigration in HMK in the early years of the projection period. The 2020 difference in total population is, in fact, smaller than in 2010, when it is 4.0 percent.

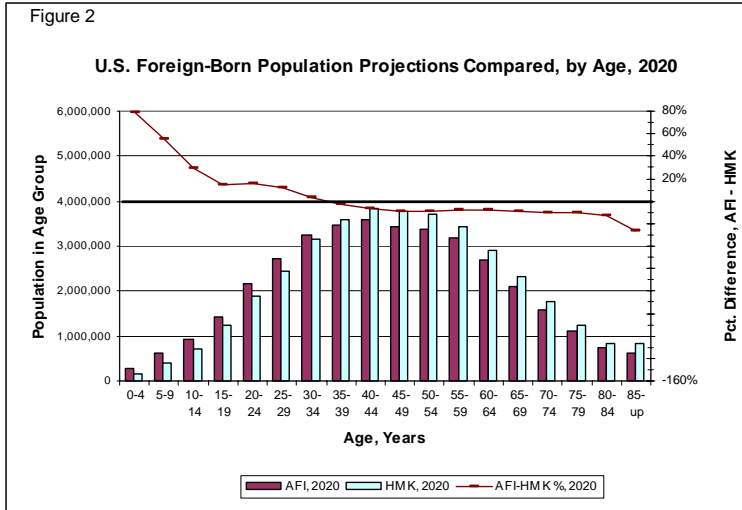
¹² Immigration varies in the HMK series “to reflect current trends in specific aspects of migration, and to gauge their likely future direction and magnitude.”

¹³ As such, they include both gross and net flows as well as small numbers of U.S. citizens.

¹⁴ Only a small portion of the difference can be attributed to the larger foreign-born population in HMK. Though AFI incorporates the variations in migration rates from Ahmed and Robinson (1994), HMK apparently does not. This difference in methodology may account for the higher out-migration in HMK.

¹⁵ AFI fertility schedule is from Day (1996).

¹⁶ Mean life expectancy at birth, for both sexes and all races combined, is 80.6 years in 2025 compared with 79.1 years in AFI. AFI survival rates are from Day (1996).



The differences between the two projections of the *foreign-born* population for 2020 show a clear age pattern (Figure 2).

- At ages up to 24, the AFI projections are higher, by up to 79 percent, for the 0–4 age group, which, it should be noted, has a

Table 3
International Migration Assumptions of AFI and HMK

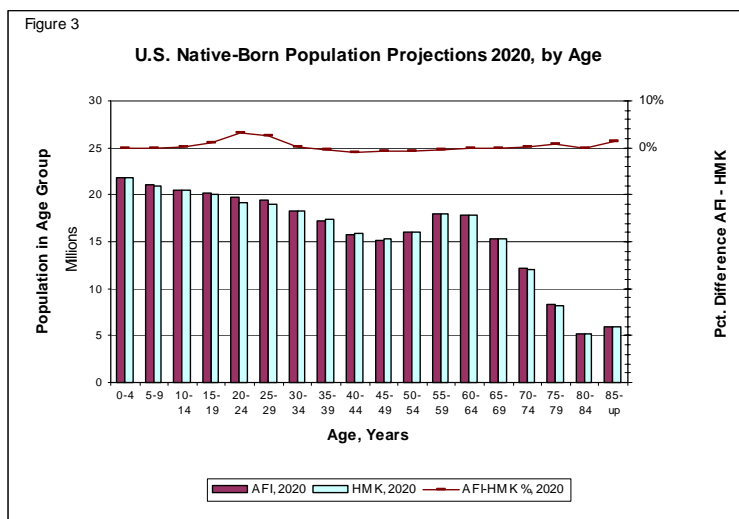
	AFI			Lowest 2025	HMK			
	1995-2000	2005-2010	2015-2020		1999	Middle 2010 2020	2025	Highest 2025
<i>Gross Immigration (less departures of illegal residents*)</i>								
Hispanic	508	508	508	170	530		364	740
White, Non-Hispanic	234	234	234	183	290		331	618
Black, Non-Hispanic	92	92	92	79	120		169	365
American Indian, Non-Hispanic	1	1	1	1	2		3	6
Asian/Pacific Islander, Non-Hispanic	243	243	243	195	294		403	841
Total	1,078	1,078	1,078	628	1,236	1,036	1,090	1,270
<i>Emigration of Legal Residents**</i>								
Hispanic	47	59	68	84	62		62	46
White, Non-Hispanic	95	99	102	200	129		151	119
Black, Non-Hispanic	16	20	22	56	27		50	47
American Indian, Non-Hispanic	1	1	1	1	1		1	1
Asian/Pacific Islander, Non-Hispanic	52	54	59	102	64		94	89
Total	212	234	252	443	283	322	339	358
<i>Net Immigration</i>								
Hispanic	461	448	440	86	468		302	694
White, Non-Hispanic	139	135	132	(17)	161		180	499
Black, Non-Hispanic	76	72	70	23	93		119	318
American Indian, Non-Hispanic	(0)	(0)	(0)	-	1		2	5
Asian/Pacific Islander, Non-Hispanic	190	188	184	93	230		309	752
Total	866	844	825	185	953	713	751	2,268

* Both projections include net immigration from Puerto Rico, and HMK includes net immigration of temporary legal residents.
** Emigration assumptions include departures of civilian citizens, 25,000 annually in AFI and 48,000 in HMK.

small population base. The peak differences for children must be attributed to the assumed age distribution of new immigrants in the two projections. Though similar over most of the age range, they must be quite far apart below age 15. The source of this discrepancy is not apparent and needs to be investigated.¹⁷

- From age 25 to 34, the age-specific differences are under 5 percent.
- From age 35 to 69, the AFI populations are 6 to 10 percent below those in HMK. The birth cohorts in this age range are in the age of peak migration rates in the years when HMK assumes substantially higher immigration than AFI; they are age 15 to 49 in 2000.
- At ages 70 and over, the AFI projections fall below the HMK by progressively larger amounts to 26 percent at ages 85 and over. This is due to the combined, cumulative higher mortality and lower survival rates as well as those of lower immigration in AFI.

The racial/ethnic composition of the two projections of foreign-born population differs in 2020. The



share of Hispanics is considerably higher in AFI than the HMK (48.7 and 42.5 percent, respectively). This difference is directly attributable to HMK's assumption that immigration from Latin countries will decline rapidly by about a third from a level in 1999 that is *above* that in AFI. In contrast, AFI projects continued immigration from these countries at the same rate as observed during the late 1990s. (The migration assumptions are summarized in Table 1.) As a result, the shares of the foreign-born population that are of the other three major race/ethnic groups

in the AFI projections are lower than in HMK: non-Hispanic whites, 20.5 and 21.4 percent, respectively; Asian and Pacific Islanders, 23.7 and 27.2 percent; and non-Hispanic blacks, 7.1 and 8.9 percent.

Immigration is not a factor for the projected 2020 *native-born* population, and as a result the two projections are much closer than for the foreign-born population, AFI being .4 percent above HMK. The difference between the two total national population projections in 2020 is only 49 thousand; the differences for the projected native and foreign-born populations in opposite directions and almost exactly cancel each other out.

The age-differences for the native-born population peak at under 4 percent for ages 20-29 (Figure 3). This is due to actual fertility having been higher in the 1990s in than was assumed in AFI. On the other hand, the differences in the projected racial/ethnic composition of the native-born population are negligible.

¹⁷ The age distributions of new arrivals in both the 1996 and updated AFI projections are the same as the most recent immigrants in each country of origin group in the 1990 Census PUMS.

In sum, the AFI and HMK Middle Series projections are for a 2020 national population of very similar size and nativity composition. This similarity is to be expected in view of the fact that the two projections start from nearly the same base populations and incorporate similar assumptions about the processes of demographic change. The similarity of the two projections supports the conclusion that the AFI methodology, assumptions, and projections provide a sound framework for projections of state-level population by nativity. At the same time, it must be noted that the 2020 foreign-born population in the updated AFI is somewhat younger and more Latin than in the HMK Middle Series. This is due to specific, identified differences in assumptions about the composition and level of future immigration.

Prototype State Projections

In 1996, also for the Fannie Mae Foundation Immigration Research Project, Analysis and Forecasting, Inc., developed regional population projections by nativity and period of arrival to 2010. These projections were made to study the feasibility of projecting nativity and arrival period for sub national areas. They were for California and seven other regions comprising the entire nation¹⁸ and were based on the 1996 AFI-FNMAF national projections. The purpose of the updated projection presented in this section is analytic. It is calibrated to the 2001 AFI national projection but not to the 1998 DoF projection for California.

Methodology and Assumptions

The AFI prototype regional projections incorporate the following assumed components of change:

1. Migration.

Interstate migration schedules are the mean of the 1975 to 1980 and 1985 to 1990 interstate migration rates. The rates for the two periods are combined so that the projections reflect a broader range of historical experience than the 1985-1990 rates alone; this also has the effect of reducing the sampling variability of the migration rates. They are both based on the number of interstate migrants inferred by comparison of responses to the Census long-form question about place of residence 5 years ago with current place of residence and are relative to the total number of residents in the state of origin. These five-year rates are smoothed and describe the flows of five-year age-sex categories among the eight regions of between one and 41 states.¹⁹

Immigration, from the national model, is apportioned among regions in the same shares as during the period fiscal years 1996-1998.²⁰

Emigration is calculated nativity-duration specific schedules and is proportional to population.²¹

2. Births (all native-born).

¹⁸ Texas, Florida, New York-New Jersey, Illinois, District of Columbia-Maryland-Virginia, Massachusetts “gateway” regions and the other 41 states combined.

¹⁹ For the foreign-born population, there are schedules for each country-of-origin and time since arrival in the U.S.; for the native-born population there are schedules for each race.

²⁰ Intended state of residence by country of origin, as reported by the Immigration and Naturalization Service. This is revised from the AFI-FNMAF prototype state projection, which is based on the state shares in fiscal years 1990-1994.

²¹ *i.e.*, uniform emigration rates across states/regions within each age-race-sex category.

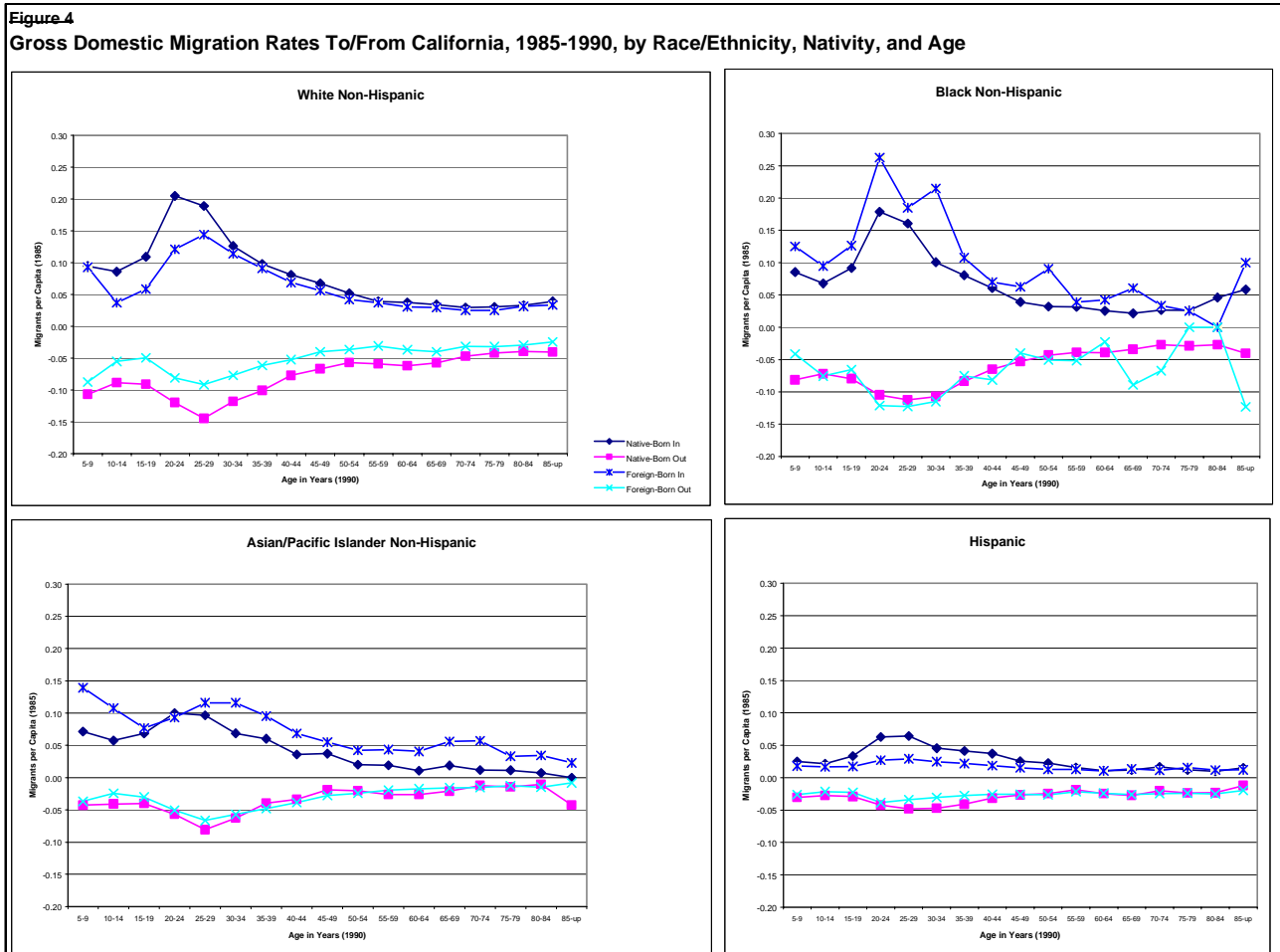
Births, are from the 1996 Census Bureau Series A projections by race and age. (Campbell 1996).

3. Deaths.

Mortality rates, are based on the AFI national age-sex race rates from Day (1996) with fixed regional differences from the national rates calculated for 1990-1994.

The regional projections are made for five-year periods. The 1993 base period population for the AFI projections for 1993 is derived from tabulations the 1990 Census Public Use Microdata Sample (U.S. Census Bureau 1993), 1990-1993 births, deaths and international migration estimates, and domestic migrates extrapolated at 1985-1990 rates. The 1993 base population is factored into the five-year projection periods by the same indirect method as for the national model.

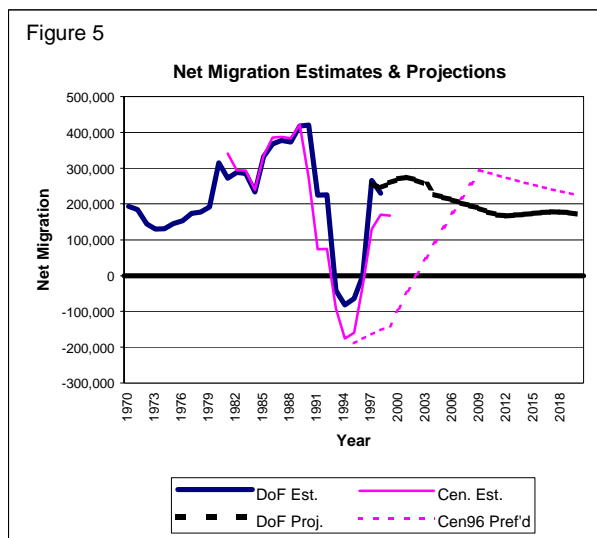
The use of nativity-specific differences in interstate migration rates could have an impact on overall projected migration, because there are differences in migration rates between the native and foreign-born. Figure 4, shows the age-specific per capita 1985-1990 migration rates for California by nativity



Note: Base of all rates is 1990 Census respondents who reported that they lived in California in 1985.
 Source: 1990 Public Use Microdata Sample (PUMS) data on current location of residence and residence in 1985.

within the four major race/ethnic groups.²² Among non-Hispanic whites the foreign-born have lower rates of migration both to and from California than native-born. For the other three race/ethnic groups, rates of out-migration are similar for the foreign- and native-born, but in-migration to California is higher for foreign than native-born Blacks and Asians; and for Hispanics the pattern is reversed, with higher in-migration for the native than foreign-born. The cumulative net effects of these differences over a decade or more will be substantial for some groups. As the foreign-born population share of the population rises at different rates in California and the rest of the United States, these differences will affect projected net migration.

Although the prototype state/regional projections are consistent with the national AFI projections by nativity, their reliance on fixed migration rates that are calibrated to the 1975-80 and 1985-90 periods is problematic. Since at least 1970, annual net migration to California has been quite variable, hitting a 28-year peak of over 400,000 in 1989 and 1990, then plunging by half a million to a 28-year low in 1994.²³ See Figure 5. The base migration rates for the prototype state projections include the peak period but miss the trough. As a result, they are above the long-term average. Further, they badly overestimate actual net migration for the post-census period between 1990 and 1996. Another, sounder model for projecting and estimating domestic migration to California is required, one that better reflects the level and recent variations in this flow.



Previous Projections: California

The Demographic Research Unit of the California Department of Finance in 1998 issued “credible, central” projections for the state and counties to 2040 with race and ethnic detail.

Of the components of change, *migration* has varied the most in recent decades and also varies the most between future projections. The DoF projects migration on a net basis. Since 1990, the DoF’s estimates of total net migration for the state have fluctuated from +421,000 in that year to –83,000 in 1994 and then back up to +265,000 in 1997. The DoF projects net migration to remain above 250,000 through 2003 due to “pent-up” demand and then to decline gradually until 2015 after which it is assumed to remain level at about 180,000 per year for the rest of the projection period.

Births and deaths are projected by applying assumed rates of fertility and mortality, by age, sex, and race/ethnicity to the projected population. *Fertility* rates for the state are projected from 1980-1990 rates by age and race/ethnic group. *Mortality* rates by age, sex and race/ethnicity are projected from

²² This comparison combines the foreign-born country-of-origin groups used in the projections to highlight the effects of nativity on domestic migration for populations that are otherwise comparable.

²³ These annual estimates include both foreign and domestic migration. Separate estimates of international migration are available since 1990 and show that at least three-quarters of the variation in total migration has been in the domestic component. It is likely that the earlier variation in the total flow were also dominated by the domestic component.

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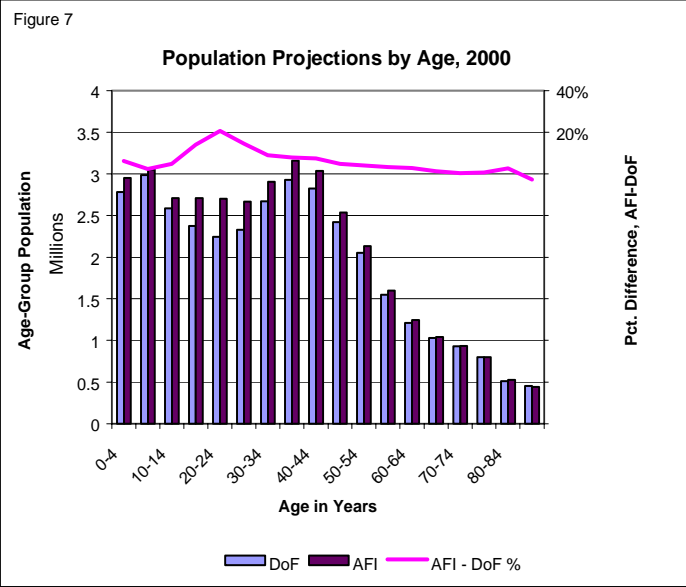
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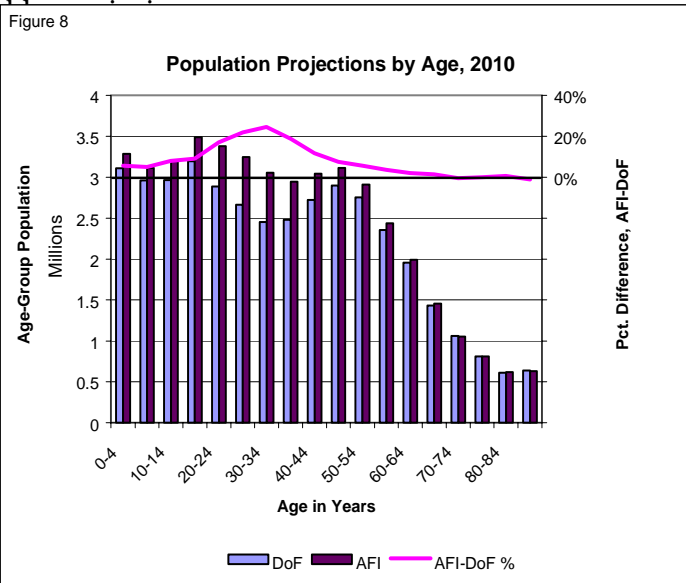
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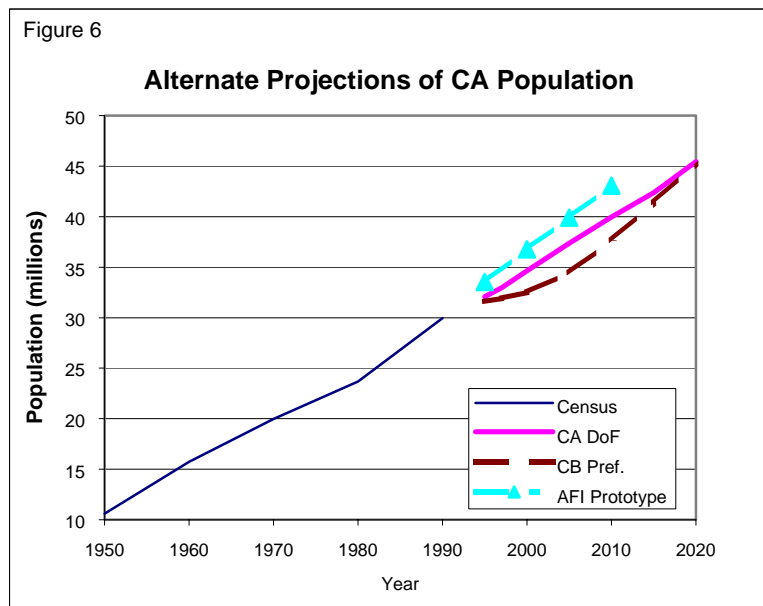
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Comparison With the AFI-FNMAF Projections of Total Population

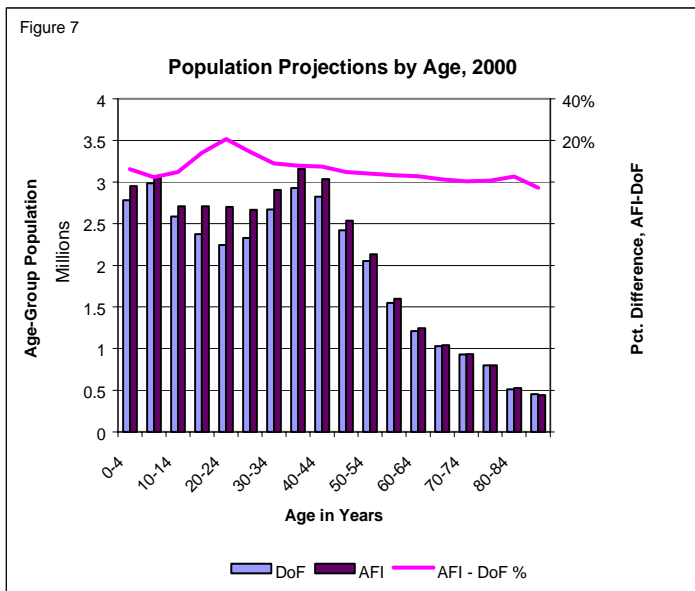
The AFI prototype projections for California's total population can be compared with the DoF. The former proves to be far above the DoF, in 2010 by 7.7 percent, or 3.1 million.



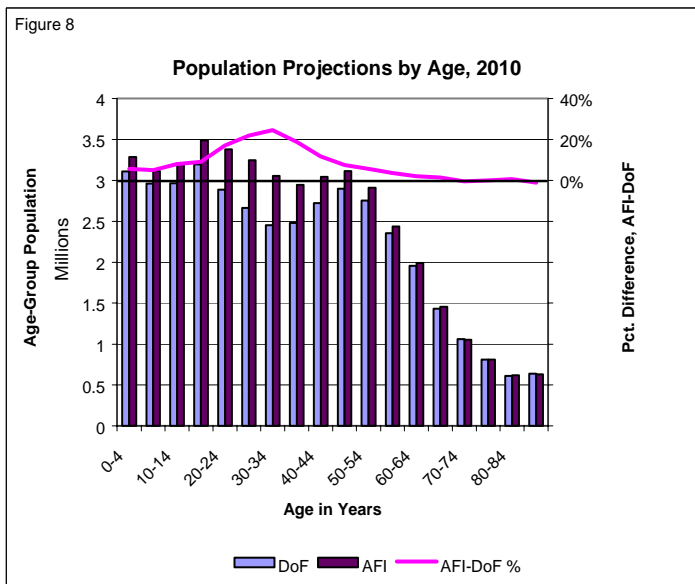
The gap with DoF is mainly due to two differences.

- First, the 1993 base period estimates of the AFI analytic projection do not reflect the step 1993-1996 downturn in migration to California but instead describe a continuation of the historically high migration rates of 1985-90 and 1975-80.
- Second, the 1995 to 2010 projection assumes that these same

high rates of migration to California are continued. The DoF migration assumption is for significantly lower inflows for most or all of the projection period.



When the resulting age distributions of the AFI and DoF 2010 population are compared, the effects of the different base and migration assumptions are apparent. The gap is greatest, 20 percent, for the cohort age 35 to 39 in 2010, who experienced their life-cycle peak rate of domestic migration about the year 2000 when they were age 25 to 29. Note the similarity of the percentage differences between AFI and DoF in Figures 7 and 8 with the age patterns of domestic migration rates that are clearly visible in Figure 4. The gaps between the population projections are smallest for children and the elderly, who have the lowest rates of migration, with closely commensurate gradations to larger gaps and migration differences to the peak cohort.



Since we have established that the DoF state population projections are a current and credible basis for planning, the large differences found between the DoF and AFI prototype series do not cast doubt on the DoF projections but rather indicate the need for modification of the prototype series, specifically in the problematic migration component of change. Such

an adjustment is incorporated in the improved set of population projections for California to 2020 by age, sex, race/ethnicity, nativity, and period of arrival.

Improved State Projections by Race/Ethnicity, Nativity and Period of Arrival

Improved projections of California's population based on the AFI-FNMAF and AFI prototype projections have been developed for the California Demographic Futures Project and the Transdisciplinary Tobacco Use Research Center (TTURC) of the University of Southern California. To meet the needs of these and other planners the period of projection has been extended to 2020. Two modifications to the projections were also made.

First, the race/ethnicity categories are now consistent with the standard typology employed by the DoF and most often used in policy analyses (Hispanic, white, non-Hispanic, black non-Hispanic, Asian or Pacific Islander non-Hispanic, and American Indian non-Hispanic). For compactness in presentation, the relatively small numbers of American Indians are combined with non-Hispanic Whites, the grouping whose self-reported racial identity is most blended with whites and patterns of housing consumption that are most similar to Whites. The methods for implementing this change are different for the foreign and native-born populations.

- For the *foreign-born* population, the AFI prototype model is modified and extended to 2020.
 - a) The distribution of legal immigrants (legal immigrants admitted plus refugees and asylees by country of origin from 1995 forward is set at the distribution of origins reported by the U.S. Immigration and Naturalization Service for fiscal years 1996-1998.
 - b) The net number of undocumented immigrants from Mexico to the U.S. is increased by 50,000 per year, consistent with the latest estimates of the U.S. Immigration and Naturalization Service (2000).
 - c) California's share of arriving immigrants is adjusted, to reflect the decline in the proportion of all legal immigrants to the U.S. who intended to reside in California between the period fiscal years 1991-1995 and fiscal years 1996-1998.
 - d) The resulting projections for California, by age, sex, region of birth and period of arrival are then post-processed by allocating the population in each origin group to the four race/ethnic groups, in proportion to the race/ethnic shares of the origin group in the 1990 Census PUMS.²⁴

- For the *native-born* population, the AFI prototype model itself is also modified and extended to 2020.
 - a) The populations of the five race/ethnic classes are projected, rather than four races in the original model.²⁵
 - b) The aggregate regional projections are scaled to the corresponding HMK national middle series native-born projections.²⁶

The second modification adjusts the migration rates for each age-sex-race/ethnic class to those in the projected DoF migration rates and populations. This is done by scaling the combined total foreign and native-born population in each age-sex-race/ethnic class scaled to the DoF projection for the class, with adjustments proportional to the population in each nativity-period subgroup within the age-sex-race/ethnic class. All differences between the updated AFI and DoF populations are closed.

²⁴ California average race/ethnic shares for the entire population in each region of origin.

²⁵ A post-projection assignment of races to race/ethnic classes, analogous to the method used for the foreign-born population, is believed to be unreliable because of expected shifts the share of Hispanics within race groups.

²⁶ The seven regions besides California are rolled up into a single region for the sake of processing efficiency.

Since possible differences in mortality rates are orders of magnitude smaller than those in migration rates, this procedure is equivalent to adjusting the net domestic migration rates for the nativity subcategories within each age-sex-race/ethnic group by the same amount.

The resulting projections for California are a modification of and improvement on the updated AFI prototype regional projections. They can equivalently be understood as a version of the DoF projections enhanced by the disaggregations by nativity and period of arrival.

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Appendix

Table : State of California, Population by Nativity and Age, 1980-2020 (projected)

	Total	Native Born				Foreign-Born			
		Under 20	20 to 34	35 to 64	65 years or	Under 20	20 to 34	35 to 64	65 years or
		years	years	years	older	years	years	years	older
1980	23,725,000	6,693,000	5,399,000	6,133,000	1,928,000	688,000	1,173,000	1,236,000	475,000
1990	29,942,000	7,693,000	5,839,000	7,333,000	2,540,000	1,106,000	2,420,000	2,423,000	588,000
2000	34,653,000	9,682,000	4,761,000	8,919,000	2,874,000	1,042,000	2,478,000	4,059,000	839,000
2010	39,958,000	11,200,000	5,574,000	9,566,000	3,327,000	1,032,000	2,435,000	5,596,000	1,229,000
2020	45,449,000	12,691,000	7,152,000	9,289,000	4,418,000	1,024,000	2,509,000	6,419,000	1,945,000
Percent									
1980	100%	28%	23%	26%	8%	3%	5%	5%	2%
1990	100%	26%	20%	24%	8%	4%	8%	8%	2%
2000	100%	28%	14%	26%	8%	3%	7%	12%	2%
2010	100%	28%	14%	24%	8%	3%	6%	14%	3%
2020	100%	28%	16%	20%	10%	2%	6%	14%	4%
Source: 1980 (4/1): U.S. Census, 5% Public Use Microdata. 1990 (7/1): estimate based on U.S. Census, 5% Public Use Microdata. 2000, 2010 and 2020 (7/1): projections by John Pitkin (Analysis and Forecasting, Inc.) for the California Demographic Futures Project									