

**Modeling the County to County Migration Flows
in the Multi-County Metropolitan Region**
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By

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Abstract

Southern California Association of Governments (SCAG) has used the two-region gross migration approach to develop the SCAG Region's multi-county population projections in an economic-demographic forecast modeling framework. Although the two-region gross migration approach is found superior to the net migration approach, it still lacks the information of migration flows. The study assesses three approaches of estimating the county-to-county migration flows for projecting county populations in the SCAG region.

Key Words: Southern California Association of Governments, multi-county population projections, multi-region migration approach, county-to-county migration flows.

1. Introduction

Southern California Association of Governments (SCAG) has used the two-region gross migration approach to develop the SCAG Region's multi-county population projections in an economic-demographic forecast modeling framework (SCAG, 2008). As one of multi-region gross migration approach, two-region gross migration approach is found superior to the net migration approach, and is found useful for modeling purposes (Isserman, 1993; Smith, 1987). Although the two-region gross migration approach meets requirements for a better modeling practice, it still lacks the information of migration flows. The county-to-county migration flows measure the migration, economic vitality, spatial (urban sprawl) relationships of counties within the region. With an increasing demand of the information of county-to-county migration flows and its regional policy and planning implications, this study expands the current two-region gross migration model to estimate the county-to-county migration flows within the SCAG region. The study discusses three approaches of estimating the county-to-county migration flows for projecting county populations in the SCAG region.

II. Modeling the County-to-County Migration Flows

The regional demographers oftentimes discuss how to model migration assumptions for regional population projections (Choi, 2007). First, they need to determine the migration approach: net migration vs. gross migration. Net migration approach is popular and widely used in the regional or local population projections due to its simplicity of application and data availability. Gross migration approach is attractive in terms of concept, but it is relatively hard to apply and requires more data. Second, they need to determine the number of regions for estimating the migration flows: two regions vs. three regions or more. The multi-region migration approach (three regions or more) can produce the location specific migration flows. Multi region approach relies on spatial interaction, log-linear models (Raymer, 2007; Plane, 1993). Third, they need to determine how to develop demographic characteristics (age, sex, and race/ethnicity) of domestic migrants.

While SCAG demographers use two region gross migration approach, California Department of Finance (DOF) demographers apply net migration approach (<http://www.dof.ca.gov/research/demographic/reports/projections/p-3/>). Table 1 shows the county-to-county migration flows for six counties in the SCAG region and the rest of US. CA DOF population projection model requires information of the net migration estimates of each county on the right end column. SCAG population projection model requires information of the in- and out- migration estimates of each county on the second to the left of the right end column. The county-to-county migration flows are literally not needed for both net migration and two region gross migration approach. In a multi-county regional planning framework, the county-to-county migration flows play important role in understanding the spatial interactions among counties in the region and their potential impact on transportation congestion and air quality. For example, 1995 and 2000, approximately 210,000 people moved from Los Angeles County (the regional core) to Riverside and San Bernardino Counties (suburban). This accounts for 17% of total

county-to-county migration flows from Los Angeles County (See tables 1 and 2). The attractiveness of these two counties has diminished from the period of 1985-1990. During the same period, 305,000 people moved from Los Angeles to Riverside and San Bernardino (SCAG, 1995). The exodus of Los Angeles County has been consistent over the decades. How many people will move from Los Angeles County to Riverside and San Bernardino Counties in 2035? The county-to-county migration approach will provide regional planners and policy makers with rich information of the future migration flows of the counties in the region.

The two-region gross migration approach, a simplified version of multiple region model, focuses on gross migration of two regions: the study region and the rest of the country. Two-region based approach retains many of the benefits of full-blown multiregional models (Smith et al, 2001). Major benefits include use of proper migration rates, less data need, fewer calculations, and less cost (Isserman, 1993; Smith et al, 2001). Two-region gross migration approach has been applied to the Southern California region's population projection using an economic-demographic modeling framework (Choi, 2007; SCAG, 2008). The gross migration optimization technique was introduced to estimate the amount of the regional and county in- and out- domestic migration reflecting the regional economy in the Southern California region. The technique presents the following characteristics: First, the optimization technique optimizes the size of regional in-migration and out-migration to achieve the balance between labor force demand and labor force supply at the regional level. Second, the optimization technique effectively allocates the regional domestic migration into county net domestic migration, using different base periods and local input. Third, the optimization technique disaggregates the county net migration into the county domestic in-migration and out-migration. Fourth, the gross migration optimization technique maintains acceptable age and sex specific in-migration and out-migration schedules by efficiently optimizing traditional adjustment factors used in the plus-minus method. The two region-region gross migration approach can be further extended to estimate the county-to-county migration within the region.

The multi-regional models have been introduced and implemented to develop population projections (Rogers, 1985, 1995; Campbell, 1996). Many research efforts have focused on how to develop the proper varying transition probabilities because the fixed transition probabilities would not represent a correct behavioral perspective of a migration system (Plane & Rogerson, 1994). Although the dynamic nature of the county-to-county migration flows more accurately represents the reality of the migration flows, the model results using varying transition probabilities are not such promising due to unpredictability of the significant factors (e.g., region's economy) affecting migration.

Two major elements are considered in determining the modeling process of developing the county-to-county migration flows. The first element is a temporal perspective of whether the projected transition probability matrix would be fixed or varying. The county-to-county migration flows projections might use the historical pattern of counties and other important factors to project the varying migration flows. Different base periods (e.g., 1985-2007 or 2000-2007) might influence the future migration flows. The county-to-county migration flows projections might be derived using the most recent pattern (e.g.,

2000 Census) during the projection period. In this case, a transition probability matrix would remain constant during the projection period. The second element is whether the modeling process would be based on the top-down (county gross migration to county specific migration flows) or bottom up (county specific migration flows to county gross migration) process. If we adopt a bottom-up approach, we might be able to measure the county's gross migration by estimating the county specific migration flows. This approach might fully reflect the county's historical pattern and other important factors. If we adopt a top-down approach, we might estimate the county specific migration flows, given the county's gross migration. This approach might partially reflect the county's historical pattern and other important factors, because the model results of the bottom approach need to be reconciled with the county's gross migration derived through the separate modeling process.

III. Modeling Application to Southern California

1. Study Area

This study focuses on the migration flows of six counties (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura) in the SCAG region and the rest of the nation (see figure 1). The SCAG is the largest of over 700 councils of governments (COGs) and metropolitan planning organizations (MPOs) in the United States. As one of MPOs, the SCAG is mandated by the federal and state governments to research and draw up plans for transportation, growth management, hazardous waste management, and air quality, housing, hazardous waste management, and waste treatment management. The region encompasses a population of nearly 19 million persons in an area of more than 38,000 square miles. The SCAG Region is the second most populated consolidated metropolitan area in the United States. Nearly one-half of all Californians live in the SCAG Region, and nearly 6 percent of people living in the entire United States reside here. By July 1, 2008, the region's population had reached 18.6 million residents, having grown by 2 million residents (12 percent) from 16.6 million people eight years ago. The population growth (2 million residents) of the SCAG Region between 2000 and 2008 was higher than the population growth (1.9 million residents) that occurred in the 1990s. Two major sources of population growth since the 2000 Census are natural increase (births minus deaths) and net foreign immigration (people who move here from foreign countries minus those who move away to foreign countries). Natural increase accounted for 55 percent of the population gain in the region. Although the total fertility rate of women of child-bearing ages remains stable in recent years, Hispanic women still maintain a relatively higher total fertility rate. The life expectancy of Southern California residents increased while the death rate decreased. Net foreign immigration, mostly from Mexico, Central America, and Asia, accounted for 43 percent of the population gain in the region. Foreign immigration, including unauthorized immigrants, was not affected by the region's economic cycle. Southern California is still an attractive destination and a gateway for new immigrants. Domestic (in- and out-) migration is volatile and fluctuating over time along with the economy cycle. While the SCAG region experiences more inflows of domestic migrants than outflows of domestic migrants between 2000 and 2004, the SCAG region's domestic migration pattern changes between 2005 and 2008. The reversal in domestic migration occurred when the job market in the region was actually improving

and performing a little better than the rest of the nation (SCAG, 2007). Domestic migration is empirically found to show a strong positive correlation ($r= 0.922$) with the regional employment rate (Choi, 2007). IRS county to county migration flows also confirm that the higher the employment rate (lower the unemployment rate), the more the net positive domestic migration is induced.

2. Data

This study uses three major migration data: US Decennial Census migration data, US IRS migration data, and CA DOF migration data. The base migration data (1995-2000) come from the Census 2000. These data are based on the sampled people's answer to long-form question on residence 5 years ago. The census migration data are useful because the demographic and economic characteristics of migrants can be cross tabulated with migration flows. However, there is no information about the frequency of movement and the location of the destination between 1995 and 2000.

During the inter-censal year periods, two domestic migration data are available. The first migration data are the county-to-county migration data (1985-86 to 2006-07) from the IRS Nationwide Migration Flow Files. These migration data are updated annually and based on the year-to-year changes in the addresses shown on the population of returns from the IRS Master File system. Excel files present data on migration patterns by state for the entire United States, including inflows and outflows (Sweeney, 2008). There are some caveats: 1) based on federal income tax returns; 2) not everyone files returns; 3) roughly equivalent to "households" (returns) and "people" (exemptions) (<http://www.incontext.indiana.edu/2008/june/2.asp>).

The second migration data come from California Department of Finance (DOF). CA DOF also annually updates the net domestic migration of each county in California using primarily driver's license address change data from the Department of Motor Vehicles, and federal income tax return data from the U.S. Internal Revenue Service (see <http://www.dof.ca.gov/research/demographic/reports/estimates/e-2/2000-08/> for most recent domestic migration estimate).

IRS data contain the county-to-county migration flows, while CA DOF data include only net migration estimates without any information of in- and out- migration. Both data do not have any information of demographic and economic characteristics of migrants. In the future, American Community Survey (ACS) would be a useful source.

3. Method

The description of both bottom-up approach and top-down approach below are based on the SCAG report prepared by Sweeney (2009).

Bottom-up approach

The bottom-up (BU) approach is to develop the county to county migration flow projections using a statistical model in a bottom-up modeling framework, proposed by Sweeney and Konty (2002). This approach measures the varying county-to-county migration flows over time. This approach is bottom-up and the model results affect total

population projections of each county. This approach is conceptually a better approach than a fixed transition probability matrix. This approach reflects the historical pattern of the IRS county-to-county migration flow data, but might be questioned for the validity of the IRS county-to-county migration flow data.

The basic methodological approach is a log-linear model with constraints imposed to admit prior information, and described in Sweeney & Konty (2002). The key advantage of their methods is to estimate time-dependent and time-independent parameters, separately. The BU approach estimates the county-to-county migration flows using the IRS county-to-county historical migration estimates (1985-86 to 2006-07) and time-dependent covariates from the Bureau of Economic Analysis (BEA) without any information of the marginal constraints (total in- and out-). The model is represented in the following way.

$$n_{ijt}^{BU} = TT_i^O T_j^D T_t^T T_{ij}^{OD} T_{it}^{OT} T_{jt}^{DT} + e_{ijt}$$

The BU estimates are developed using the only the 22 years of IRS county-to-county migration flow data. In addition to the six SCAG counties, the migration to the rest of the nation was represented by a regionalization that retained important external trading partners with the SCAG region counties, and collapsed the remainder into BEA regions. The final regionalization had 28 areas (6 SCAG counties, 14 EA trading partners, 8 BEA residual regions). Once the forecasts of the time-dependent parameters ($T_t^T T_{it}^{OT} T_{jt}^{DT}$) and the time-independent parameters ($TT_i^O T_j^D T_t^T T_{ij}^{OD}$) are available, the entire series of migration interactions can be forecasted forward.

Top-down approach

The Top-down (TD) approach starts with the BU estimates and then adjust them to match the marginal constraints (total in- and out-) developed the SCAG's existing two-region migration approach. This approach reflects the products of both the SCAG's two region gross migration model (2007) and Sweeney and Konty's model (2002). The marginal constraints (total in- and out-) are derived using the existing SCAG model (Choi, 2007), while the distribution of the county-to-county migration flows is calculated using a log-linear model (Sweeney & Konty, 2002). The TD estimates of S&K model are produced in three steps. First, the BU estimates were aggregated to 5-year time intervals and the areas 7-28 were collapsed into a single "Rest of U.S." category. The latter step was necessary because SCAG on provided marginal constraints for the SCAG counties. The second step was to produce an estimated constraint for the rest of the U.S. The third and final step was to fit a new model using the ECM algorithm,

$$n_{ijt}^{TD} = n_{ijt}^{BU} TT_i^O T_j^D T_t^T T_{it}^{OT} T_{jt}^{DT}$$

where the marginal constraints O;D; T;OT;DT are from the SCAG total in- and outmigration estimates.

Census Approach

The Census (C) approach is to use a 2000 Census based county-to-county migration distribution in a top-down modeling framework. The C approach starts with the marginal constraints (total in- and out-) developed the SCAG's existing two-region migration approach.. The gross migration flows of each county are further disaggregated into the

county-to-county migration flows using the 2000 Census distribution. The iterative proportional fitting procedure (IPFP) is used to update the 2000 county-to-county migration flows with the updated marginal controls (total in- and out-). This approach is easily applicable and reflects the historical pattern of CA DOF net domestic migration data. The use of the 2000 Census distribution of the county-to-county migration flows as a reference distribution might be challenged for ignoring dynamic nature of migration flow changes associated with significant economic factors (e.g., unemployment rate) or others in the future.

IV. Results

According to BU approach, approximately 1.5 million people leave the SCAG region for the rest of the nation between 2000 and 2035 after accounting for domestic in- and out-migration (See Tables 4 and 5). Both TD/C approaches show nearly 3.0 million people to leave the SCAG region for the rest of the nation during the same period. The difference in the number of net migration between BU and TD/C accounts for 6.3% of total population projections in 2035.

It should be noted that this gap is also partially contributed by the difference of the historical data sources. For example, between 2000 and 2005, US IRS county-to-county migration estimates the net migration of six counties in the SCAG region to be -350,000, while CA DOF estimates the net migration of the size counties in the SCAG region to be +98,000. The difference of nearly 450,000 migrants for the period of 2000-2005 accounts for almost 30% of total gap of 1.5 million migrants for the period of 2000-2030.

Both BU and TD/C approaches share the similar net migration pattern in the short term (2005-2010 and 2010-2015). The net outmigration was highest during the period of 2005-2010, then scaled down during the period of 2010-2015. In the long term, both BU and TD/C approaches showed a different path toward net migration. During the period of 2015-2035, the BU approach showed the declining net outmigration (increasing net immigration), while the TD/C approach maintained the consistent net outmigration pattern during the projection horizon (See Figure 2).

The overall gap in the number of net domestic migrants of the SCAG Region between BU and TD/C approaches is getting smaller from 2010-2015 to 2015-2020, then getting bigger during the remaining period, while Imperial and Ventura Counties show different pattern. BU approach brings more net domestic immigrants into four counties (Los Angeles, Orange, Riverside, and Ventura) than the TD/C approaches., while it brings less net domestic immigrants into two counties (Imperial and San Bernardino) than the TD/C approaches. (See Figure 3 and Tables 5, 6, 7).

The difference in the in- and out- migration patterns during the projection horizons (7 time periods between 2000 and 2035) between BU/TD and C approaches can be analyzed using the mean percent error (MPE) and mean absolute percent error (MAPE). The MAPE between TD and C approaches is much smaller than the MAPE between BU and C approaches. For example, the average MAPE in percent distribution of immigrants by

county between TD and C approaches is 15%, while the average MAPE in percent distribution of immigrants by county between BU and C approaches is 51%. The similar pattern applies to outmigration by county. The average MAPE in percent distribution of outmigrants by county between TD and C approaches is 16%, while the average MAPE in percent distribution of outmigrants by county between BU and C approaches is 45%. (See Tables 9 and 10).

The migration attractiveness might be a useful concept to understand the county-to-county migration flows of people in the SCAG region. Migration attractiveness of each county is measured using the ratio of immigrants to outmigrants. If the migration attractiveness is higher than 1, indicating that more people enter than leave the county. If the migration attractiveness is lower than 1, more people leave than enter the county. The higher the migration attractiveness, the more immigrants than outmigrants are observed.

The overall migration attractiveness of each county in the TD/C approaches is stable during the projection period, 2005-2035, except Imperial county. Imperial county's migration attractiveness increases between 2000 and 2015, then declines over time (See Tables 11, 12, 13).

Four counties (Los Angeles, Orange, Riverside, and Ventura) show the higher overall attractiveness level in the BU approach than in the TD/C approaches from the long term perspective. In particular, Los Angeles county's overall attractive level of the BU approach rapidly increases from 0.8 in 2012-2020 to 1.4 in 2030-2035. It is surprising that Los Angeles county will bring more immigrants than sending outmigrants in the long term perspective, and this implies that there would be a reversal of the migration flows (urban sprawl) after 2020 in the region. Ventura county also shows the higher overall attractive level in the BU approach, which increases the migration attractiveness from 1.0 in 2000-2005 to 1.6 in 2030-2035. Riverside county shows a high level of migration attractiveness in the BU approach. The migration attractiveness of the Riverside county increases from 1.2 in 2015-2020 to 1.6 in 2030-2035. Orange county also shows the consistently higher level of migration attractiveness in the BU approach than in TD/C approaches since 2010-2015. The county's migration attractiveness level will remain at 1. However, two counties (San Bernardino and Imperial) show the lower overall attractiveness level in the BU approach than in the TD/C approaches from the long term perspective. It is surprising that the San Bernardino county's migration attractiveness will be gradually reduced during the projection horizon (See Figure 4-10)

The analysis of migration attractiveness of each county relative to each county indicates that Both TD approach and C approach show a very similar attractiveness pattern during the projection horizon, while BU approach shows its own projected pattern. Los Angeles county's attractiveness in the BU approach is getting higher relative to Orange, Riverside, and San Bernardino than in the TD/C approaches from the long term perspective, while San Bernardino county's attractiveness in the BU approach is getting lower relative to Orange, Riverside, and San Bernardino in the TD/C approaches from the long term perspective.

In summary, the BU and TD/C approaches present similar or different perspectives on the future migration flows. First, both the BU and TD/C approaches predict the recent economic recession and its potential impact on region-wide migration flows in the short term. Second, the BU approach indicates that the regional domestic migration pattern eventually will turn into positive (net immigration) in the long term. This implies that the region would be relatively competitive to other parts of the nation in the long term. However, the TD/C approaches indicate that the regional domestic migration pattern will never be positive (net immigration) but remain negative (net outmigration) during the projection horizon. Third, the BU approach indicates that the past and recent suburbanization pattern or urban sprawl (e.g., migration from Los Angeles to Riverside and San Bernardino) might not continue in the long term. As a result, Los Angeles county might revive its growth because of the reversal of outmigration pattern. San Bernardino county, however, might not grow even at a moderate speed due to less immigration pattern in the long term perspective. The TD/C approaches show that the past and current suburbanization will continue in the long term perspective.

V. Implications for Urban Sprawl and Regional Planning

While the TD/C approaches present a conservative perspective of the migration flows for the SCAG region, the BU approach suggests a fresh outlook of the migration flows. In particular, the stronger economic vitality and the related more immigration, and the reversal of the currently ongoing urban sprawl pattern, are a new view on the future regional growth of the SCAG region. The reversal of urban sprawl in the BU approach might be partially supported by the recently introduced statewide planning efforts of reducing the greenhouse gas (GHG) emissions. The State of California has introduced the Global Warming Solutions Act (a.k.a. AB32), which is signed into law by Governor of California Arnold Schwarzenegger on September 27, 2006. The bill establishes a timetable to bring California into near compliance with the provisions of the Kyoto Protocol. AB32 mandates the State of California to reduce GHG emissions to 1990 levels by the year 2020. Given the significant contribution of transportation sector in producing GHG emissions, SB 375 is passed by the State legislature and signed by Governor Schwarzenegger on September 2008 to provide a means for achieving AB 32 goals from cars and light trucks. This bill shows a significant effort of the State of California to implement the global warming goals of AB 32. One important policy and planning element of SB 375 for achieving the regional GHG emissions reductions target for years 2020 and 2035 is to develop a sustainable communities strategy (SCS). The SCS is a required element of the regional transportation plans (RTPs) in reducing GHG emissions. As SCS shall identify general location of land uses, residential densities and building intensities within the region, it would be understood as a regional version of the land use element in the local general plan. The regional land use plan and its relevant strategies would limit the frequency of driving by car and encourage more transit use or walking by promoting smart growth principles such as: development near public transit; mixed use development, provision of housing opportunities near job centers, and job opportunities, and when appropriate, in housing-rich communities; development of workable communities; in-fill development where appropriate to revitalize underutilized sites; focusing growth along transit corridors and nodes to utilize available capacity; transit-

oriented development. All of these sustainable planning efforts might tremendously increase the development capacity of Los Angeles county's urbanized areas so that extensive immigration would be made possible.

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Figure 1. Study Area



Table 1. Migration Flows of Counties in the SCAG Region, 1995-2000

County	Imperial	Los Angeles	Orange	Riverside	San Bernadino	Ventura	Rest of U.S.	TOTAL OUT	Total Net
Imperial	0	1,883	355	2,792	925	154	16,476	22,585	-2,183
Los Angeles	1,695	0	146,044	74,919	135,657	45,419	780,485	1,184,219	-567,271
Orange	2,872	77,760	0	57,495	21,342	3,399	260,519	423,387	-59,686
Riverside	1,339	27,965	27,901	0	36,742	1,700	132,516	228,163	80,854
San Bernadino	2,010	59,614	19,368	48,431	0	2,219	172,313	303,955	-2,700
Ventura	142	24,090	4,525	2,587	1,755	0	82,034	115,133	-1,148
Rest of U.S.	12,344	425,636	165,508	122,793	104,834	61,094	0	892,209	552,134
TOTAL IN	20,402	616,948	363,701	309,017	301,255	113,985	1,444,343	3,169,651	-552,134

Source: US Census 2000

Table 2. Percent Distribution of Migration Flows of Counties in the SCAG Region, 1995-2000

A. Percent Distribution based on the Origin County of Migrants

County	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Rest of U.S.	TOTAL OUT
Imperial		8%	2%	12%	4%	1%	73%	100%
Los Angeles	0%		12%	6%	11%	4%	66%	100%
Orange	1%	18%		14%	5%	1%	62%	100%
Riverside	1%	12%	12%		16%	1%	58%	100%
San Bernardino	1%	20%	6%	16%		1%	57%	100%
Ventura	0%	21%	4%	2%	2%		71%	100%
Rest of U.S.	1%	48%	19%	14%	12%	7%		100%
TOTAL IN	1%	19%	11%	10%	10%	4%	46%	100%

Source: US Census 2000

B. Percent Distribution based on the Destination County of Migrants

County	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Rest of U.S.	TOTAL OUT
Imperial		0%	0%	1%	0%	0%	1%	1%
Los Angeles	8%		40%	24%	45%	40%	54%	37%
Orange	14%	13%		19%	7%	3%	18%	13%
Riverside	7%	5%	8%		12%	1%	9%	7%
San Bernardino	10%	10%	5%	16%		2%	12%	10%
Ventura	1%	4%	1%	1%	1%		6%	4%
Rest of U.S.	61%	69%	46%	40%	35%	54%		28%
TOTAL IN	100%	100%	100%	100%	100%	100%	100%	100%

Table 3. Population Trends, 2000-2008

County	2000	2001	2002	2003	2004	2005	2006	2007	2008
Imperial	143,522	145,984	149,488	154,112	158,644	162,940	168,614	173,790	177,820
Los Angeles	9,575,838	9,735,699	9,893,011	10,023,138	10,123,934	10,190,347	10,232,453	10,273,083	10,347,437
Orange	2,863,368	2,916,812	2,959,709	3,000,237	3,032,362	3,056,518	3,070,696	3,094,872	3,125,756
Riverside	1,559,076	1,621,143	1,684,276	1,764,313	1,843,953	1,923,454	2,001,641	2,062,150	2,106,328
San Bernardino	1,722,378	1,771,416	1,813,725	1,866,718	1,920,577	1,971,803	2,009,787	2,038,345	2,060,722
Ventura	758,614	773,301	786,668	798,060	806,399	811,934	818,200	824,041	830,343
SCAG	16,622,797	16,964,355	17,286,877	17,606,578	17,885,869	18,116,996	18,301,391	18,466,281	18,648,406
California	34,095,209	34,766,730	35,361,187	35,944,213	36,454,471	36,899,392	37,298,417	37,712,588	38,148,493
% SCAG	48.8%	48.8%	48.9%	49.0%	49.1%	49.1%	49.1%	49.0%	48.9%

Source: CA DOF, E-2. California County Population Estimates and Percent Change, Revised July 1, 2000 through Provisional July 1, 2008, January 2009.

Table 4. Net Migration Projections by Approach and by County, 2000-2035

Approach	County/Year	00-05	05-10	10-15	15-20	20-25	25-30	30-35	Average
BU	Imperial	3874	7266	-14761	-25887	-33916	-37128	-35561	-19445
BU	Los Angeles	-644128	-899072	-732782	-395932	-45198	195108	310858	-315878
BU	Orange	-122532	-151353	-72206	-33523	-20668	-30721	-45315	-68045
BU	Riverside	284810	207649	160612	174391	177288	190067	214467	201326
BU	San Bernadino	124484	62465	1676	-81461	-129677	-145748	-137417	-43668
BU	Ventura	3459	8459	38054	51404	54060	48519	43180	35305
BU	TOTAL IN	-350033	-764586	-619407	-311008	1889	220097	350212	-210405
TD/C	Imperial	-5549	6603	17757	2609	-3973	-8972	-13055	-654
TD/C	Los Angeles	-229508	-570422	-480317	-523439	-532165	-499092	-465623	-471509
TD/C	Orange	-45547	-74470	-88314	-152182	-178970	-173732	-176017	-127033
TD/C	Riverside	256715	139716	128016	145973	124910	107343	117200	145696
TD/C	San Bernadino	123102	1959	55904	37790	29355	28365	28498	43568
TD/C	Ventura	-1567	-24476	-13085	-17664	-21907	-20846	-24334	-17697
TD/C	TOTAL IN	97646	-521090	-380039	-506913	-582750	-566934	-533331	-427630
Difference (BU-TD/C)	Imperial	9423	663	-32518	-28496	-29943	-28156	-22506	-18790
Difference (BU-TD/C)	Los Angeles	-414620	-328650	-252465	127507	486967	694200	776481	155631
Difference (BU-TD/C)	Orange	-76985	-76883	16108	118659	158302	143011	130702	58988
Difference (BU-TD/C)	Riverside	28095	67933	32596	28418	52378	82724	97267	55630
Difference (BU-TD/C)	San Bernadino	1382	60506	-54228	-119251	-159032	-174113	-165915	-87236
Difference (BU-TD/C)	Ventura	5026	32935	51139	69068	75967	69365	67514	53002
Difference (BU-TD/C)	TOTAL IN	-447679	-243496	-239368	195905	584639	787031	883543	217225
% Difference/(TD/C)	Imperial	-170%	10%	-183%	-1092%	754%	314%	172%	-28%
% Difference/(TD/C)	Los Angeles	181%	58%	53%	-24%	-92%	-139%	-167%	-19%
% Difference/(TD/C)	Orange	169%	103%	-18%	-78%	-88%	-82%	-74%	-10%
% Difference/(TD/C)	Riverside	11%	49%	25%	19%	42%	77%	83%	44%
% Difference/(TD/C)	San Bernadino	1%	3089%	-97%	-316%	-542%	-614%	-582%	134%
% Difference/(TD/C)	Ventura	-321%	-135%	-391%	-391%	-347%	-333%	-277%	-313%
% Difference/(TD/C)	TOTAL IN	-458%	47%	63%	-39%	-100%	-139%	-166%	-113%

Table 5. Net Domestic Migration Projections of the SCAG Region, 2000-2035

	00-05	05-10	10-15	15-20	20-25	25-30	30-35	00-35
BU	-350033	-764586	-619407	-311008	1889	220097	350212	-1472836
TD/C	97646	-521090	-380039	-506913	-582750	-566934	-533331	-2993411
Difference (BU-TD/C)	-447679	-243496	-239368	195905	584639	787031	883543	1520575
% Difference/(TD/C)	-458%	47%	63%	-39%	-100%	-139%	-166%	-51%

Figure 2. Net Domestic Migration Projections of the SCAG Region, 2000-2035

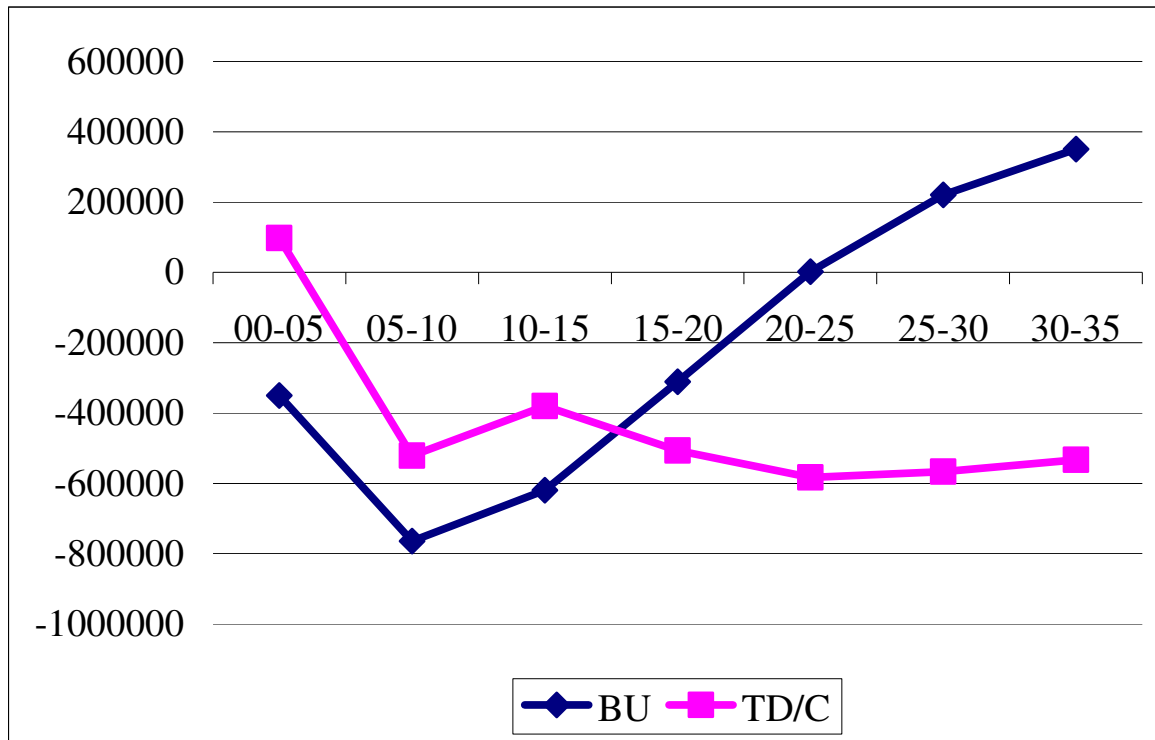


Figure 3. Net Domestic Migration Projections by County and Approach

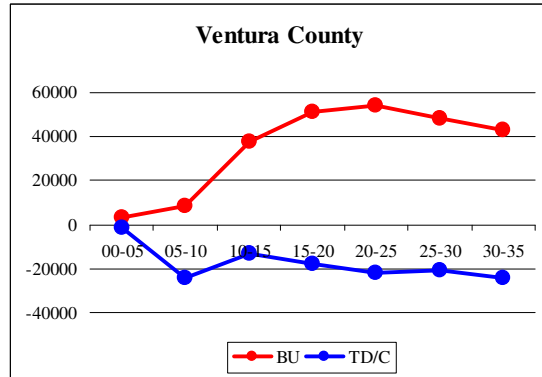
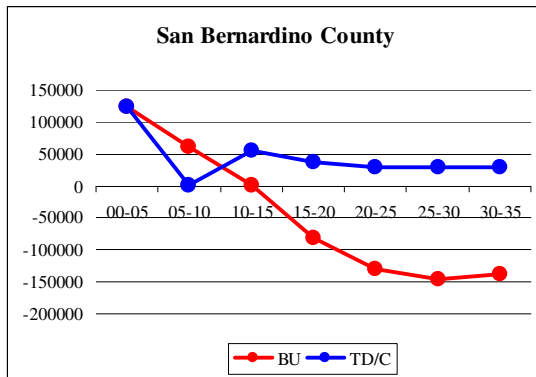
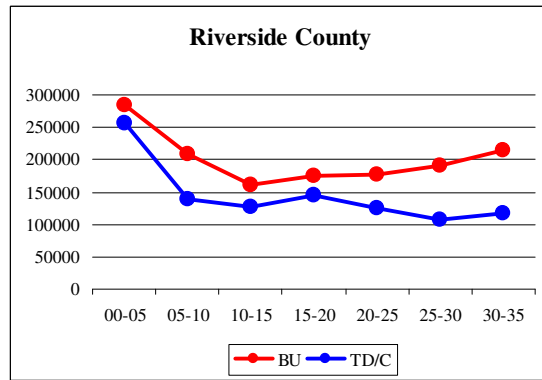
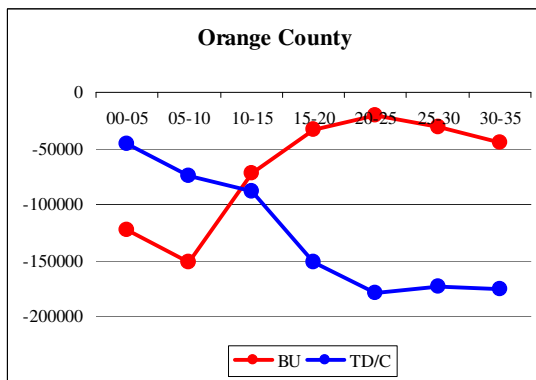
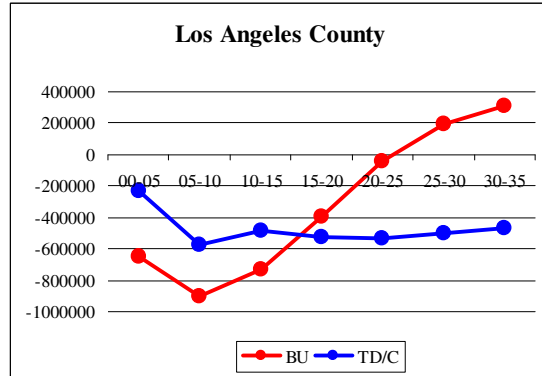
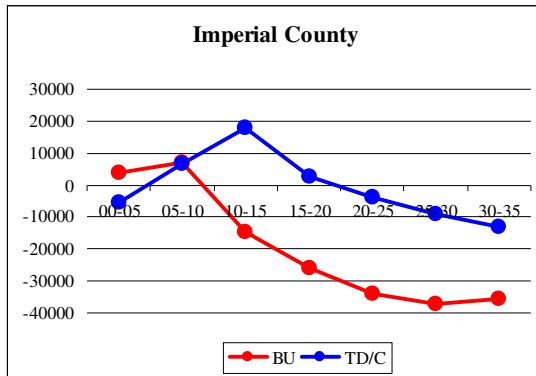


Table 6. Bottom up Approach: County-to-County Migration Flows, 2000-2035

Year	County	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Rest of U.S.	TOTAL OUT
2000-05	Imperial	0	2,553	605	7,411	1,393	243	15,131	27,336
	Los Angeles	4,077	0	227,288	160,591	293,170	74,113	918,028	1,677,267
	Orange	980	159,505	0	154,712	53,216	6,360	338,037	712,810
	Riverside	6,466	54,473	58,135	0	97,108	3,574	178,197	397,953
	San Bernardino	1,541	117,124	33,665	123,711	0	3,916	202,959	482,916
	Ventura	391	46,671	5,705	5,863	4,716	0	97,333	160,679
	Rest of U.S.	17,755	652,813	264,880	230,475	157,797	75,932	0	1,399,652
	TOTAL IN	31,210	1,033,139	590,278	682,763	607,400	164,138	1,749,685	4,858,613
2005-10	Imperial	0	2,569	545	7,734	1,415	237	14,990	27,490
	Los Angeles	5,039	0	232,462	187,279	332,788	82,450	1,080,014	1,920,032
	Orange	1,042	154,925	0	155,760	51,875	6,052	342,097	711,751
	Riverside	9,061	70,448	67,780	0	125,440	4,538	238,545	515,812
	San Bernardino	2,041	142,933	36,991	154,780	0	4,685	260,083	601,513
	Ventura	412	44,849	4,963	5,840	4,542	0	95,880	156,486
	Rest of U.S.	17,161	605,236	217,657	212,068	147,918	66,983	0	1,267,023
	TOTAL IN	34,756	1,020,960	560,398	723,461	663,978	164,945	2,031,609	5,200,107
2010-15	Imperial	0	4,478	921	13,184	2,496	401	25,136	46,616
	Los Angeles	4,300	0	225,911	180,995	337,674	80,294	1,013,123	1,842,297
	Orange	843	148,324	0	142,109	49,904	5,598	304,507	651,285
	Riverside	8,901	81,548	75,645	0	146,164	5,073	259,510	576,841
	San Bernardino	2,113	174,209	43,504	181,548	0	5,514	295,956	702,844
	Ventura	295	38,311	4,070	4,728	3,893	0	77,173	128,470
	Rest of U.S.	15,403	662,645	229,028	214,889	164,389	69,644	0	1,355,998
	TOTAL IN	31,855	1,109,515	579,079	737,453	704,520	166,524	1,975,405	5,304,351
2015-20	Imperial	0	5,533	1,138	16,819	3,124	499	31,427	58,540
	Los Angeles	3,593	0	174,115	144,154	263,432	61,985	805,333	1,452,612
	Orange	759	122,953	0	122,015	41,975	4,660	260,280	552,642
	Riverside	8,660	73,005	67,884	0	132,731	4,563	238,023	524,866
	San Bernardino	2,209	167,603	41,953	180,680	0	5,329	293,812	691,586
	Ventura	240	28,466	3,033	3,642	2,936	0	58,511	96,828
	Rest of U.S.	17,192	659,120	230,996	231,947	165,927	71,196	0	1,376,378
	TOTAL IN	32,653	1,056,680	519,119	699,257	610,125	148,232	1,687,386	4,753,452
2020-25	Imperial	0	6,122	1,258	18,432	3,442	554	34,904	64,712
	Los Angeles	2,665	0	128,689	105,672	194,162	46,042	595,506	1,072,736
	Orange	668	108,197	0	106,341	36,783	4,115	229,007	485,111
	Riverside	7,561	63,642	59,097	0	115,225	3,992	207,700	457,217
	San Bernardino	2,082	157,835	39,453	168,529	0	5,036	276,296	649,231
	Ventura	193	22,969	2,444	2,910	2,359	0	47,302	78,177
	Rest of U.S.	17,627	668,773	233,502	232,621	167,583	72,498	0	1,392,604
	TOTAL IN	30,796	1,027,538	464,443	634,505	519,554	132,237	1,390,715	4,199,788
2025-30	Imperial	0	6,220	1,279	18,732	3,497	561	35,368	65,657
	Los Angeles	2,006	0	97,557	80,102	147,189	34,851	450,375	812,080
	Orange	623	101,528	0	99,798	34,520	3,856	214,409	454,734
	Riverside	6,533	55,380	51,429	0	100,277	3,468	180,330	397,417
	San Bernardino	1,921	146,637	36,657	156,588	0	4,672	256,237	602,712
	Ventura	176	20,957	2,231	2,655	2,151	0	43,061	71,231
	Rest of U.S.	17,270	676,466	234,860	229,609	169,330	72,342	0	1,399,877
	TOTAL IN	28,529	1,007,188	424,013	587,484	456,964	119,750	1,179,780	3,803,708
2030-35	Imperial	0	6,034	1,240	18,186	3,395	545	34,321	63,721
	Los Angeles	1,731	0	84,053	69,063	126,845	30,029	388,412	700,133
	Orange	626	101,717	0	100,060	34,594	3,863	215,015	455,875
	Riverside	5,957	50,402	46,809	0	91,290	3,156	164,216	361,830
	San Bernardino	1,817	138,466	34,620	147,977	0	4,413	242,140	569,433
	Ventura	181	21,563	2,294	2,733	2,215	0	44,334	73,320
	Rest of U.S.	17,848	692,809	241,544	238,278	173,677	74,494	0	1,438,650
	TOTAL IN	28,160	1,010,991	410,560	576,297	432,016	116,500	1,088,438	3,662,962

Table 7. Top-down Approach: County-to-County Migration Flows, 2000-2035

Year	County	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Rest of U.S.	TOTAL OUT
2000-05	Imperial	0	4,808	989	9,719	1,919	393	13,156	30,984
	Los Angeles	4,142	0	254,626	144,291	276,777	82,066	546,872	1,308,774
	Orange	1,003	207,440	0	140,113	50,640	7,098	202,970	609,265
	Riverside	5,601	59,936	55,538	0	78,179	3,375	90,522	293,152
	San Bernardino	1,449	139,913	34,917	102,910	0	4,015	111,936	395,139
	Ventura	466	70,657	7,499	6,181	5,224	0	68,032	158,059
	Rest of U.S.	12,773	596,513	210,148	146,653	105,502	59,545	0	1,131,134
	TOTAL IN	25,435	1,079,266	563,718	549,867	518,241	156,492	1,033,488	3,926,507
2005-10	Imperial	0	3,592	791	7,610	1,444	301	15,127	28,865
	Los Angeles	5,714	0	260,397	142,132	261,897	80,845	840,655	1,591,640
	Orange	1,296	183,240	0	129,636	44,770	6,508	292,013	657,462
	Riverside	8,995	66,525	66,477	0	86,434	3,896	162,571	394,898
	San Bernardino	2,201	146,618	39,410	111,722	0	4,369	192,540	496,860
	Ventura	602	62,348	7,166	5,713	4,607	0	96,194	176,630
	Rest of U.S.	16,660	558,896	208,752	137,801	99,668	56,234	0	1,078,011
	TOTAL IN	35,468	1,021,218	582,992	534,614	498,819	152,154	1,599,101	4,424,366
2010-15	Imperial	0	3,562	773	7,889	1,533	308	14,423	28,488
	Los Angeles	7,099	0	260,235	148,675	284,611	84,600	798,004	1,583,223
	Orange	1,698	197,618	0	142,438	51,324	7,197	292,668	692,944
	Riverside	12,494	75,710	74,092	0	104,750	4,545	173,804	445,395
	San Bernardino	2,804	152,916	40,287	119,885	0	4,670	187,402	507,964
	Ventura	746	64,105	7,185	5,952	5,028	0	93,152	176,168
	Rest of U.S.	21,403	608,995	222,060	148,572	116,622	61,763	0	1,179,414
	TOTAL IN	46,245	1,102,906	604,630	573,411	563,868	163,083	1,559,453	4,613,596
2015-20	Imperial	0	3,760	852	9,782	1,951	352	24,056	40,753
	Los Angeles	5,044	0	207,317	133,305	261,533	69,511	980,090	1,656,799
	Orange	1,302	162,410	0	137,936	50,944	6,388	387,237	746,218
	Riverside	9,734	63,168	64,726	0	105,522	4,098	231,965	479,212
	San Bernardino	2,246	131,198	36,189	121,045	0	4,329	259,046	554,054
	Ventura	551	50,263	5,901	5,504	4,763	0	116,364	183,345
	Rest of U.S.	24,484	722,561	279,051	217,614	167,131	81,003	0	1,491,844
	TOTAL IN	43,362	1,133,360	594,036	625,185	591,844	165,681	1,998,757	5,152,225
2020-25	Imperial	0	2,937	705	8,962	1,877	293	32,518	47,292
	Los Angeles	3,453	0	151,808	108,193	222,901	51,287	1,168,264	1,705,905
	Orange	935	118,064	0	117,603	45,612	4,951	485,270	772,435
	Riverside	7,547	49,527	53,703	0	101,900	3,425	313,884	529,986
	San Bernardino	1,724	101,910	29,746	110,282	0	3,585	346,435	593,683
	Ventura	379	35,131	4,365	4,511	4,100	0	140,496	188,982
	Rest of U.S.	29,281	866,170	353,139	305,345	246,649	103,533	0	1,904,118
	TOTAL IN	43,319	1,173,740	593,465	654,896	623,038	167,075	2,486,868	5,742,401
2025-30	Imperial	0	2,272	567	7,872	1,704	235	39,698	52,348
	Los Angeles	2,427	0	111,949	87,166	185,756	37,813	1,309,017	1,734,129
	Orange	671	85,533	0	96,707	38,794	3,726	554,938	780,369
	Riverside	5,899	39,100	44,044	0	94,445	2,808	391,156	577,453
	San Bernardino	1,329	79,337	24,057	97,449	0	2,899	425,920	630,991
	Ventura	266	24,753	3,196	3,607	3,389	0	156,255	191,466
	Rest of U.S.	32,783	1,004,041	422,824	391,995	335,266	123,140	0	2,310,050
	TOTAL IN	43,376	1,235,037	606,637	684,796	659,356	170,620	2,876,984	6,276,806
2030-35	Imperial	0	1,858	462	6,957	1,544	189	45,245	56,255
	Los Angeles	1,796	0	86,789	73,211	159,902	28,811	1,418,981	1,769,491
	Orange	502	67,103	0	81,999	33,713	2,865	607,250	793,433
	Riverside	4,646	32,324	36,323	0	86,485	2,276	450,855	612,908
	San Bernardino	1,051	65,882	19,931	87,461	0	2,361	493,220	669,907
	Ventura	195	19,116	2,461	3,010	2,901	0	168,258	195,941
	Rest of U.S.	35,010	1,117,584	471,451	477,470	413,860	135,105	0	2,650,480
	TOTAL IN	43,200	1,303,868	617,416	730,108	698,405	171,607	3,183,811	6,748,415

Table 8. Census Approach: County-to-County Migration Flows, 2000-2035

Year	County	Imperial	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Rest of U.S.	TOTAL OUT
2000-05	Imperial	0	5,615	860	7,318	2,332	344	14,515	30,984
	Los Angeles	2,697	0	274,794	152,556	265,762	78,732	534,233	1,308,774
	Orange	5,274	207,962	0	135,137	48,260	6,801	205,831	609,265
	Riverside	2,191	66,635	53,989	0	74,025	3,031	93,282	293,152
	San Bernardino	3,173	137,071	36,164	97,867	0	3,817	117,046	395,139
	Ventura	276	68,171	10,399	6,434	4,199	0	68,580	158,059
	Rest of U.S.	11,825	593,811	187,512	150,556	123,663	63,768	0	1,131,134
	TOTAL IN	25,435	1,079,266	563,718	549,867	518,241	156,492	1,033,488	3,926,507
2005-10	Imperial	0	4,041	660	5,409	1,671	253	16,831	28,865
	Los Angeles	3,771	0	281,099	150,273	253,746	77,240	825,511	1,591,640
	Orange	6,822	184,482	0	123,139	42,625	6,172	294,221	657,462
	Riverside	3,558	74,221	64,148	0	82,094	3,453	167,424	394,898
	San Bernardino	4,858	143,890	40,497	105,529	0	4,099	197,987	496,860
	Ventura	354	59,917	9,749	5,809	3,675	0	97,127	176,630
	Rest of U.S.	16,106	554,667	186,838	144,455	115,009	60,936	0	1,078,011
	TOTAL IN	35,468	1,021,218	582,992	534,614	498,819	152,154	1,599,101	4,424,366
2010-15	Imperial	0	4,137	662	5,615	1,819	263	15,991	28,488
	Los Angeles	4,669	0	281,842	155,965	276,187	80,431	784,129	1,583,223
	Orange	8,904	199,059	0	134,715	48,904	6,775	294,587	692,944
	Riverside	4,947	85,307	72,216	0	100,327	4,038	178,561	445,395
	San Bernardino	6,162	150,916	41,603	112,221	0	4,374	192,688	507,964
	Ventura	444	62,157	9,907	6,110	4,053	0	93,497	176,168
	Rest of U.S.	21,120	601,330	198,400	158,785	132,576	67,203	0	1,179,414
	TOTAL IN	46,245	1,102,906	604,630	573,411	563,868	163,083	1,559,453	4,613,596
2015-20	Imperial	0	4,255	727	6,862	2,223	290	26,396	40,753
	Los Angeles	3,385	0	230,491	141,920	251,273	65,987	963,743	1,656,799
	Orange	6,944	164,006	0	131,884	47,868	5,980	389,535	746,218
	Riverside	3,888	70,825	64,027	0	98,956	3,591	237,925	479,212
	San Bernardino	4,984	128,946	37,960	113,931	0	4,004	264,229	554,054
	Ventura	327	48,435	8,244	5,657	3,752	0	116,929	183,345
	Rest of U.S.	23,834	716,892	252,587	224,930	187,771	85,830	0	1,491,844
	TOTAL IN	43,362	1,133,360	594,036	625,185	591,844	165,681	1,998,757	5,152,225
2020-25	Imperial	0	3,304	608	6,181	2,071	236	34,894	47,292
	Los Angeles	2,383	0	174,367	115,707	211,835	48,473	1,153,139	1,705,905
	Orange	5,114	120,540	0	112,467	42,210	4,595	487,510	772,435
	Riverside	3,075	55,918	54,424	0	93,736	2,964	319,869	529,986
	San Bernardino	3,895	100,580	31,877	103,112	0	3,265	350,954	593,683
	Ventura	231	34,178	6,263	4,632	3,177	0	140,501	188,982
	Rest of U.S.	28,621	859,221	325,927	312,797	270,009	107,543	0	1,904,118
	TOTAL IN	43,319	1,173,740	593,465	654,896	623,038	167,075	2,486,868	5,742,401
2025-30	Imperial	0	2,560	495	5,305	1,837	185	41,966	52,348
	Los Angeles	1,688	0	132,658	92,783	175,585	35,608	1,295,807	1,734,129
	Orange	3,684	88,770	0	91,724	35,584	3,433	557,174	780,369
	Riverside	2,403	44,671	45,682	0	85,721	2,402	396,573	577,453
	San Bernardino	3,005	79,327	26,416	90,061	0	2,612	429,569	630,991
	Ventura	162	24,436	4,705	3,667	2,600	0	155,896	191,466
	Rest of U.S.	32,433	995,273	396,680	401,255	358,029	126,380	0	2,310,050
	TOTAL IN	43,376	1,235,037	606,637	684,796	659,356	170,620	2,876,984	6,276,806
2030-35	Imperial	0	2,080	407	4,666	1,631	147	47,324	56,255
	Los Angeles	1,268	0	105,058	78,598	150,113	27,196	1,407,258	1,769,491
	Orange	2,786	69,934	0	78,230	30,629	2,640	609,214	793,433
	Riverside	1,912	37,018	38,314	0	77,612	1,943	456,109	612,908
	San Bernardino	2,400	65,999	22,244	81,119	0	2,121	496,025	669,907
	Ventura	121	18,960	3,695	3,080	2,204	0	167,881	195,941
	Rest of U.S.	34,714	1,109,876	447,699	484,415	436,216	137,560	0	2,650,480
	TOTAL IN	43,200	1,303,868	617,416	730,108	698,405	171,607	3,183,811	6,748,415

Table 9. Error Measure of Percent Distribution of the Immigrants by the Origin County

Error Measure	Approach	County	Los Angeles	Orange	Riverside	San Bernadino	Imperial	Ventura	Rest of U.S.	Average
MPE	BU-C	Imperial	61%	-78%	242%	-27%		52%	-5%	41%
MPE	BU-C	Los Angeles		18%	25%	70%	99%	-3%	-4%	34%
MPE	BU-C	Orange	-3%		37%	53%	151%	-36%	3%	34%
MPE	BU-C	Riverside	-3%	13%		61%	184%	-17%	-13%	38%
MPE	BU-C	San Bernadino	12%	21%	44%		87%	14%	-17%	27%
MPE	BU-C	Ventura	22%	32%	66%	88%	186%		-8%	64%
MPE	BU-C	Rest of U.S.	-7%	-8%	11%	27%	50%	-27%		8%
MPE		Average	14%	0%	71%	46%	126%	-3%	-7%	33%
MAPE	BU-C	Imperial	61%	78%	242%	32%		54%	14%	80%
MAPE	BU-C	Los Angeles		38%	32%	73%	122%	35%	13%	52%
MAPE	BU-C	Orange	15%		37%	57%	163%	39%	18%	55%
MAPE	BU-C	Riverside	9%	26%		61%	189%	29%	22%	56%
MAPE	BU-C	San Bernadino	14%	33%	44%		108%	31%	19%	42%
MAPE	BU-C	Ventura	25%	45%	66%	89%	197%		12%	73%
MAPE	BU-C	Rest of U.S.	8%	11%	12%	27%	67%	27%		25%
MAPE		Average	22%	39%	72%	57%	141%	36%	16%	51%
MPE	TD-C	Imperial	47%	-81%	148%	-55%		66%	3%	21%
MPE	TD-C	Los Angeles		-2%	-11%	1%	-12%	3%	1%	-3%
MPE	TD-C	Orange	-12%		-1%	-6%	16%	-30%	9%	-4%
MPE	TD-C	Riverside	-6%	5%		7%	43%	-3%	-3%	7%
MPE	TD-C	San Bernadino	5%	7%	8%		-11%	28%	-10%	5%
MPE	TD-C	Ventura	5%	7%	15%	9%	22%		-5%	9%
MPE	TD-C	Rest of U.S.	1%	-1%	-2%	-2%	-7%	0%		-2%
MPE		Average	6%	-11%	26%	-8%	9%	11%	-1%	4%
MAPE	TD-C	Imperial	47%	81%	148%	55%		66%	3%	67%
MAPE	TD-C	Los Angeles		2%	11%	1%	12%	3%	1%	5%
MAPE	TD-C	Orange	12%		3%	6%	16%	30%	9%	13%
MAPE	TD-C	Riverside	6%	5%		7%	43%	3%	3%	11%
MAPE	TD-C	San Bernadino	5%	7%	8%		11%	28%	10%	11%
MAPE	TD-C	Ventura	5%	7%	15%	9%	22%		5%	10%
MAPE	TD-C	Rest of U.S.	1%	1%	2%	2%	7%	0%		2%
MAPE		Average	13%	17%	31%	13%	19%	22%	5%	15%

Note: MPE=Mean Percent Error, MAPE: Mean Absolute Percent Error

Table 10. Error Measure of Percent Distribution of Migrants by the Destination County

Error Measure	Approach	County	Los Angeles	Orange	Riverside	San Bernadino	Imperial	Ventura	Rest of U.S.	Average
MPE	BU-C	Imperial	38%	57%	119%	23%		76%	-18%	49%
MPE	BU-C	Los Angeles		21%	46%	47%	92%	54%	-7%	42%
MPE	BU-C	Orange	45%		53%	42%	-77%	46%	-11%	16%
MPE	BU-C	Riverside	33%	30%		45%	209%	59%	-10%	61%
MPE	BU-C	San Bernadino	45%	17%	53%		-47%	45%	-12%	17%
MPE	BU-C	Ventura	67%	-1%	55%	84%	123%		-5%	54%
MPE	BU-C	Rest of U.S.	3%	1%	7%	-9%	-10%	-7%		-3%
MPE		Average	39%	21%	56%	38%	48%	45%	-11%	28%
MAPE	BU-C	Imperial	69%	69%	119%	38%		83%	22%	67%
MAPE	BU-C	Los Angeles		49%	50%	50%	98%	67%	20%	56%
MAPE	BU-C	Orange	64%		54%	43%	77%	56%	25%	53%
MAPE	BU-C	Riverside	58%	45%		46%	209%	63%	26%	75%
MAPE	BU-C	San Bernadino	61%	39%	53%		47%	52%	28%	47%
MAPE	BU-C	Ventura	83%	41%	58%	84%	125%		22%	69%
MAPE	BU-C	Rest of U.S.	9%	3%	13%	14%	16%	7%		10%
MAPE		Average	57%	41%	58%	46%	95%	55%	24%	45%
MPE	TD-C	Imperial	-12%	16%	43%	-11%		22%	-7%	9%
MPE	TD-C	Los Angeles		-12%	-6%	5%	47%	5%	1%	7%
MPE	TD-C	Orange	-2%		5%	7%	-81%	7%	-1%	-11%
MPE	TD-C	Riverside	-11%	-1%		8%	148%	15%	-2%	26%
MPE	TD-C	San Bernadino	1%	-6%	7%		-55%	9%	-2%	-8%
MPE	TD-C	Ventura	3%	-30%	-3%	28%	66%		0%	11%
MPE	TD-C	Rest of U.S.	1%	9%	-3%	-10%	3%	-5%		-1%
MPE		Average	-3%	-4%	7%	5%	21%	9%	-2%	5%
MAPE	TD-C	Imperial	12%	16%	43%	11%		22%	7%	19%
MAPE	TD-C	Los Angeles		12%	6%	5%	47%	5%	1%	13%
MAPE	TD-C	Orange	2%		5%	7%	81%	7%	1%	17%
MAPE	TD-C	Riverside	11%	3%		8%	148%	15%	2%	31%
MAPE	TD-C	San Bernadino	1%	6%	7%		55%	9%	2%	13%
MAPE	TD-C	Ventura	3%	30%	3%	28%	66%		0%	22%
MAPE	TD-C	Rest of U.S.	1%	9%	3%	10%	3%	5%		5%
MAPE		Average	5%	13%	11%	11%	67%	10%	2%	16%

Note: MPE=Mean Percent Error, MAPE: Mean Absolute Percent Error

Table 11. Bottom up Approach: Migration Attractiveness, 2000-2035

Year	County	Imperial	Los Angeles	Orange	Riverside	San Bernadino	Ventura	Rest of U.S.	TOTAL OUT
2000-05	Imperial		0.6	0.6	1.1	0.9	0.6	0.9	0.9
	Los Angeles	1.6		1.4	2.9	2.5	1.6	1.4	1.6
	Orange	1.6	0.7		2.7	1.6	1.1	1.3	1.2
	Riverside	0.9	0.3	0.4		0.8	0.6	0.8	0.6
	San Bernadino	1.1	0.4	0.6	1.3		0.8	1.3	0.8
	Ventura	1.6	0.6	0.9	1.6	1.2		1.3	1.0
	Rest of U.S.	1.2	0.7	0.8	1.3	0.8	0.8		0.8
	TOTAL IN	1.1	0.6	0.8	1.7	1.3	1.0	1.3	
2005-10	Imperial		0.5	0.5	0.9	0.7	0.6	0.9	0.8
	Los Angeles	2.0		1.5	2.7	2.3	1.8	1.8	1.9
	Orange	1.9	0.7		2.3	1.4	1.2	1.6	1.3
	Riverside	1.2	0.4	0.4		0.8	0.8	1.1	0.7
	San Bernadino	1.4	0.4	0.7	1.2		1.0	1.8	0.9
	Ventura	1.7	0.5	0.8	1.3	1.0		1.4	0.9
	Rest of U.S.	1.1	0.6	0.6	0.9	0.6	0.7		0.6
	TOTAL IN	1.3	0.5	0.8	1.4	1.1	1.1	1.6	
2010-15	Imperial		1.0	1.1	1.5	1.2	1.4	1.6	1.5
	Los Angeles	1.0		1.5	2.2	1.9	2.1	1.5	1.7
	Orange	0.9	0.7		1.9	1.1	1.4	1.3	1.1
	Riverside	0.7	0.5	0.5		0.8	1.1	1.2	0.8
	San Bernadino	0.8	0.5	0.9	1.2		1.4	1.8	1.0
	Ventura	0.7	0.5	0.7	0.9	0.7		1.1	0.8
	Rest of U.S.	0.6	0.7	0.8	0.8	0.6	0.9		0.7
	TOTAL IN	0.7	0.6	0.9	1.3	1.0	1.3	1.5	
2015-20	Imperial		1.5	1.5	1.9	1.4	2.1	1.8	1.8
	Los Angeles	0.6		1.4	2.0	1.6	2.2	1.2	1.4
	Orange	0.7	0.7		1.8	1.0	1.5	1.1	1.1
	Riverside	0.5	0.5	0.6		0.7	1.3	1.0	0.8
	San Bernadino	0.7	0.6	1.0	1.4		1.8	1.8	1.1
	Ventura	0.5	0.5	0.7	0.8	0.6		0.8	0.7
	Rest of U.S.	0.5	0.8	0.9	1.0	0.6	1.2		0.8
	TOTAL IN	0.6	0.7	0.9	1.3	0.9	1.5	1.2	
2020-25	Imperial		2.3	1.9	2.4	1.7	2.9	2.0	2.1
	Los Angeles	0.4		1.2	1.7	1.2	2.0	0.9	1.0
	Orange	0.5	0.8		1.8	0.9	1.7	1.0	1.0
	Riverside	0.4	0.6	0.6		0.7	1.4	0.9	0.7
	San Bernadino	0.6	0.8	1.1	1.5		2.1	1.6	1.2
	Ventura	0.3	0.5	0.6	0.7	0.5		0.7	0.6
	Rest of U.S.	0.5	1.1	1.0	1.1	0.6	1.5		1.0
	TOTAL IN	0.5	1.0	1.0	1.4	0.8	1.7	1.0	
2025-30	Imperial		3.1	2.1	2.9	1.8	3.2	2.0	2.3
	Los Angeles	0.3		1.0	1.4	1.0	1.7	0.7	0.8
	Orange	0.5	1.0		1.9	0.9	1.7	0.9	1.1
	Riverside	0.3	0.7	0.5		0.6	1.3	0.8	0.7
	San Bernadino	0.5	1.0	1.1	1.6		2.2	1.5	1.3
	Ventura	0.3	0.6	0.6	0.8	0.5		0.6	0.6
	Rest of U.S.	0.5	1.5	1.1	1.3	0.7	1.7		1.2
	TOTAL IN	0.4	1.2	0.9	1.5	0.8	1.7	0.8	
2030-35	Imperial		3.5	2.0	3.1	1.9	3.0	1.9	2.3
	Los Angeles	0.3		0.8	1.4	0.9	1.4	0.6	0.7
	Orange	0.5	1.2		2.1	1.0	1.7	0.9	1.1
	Riverside	0.3	0.7	0.5		0.6	1.2	0.7	0.6
	San Bernadino	0.5	1.1	1.0	1.6		2.0	1.4	1.3
	Ventura	0.3	0.7	0.6	0.9	0.5		0.6	0.6
	Rest of U.S.	0.5	1.8	1.1	1.5	0.7	1.7		1.3
	TOTAL IN	0.4	1.4	0.9	1.6	0.8	1.6	0.8	

Note: Migration Attractiveness = Domestic Immigrants/Domestic Outmigrants

Table 12. Top down Approach: Migration Attractiveness, 2000-2035

Year	County	Imperial	Los Angeles	Orange	Riverside	San Bernadino	Ventura	Rest of U.S.	TOTAL OUT
2000-05	Imperial		1.2	1.0	1.7	1.3	0.8	1.0	1.2
	Los Angeles	0.9		1.2	2.4	2.0	1.2	0.9	1.2
	Orange	1.0	0.8		2.5	1.5	0.9	1.0	1.1
	Riverside	0.6	0.4	0.4		0.8	0.5	0.6	0.5
	San Bernadino	0.8	0.5	0.7	1.3		0.8	1.1	0.8
	Ventura	1.2	0.9	1.1	1.8	1.3		1.1	1.0
	Rest of U.S.	1.0	1.1	1.0	1.6	0.9	0.9		1.1
	TOTAL IN	0.8	0.8	0.9	1.9	1.3	1.0	0.9	
2005-10	Imperial		0.6	0.6	0.8	0.7	0.5	0.9	0.8
	Los Angeles	1.6		1.4	2.1	1.8	1.3	1.5	1.6
	Orange	1.6	0.7		2.0	1.1	0.9	1.4	1.1
	Riverside	1.2	0.5	0.5		0.8	0.7	1.2	0.7
	San Bernadino	1.5	0.6	0.9	1.3		0.9	1.9	1.0
	Ventura	2.0	0.8	1.1	1.5	1.1		1.7	1.2
	Rest of U.S.	1.1	0.7	0.7	0.8	0.5	0.6		0.7
	TOTAL IN	1.2	0.6	0.9	1.4	1.0	0.9	1.5	
2010-15	Imperial		0.5	0.5	0.6	0.5	0.4	0.7	0.6
	Los Angeles	2.0		1.3	2.0	1.9	1.3	1.3	1.4
	Orange	2.2	0.8		1.9	1.3	1.0	1.3	1.1
	Riverside	1.6	0.5	0.5		0.9	0.8	1.2	0.8
	San Bernadino	1.8	0.5	0.8	1.1		0.9	1.6	0.9
	Ventura	2.4	0.8	1.0	1.3	1.1		1.5	1.1
	Rest of U.S.	1.5	0.8	0.8	0.9	0.6	0.7		0.8
	TOTAL IN	1.6	0.7	0.9	1.3	1.1	0.9	1.3	
2015-20	Imperial		0.7	0.7	1.0	0.9	0.6	1.0	0.9
	Los Angeles	1.3		1.3	2.1	2.0	1.4	1.4	1.5
	Orange	1.5	0.8		2.1	1.4	1.1	1.4	1.3
	Riverside	1.0	0.5	0.5		0.9	0.7	1.1	0.8
	San Bernadino	1.2	0.5	0.7	1.1		0.9	1.5	0.9
	Ventura	1.6	0.7	0.9	1.3	1.1		1.4	1.1
	Rest of U.S.	1.0	0.7	0.7	0.9	0.6	0.7		0.7
	TOTAL IN	1.1	0.7	0.8	1.3	1.1	0.9	1.3	
2020-25	Imperial		0.9	0.8	1.2	1.1	0.8	1.1	1.1
	Los Angeles	1.2		1.3	2.2	2.2	1.5	1.3	1.5
	Orange	1.3	0.8		2.2	1.5	1.1	1.4	1.3
	Riverside	0.8	0.5	0.5		0.9	0.8	1.0	0.8
	San Bernadino	0.9	0.5	0.7	1.1		0.9	1.4	1.0
	Ventura	1.3	0.7	0.9	1.3	1.1		1.4	1.1
	Rest of U.S.	0.9	0.7	0.7	1.0	0.7	0.7		0.8
	TOTAL IN	0.9	0.7	0.8	1.2	1.0	0.9	1.3	
2025-30	Imperial		0.9	0.8	1.3	1.3	0.9	1.2	1.2
	Los Angeles	1.1		1.3	2.2	2.3	1.5	1.3	1.4
	Orange	1.2	0.8		2.2	1.6	1.2	1.3	1.3
	Riverside	0.7	0.4	0.5		1.0	0.8	1.0	0.8
	San Bernadino	0.8	0.4	0.6	1.0		0.9	1.3	1.0
	Ventura	1.1	0.7	0.9	1.3	1.2		1.3	1.1
	Rest of U.S.	0.8	0.8	0.8	1.0	0.8	0.8		0.8
	TOTAL IN	0.8	0.7	0.8	1.2	1.0	0.9	1.2	
2030-35	Imperial		1.0	0.9	1.5	1.5	1.0	1.3	1.3
	Los Angeles	1.0		1.3	2.3	2.4	1.5	1.3	1.4
	Orange	1.1	0.8		2.3	1.7	1.2	1.3	1.3
	Riverside	0.7	0.4	0.4		1.0	0.8	0.9	0.8
	San Bernadino	0.7	0.4	0.6	1.0		0.8	1.2	1.0
	Ventura	1.0	0.7	0.9	1.3	1.2		1.2	1.1
	Rest of U.S.	0.8	0.8	0.8	1.1	0.8	0.8		0.8
	TOTAL IN	0.8	0.7	0.8	1.2	1.0	0.9	1.2	

Note: Migration Attractiveness = Domestic Immigrants/Domestic Outmigrants

Table 13. Census Approach: Migration Attractiveness, 2000-2035

Year	County	Imperial	Los Angeles	Orange	Riverside	San Bernadino	Ventura	Rest of U.S.	TOTAL OUT
2000-05	Imperial		2.1	0.2	3.3	0.7	1.2	1.2	1.2
	Los Angeles	0.5		1.3	2.3	1.9	1.2	0.9	1.2
	Orange	6.1	0.8		2.5	1.3	0.7	1.1	1.1
	Riverside	0.3	0.4	0.4		0.8	0.5	0.6	0.5
	San Bernadino	1.4	0.5	0.7	1.3		0.9	0.9	0.8
	Ventura	0.8	0.9	1.5	2.1	1.1		1.1	1.0
	Rest of U.S.	0.8	1.1	0.9	1.6	1.1	0.9		1.1
	TOTAL IN	0.8	0.8	0.9	1.9	1.3	1.0	0.9	
2005-10	Imperial		1.1	0.1	1.5	0.3	0.7	1.0	0.8
	Los Angeles	0.9		1.5	2.0	1.8	1.3	1.5	1.6
	Orange	10.3	0.7		1.9	1.1	0.6	1.6	1.1
	Riverside	0.7	0.5	0.5		0.8	0.6	1.2	0.7
	San Bernadino	2.9	0.6	1.0	1.3		1.1	1.7	1.0
	Ventura	1.4	0.8	1.6	1.7	0.9		1.6	1.2
	Rest of U.S.	1.0	0.7	0.6	0.9	0.6	0.6		0.7
	TOTAL IN	1.2	0.6	0.9	1.4	1.0	0.9	1.5	
2010-15	Imperial		0.9	0.1	1.1	0.3	0.6	0.8	0.6
	Los Angeles	1.1		1.4	1.8	1.8	1.3	1.3	1.4
	Orange	13.5	0.7		1.9	1.2	0.7	1.5	1.1
	Riverside	0.9	0.5	0.5		0.9	0.7	1.1	0.8
	San Bernadino	3.4	0.5	0.9	1.1		1.1	1.5	0.9
	Ventura	1.7	0.8	1.5	1.5	0.9		1.4	1.1
	Rest of U.S.	1.3	0.8	0.7	0.9	0.7	0.7		0.8
	TOTAL IN	1.6	0.7	0.9	1.3	1.1	0.9	1.3	
2015-20	Imperial		1.3	0.1	1.8	0.4	0.9	1.1	0.9
	Los Angeles	0.8		1.4	2.0	1.9	1.4	1.3	1.5
	Orange	9.6	0.7		2.1	1.3	0.7	1.5	1.3
	Riverside	0.6	0.5	0.5		0.9	0.6	1.1	0.8
	San Bernadino	2.2	0.5	0.8	1.2		1.1	1.4	0.9
	Ventura	1.1	0.7	1.4	1.6	0.9		1.4	1.1
	Rest of U.S.	0.9	0.7	0.6	0.9	0.7	0.7		0.7
	TOTAL IN	1.1	0.7	0.8	1.3	1.1	0.9	1.3	
2020-25	Imperial		1.4	0.1	2.0	0.5	1.0	1.2	1.1
	Los Angeles	0.7		1.4	2.1	2.1	1.4	1.3	1.5
	Orange	8.4	0.7		2.1	1.3	0.7	1.5	1.3
	Riverside	0.5	0.5	0.5		0.9	0.6	1.0	0.8
	San Bernadino	1.9	0.5	0.8	1.1		1.0	1.3	1.0
	Ventura	1.0	0.7	1.4	1.6	1.0		1.3	1.1
	Rest of U.S.	0.8	0.7	0.7	1.0	0.8	0.8		0.8
	TOTAL IN	0.9	0.7	0.8	1.2	1.0	0.9	1.3	
2025-30	Imperial		1.5	0.1	2.2	0.6	1.1	1.3	1.2
	Los Angeles	0.7		1.5	2.1	2.2	1.5	1.3	1.4
	Orange	7.4	0.7		2.0	1.3	0.7	1.4	1.3
	Riverside	0.5	0.5	0.5		1.0	0.7	1.0	0.8
	San Bernadino	1.6	0.5	0.7	1.1		1.0	1.2	1.0
	Ventura	0.9	0.7	1.4	1.5	1.0		1.2	1.1
	Rest of U.S.	0.8	0.8	0.7	1.0	0.8	0.8		0.8
	TOTAL IN	0.8	0.7	0.8	1.2	1.0	0.9	1.2	
2030-35	Imperial		1.6	0.1	2.4	0.7	1.2	1.4	1.3
	Los Angeles	0.6		1.5	2.1	2.3	1.4	1.3	1.4
	Orange	6.8	0.7		2.0	1.4	0.7	1.4	1.3
	Riverside	0.4	0.5	0.5		1.0	0.6	0.9	0.8
	San Bernadino	1.5	0.4	0.7	1.0		1.0	1.1	1.0
	Ventura	0.8	0.7	1.4	1.6	1.0		1.2	1.1
	Rest of U.S.	0.7	0.8	0.7	1.1	0.9	0.8		0.8
	TOTAL IN	0.8	0.7	0.8	1.2	1.0	0.9	1.2	

Note: Migration Attractiveness = Domestic Immigrants/Domestic Outmigrants

Figure 4. Overall Migration Attractiveness of Each County

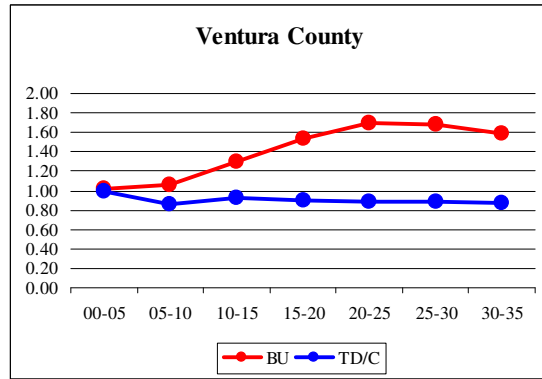
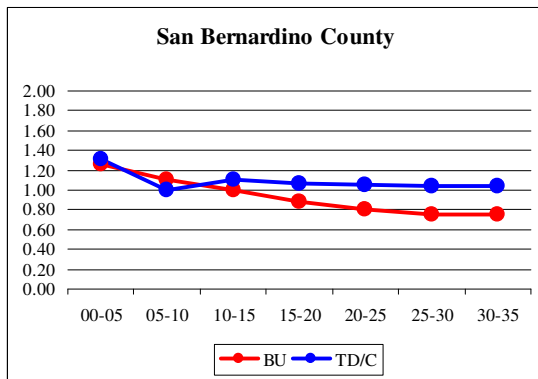
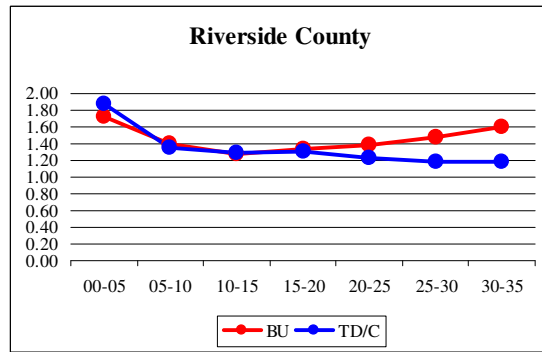
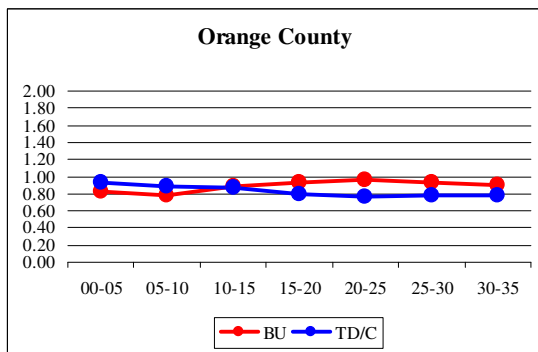
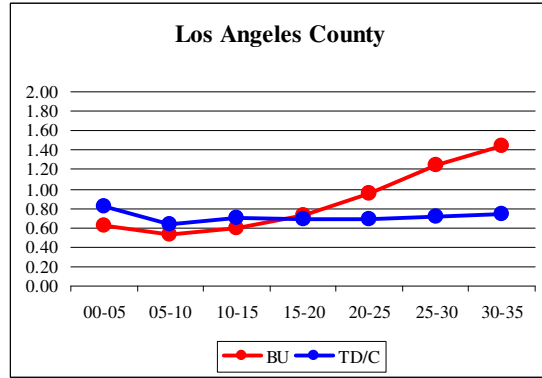
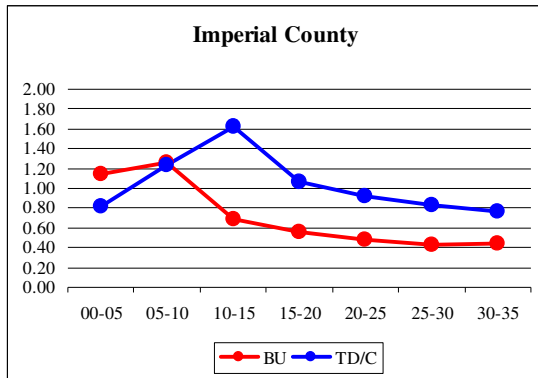


Figure 5. Migration Attractiveness of Each County Relative to Imperial County

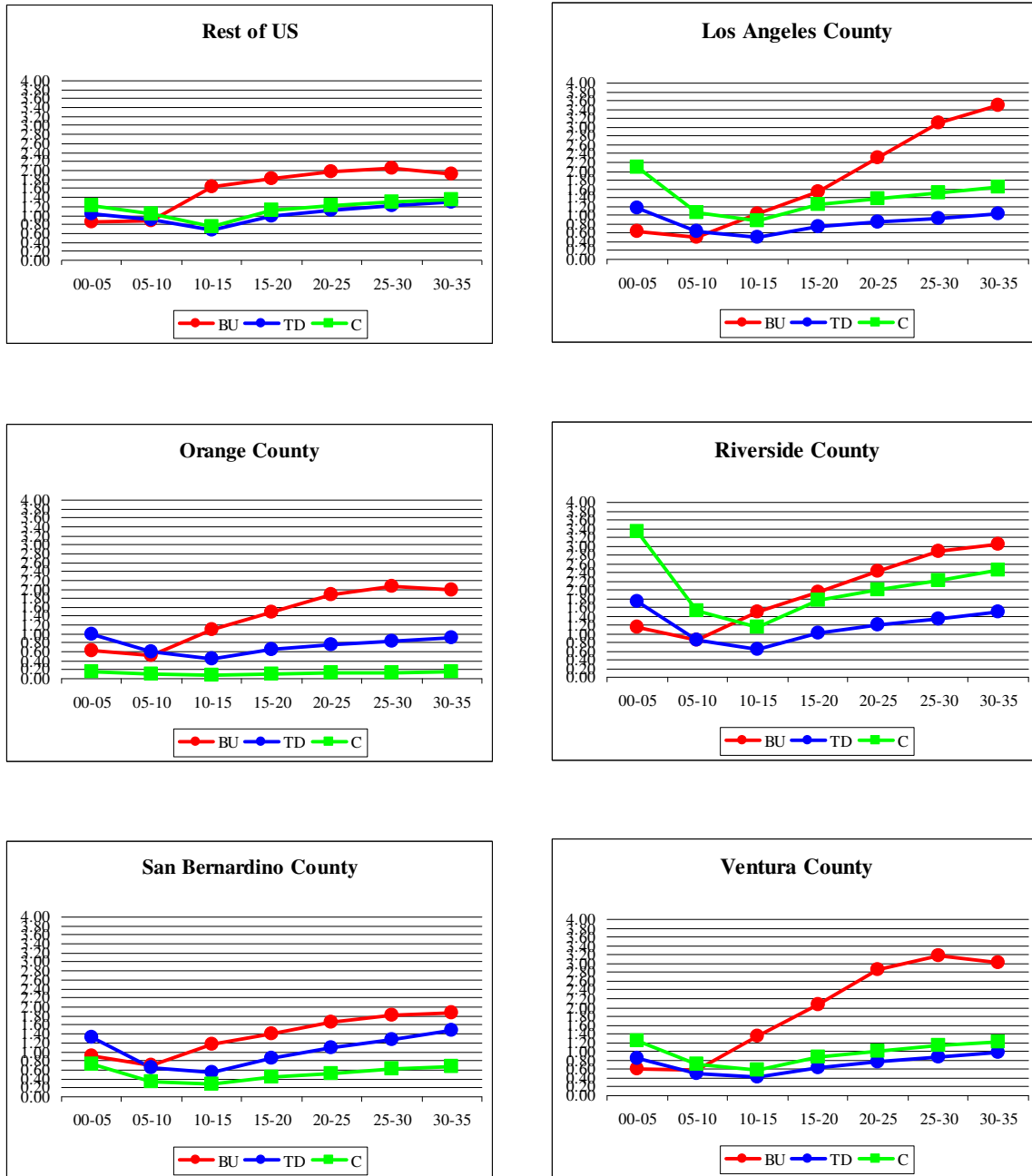


Figure 6. Migration Attractiveness of Each County Relative to Los Angeles County

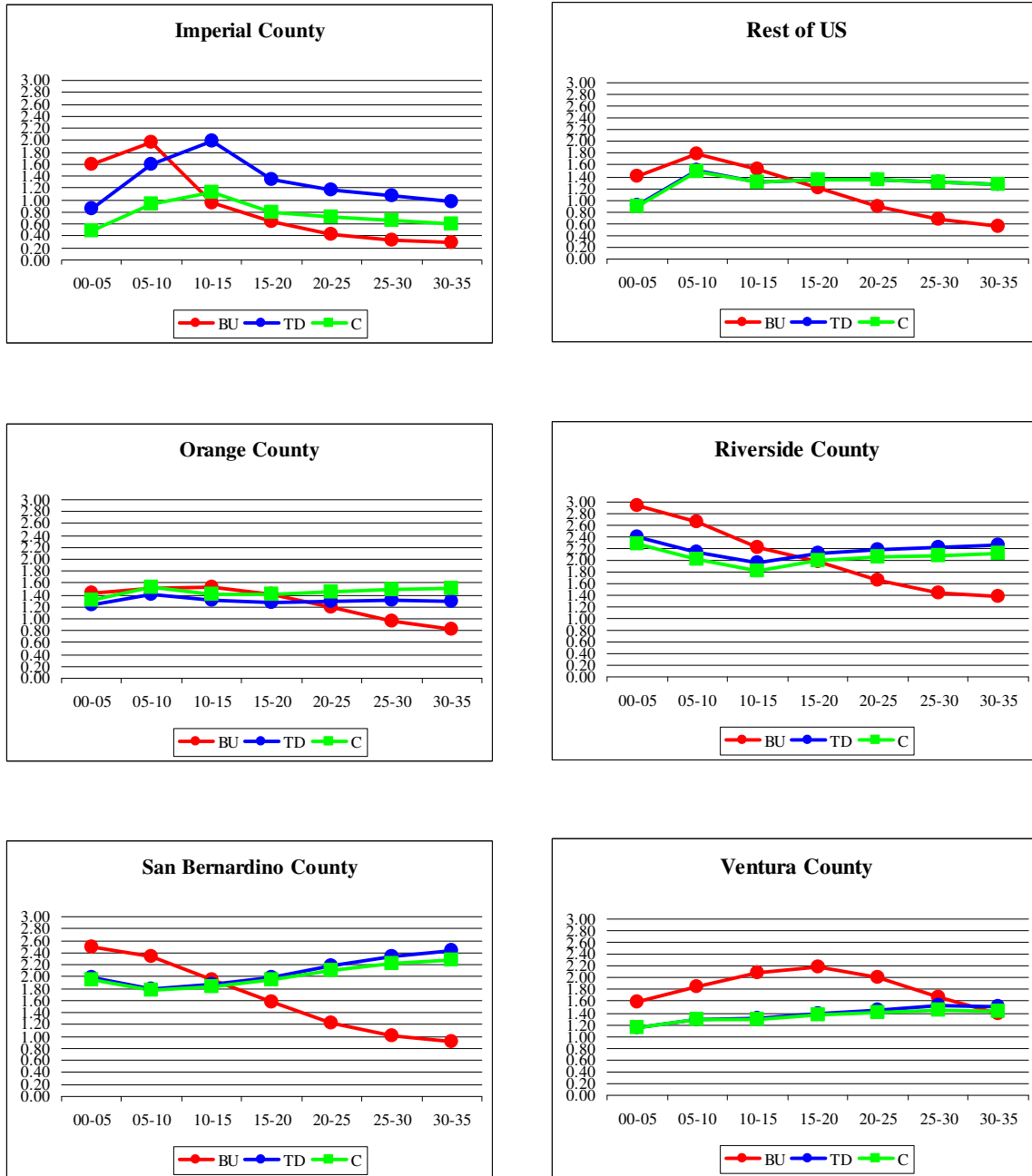


Figure 7. Migration Attractiveness of Each County Relative to Orange County

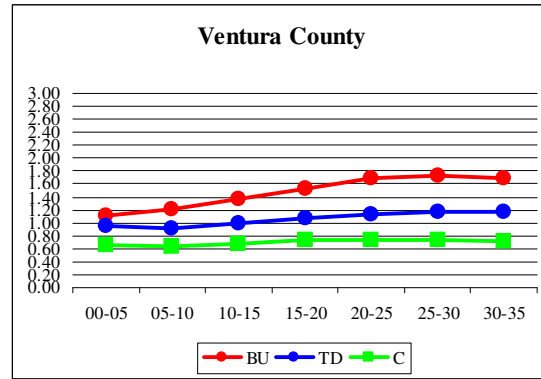
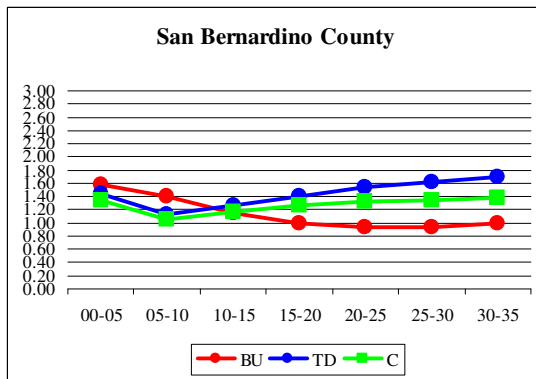
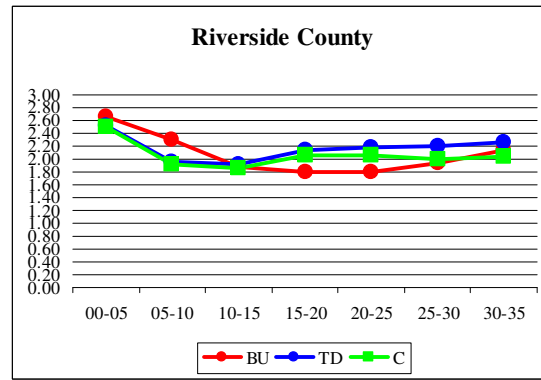
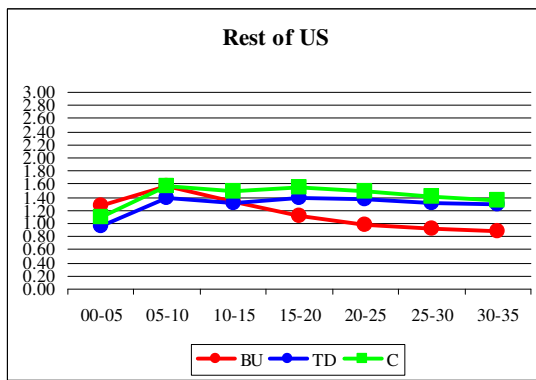
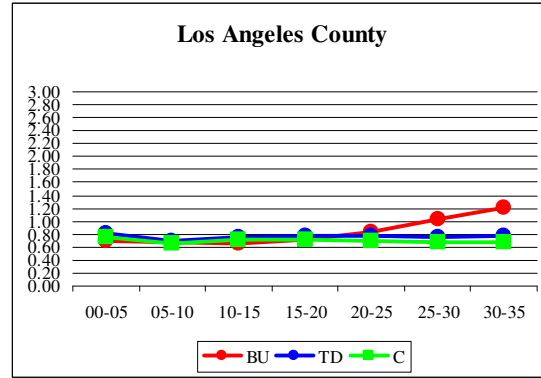
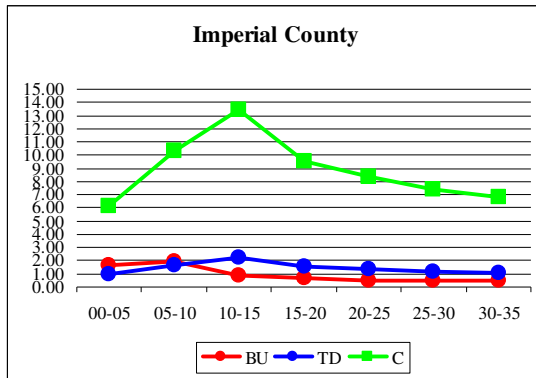


Figure 8. Migration Attractiveness of Each County Relative to Riverside County

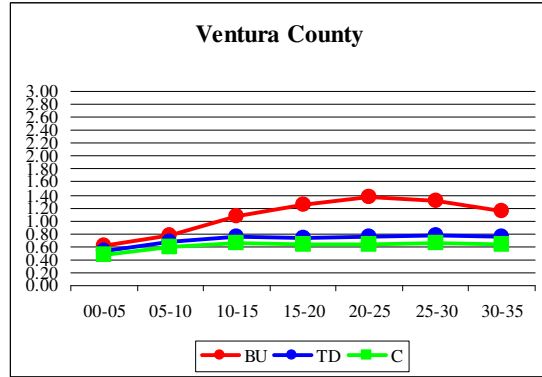
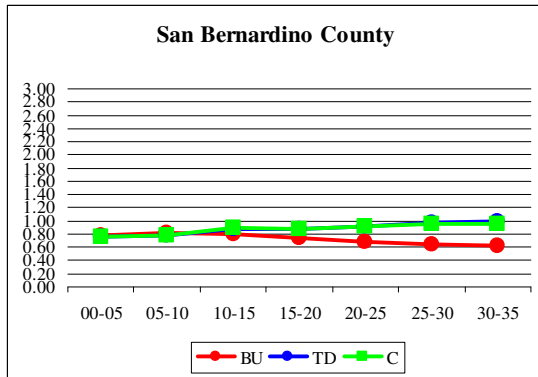
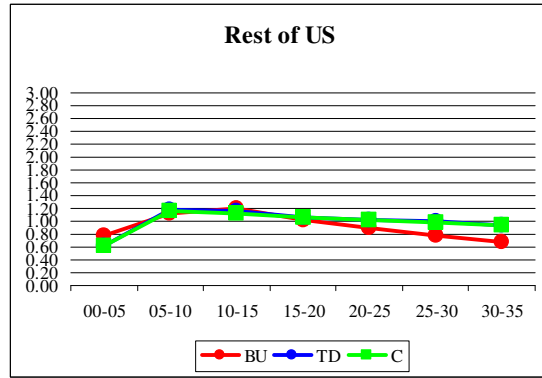
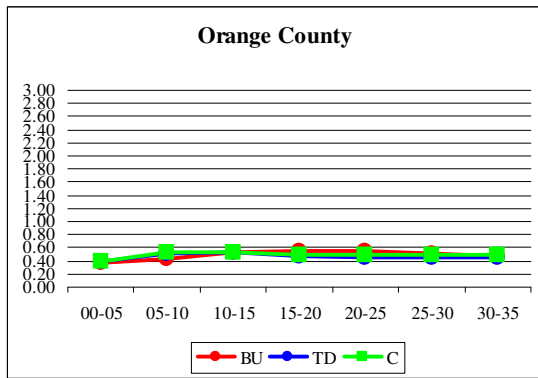
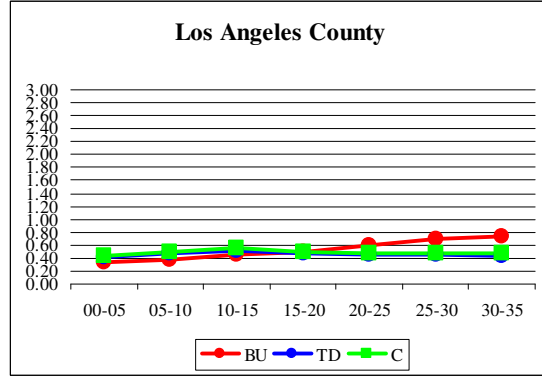
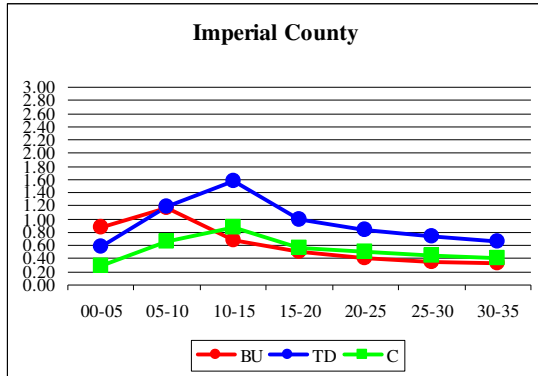


Figure 9. Migration Attractiveness of Each County Relative to San Bernardino County

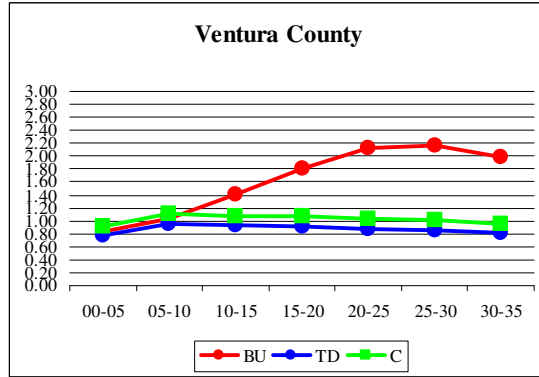
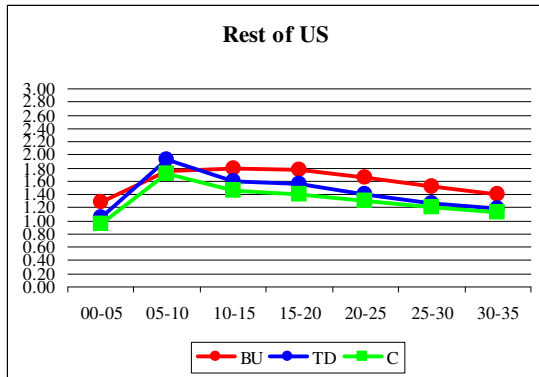
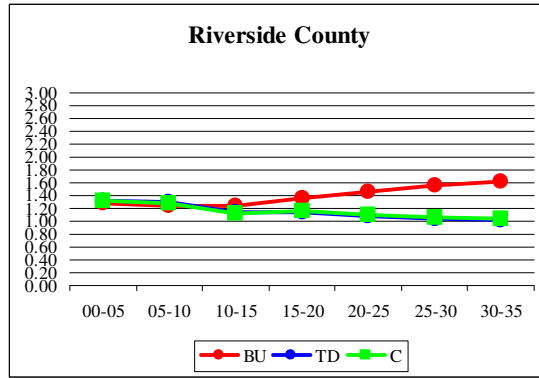
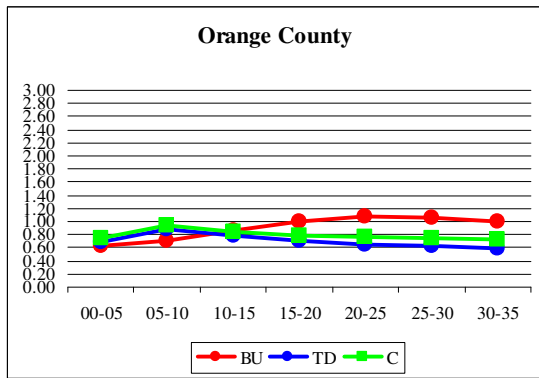
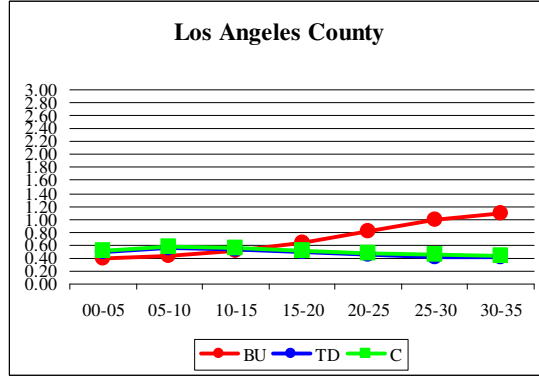
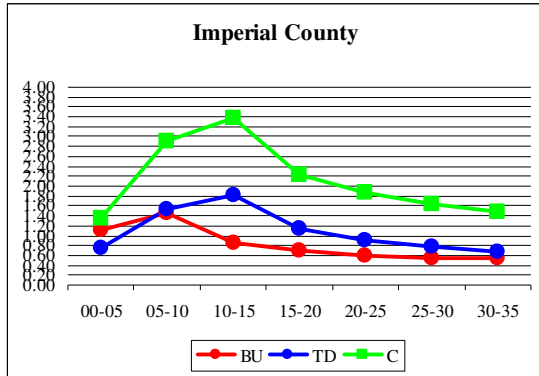


Figure 10. Migration Attractiveness of Each County Relative to Ventura County

