Domestic migration across booming regions: Pull of job growth or push of housing cost?

Southern Demographic Association

Kevin Kane, PhD
w/ John Cho, PhD, Frank Wen, PhD, & Simon Choi, PhD
Southern California Association of Governments
Department of Research & Analysis
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Presentation Outline

- Southern California region trends & motivation for research
- Domestic migration literature review & hypothesis
- Methods
- Preliminary results: Migration across the urban hierarchy
- Preliminary results: Drivers of interregional migration

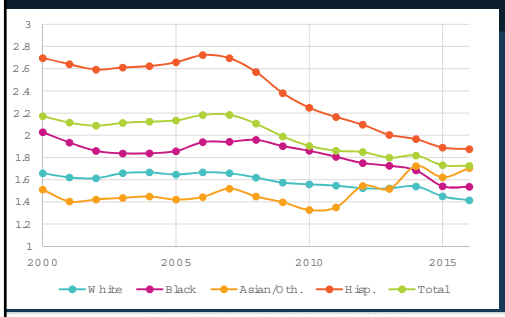
191 Cities
6 Counties

19.1 Million People

49.1% State Population

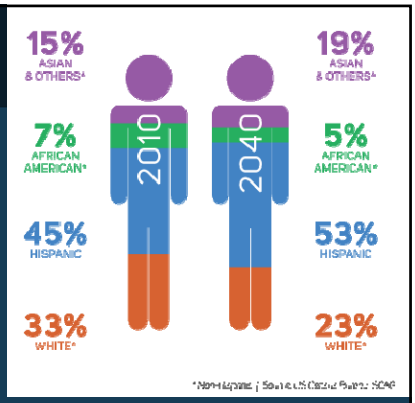
SAN BERNARDINO
VENTURA
LOS ANGELES
ORANGE
RIVERSIDE
IMPERIAL

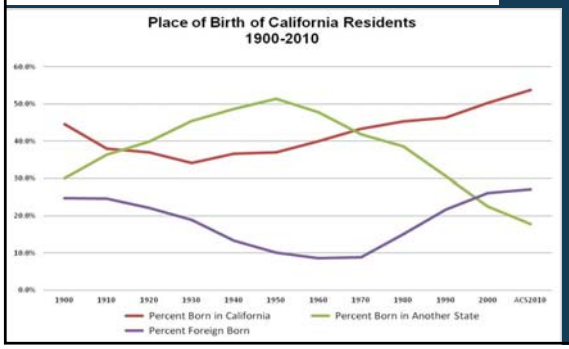
Regional Demographic Trends



← SCAG Region Fertility

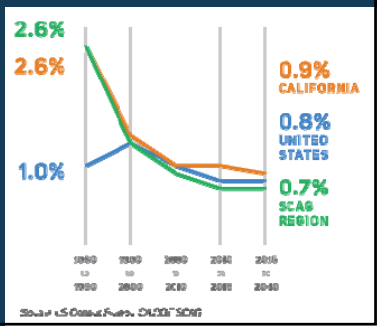
Racial/Ethnic Composition →





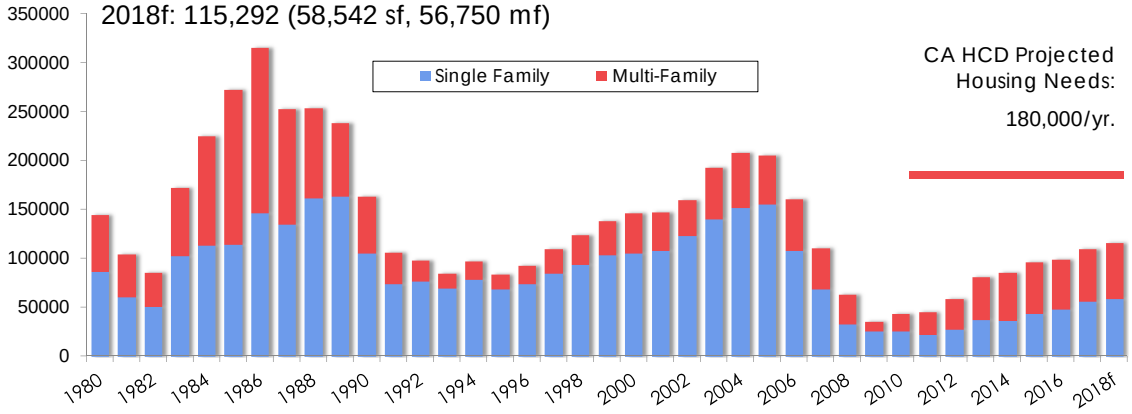
← Birthplace of California Residents

Future Population Growth Rate →



"Missing" 72,000 New Units Annually

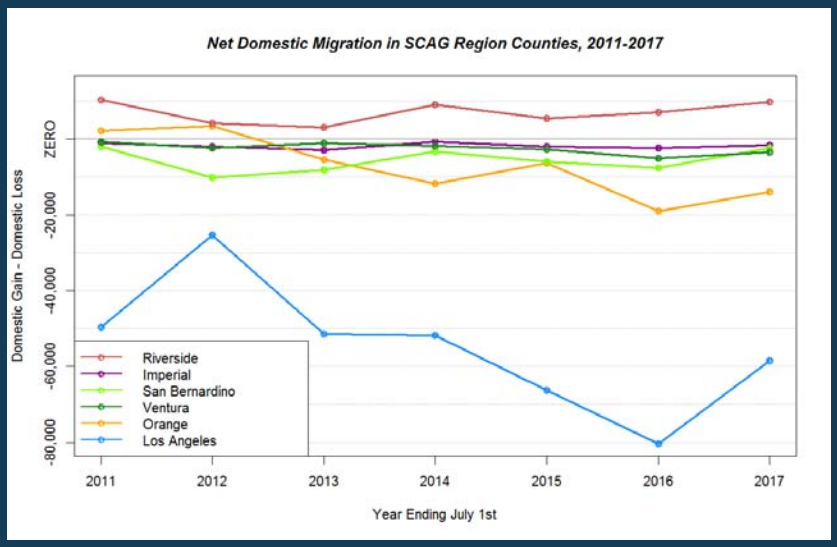
2016: 98,881 (47,889 sf, 50,992 mf)
2017p: 107,756 (53,708 sf, 54,048 mf)
2018f: 115,292 (58,542 sf, 56,750 mf)



SERIES: California New Housing Permits
SOURCE: Construction Industry Research Board

Snapshot: SCAG Region Domestic Migration

- 2017: Deficit decreases substantially
  - Housing shortage, but
  - Improved economic fundamentals
- Brain gain?
  - Harder for native Californians to find housing, but
  - In-migrants bringing up college education rates



Source: CA DOF E-1 (January 2018)

Regional Economies, Regional Forecasting

- Hypothesis: Two main behavioral drivers of domestic migration
  - Cost of living (housing)
  - Job Growth
- Changes in the regional economic system impacting interregional migration
  - Innovative, booming 'megaregions' led by creative class employment, innovation (e.g. Florida 2017)
  - Urban Hierarchy: productivity gaps are widening, but congestion also bids up living costs
- SCAG Economic-Demographic Forecast Model
  - Net domestic migration treated as residual based on independent job forecast
- Challenge: How can we better forecast migration across regions?

Literature Review I – Drivers of Migration

- Domestic migration slowing since 1980
  - Housing lock-in effect (Molloy, Smith, & Wozniak 2011)
  - Reached North/Sunbelt equilibrium (Glaeser & Tobio 2007)
  - Telecommuting
- Dominant direction of migration is now down the urban hierarchy
  - Contrary to historical patterns of rural-to-urban migration (Plane, Henrie, & Perry 2005)
- Subpopualtion/life stage effects
  - Where to retire? Drivers may be different (Duncombe et al 1999, Conway & Houtenville 2001)

Methods

1. Migration flows across the urban hierarchy
   - 6 region size categories → 15 pairs of net flow observed (Plane, Henrie, & Perry 2005)
2. Model MSA-level drivers of domestic migration
   - "Push" vs. "Pull" comparison well-suited for a discrete choice model (Newbold et al. 1996, Dumcombe et al. 1999)
   - Our approach: OLS using gross flow from MSA_i to MSA_j (Conway & Houtenville 2001)

$$F_{ij} = \alpha + \beta_1 d_{ij} + \beta_2 BORD_{ij} + \beta_3 VAR_i + \beta_4 VAR_j + e_{ij}$$

where F_{ij} represents flow, d_{ij} represents distance, $BORD_{ij}$ is a dummy variable indicating a shared border, e_{ij} is an error term, and VAR_i and VAR_j represent origin and destination characteristics, respectively.

Data

- Dependent Variable
  - ACS MSA-to-MSA migration flow (2015 5-yr sample)
  - Total population moving from origin (i) to destination (j) in one year
  - Note: Age-specific data censored for many counties. Requires additional processing.
- Drivers of interregional migration
  - Home price index, 2015 (FHFA HPI)
  - Job growth, 2010-2015 (BLS)
  - Share of employment in "creative class," 2015 (ACS)
  - Fortune 1000 headquarters, 2015 (ProximityOne)
  - Patents, log of total 2010-2015 value (USPO)
  - College educated share, 2015 (ACS)
  - Metro-level GDP (BEA)
  - Share of Democratic presidential election vote, 2012 (Rogers and Cage 2012)
  - Violent crime rate, 2014 (FBI UCR)

Migration across the urban hierarchy

Table 1: MSA Size Categories

Label	Population Range	Count
1. Mega-metropolitan	2,500,000 +	21
2. Major metropolitan	1,000,000 - 2,500,000	31
3. AAA Metropolitan	500,000 - 1,000,000	53
4. AA Metropolitan	250,000 - 500,000	81
5. A Metropolitan	50,000 - 250,000	202
6. Non-metropolitan	< 50,000	NA

Migration Flows – top and bottom ten

Table 3: Top 10 Net MSA Migration Flows

Origin	*Size*	Destination	*Size*	Flow	Counterflow	**Net Flow**	Net Flow Rate*
Los Angeles-Long Beach-Anaheim, CA	*1*	Riverside-San Bernardino-Ontario, CA	*1*	83,445	49,855	-33,590	0.0019
New York-Newark-Jersey City, NY-NJ-PA	*1*	Outside Metro Area within U.S.	*6*	35,965	15,481	-20,484	
Chicago-Naperville-Elgin, IL-IN-WI	*1*	Outside Metro Area within U.S.	*6*	40,925	22,874	-18,051	
New York-Newark-Jersey City, NY-NJ-PA	*1*	Miami-Fort Lauderdale-West Palm Beach, FL	*1*	23,221	9,979	-13,242	0.0005
New York-Newark-Jersey City, NY-NJ-PA	*1*	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	*1*	27,934	18,130	-9,804	0.0004
San Diego-Carlsbad, CA	*1*	Riverside-San Bernardino-Ontario, CA	*1*	22,027	13,734	-8,293	0.0011
Los Angeles-Long Beach-Anaheim, CA	*1*	Outside Metro Area within U.S.	*6*	18,756	10,915	-7,841	
Los Angeles-Long Beach-Anaheim, CA	*1*	Las Vegas-Henderson-Paradise, NV	*2*	15,264	7,533	-7,731	0.0005
San Jose-Sunnyvale-Santa Clara, CA	*2*	San Francisco-Oakland-Hayward, CA	*1*	26,128	18,504	-7,624	0.0012
New York-Newark-Jersey City, NY-NJ-PA	*1*	Orlando-Kissimmee-Sanford, FL	*2*	10,986	3,788	-7,198	0.0003

**Calculated by dividing the net flow by the sum of the populations of origin and destination locations. Omitted for non-MSA locations without a population total.*

Table 4: Top 10 Net MSA Migration Flows by Rate

Origin	*Size*	Destination	*Size*	Flow	Counterflow	Net Flow	**Net Flow Rate***
Corvallis, OR	*5*	Albany, OR	*5*	1,699	634	-1,065	0.0052
Midland, TX	*5*	Odessa, TX	*5*	2,019	1,173	-846	0.0028
Grants Pass, OR	*5*	Medford, OR	*5*	1,321	609	-712	0.0025
Gettysburg, PA	*5*	York-Hanover, PA	*4*	2,437	1,126	-1,311	0.0025
Napa, CA	*5*	Vallejo-Fairfield, CA	*4*	2,136	950	-1,186	0.0021
Bismarck, ND	*5*	Fargo, ND-MN	*5*	1,070	403	-667	0.0020
Columbus, GA-AL	*4*	Auburn-Opelika, AL	*5*	2,132	1,237	-895	0.0020
Hinesville, GA	*5*	Savannah, GA	*4*	1,397	541	-856	0.0020
Los Angeles-Long Beach-Anaheim, CA	*1*	Riverside-San Bernardino-Ontario, CA	*1*	83,445	49,855	-33,590	0.0019
Bay City, MI	*5*	Midland, MI	*5*	662	311	-351	0.0019

**Calculated by dividing the net flow by the sum of the populations of origin and destination locations*

Net migration by MSA size category

- Moving away from megaregions
- Moving from nonmetro to A/AA metro
- Within-megaregion
- Upward moves exist, but overwhelmed by downward flow

Table 5: Net migration across the urban hierarchy

FROM \ TO	Mega metro	Major metro	AAA Metro	AA Metro	A Metro	Non-metro
Mega metro		95,252	75,142	84,162	96,289	100,301
Major metro			(11,524)	(11,688)	6,382	(5,993)
AAA Metro				8,971	(5,020)	(3,684)
AA Metro					(10,617)	(25,723)
A Metro						(64,252)
Non-metro						

Table 6: Out-migration by destination type

FROM \ TO	Mega metro	Major metro	AAA Metro	AA Metro	A Metro	Non-metro
Mega metro	33.2%	17.2%	12.8%	12.5%	12.4%	11.9%
Major metro	28.3%	15.2%	15.3%	12.0%	12.8%	16.4%
AAA Metro	25.5%	19.4%	13.1%	12.2%	12.6%	17.1%
AA Metro	26.4%	16.8%	12.7%	11.8%	13.7%	18.5%
A Metro	22.2%	14.6%	12.4%	12.7%	15.0%	23.2%
Non-metro	20.5%	19.2%	16.3%	17.5%	26.5%	0.0%

Model Results 1

How does the push of housing cost and the pull of job growth impact domestic migration?

- Gross flow between 45,824 MSA pairs
- "How can they both be positive?"
  - Counter-stream migration (Voss et al. 1988)
  - Use difference in means test
- Distance, border, population effects as expected
- Weak evidence of flow toward high home prices and toward greater job growth

MODEL 1: ORIGIN - DESTINATION MIGRATION FLOW

Variable		Estimate	Std. Err.	t-value (sig)	Equality^
Intercept		-427.600	*(28)*	-15.272***	
Distance (i → j)		-9.253	*(0.2783)*	-33.245***	
Shares border		106.300	*(55.81)*	1.904.	
Total Pop. (log)	*Origin*	6.90E-05	*(0)*	42.732***	45.856***
	Dest.	5.38E-05	*(0)*	32.45***	
Home Values (2015)	*Origin*	-3.125	*(29.42)*	-0.106	2.7896.
	Dest.	66.800	*(30.13)*	2.217*	
Job Growth ('10-'15)	*Origin*	1.436	*(0.1142)*	12.57***	2.7612.
	Dest.	1.708	*(0.1152)*	14.826***	

R-squared = *0.0922* *N* = 45,824

**** p<0.001, ** p<0.01, * p<0.05, . p<0.10*

^ F-Test for equality of coefficient estimates for origin vs. destination

Model Results 2

- Models migration flow rate
- No population control
- Less influenced by megaregion flows

MODEL 2: ORIGIN - DESTINATION MIGRATION FLOW RATE

Variable		Estimate	Std. Err.	t-value (sig)	Equality^
Intercept		4.15E-05	8.53E-06	4.868***	
Distance (i → j)		-3.82E-06	8.69E-08	-43.984***	
Shares border		5.35E-05	1.74E-05	3.071**	
Home Values (2015)	*Origin*	-7.14E-06	9.19E-06	-0.777	0.19922
	Dest.	6.95E-06	9.41E-06	0.738	
Job Growth ('10-'15)	*Origin*	2.71E-07	3.34E-08	8.111***	0.2837
	Dest.	2.92E-07	3.37E-08	8.659***	

R-squared = *0.0408* *N* = 45,824

**** p<0.001, ** p<0.01, * p<0.05, . p<0.10*

^ F-Test for equality of coefficient estimates for origin vs. destination

Model Results 3

- Adds variables explaining region-level productivity
  - Creative class & Fortune 1000 too collinear
- Moves toward higher housing cost
- Job growth less clear
- More inventive regions attract,
- But lower economic output/capita
- % Obama voters (+), crime (+), and college education rate (-), but counterstream muddies inference

MODEL 3: ORIGIN - DESTINATION MIGRATION FLOW - ADD'L DRIVERS

MODEL 1: ORIGIN - DESTINATION MIGRATION FLOW

Variable		Estimate	Std. Err.	t-value (sig)	Equality^
Intercept		-787.5	*(36.81)*	-21.392***	
Distance (i → j)		-9.8020	*(0.2809)*	-34.899***	
Shares border		110.1	*(55.61)*	1.979*	
Total Pop. (log)	*Origin*	5.89E-05	*(0)*	28.783***	59.303***
	Dest.	3.61E-05	*(0)*	17.102***	
% College Educated	*Origin*	-248.2	*(74.05)*	-3.352***	0.0161
	Dest.	-234.7	*(74.23)*	-3.161**	
GDP/capita (2015)	*Origin*	-0.0001	*(0.0004)*	-0.339	4.3521*
	Dest.	-0.0012	*(0.0004)*	-3.279**	
Obama vote % (2012)	*Origin*	1.757	*(0.3478)*	5.052***	1.241
	Dest.	1.205	*(0.3454)*	3.488***	
Patents ('10-'15, log)	*Origin*	22.470	*(3.232)*	6.951***	17.232***
	Dest.	41.480	*(3.253)*	12.748***	
Violent Crime Rate ('14)	*Origin*	0.065	*(0.0245)*	2.656**	0.3964
	Dest.	0.087	*(0.025)*	3.494***	
Home Values (2015)	*Origin*	10.260	*(29.78)*	0.345	2.6496.
	Dest.	61.510	*(30.54)*	2.014*	
Job Growth ('10-'15)	*Origin*	1.416	*(0.1262)*	11.22***	1.445
	Dest.	1.711	*(0.1274)*	13.431***	

R-squared = *0.099* *N* = 45,824

**** p<0.001, ** p<0.01, * p<0.05, . p<0.10*

^ F-Test for equality of coefficient estimates for origin vs. destination

Conclusions

- Moves appear to be mostly down the urban hierarchy. Most prominently:
  - Megaregion movers go nearby, to rural areas, or the Sunbelt
  - Megaregions to nonmetro
  - Nonmetro to small regions
- Some evidence of a "tug of war" between job growth and housing cost:
  - Overall direction of moves is toward more expensive housing
  - Overall direction of moves is toward job growth (stronger magnitude)
  - Evidence of moves toward "superstar regions" (patenting) but also "crowding out" (GDP/capita).
  - Likely SCAG region implication: strong economic fundamentals will continue to attract wealthier in-migrants despite the cost
- Model refinement
  - Split by age cohort and race/ethnicity, longitudinal
  - Model refinement: housing cost/living cost/HH income all correlated
  - Information on movers' characteristics (education, income, family formation preference)

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Thank you

Kevin Kane, PhD

kane@scag.ca.gov

213-236-1828

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