Appendices

to

The Bay Area

A REGIONAL ECONOMIC ASSESSMENT

A Bay Area Council Economic Institute Report
October 2012

BAY AREA COUNCIL
ECONOMIC
INSTITUTE
Connecting business, labor, government and education

Contents

BAYAREA COUNCIL ECONOMIC INSTITUTE

201 California Street, Suite 1450
San Francisco, California 94111
P 415.981.7117 F 415.981.6408
www.bayareaeconomy.org
bacei@bayareacouncil.org

Appendix A: The Region

The Bay Area, most often defined as the nine-county region surrounding San Francisco Bay, spans over 6,900 square miles. Of this vast expanse, approximately 1,442 square miles of land (20.9%) were built up by 2010. But the area was not built up evenly over time. In fact, most of the area was built up by the 1960s. Since then, expansion has slowed to a mere trickle, and in the last decade it has virtually ground to a halt. The third column of Table 1 shows the share of the Bay Area's 2010 built-up footprint that was already in place at the end of each decade.[1]

Table 1: Evolution of the Bay Area's Population and Built-Up Footprint

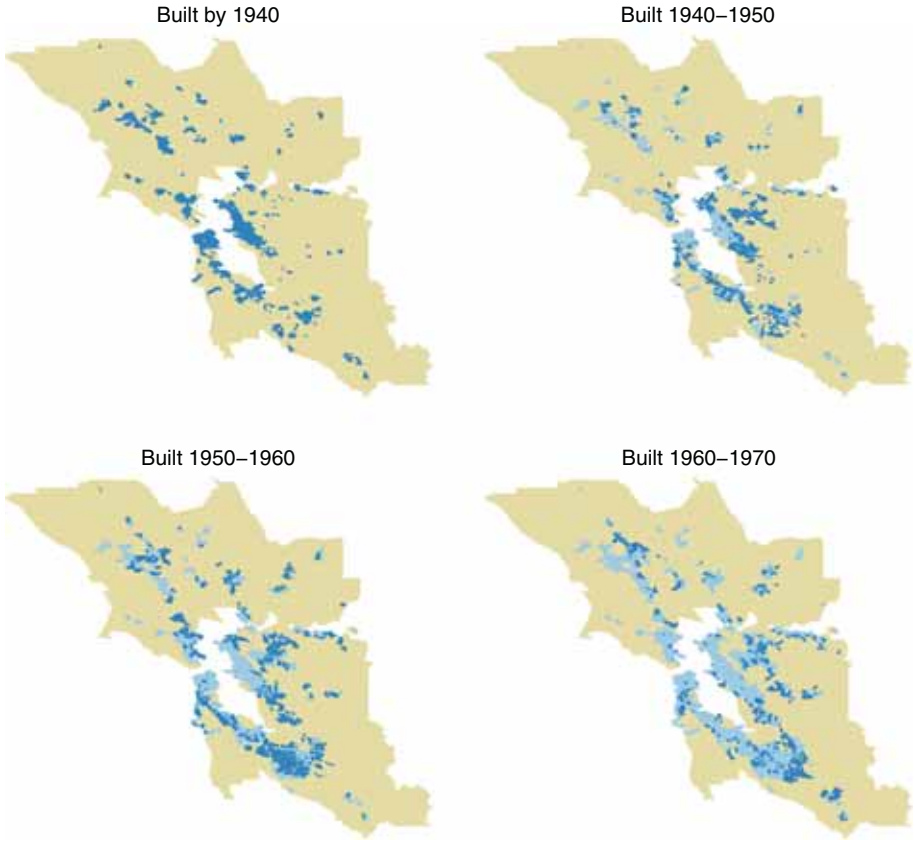
Year	Built-Up Sq. Miles	Percent of 2010 Built-Up Footprint	Population (Millions)	Percent of 2010 Population
1940	372	25.8	1.73	24.5
1950	592	41.1	2.08	29.3
1960	925	64.2	3.27	46.1
1970	1,145	79.4	4.63	65.3
1980	1,315	91.2	5.18	73.0
1990	1,389	96.3	6.02	84.9
2000	1,435	99.5	6.78	95.6
2010	1,442	100	7.09	100

Source: ACS 2006–2010; population, U.S. Census; calculations by Bay Area Council Economic Institute

[1] In Figure 1, and in columns 1 and 2 of Table 1, each block group in the nine-county area is classified as being built in a particular decade. The classification is based on the distribution of years in which American Community Survey (ACS) respondents' residences were built. A block group is classified as being built in, say, the 1950s, if the residence of the 10th percentile of ACS respondents, ranked by the year their residence was built, was built in the 1950s. Block groups whose land area exceeds the 95th percentile of land area in the nine-county region are classified as non-built, and are omitted from the data. As block groups are defined to have roughly similar populations, excessively large block groups are effectively rural. Because the data is taken from the 2006–2010 ACS, some block groups may be misclassified as having been built sooner than they would be according to the 10th percentile measure described, but no sooner than the first structures in that block group were actually built. The possibility of such misclassification is likeliest in block groups that saw substantial amounts of residential construction in the years 2006–2010, of which there are few, because those years were dominated by the housing crisis.

Figure 1 provides a series of sequential snapshots of the Bay Area's built-up footprint. The first map indicates the area built up by 1940. By that year, two continuous stretches of built-up land were already present in the Bay Area, the first spanning the city of San Francisco and the second stretching along the East Bay expanse that runs from Oakland to Berkeley. Most of the settlements constituting the Bay Area were already established by that time, but outside of the two continuous expanses, the built-up area for the most part comprised small town centers surrounded by open land (agricultural or virgin). The string of settlements along the San Francisco Peninsula was present, but did not yet form a continuous stretch.[2]

Figure 1a: The Bay Area's Built-Up Footprint Over Time, 1940–1970

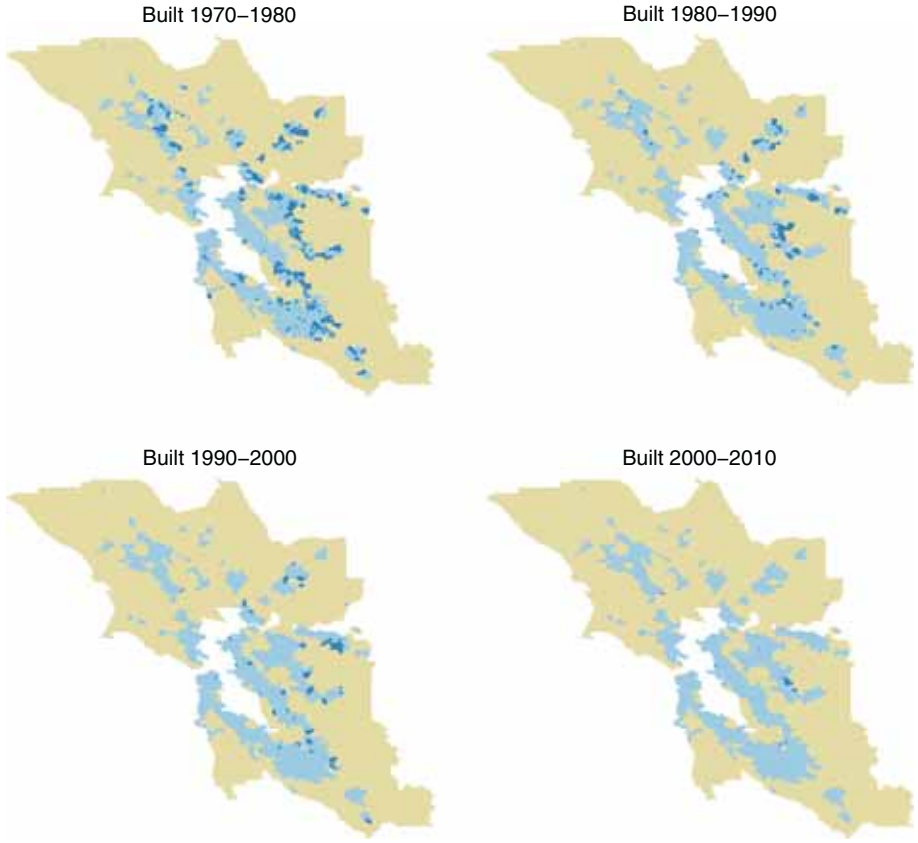


Note: data is plotted at the census block–group level
Source: ACS 2006–2010; calculation and mapping by Bay Area Council Economic Institute

[2] Land built up during the indicated decade is in dark blue; previously built-up land is in light blue.

During the 1940s, 1950s, and 1960s, the Bay Area's built-up area expanded dramatically. The expansion was most pronounced in the East Bay, along the Peninsula, and in San Jose. By 1970, most of the present-day built-up area was covered. From the 1970s on, growth continued, but at an ever-slowing pace. As the maps in Figure 1 show, some development continued through the 1970s, mostly in the East Bay, but by the 1980s expansion was limited to marginal additions to the built-up area, almost exclusively in the East Bay. The same pattern persisted through the 1990s, and by the 2000s expansion of the Bay Area's built-up area had virtually halted.[3]

Figure 1b: The Bay Area's Built-Up Footprint Over Time, 1970–2010

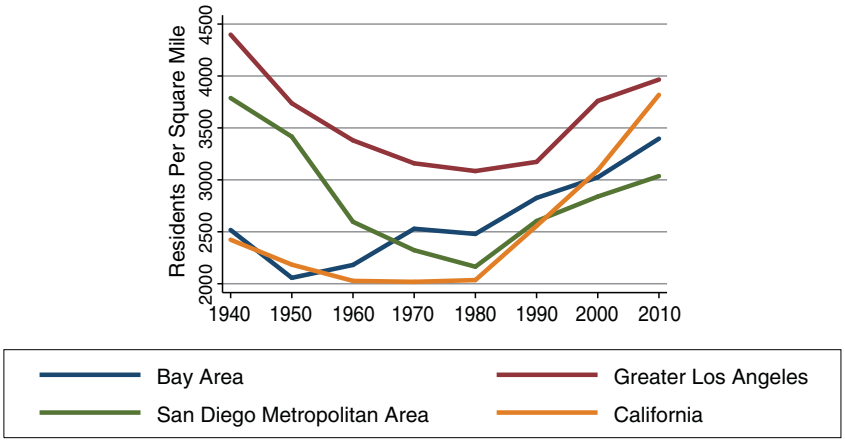


Note: data is plotted at the census block–group level
Source: ACS 2006–2010; calculation and mapping by Bay Area Council Economic Institute

[3] See Footnote 1.

The Bay Area's population in 2010 stood at 7.09 million, almost quadruple its population in 1940. Column 3 of Table 1 shows how the Bay Area's population has evolved over the past 70 years, and column 4 shows the population in each decade as a share of the 2010 population. Comparing the rates at which the Bay Area's population and footprint have grown reveals that the Bay Area's geographic expansion exceeded its population growth at first, but expansion has not kept up with population growth over the last 50 years or so. Figure 2 plots the Bay Area's population density over time and contrasts it with that of the Greater Los Angeles area[4] and the San Diego Metropolitan Statistical Area. With the exception of the 1970s, the current wave of densification, which has been common to the three California metropolises since the 1980s, appears to have begun in the Bay Area as early as the 1950s.

Figure 2: Population Density of Built-Up Area



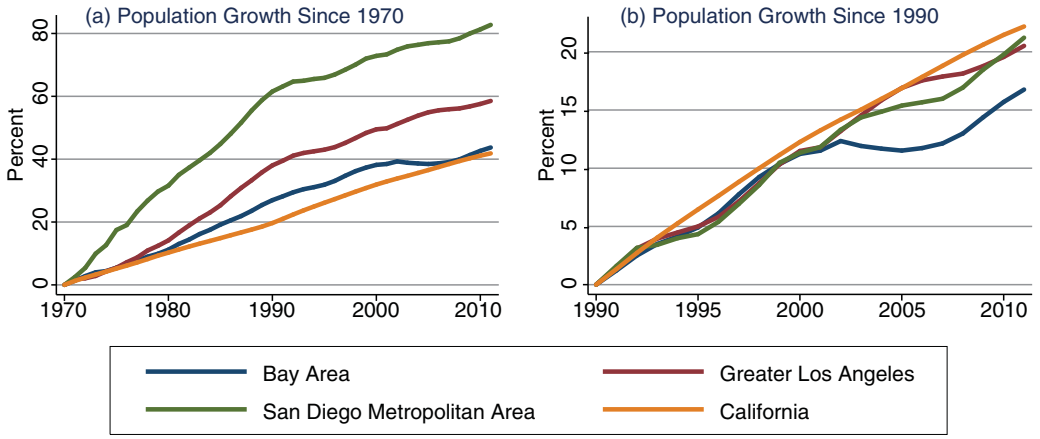
Source: U.S. Census; calculations by Bay Area Council Economic Institute

Figure 3 compares the Bay Area's population growth with that of Greater Los Angeles, the San Diego metropolitan area, and the United States as a whole. Panel 3(a) indicates that from 1970 to 2011, the Bay Area's population grew by almost 44%, similar to the expansion of the U.S. population, which grew by almost 42% over the same period, but this observation masks the fact that population growth in the Bay Area has slowed down substantially. From 1970 to 1990, the Bay Area's population grew faster than the nation's, as did the populations of other California metros, but population growth in the Bay Area and in the other California metros slowed down since 1990, reaching levels more in keeping with national population growth, as is evident in panel 3(b). Shortly after 2000, the Bay Area's population growth halted for more than half a decade as a result of the bursting of the

[4] "Greater Los Angeles" is the Combined Statistical Area comprising Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties.

dot-com bubble, and it only resumed growing around 2007.[5] Table 2 reports the average annual population growth for each California metro area and for the nation, from 1970–1990 and from 1990–2010.

Figure 3: Population Growth for California Regions



Source: U.S. Census; calculations by Bay Area Council Economic Institute

Table 2: Population Growth for California Regions

	Average Annual Population Growth	
	1970–1990	1990–2010
Bay Area	1.35%	0.78%
Greater Los Angeles	1.90%	0.98%
San Diego Metro Area	3.08%	0.99%
U.S.	0.98%	1.07%

Source: U.S. Census; calculations by Bay Area Council Economic Institute

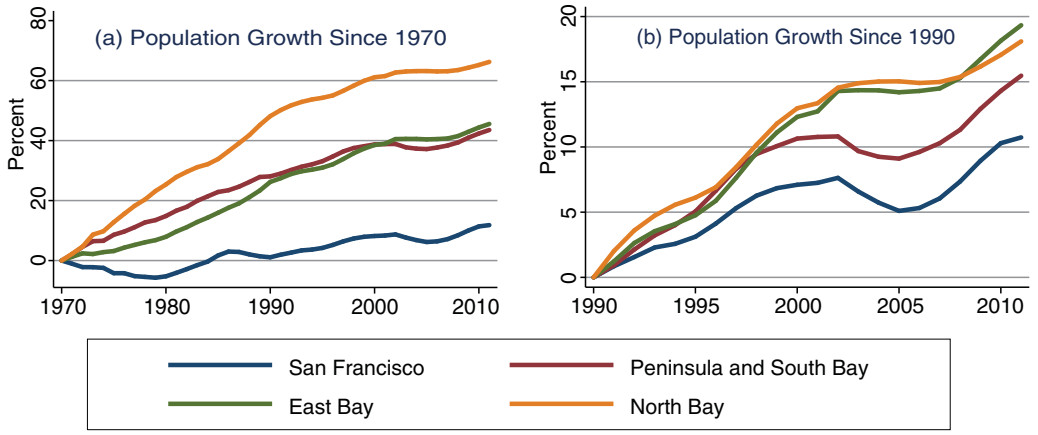
Population growth within the Bay Area has not been evenly distributed (Figure 4, Table 3). San Francisco's population has grown considerably more slowly than that of the rest of the Bay Area; today the population of San Francisco is only about 12% larger than it was over 40 years ago (Table 4). In fact, San Francisco's population actually decreased during the 1970s and has been growing at a relatively slow pace since 1980.[6] Population growth

[5] Such a period of "lost" population growth is not unusual in the United States for cities and regions suffering from localized economic downturns: it is the result of increased out-migration from the area during this period. See Appendix G, Figure 61: Migration Flows to the Bay Area.

[6] Most metropolitan core cities in the United States lost population during the 1970s, a decade in which urban crime and suburban flight peaked, New York City went bankrupt, and the popularity of dense urban living was at an all-time low.

on the Peninsula and in the South Bay proceeded at a slightly faster pace than in the rest of the Bay Area from 1970 to 1990, but slowed to half of its former pace between 1990 and 2010. The East Bay's population, on the other hand, grew slightly more slowly than that of the rest of the Bay Area from 1970 to 1990, but its growth slowed much more modestly than elsewhere in the Bay Area later on. The North Bay[7] experienced the fastest population growth from 1970 to 1990, but subsequently posted the most dramatic decrease in growth, slowing from 2.41% annually to 0.85%.

Figure 4: Population Growth Within the Bay Area



Source: U.S. Census; calculations by Bay Area Council Economic Institute

Table 3: Population Growth Within the Bay Area

	Average Annual Population Growth	
	1970–1990	1990–2010
San Francisco	-0.05%	0.51%
Peninsula and South Bay	1.40%	0.71%
East Bay	1.31%	0.91%
North Bay	2.41%	0.85%
Bay Area	1.35%	0.78%

Source: U.S. Census; calculations by Bay Area Council Economic Institute

[7] The North Bay as defined here includes the counties of Marin, Napa, Solano and Sonoma.

Table 4: San Francisco's Share of the Bay Area Population

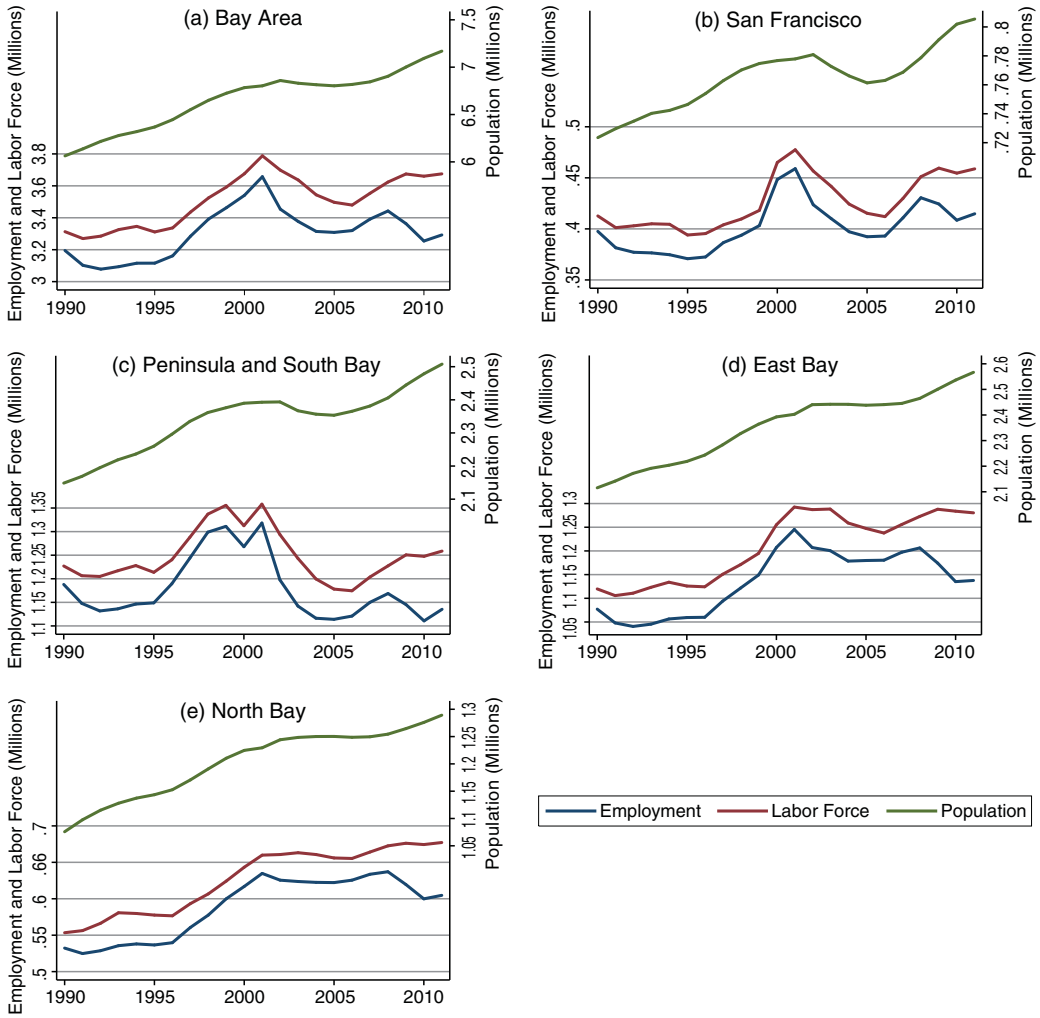
	San Francisco Population (Thousands)	Bay Area Population (Thousands)	San Francisco's Share of the Bay Area's Population
1970	715.7	4,630.60	15.50%
1980	679.0	5,179.80	13.10%
1990	723.5	6,063.20	11.90%
2000	776.7	6,783.70	11.40%
2010	801.9	7,093.00	11.30%

Source: U.S. Census; calculations by Bay Area Council Economic Institute

The next major disruption to growth in the region came with the bursting of the dot-com bubble just after the turn of the century. Although the population in San Francisco and the Peninsula had not grown significantly faster than those of the North Bay or East Bay, the dot-com collapse had a dramatic negative effect on its size. In contrast, the populations of the East Bay and the North Bay remained flat during the bursting of the bubble, indicating that there was just sufficient out-migration to offset natural increases in population; there was very little in-migration during these years to any part of the Bay Area.

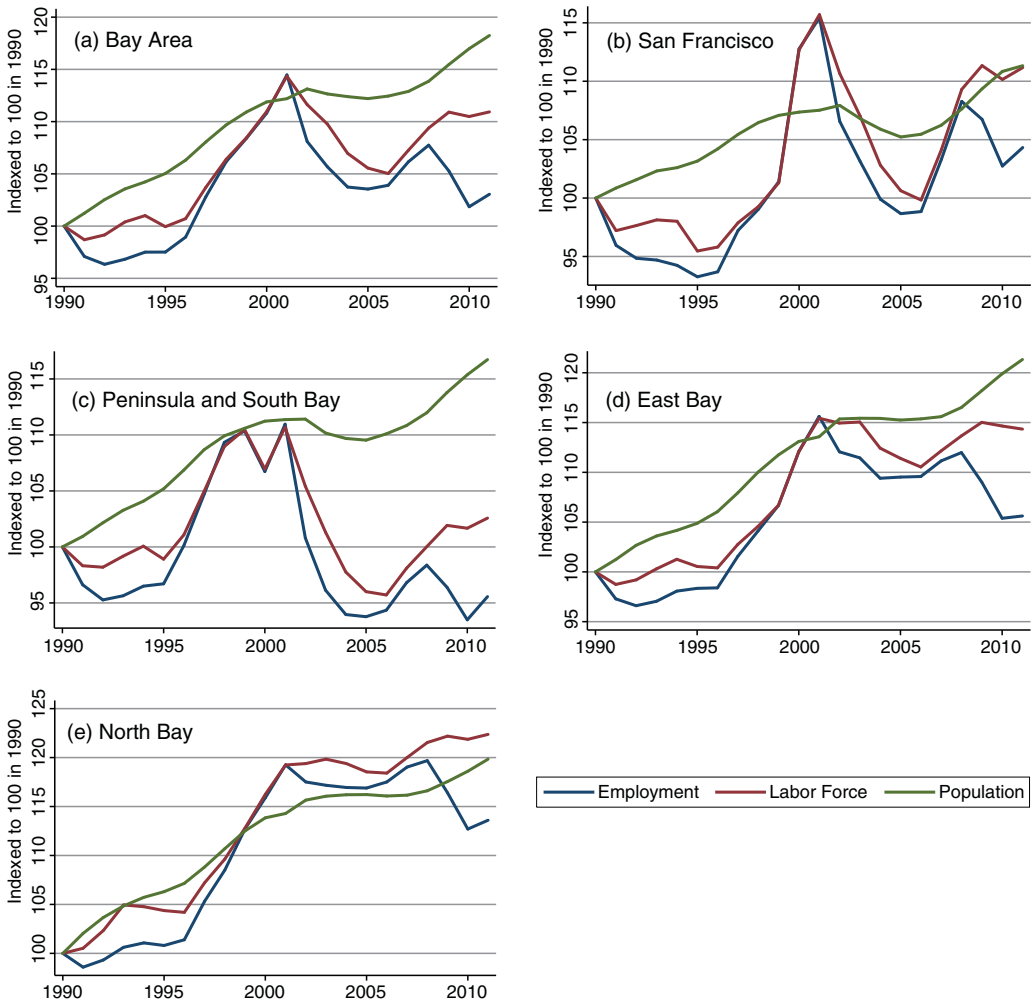
Across the Bay Area, the collapse of the dot-com bubble had a greater effect on employment than on population (Figure 5(a)). While population growth stalled between 2002 and 2007, employment fell dramatically between 2001 and 2005. The data suggests that during this period there was not only significant out-migration and reduced in-migration, but many people were pushed out of the labor force entirely. Although the size of the overall population was significantly higher in 2011 than in 2002, the labor force has yet to come close to its peak in 2001; labor force participation rates across the Bay Area have declined significantly in the wake of the dot-com bust (Figure 6). Curiously, the erosion in employment that has accompanied the most recent recession has not resulted in significant overall declines in the labor force; there has been a downturn in labor force participation, to be sure, but not overall declines in the labor force. This is likely due to the fact that the Bay Area was not the only region to suffer during the Great Recession—hence migrating to other parts of the country did not offer the escape that it provided a decade ago.

Figure 5: Employment, Labor Force and Population Levels



Source: California EDD; calculations by Bay Area Council Economic Institute

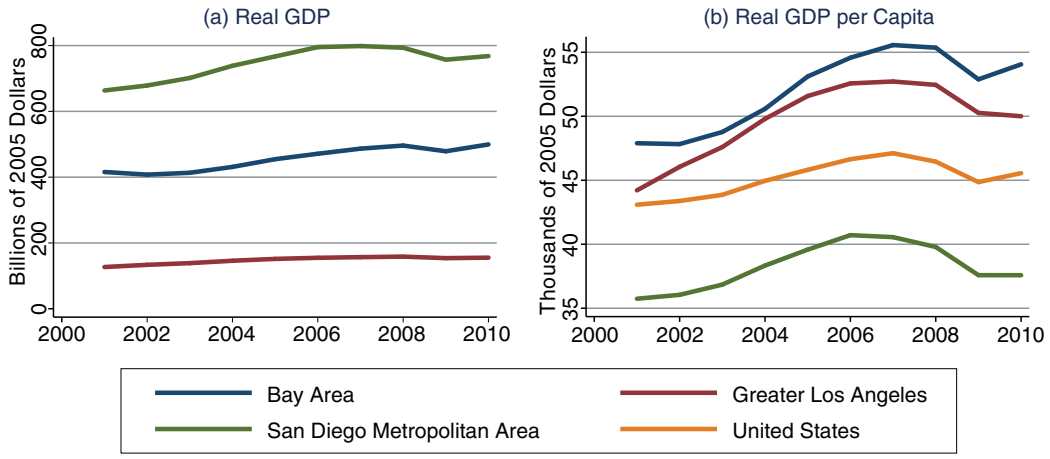
Figure 6: Employment, Labor Force and Population: Indexed to 100 in 1990



Source: California EDD; calculations by Bay Area Council Economic Institute

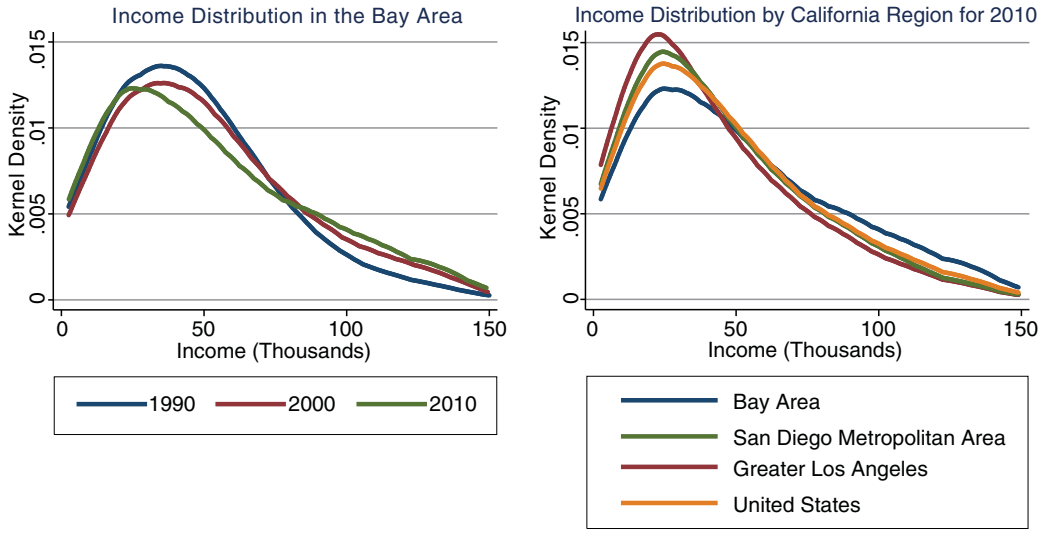
As mentioned earlier, the dot-com bust was felt more strongly in San Francisco and on the Peninsula than in the East Bay and the North Bay. These graphs suggest that the Peninsula was hit hardest, then San Francisco, then the East Bay, and least of all the North Bay, which speaks to their respective degrees of connection to the Silicon Valley economy.

Figure 7: GDP



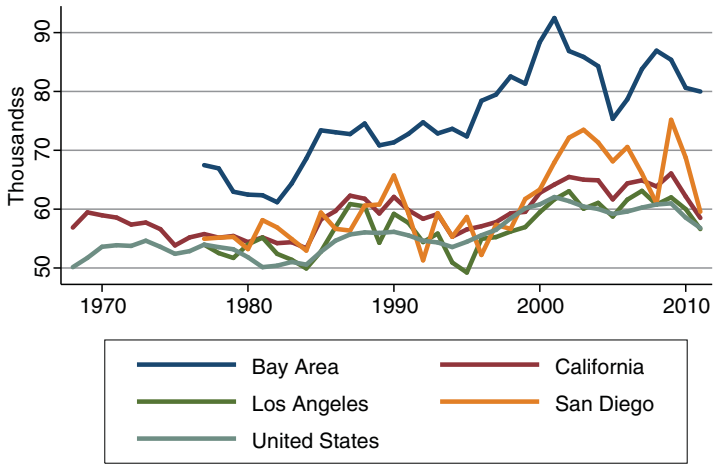
Source: Bureau of Economic Analysis; calculations by Bay Area Council Economic Institute

Figure 8: Income Distribution



Source: U.S. Census and ACS; calculations by Bay Area Council Economic Institute; in 2010 dollars

Figure 9: Median Household Income



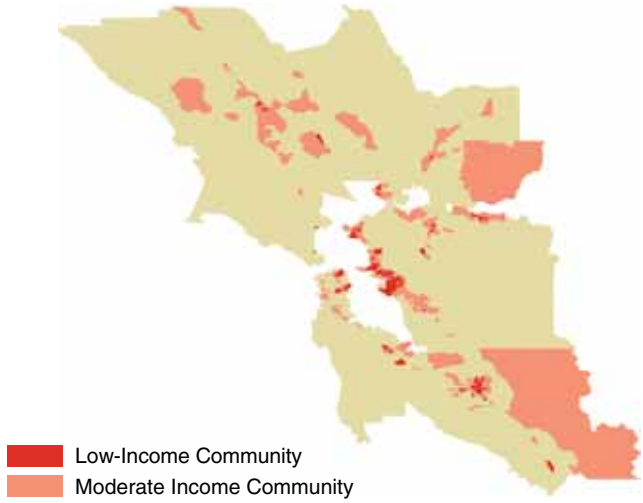
Source: U.S. Census Current Population Survey; calculations by Bay Area Council Economic Institute; adjusted for inflation

Table 5: Gini Coefficients by Region

Boston	0.345
Washington, DC	0.346
Seattle	0.350
Chicago	0.356
New York	0.360
Bay Area	0.360
Raleigh	0.361
Austin	0.363
San Diego	0.368
Greater Los Angeles	0.380
United States	0.364

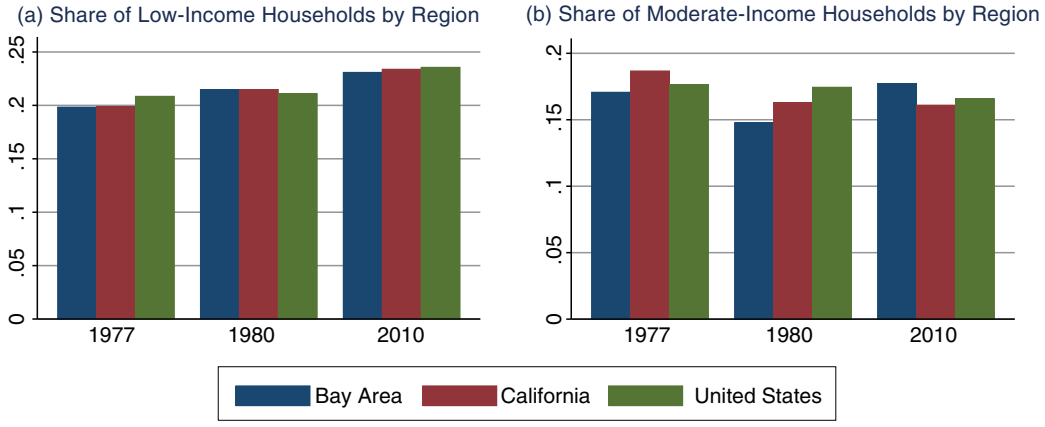
Source: ACS; calculations by Bay Area Council Economic Institute

Figure 10: Locations of Low- and Moderate-Income Communities



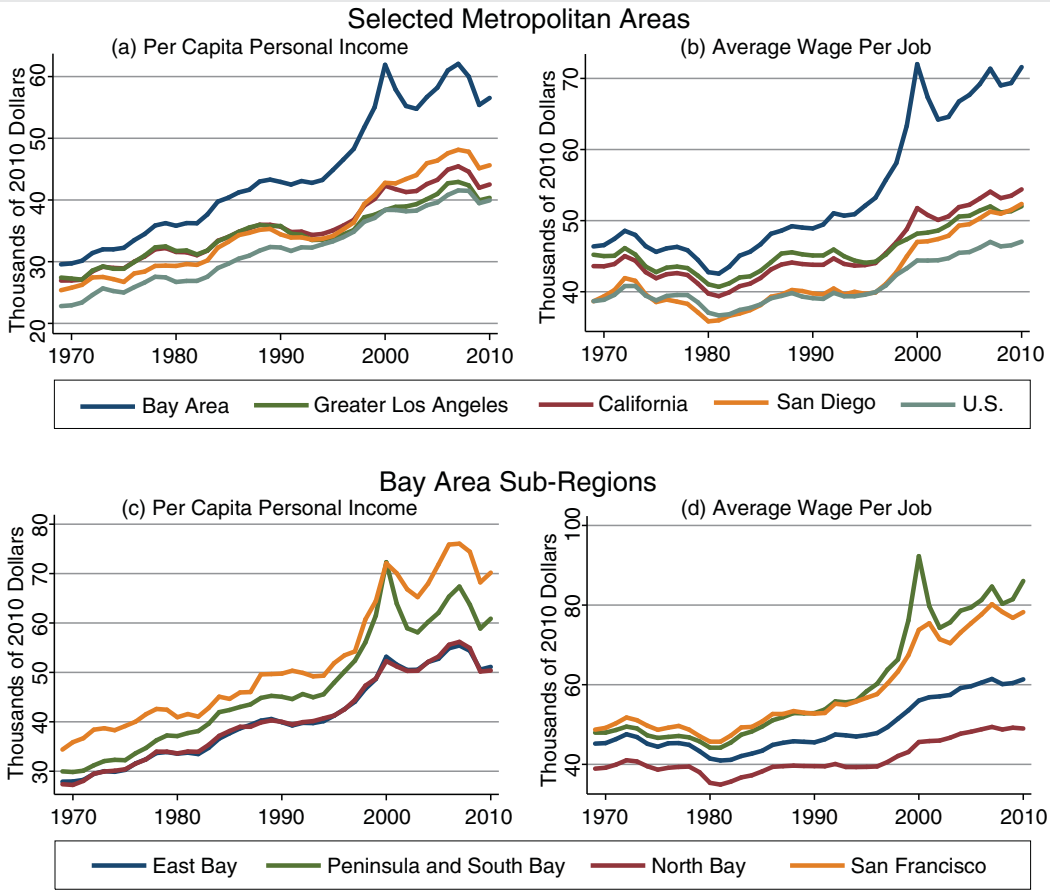
Source: U.S. Census LEHD Data, 2010; calculations by Bay Area Council Economic Institute

Figure 11: Share of Low- and Moderate-Income Households



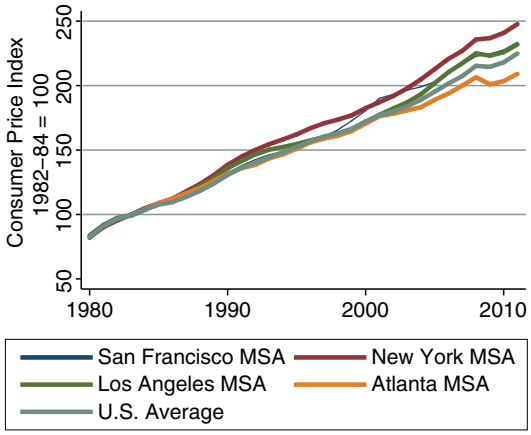
Source: U.S. Census Current Population Survey; calculations by Bay Area Council Economic Institute

Figure 12: Income and Wage Growth



Source: Bureau of Economic Analysis; calculations by Bay Area Council Economic Institute

Figure 13: CPI by Metro



Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute

Appendix B: Commuting Patterns

Workers at all levels of educational attainment, in particular those with a bachelor's degree or higher, live in all corners of the Bay Area. At the same time, jobs are more heavily concentrated in economic centers. Thus many of the Bay Area's residents have significant commutes. In excess of 850,000 Bay Area residents cross a county line on their way to work each day.

Table 6 shows which counties have the most commuters—whether residents who are commuting to work within the county or employees commuting into the county for work. The table is sorted by the percentage of residents of each county that also work in the county. Solano and Contra Costa counties stand out as having less than 40% of their working residents employed in the county. Solano County also has less than 40% of its jobs filled by county residents, tied with Marin at 39%. San Mateo and Marin counties both have a significant volume of movement across county lines. Marin, Contra Costa, and Solano counties are perhaps the Bay Area's predominant bedroom communities. San Mateo County is less of a bedroom community than a county that straddles the two major employment centers of the region: San Francisco and Silicon Valley.

Table 6: Commute Patterns: 2010

County	% of Employed Residents Who Work in the County	% of Workers Who Live in the County
Solano	36	39
Contra Costa	39	51
San Mateo	40	40
Marin	41	39
Alameda	49	47
Napa	55	52
San Francisco	60	40
Sonoma	63	71
Santa Clara	71	61

Source: 5-year 2010 American Community Survey; calculations by Bay Area Council Economic Institute

Napa and Sonoma counties are more self-contained than the other counties in the region, as is Santa Clara County. Nearly three-quarters of Santa Clara's working residents are employed in the county, and three-fifths of its workers reside in the county. San Francisco has less outward commuting, but significant numbers of workers commute into the county. In fact, commutes into San Francisco represent the most common city-to-city commutes

in the region (Table 7). San Francisco is clearly the hub of the Bay Area—eight of the top ten commutes in the region have San Francisco at one end or the other.

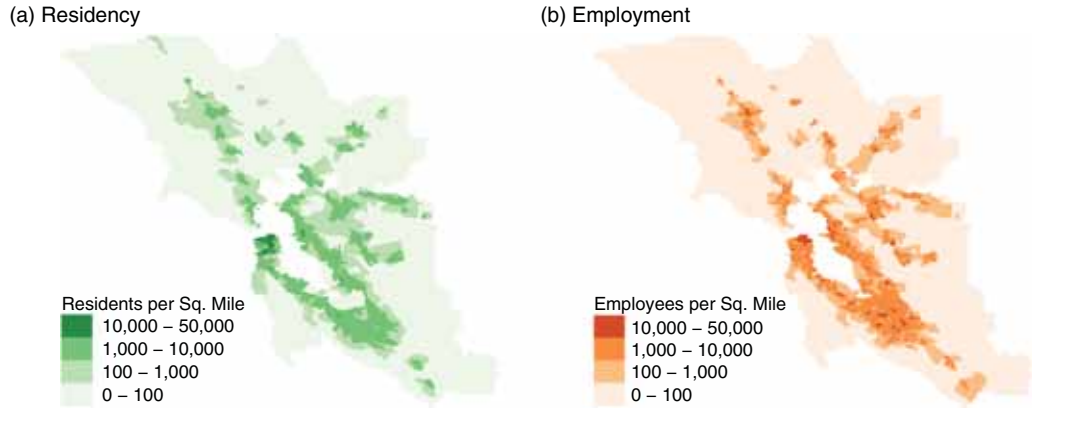
Table 7: Top 10 Inter-County Commutes by One-Way City Pair

Home City	Work City	# of Workers
Oakland	San Francisco	25,343
Daly City	San Francisco	17,194
San Francisco	Oakland	12,235
Fremont	San Jose	12,137
San Jose	Fremont	11,242
San Jose	San Francisco	10,031
South San Francisco	San Francisco	8,202
San Francisco	South San Francisco	7,397
San Francisco	San Jose	7,364
San Mateo	San Francisco	7,109

Source: 5-year 2010 American Community Survey; calculations by Bay Area Council Economic Institute

Figure 14 provides a glimpse of the density of residents and the density of employment around the region. These maps depict the number of residents and employees per square mile in each census tract in the nine Bay Area counties. In Figure 14(a), the more densely populated regions are relatively clear. Residents are heavily concentrated in the regions running alongside the southern shores of San Francisco Bay and the regions along major highway corridors to the north and east. The pattern of jobs is similar (Figure 14(b)).

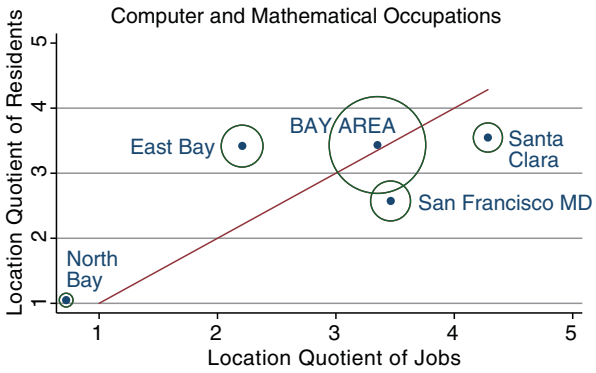
Figure 14: Residential and Employment Density Throughout the Bay Area



Source: U.S. Census LEHD Data, 2010; calculations by Bay Area Council Economic Institute.

Mismatches between the skill requirements of jobs and the residents with those skills are likely to be significant. For instance, of the 161,000 residents employed in Computer and Mathematical occupations, more than one-third (37%) cross county lines on their way to work each day. Figure 15 provides an indication of the exporting and importing regions for members of this occupation category. The graph has a location quotient for residents on the vertical axis and for jobs on the horizontal axis. The diagonal red line indicates points along which the region or sub-region is neither a net exporter of workers nor a net importer of workers in the occupation category. The Bay Area lies high along the red line, indicating that it has a large share of residents working in this occupation category and a large share of jobs in this category. The Bay Area employs this occupation relatively intensively.

Figure 15: 2010 Location Quotients by Bay Area Sub-Regions and Occupation



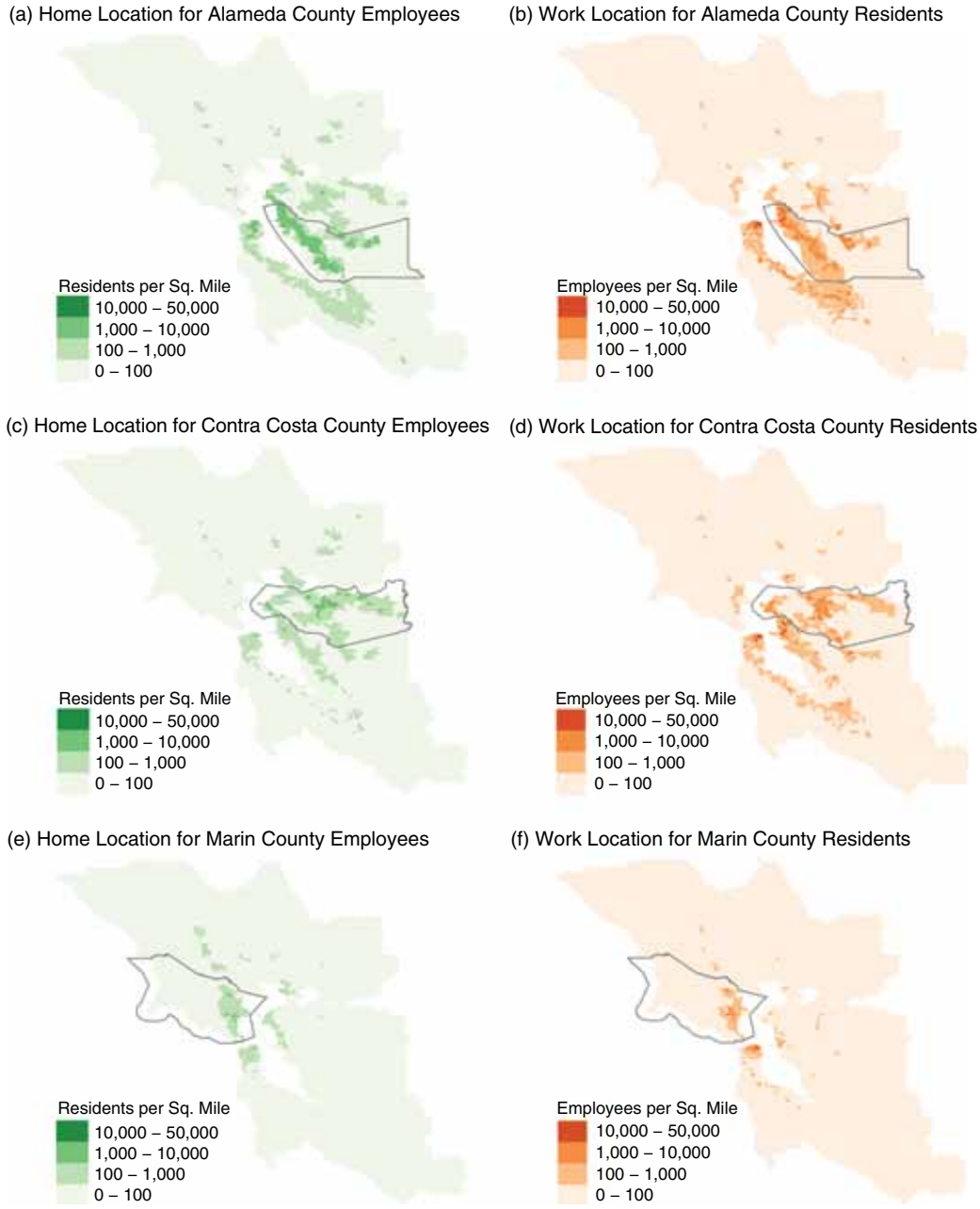
Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute
Ring size reflects the relative size of the occupation.

Among the sub-regions of the Bay Area, the experiences differ. The North Bay both houses and employs relatively few workers in this occupation, as evidenced by location quotients in both dimensions of less than one. The East Bay's position to the left of the red line indicates that it is a net exporter of these workers; it houses these workers more intensively than it employs them. San Francisco is the East Bay's major market for these workers, employing them to a greater degree than it houses them. Santa Clara both employs and houses these workers intensively.

Thus the regions within the Bay Area vary significantly in terms of housing and employing individuals. Some counties have many of the characteristics of bedroom communities, while others remain more self-contained. Figure 16 shows the labor flows of each of the nine counties. The green maps indicate the home locations for those employed in the county, while the orange maps indicate the work location for county residents. The spread of each around the Bay Area provides an indication of the incorporation of the county into the Bay Area labor market.

Counties such as Alameda, Contra Costa, San Francisco, and San Mateo all have a long reach for workers, and they also spread their residents broadly across the region. Other counties, primarily in the North Bay but also, to a lesser extent, Santa Clara County, tend to house and employ most of their workforce.

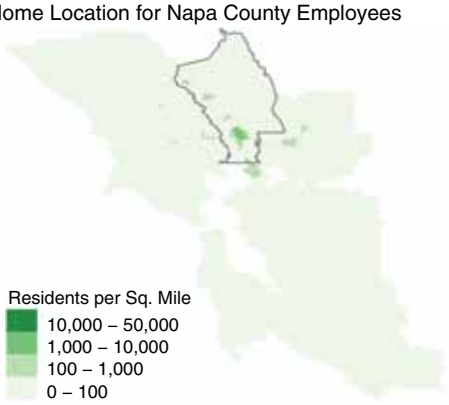
Figure 16: Bay Area County Commute Patterns



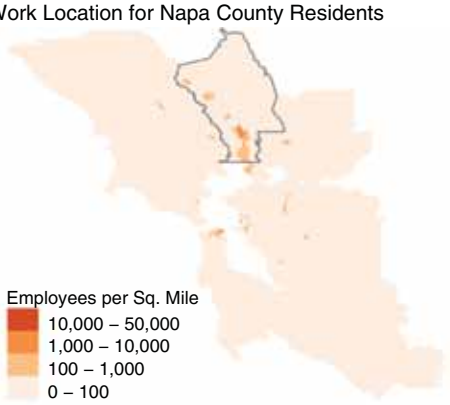
Source: U.S. Census LEHD Data, 2010; calculations by Bay Area Council Economic Institute

Figure 16: Bay Area County Commute Patterns (continued)

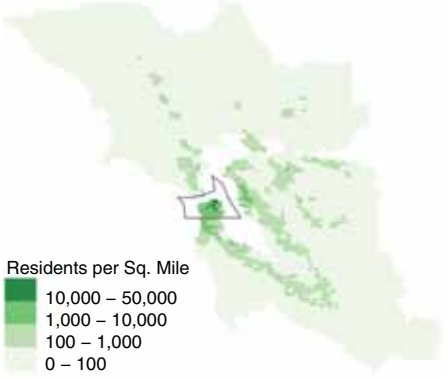
(g) Home Location for Napa County Employees



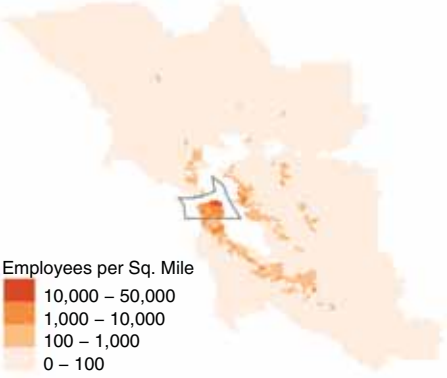
(h) Work Location for Napa County Residents



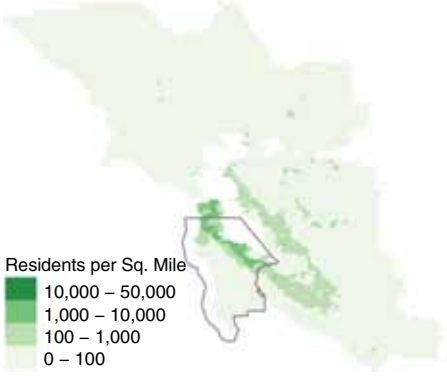
(i) Home Location for San Francisco County Employees



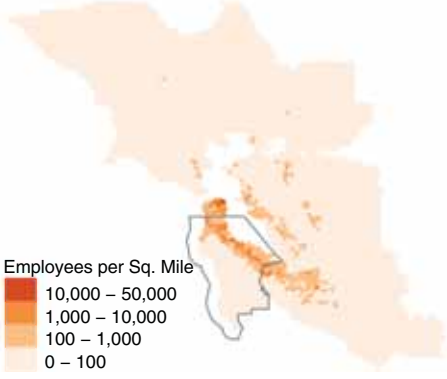
(j) Work Location for San Francisco County Residents



(k) Home Location for San Mateo County Employees



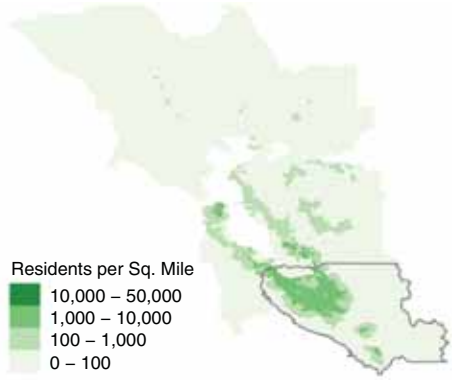
(l) Work Location for San Mateo County Residents



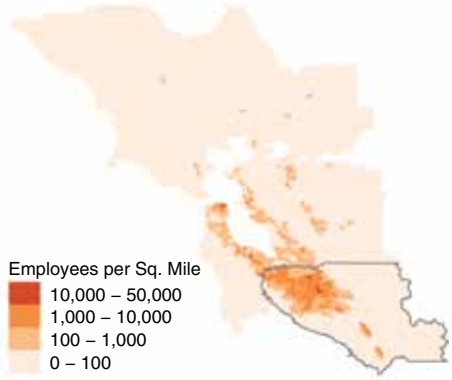
Source: U.S. Census LEHD Data, 2010; calculations by Bay Area Council Economic Institute

Figure 16: Bay Area County Commute Patterns (continued)

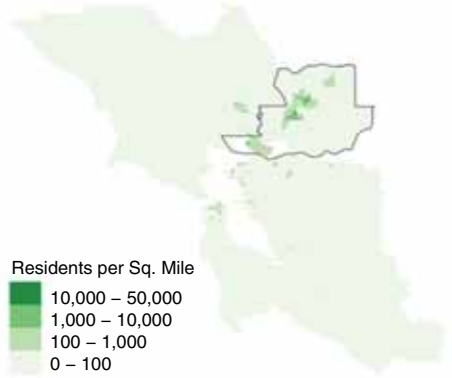
(m) Home Location for Santa Clara County Employees



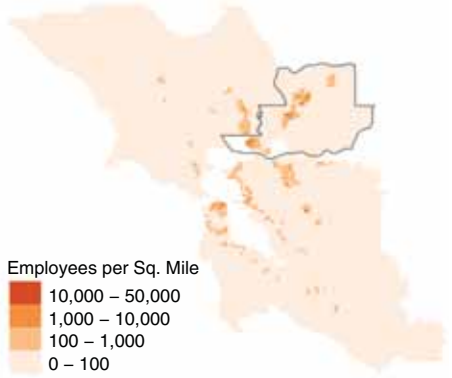
(n) Work Location for Santa Clara County Residents



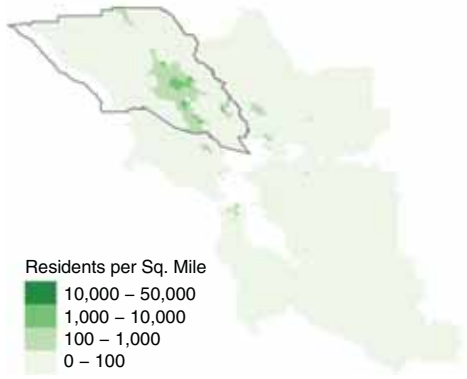
(o) Home Location for Solano County Employees



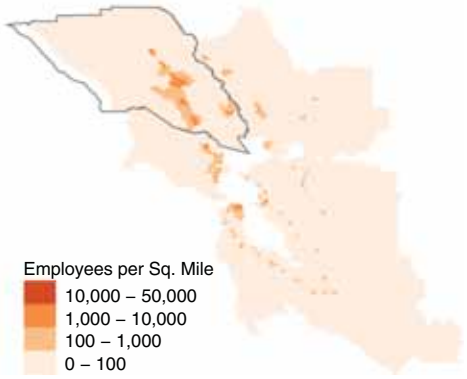
(p) Work Location for Solano County Residents



(q) Home Location for Sonoma County Employees



(r) Work Location for Sonoma County Residents

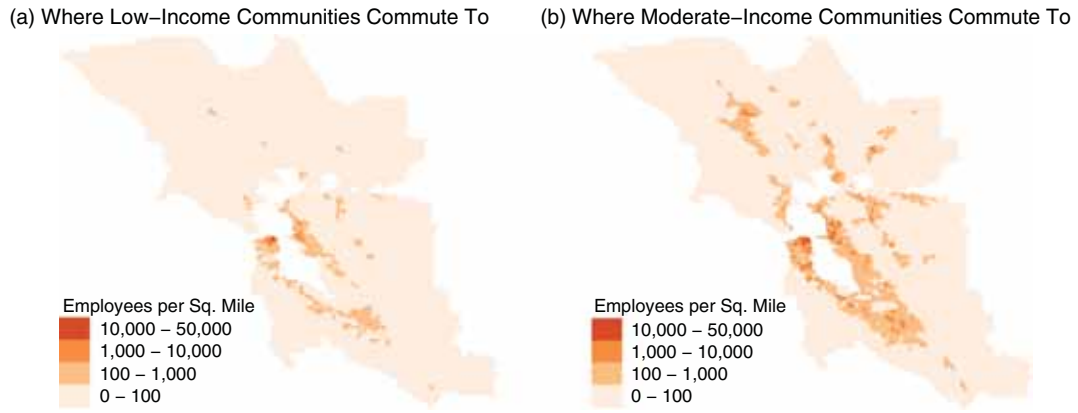


Source: U.S. Census LEHD Data, 2010; calculations by Bay Area Council Economic Institute

In addition to assessing the commutes of workers in specific regions or counties, we can also examine the movement of specific populations. In particular, the following graphs illustrate the locations and commute patterns of the Bay Area's low- to moderate-income (LMI) communities. Earlier we presented a map of the location of LMI communities (Figure 10). In the legend, dark red indicates a low-income community, while pink indicates a moderate-income community.

Figures 17(a-b) provide an indication of the commute patterns of LMI communities. Figure 17(a) describes the employment locations for low-income communities and Figure 17(b) provides the same information for moderate-income communities. The range of clustered job opportunities is significantly wider for those from moderate-income communities than for those from low-income communities, as is the location of residences.

Figure 17: LMI Community Commuter Patterns



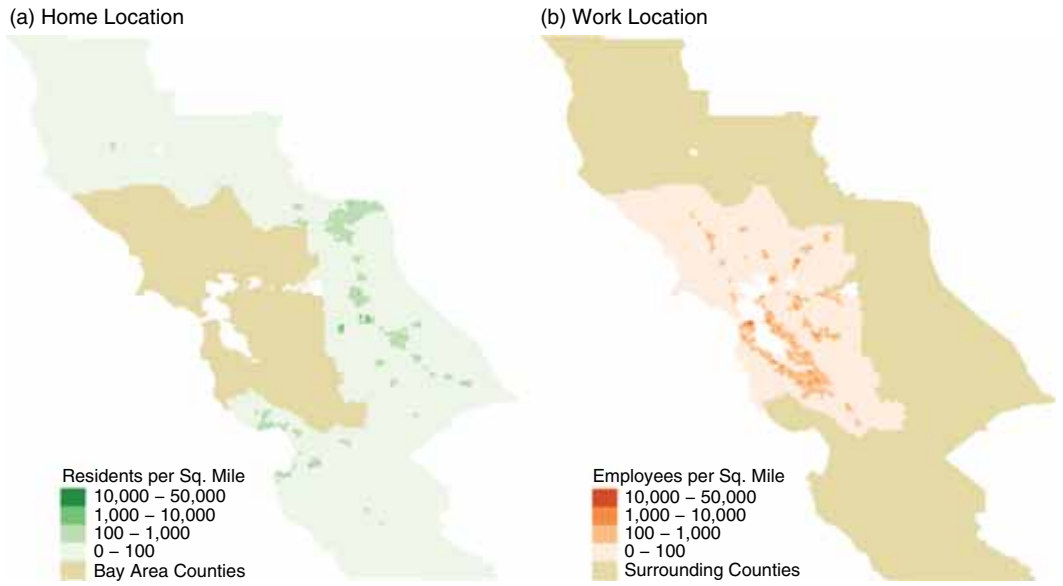
Source: U.S. Census LEHD Data, 2010; calculations by Bay Area Council Economic Institute

Table 8: Distance LMI Communities Commute

Percentile	All	LMI Communities
20th	5 miles	4.4 miles
40th	10.7 miles	10.3 miles
60th	19.1 miles	19.5 miles
80th	34.2 miles	35.6 miles
100th	146 miles	150.4 miles
Average	21.3 miles	22.1 miles

Source: 5 year 2010 American Community Survey, LEHD; calculations by Bay Area Council Economic Institute

Figure 18: Surrounding County Residents Working in the Bay Area



Source: U.S. Census LEHD Data, 2010; calculations by Bay Area Council Economic Institute.

Table 9: Outside Employment 2010

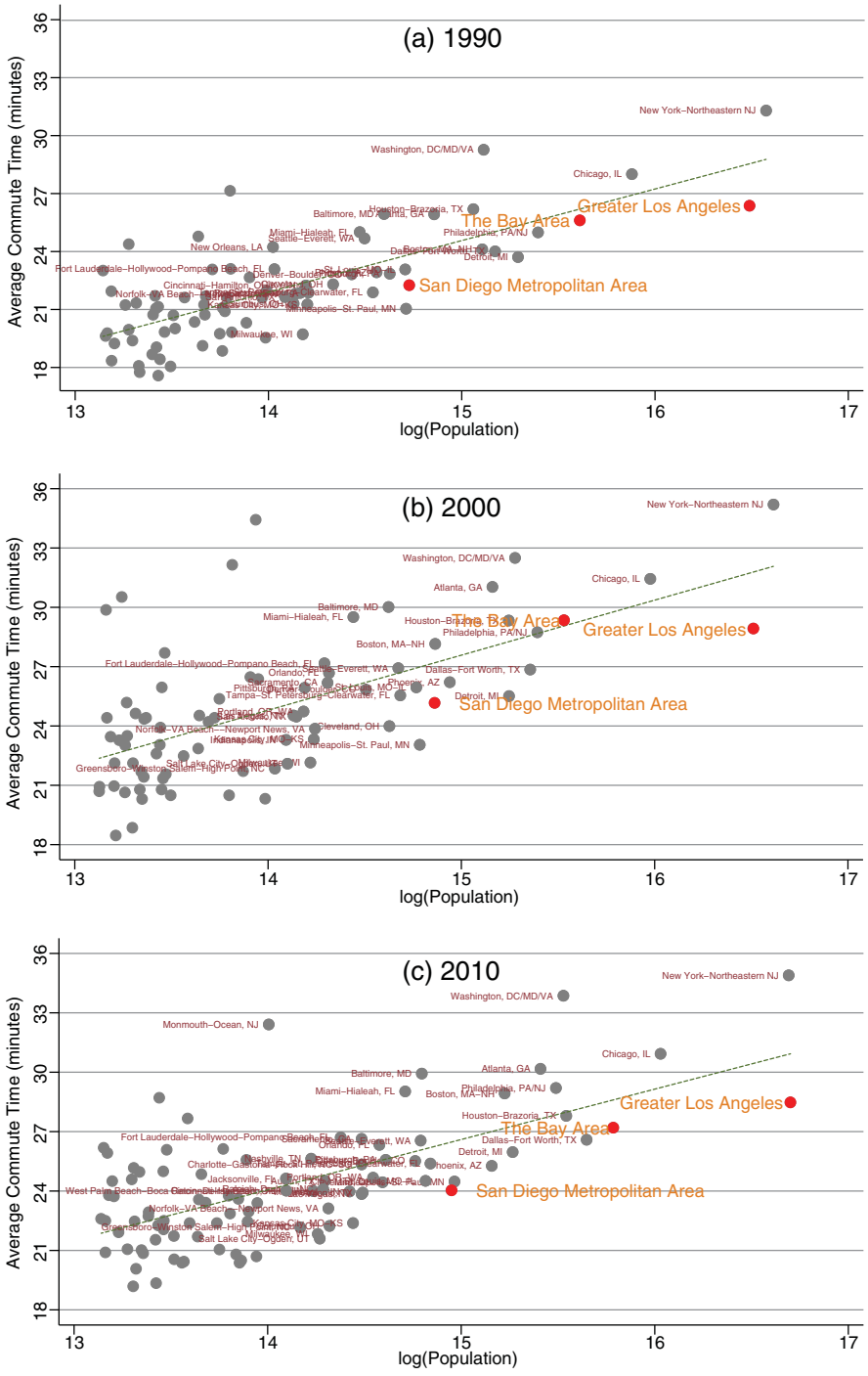
Category	Employment	% of Bay Area Total
Residents Working Outside the Bay Area	248,436	8.6
Employees Living Outside the Bay Area	337,988	11.8

Source: U.S. Census LEHD Data, 2010; calculations by Bay Area Council Economic Institute.

Commute Times

How long are Bay Area commutes relative to those of other cities and how is the pattern evolving? Figure 19 presents a set of scatter plots of average commute time versus population for a variety of metropolitan areas in the United States for each of three years: 1990, 2000, and 2010. The three major metropolitan areas in California are highlighted in red. The dotted line represents the general relationship between population size and commute times. The primary observation from these graphs is that commute times in the Bay Area are not abnormally high. The figure for the year 2000 is the only figure in which the Bay Area lies above the dotted line, and it is only barely above the line. The Bay Area falls below the line in each of the other two years.

Figure 19: Average Commute Times by Metropolitan Area



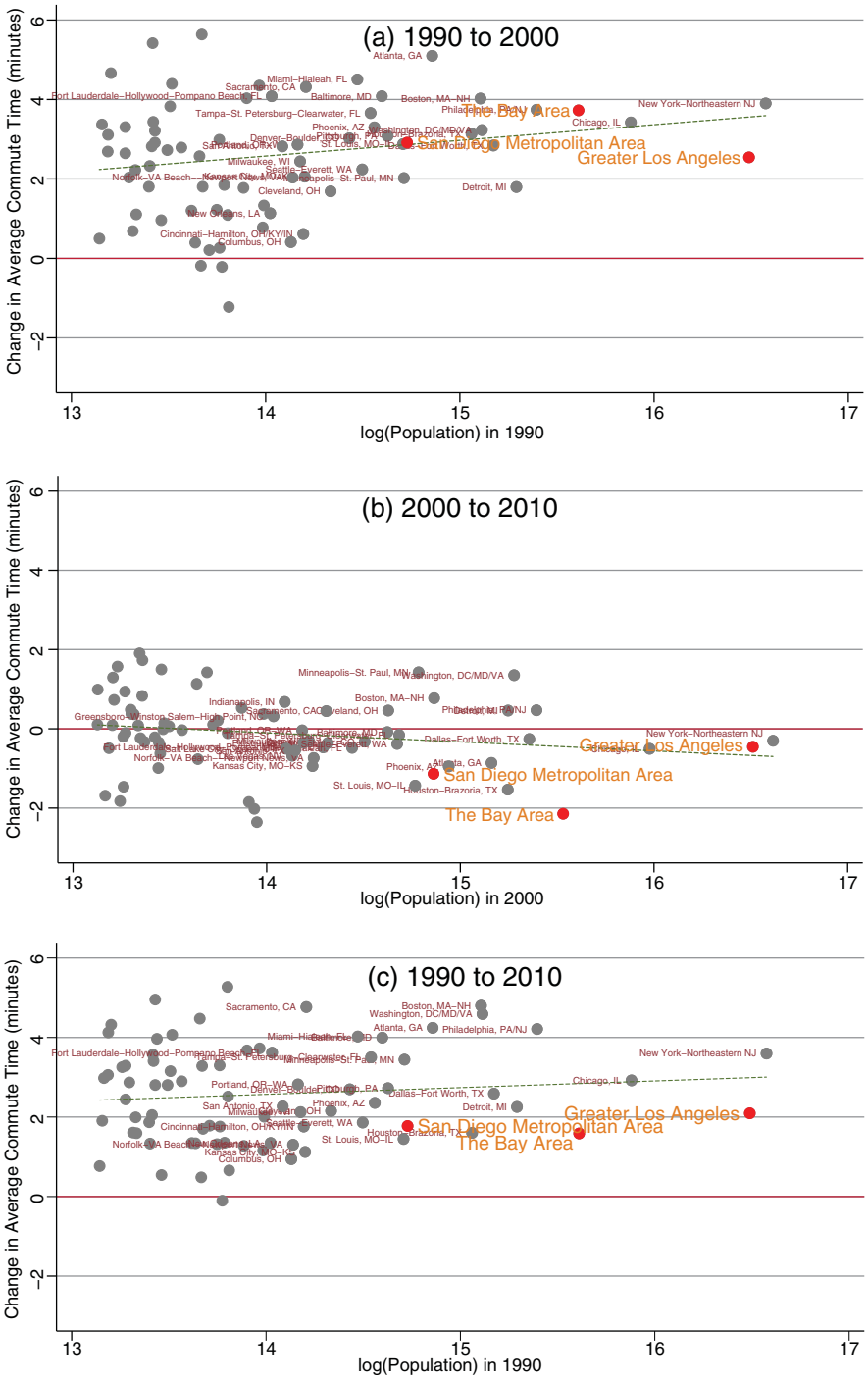
Source: U.S. Census; calculations by Bay Area Council Economic Institute

Notes: Sample includes all U.S. MSAs with a population of 500,000 or more in 1990.
Fitted values from population-weighted linear regression.

Over time, a pattern emerges that is not terribly surprising. Between 1990 and 2000, commute times in the Bay Area worsened, both in absolute terms as well as relative to other regions. This change is no doubt the result of the dot-com bubble, which raised congestion on Bay Area roads to levels not previously experienced. By 2010, commute times in the Bay Area had fallen back in line with commute times in other regions and, in fact, they gained some ground. The distance between the Bay Area point and the dotted line was greater in 2010 than in 1990, indicating that commute times were shorter than would be expected. At the same time, however, commute times were higher in 2010 than in 1990. This is in part owing to a larger population in the area but it also stems from the inability of the existing infrastructure to handle the higher level of population. This is a growing trend nationwide, as evidenced by the higher level of the dotted line in 2010 relative to the dotted line in 1990.

These changes are perhaps better seen in Figure 20(a–c). These graphs indicate the change in average commute times between decades as well as over the entire 20-year period. Commute times generally increased between 1990 and 2000, with travel times in the Bay Area increasing by more than would be expected (in this figure, the Bay Area lies above the dotted line). Between 2000 and 2010, average commute times around the country fell, or increased by much less than during the previous decade, with commute times in the Bay Area falling by more than most. Overall, commute times increased between 1990 and 2010, with commute times in all three California regions increasing by significantly less than average.

Figure 20: Change in Average Commute Times by Metropolitan Area



Source: U.S. Census; calculations by Bay Area Council Economic Institute

Notes: Sample includes all U.S. MSAs with a population of 500,000 or more in 1990.
Fitted values from population-weighted linear regression.

Public Transportation

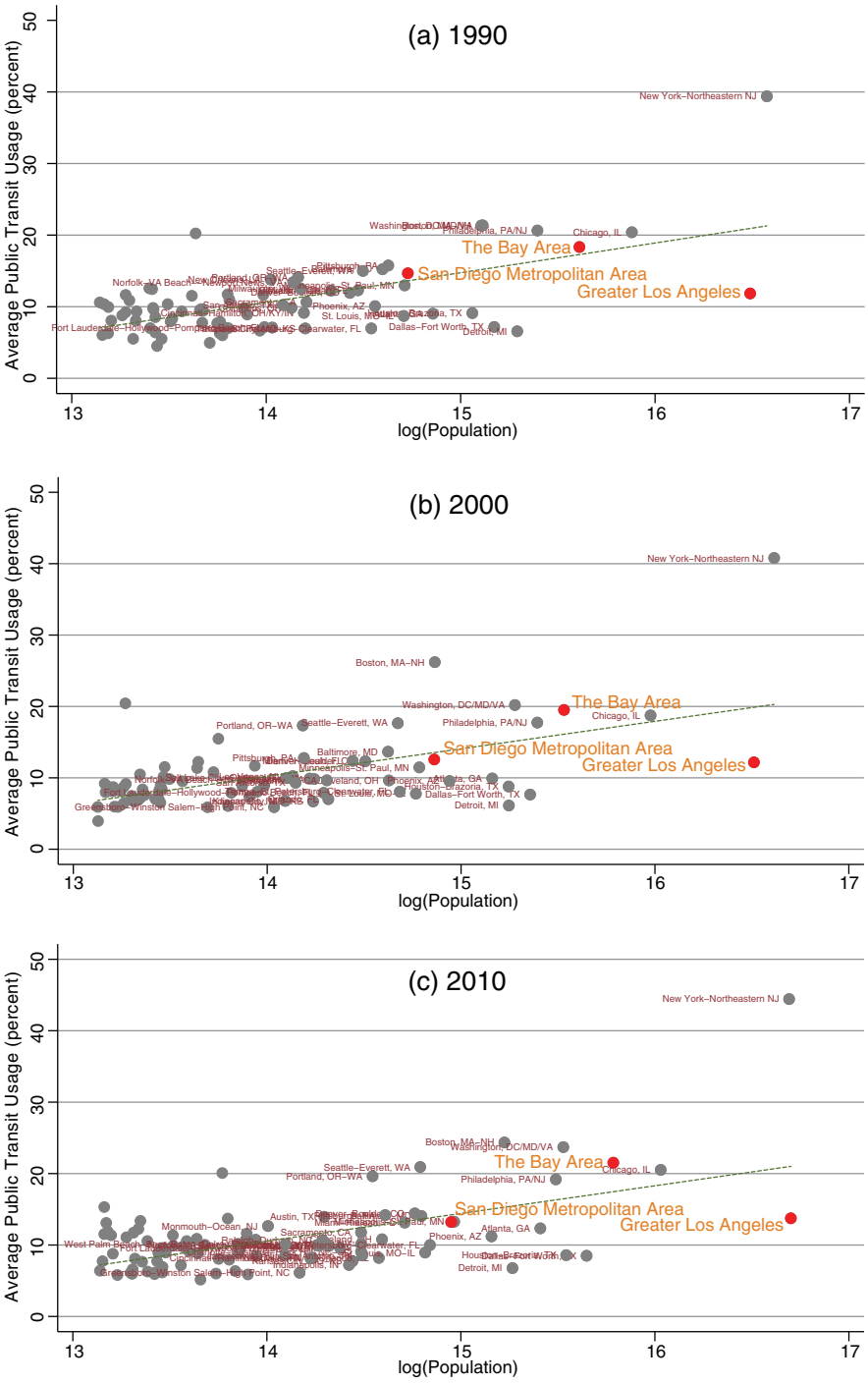
It is worth considering the role of public transportation in commute patterns around the Bay Area. Public transportation usage can change for a variety of reasons. First, system expansions can increase utilization—expansions can be designed to serve the general population more effectively. Second, general perceptions surrounding public transportation can change. Third, increased congestion on local roads can encourage workers to take advantage of public transportation. Fourth, increased population growth relative to public-transportation capacity can cause utilization to decline as public transportation becomes more crowded and hence less desirable relative to alternatives.

Figure 21(a–c) examines public transportation usage in metro areas within the Bay Area. These figures are analogous to those presented earlier in Figure 19(a–c) with respect to commute times, but in this case being higher on the y-axis is a good thing. Being above the dotted line is also a positive reflection of public transportation usage. In all three years, the point for the Bay Area is above the dotted line, though the distance above the dotted line is less in 1990 than in 2000 or 2010. This indicates that, after accounting for population size, the extent to which residents take advantage of the public transportation system in the Bay Area is relatively high.

Changes over the 20-year period are presented in Figure 22(a–c). In each decade (and hence over the 20-year period) public transportation usage grew in the Bay Area. In each period, this growth was greater than the increase in regions with comparable levels of population, and greater than in either San Diego, where usage declined over the period, or Greater Los Angeles, where usage grew, but by less than might have been expected. The Bay Area appears to be performing relatively well in terms of exploiting the available public transportation systems—or the public transportation systems appear to be serving the local population relatively well.

That public transportation use grew between 2000 and 2010 is somewhat surprising. The two recessions during that time significantly reduced employment and hence commute-related congestion.

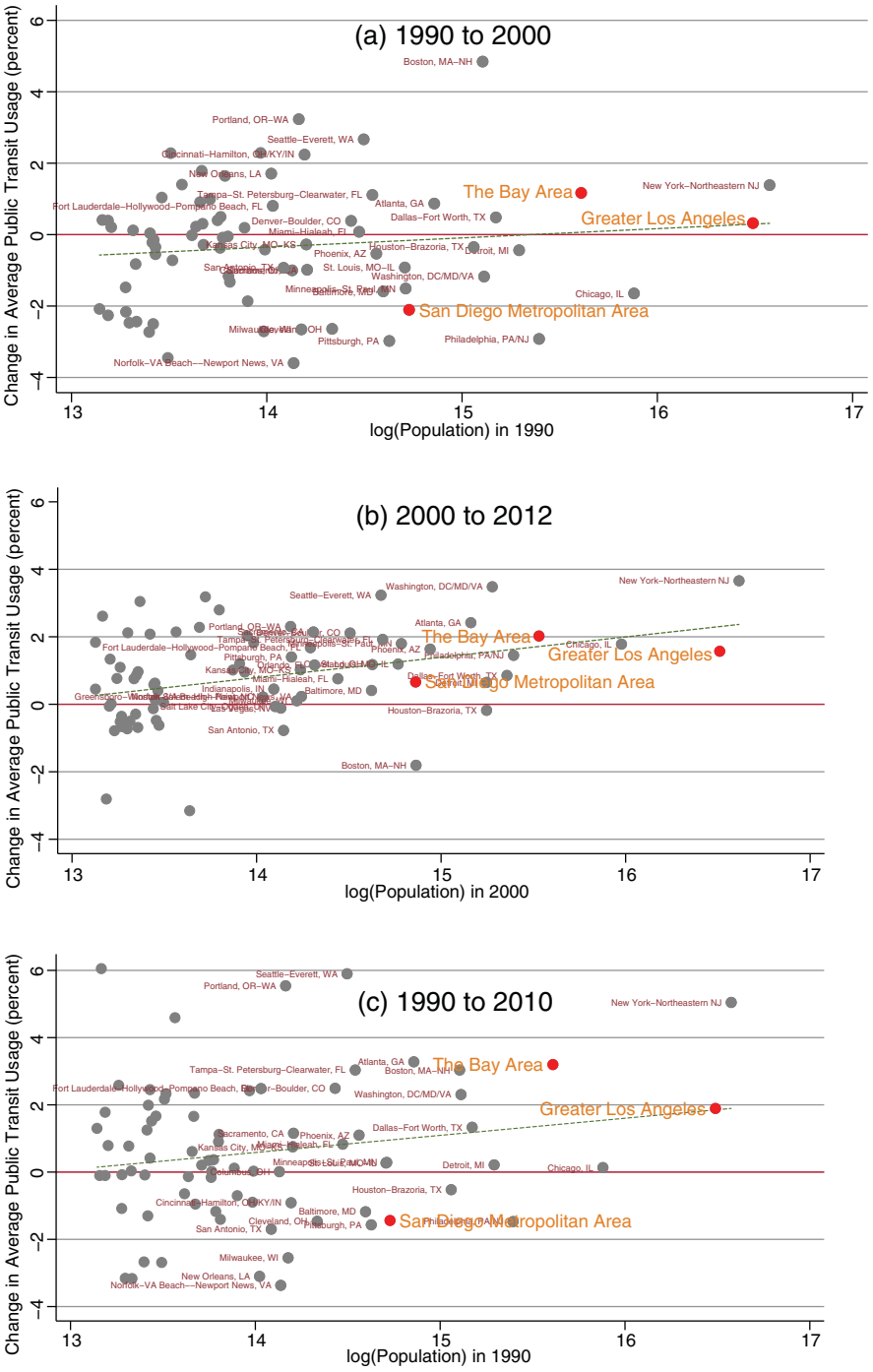
Figure 21: Average Public Transit Usage by Metropolitan Area



Source: U.S. Census; calculations by Bay Area Council Economic Institute.

Notes: Sample includes all U.S. MSAs with a population of 500,000 or more in 1990.
Fitted values from population-weighted linear regression.

Figure 22: Change in Average Public Transit Usage by Metropolitan Area



Source: U.S. Census; calculations by Bay Area Council Economic Institute.

Notes: Sample includes all U.S. MSAs with a population of 500,000 or more in 1990.
Fitted values from population-weighted linear regression.

Appendix C: Industry-Level Analysis

From an industry-level perspective, the Bay Area is a relatively diverse economy. However, it does have a significant concentration of high-skilled, high-value-added activities. These are sectors for which the Bay Area is well known: Information (including the social media companies); Computer and Peripheral Equipment Manufacturing; Beverage Manufacturing (wine); as well as a variety of Professional, Scientific, and Technical Services sub-sectors.

The Bay Area's industrial composition has evolved since 1990. Notable trends that can be seen in Table 10 include:

- the dramatic growth of the Professional, Scientific, and Technical Services (PSTS) sector;
- the almost equally dramatic growth of the Health Care sector;
- the precipitous decline of the Manufacturing sector;
- the shrinkage (by 33%) of the Finance and Insurance industry.

This section of Appendix C will explain these trends and raise questions for ongoing investigation and analysis.

The Evolution of Industry in the Bay Area

Over time, significant changes have taken place in the distribution of employment across major sectors of the Bay Area economy (Table 10). In particular, an important transition occurred in the economy between 1990 and 2011: employment shifted away from a heavy concentration in Manufacturing and Retail Trade and became more broad-based and diverse. In 2011, five sectors had employment shares greater than the third-largest sector in 1990. In four of these sectors, employment growth outpaced that of the nation as a whole (or fell more slowly, as in the case of Manufacturing). The only one of these sectors that fell short of the national employment trend was Retail Trade.

Table 10: Industry Employment in the Bay Area

	Share of Bay Area Employment (Percent))				Employment Levels (Thousands)			
Industry	1990	2000	2003	2011	1990	2000	2003	2011
Prof., Sci., & Technical	7.8	10.3	9.4	11.8	205	332	278	340
Health Care & Soc. Asst.	7.4	7.6	8.9	11	196	244	262	317
Retail Trade	12.9	11	11.4	10.8	342	353	336	311
Accom. & Food Srvcs.	7.8	7.7	8.6	9.8	207	249	252	283
Manufacturing	14.9	13.1	10.9	9.3	395	423	320	269
Educ. Services	5.9	6.2	7.1	6.6	156	200	208	190
Admin., Support, & Waste	6.2	7.3	5.9	5.8	165	237	172	167
Other Srvcs.	4	4	4.7	5.4	107	128	138	154
Construction	5.6	5.8	6.1	4.6	149	188	179	132
Wholesale Trade	5.3	4.3	4.2	3.9	141	137	124	113
Public Admin.	3.9	3.1	3.8	3.8	103	101	111	110
Fin. & Ins.	5.8	3.9	4.8	3.7	153	124	141	105
Information	2.9	4.3	3.8	3.6	78	139	110	103
Trans. & Ware.	4.1	3.8	3.7	3	109	123	110	86
Mgmt of Companies	0.6	3.4	2.3	2.1	15	111	68	60
Arts, Ent., & Rec.	1.6	1.3	1.5	1.9	42	43	45	54
RE, Rental, Leasing	2.4	1.9	2.1	1.8	62	62	61	52
Other	0.9	0.8	0.9	1.3	24	27	27	37
Total	100	100	100	100	2,649	3,219	2,943	2,884

Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute

Sorted by 2011 Share of Bay Area Employment

Table 11: Value Added by Industry per Capita: 2010

Industry	Value Added	Employment	VA per Capita
Real Estate and Rental and Leasing	1,765,239	2,015	876.0
Information	623,472	2,720	229.2
Finance and Insurance	1,241,946	5,720	217.1
Manufacturing	1,701,937	11,529	147.6
Wholesale Trade	797,348	5,520	144.4
Prof., Sci., & Tech. Srvcs.	1,095,758	7,603	144.1
Mgmt. of Companies	263,699	1,853	142.3
Ag., Forestry, Fishing, and Hunting	156,984	1,271	123.5
Federal	649,552	5,425	119.7
All Private Industries	12,558,037	111,375	112.8
Transportation and Warehousing	402,524	4,227	95.2
Construction	511,639	5,767	88.7
Arts, Entertainment, and Recreation	139,112	1,944	71.6
State and Local Government	1,318,958	19,541	67.5
Health Care & Social Assistance	1,109,187	16,534	67.1
Retail Trade	884,877	14,743	60.0
Admin., Support and Waste Mgmt.	423,380	7,515	56.3
Educational Services	163,101	3,211	50.8
Accommodation and Food Services	416,693	11,262	37.0

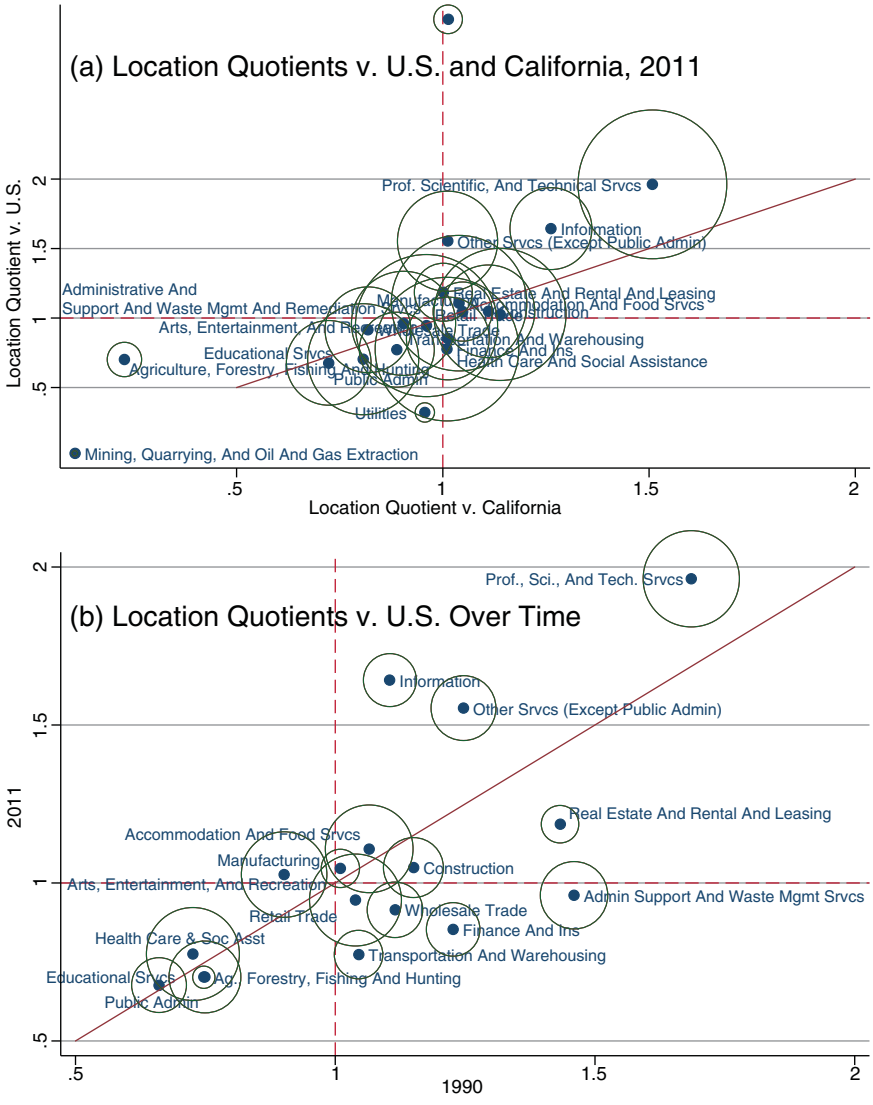
Source: Bureau of Economic Analysis; calculations by Bay Area Council Economic Institute
Sorted by Value Added per Capita

A common means of tracking local employment relative to some other geography (e.g., the United States as a whole or California) is through a location quotient. The location quotient is simply the ratio of the share of employment in the Bay Area relative to the share of employment in the nation or state. Figure 23 presents location quotients for industries in the Bay Area relative to the United States on the vertical axis and relative to California on the horizontal axis. For example, Professional, Scientific, and Technical Services (PSTS) has a location quotient of about 2.0 relative to the United States and about 1.5 relative to California. This means that the share of PSTS employment in total Bay Area employment is twice as large as it is in the United States as a whole, and 50% larger than in California as a whole.

According to Figure 23, there are three industries with location quotients significantly greater than one relative to the United States: PSTS, Information,

and Other Services (Except Public Administration).[8] Industries with location quotients significantly larger than one are often considered to be "driving industries"—industries that play a primary role in growing employment in the region.

Figure 23: Industry Location Quotients for the Bay Area as a Whole



Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute.

Ring size reflects the relative size of the industry.

[8] "Other Services" encompasses a wide variety of services that do not fit well into any other category. Examples include Equipment Repair and Maintenance (such as Electronic and Precision Equipment Repair and Maintenance); Religious, Grant-making, Civic, Professional and Similar Organizations; Death Care Services; and Other Personal Services (such as non-veterinary Pet Care Services, and Parking Lots and Garages).

Industries with location quotients of approximately one are often referred to as "supporting industries." In the Bay Area, these supporting industries include Retail and Wholesale Trade; Finance and Insurance; Manufacturing; Construction; Arts, Entertainment, and Recreation; and Administrative Support and Waste Management Services (Table 12, Table 13). It is worth noting that some of these industries are plausibly categorized as driving industries within specific regions of the Bay Area. For example, Manufacturing plays a large role on the Peninsula and in the South Bay. Arts, Entertainment, and Recreation remains an important industry in San Francisco.

Table 12: Location Quotients v. the U.S. by Sub-Region, 1990

Industry	Bay Area	East Bay	North Bay	San Francisco	San Jose
Prof., Sci., and Tech. Srvcs.	1.7	1.3		2.3	1.7
Admin. Support and Waste Mgmt. Srvcs.	1.5	1.4		1.7	1.4
Real Estate and Rental and Leasing	1.4	1.3		1.9	
Other Srvcs. (Except Public Admin.)	1.2		1.3	1.5	
Finance and Ins.	1.2			2.0	
Construction	1.2	1.4	2.0		
Wholesale Trade	1.1				
Information	1.1			1.3	
Accommodation and Food Srvcs	1.1		1.4	1.3	
Transportation and Warehousing	1.0			1.7	
Retail Trade	1.0		1.4		
Arts, Entertainment, and Recreation	1.0				
Manufacturing	0.9				1.8
Educational Srvcs.	0.7				
Ag., Forestry, Fishing and Hunting	0.7		4.5		
Health Care and Social Assistance	0.7				
Public Admin.	0.7				
Utilities	0.1				

Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute

Table 13: Location Quotients vs. the U.S. by Sub-Region, 2011

Industry	Bay Area	East Bay	North Bay	San Francisco	San Jose
Prof., Sci., and Tech. Srvcs.	2.0	1.5		2.5	2.3
Information	1.6			2.0	2.8
Other Srvcs. (Except Public Admin.)	1.6	1.6	1.5	2.0	
Real Estate and Rental and Leasing	1.2			1.5	
Accommodation and Food Srvcs.	1.1		1.3	1.4	
Construction	1.0		1.4		
Arts, Entertainment, and Recreation	1.0			1.4	
Manufacturing	1.0				1.9
Admin. Support and Waste Mgmt. Srvcs.	1.0				
Retail Trade	0.9				
Wholesale Trade	0.9				
Finance and Ins.	0.9			1.3	
Health Care and Social Assistance	0.8				
Transportation and Warehousing	0.8				
Educational Srvcs.	0.7				
Ag., Forestry, Fishing and Hunting	0.7		4.2		
Public Admin.	0.7				
Utilities	0.3				

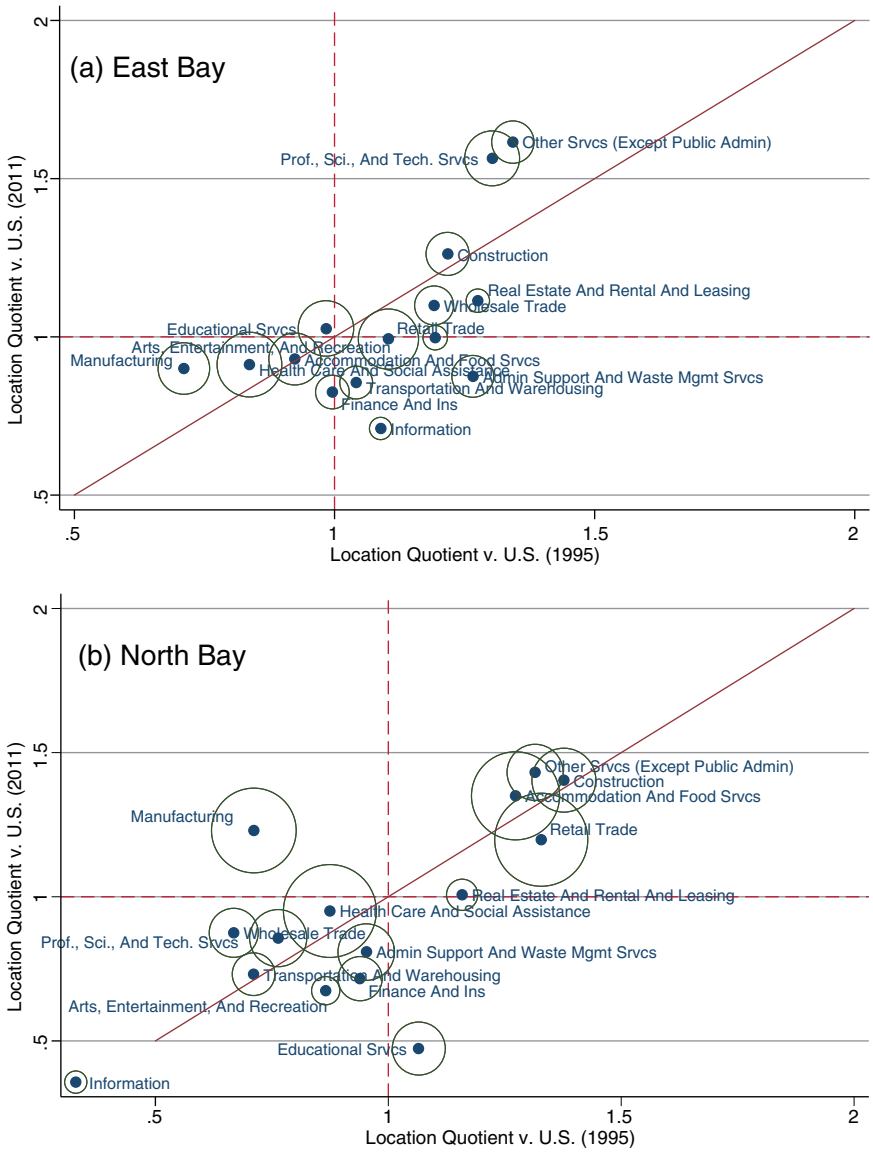
Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute

Similarly, not all driving industries in the Bay Area are driving industries in each of the regional economies. For example, Information is heavily concentrated in San Francisco and the Peninsula. Professional, Scientific, and Technical Services, though strong in other sub-regions, is not a driving industry in the North Bay. Likewise, Other Services plays a relatively small role in the economy on the Peninsula. Figure 24 provides more evidence for the varying concentration of industries within the Bay Area's four sub-regions.

Regionally, there is a clear pecking order in terms of the quality of driving industries with respect to average annual wages. Overall, full-time employees in the Bay Area earn an average of $71,400. Of the Bay Area's driving industries, both PSTS and Information are characterized by very high annual wages, at $104,000 and $92,000, respectively. San Jose, with a heavy concentration of employees in both PSTS and Information, as well as in Manufacturing, has a very solid core of driving industries with exceptionally high wages. The driving industries in San Francisco comprise more of a mixed bag, with a solid concentration in high-wage sectors, but also a heavy concentration in industries with lower-than-average wages; for example, Arts,

Entertainment, and Recreation ($49,400), Accommodation and Food Services ($31,100), and Other Services ($45,400).

Figure 24: Location Quotients Over Time for Bay Area Sub-Regions

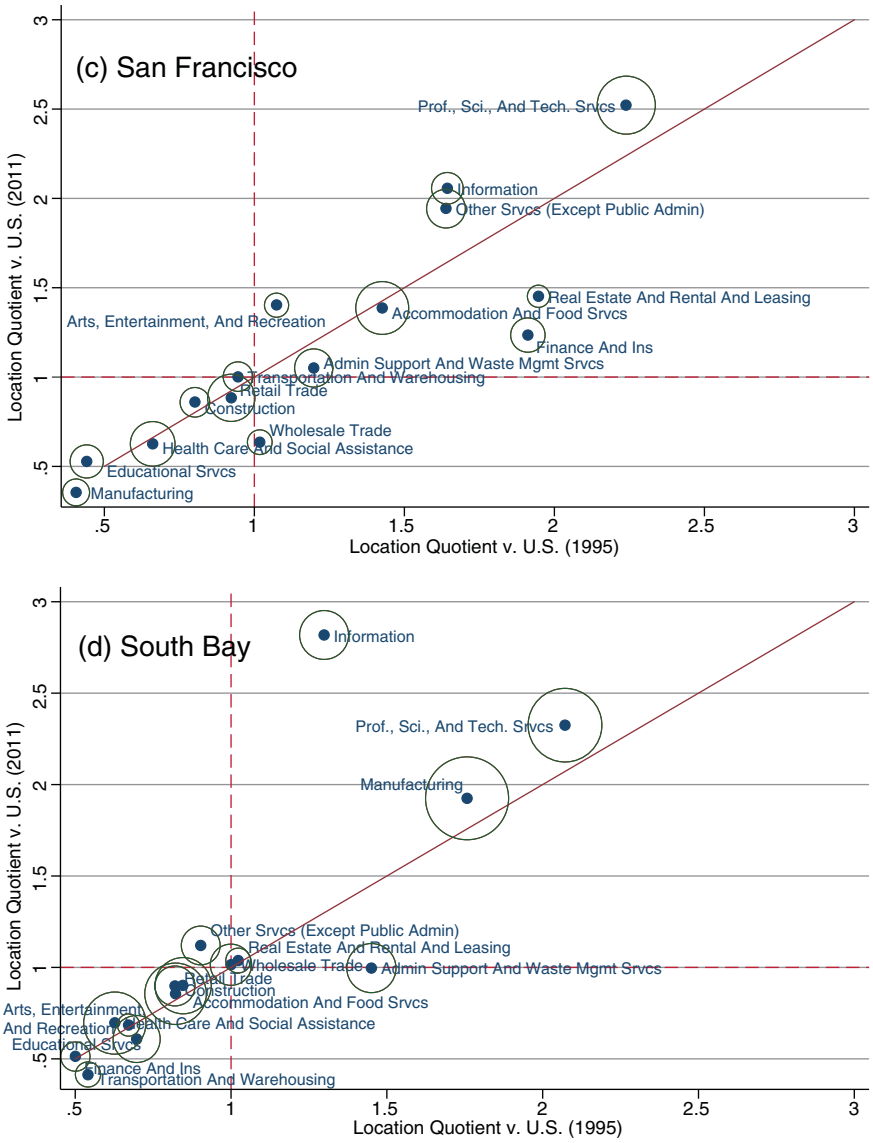


Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute
Ring size reflects the relative size of the industry.

The East Bay has a heavy concentration in PSTS, but its other areas of concentration, such as Other Services and Construction, are industries with relatively low average wages. The North Bay is lacking any concentration in high-wage sectors. All three of its driving industries offer relatively low

wages, with average annual wages falling from $15,000 to $40,000 below the regional average.

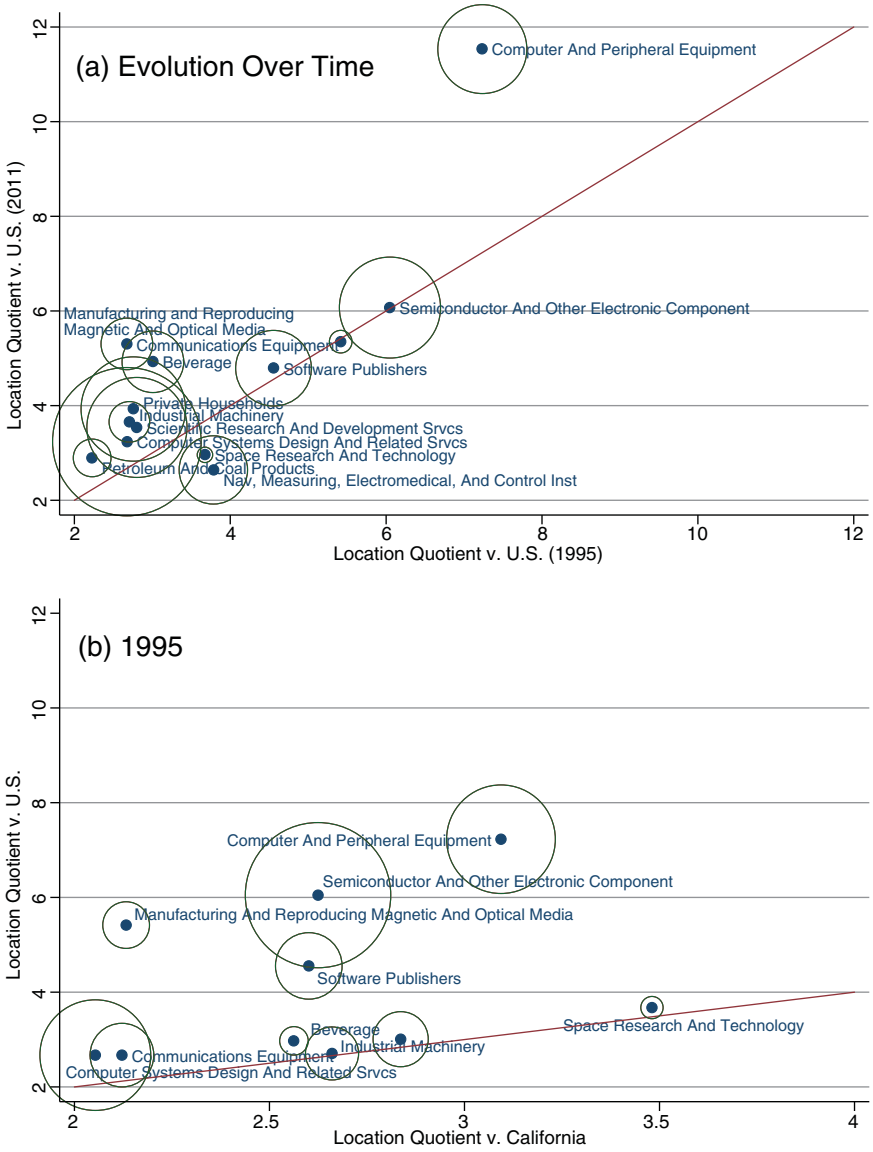
Figure 24: Location Quotients Over Time for Bay Area Sub-Regions (continued)



Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute

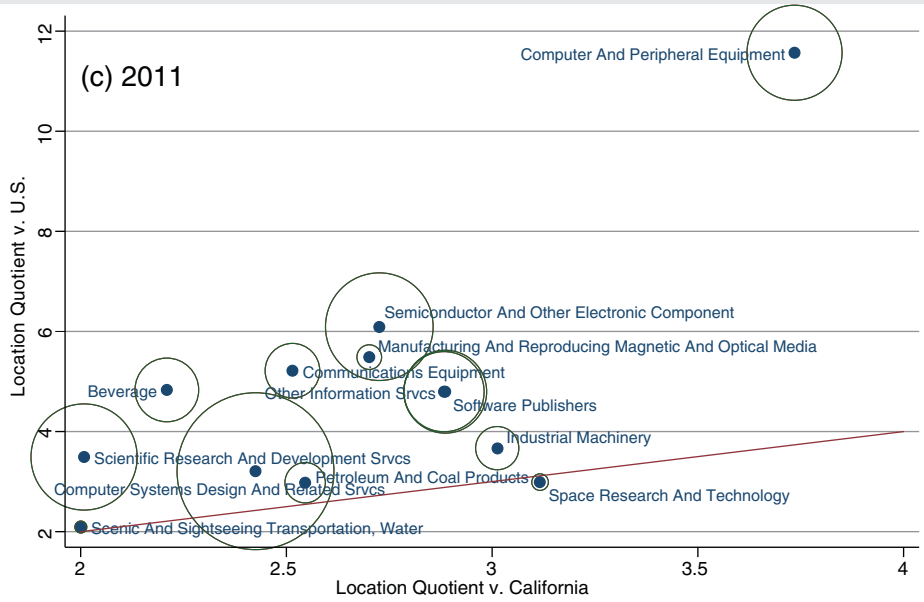
Ring size reflects the relative size of the industry.

Figure 25: Detailed Location Quotients for the Bay Area



Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute
Ring size reflects the relative size of the industry.

Figure 25: Detailed Location Quotients for the Bay Area (continued)

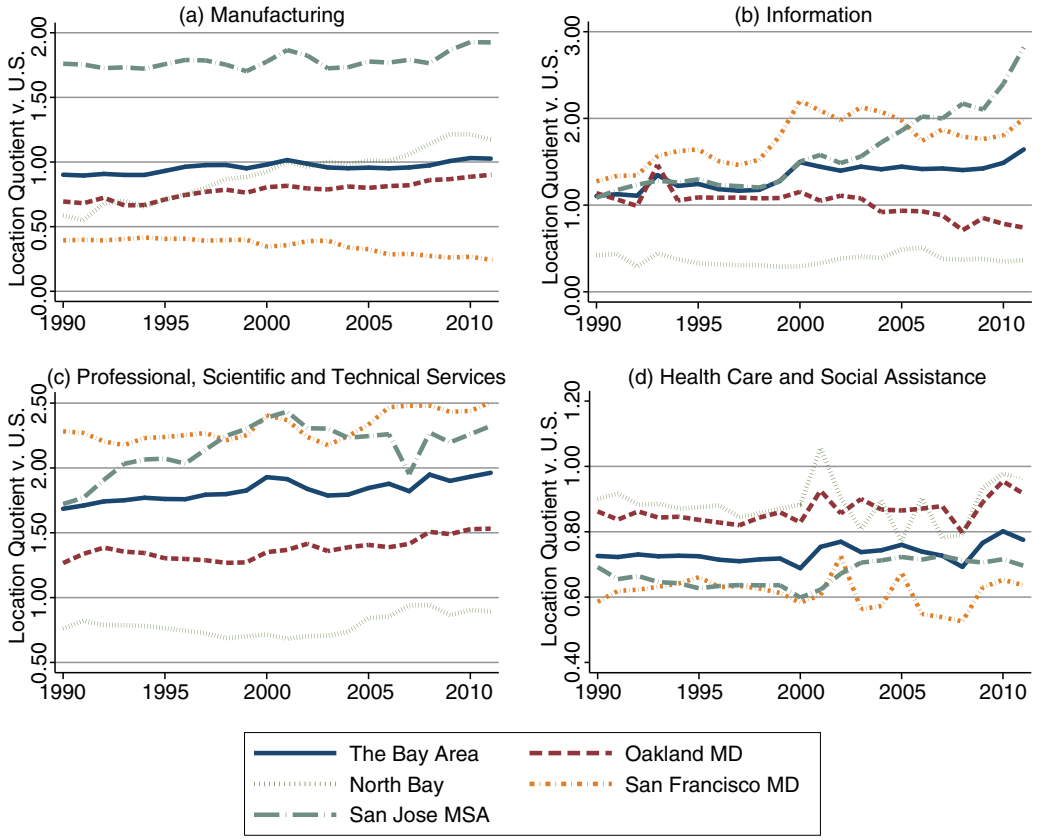


Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute
Ring size reflects the relative size of the industry.

The Bay Area also has heavy concentrations in sub-sectors of the major industries identified in the figures. In particular, Computer and Peripheral Equipment Manufacturing has a location quotient of nearly 12 in the Bay Area relative to the United States as a whole: for every one employee in the sector nationwide, there are 12 in the Bay Area (Figure 25). Other sub-sectors include a variety of manufacturing activities. In fact, the top five most heavily concentrated sub-sectors in the Bay Area are all in Manufacturing, followed by some in Information Services and Software Publishing. Each of these sectors in the Bay Area is a driving industry relative to California as a whole.

As mentioned earlier, employment growth in some Bay Area industries has been outperforming employment growth at the national level. Figure 26 provides the history of location quotient change for four of these industries, along with their concentration in the Bay Area's sub-regions. Manufacturing employment, though falling both as a share of regional employment and in absolute numbers, is gaining in concentration relative to the United States as a whole. Much of this increase comes from the Peninsula, although the North Bay is also showing relative growth in the sector (Figure 26(a)). The growth in the North Bay location quotient is largely due to employment growth in the Beverages Manufacturing sector.

Figure 26: Location Quotients Over Time for Growing Industries with Increased Concentration Locally

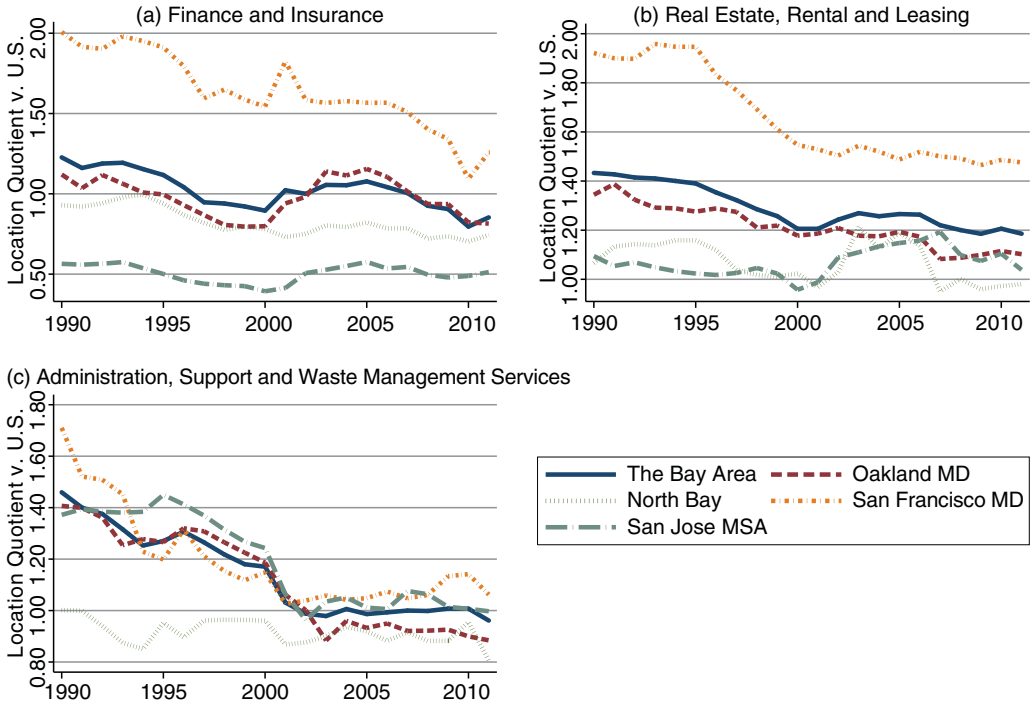


Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute

Some of the industries that were formerly driving the Bay Area economy are now experiencing declines in concentration (Figure 27). Most notable among these is the Finance and Insurance industry. Although Finance and Insurance was never a major driving force for the Bay Area economy as a whole, it did have a location quotient of 2.0 for San Francisco in 1990, confirming the area's reputation as a major financial sector. For a variety of reasons, including the movement of Bank of America's headquarters out of the state, employment in this industry in San Francisco has been in long-term decline, with a location quotient in 2011 of approximately 1.25.

The Administrative Support and Waste Management Services sector has experienced perhaps the most striking and broad-based decline in concentration throughout the region. The decline occurred between 1990 and 2002, with a relatively constant location quotient since then. The sub-sectors that are primarily responsible for this trend include Employment and Business Support Services, which constitutes about half of employment in the broader industry. These declines are shared by each of the Bay Area's sub-regions.

Figure 27: Location Quotients Over Time for Industries with Declining Concentration Locally



Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute

The Geographic Organization of Bay Area Industries

Up to this point, we have examined the changes and characteristics of regional employment at the industry level. In this section, we examine the current location patterns of industry employment within the four Bay Area sub-regions and look at how the location patterns have changed from 1990 to 2011.

Table 14 provides sub-regional employment shares for each of the major industries along with an indication of how those shares have changed over time. For example, in 1990, 43.8% of all jobs in the PSTS sector were in San Francisco, 30.1% were in the South Bay, 3.9% were in the North Bay, and 22.3% were in the East Bay. Since that time, there has been greater growth in PSTS employment outside of San Francisco, with each region outside of San Francisco gaining in share in rough proportion to their original shares in 1990. By 2011, the South Bay had gained the most (3.0 percentage points of share), the East Bay second (2.0 percentage points), and the North Bay last (1.1 percentage point).

Table 14: Industry Employment Distributions in the Bay Area by Year and Sub-Region

	Shares (%)											
	1990				2011				Change			
Industry	SF	SB	NB	EB	SF	SB	NB	EB	SF	SB	NB	EB
Prof., Sci., & Tech.	43.8	30.1	3.9	22.3	38.3	33.0	5.0	24.2	-5.5	3.0	1.1	1.9
Health Care & Soc. Asst.	26.1	28.0	10.7	35.2	24.6	25.3	13.5	36.7	-1.5	-2.8	2.8	1.5
Retail Trade	29.8	24.1	11.4	34.7	28.3	25.2	13.9	32.4	-1.5	1.1	2.5	-2.3
Accom. & Food Srvcs.	40.1	22.3	11.3	26.3	37.9	23.2	13.2	26.1	-2.2	1.0	1.9	-0.3
Manufactur-ing	14.1	57.4	5.6	22.8	7.1	53.0	12.5	27.2	-7.0	-4.4	6.8	4.4
Educ. Services	18.2	27.6	12.2	42.0	22.7	24.2	7.5	45.0	4.5	-3.4	-4.7	3.0
Admin., Support, & Waste	37.9	27.7	5.9	28.6	33.1	30.0	9.1	28.5	-4.7	2.3	3.2	0
Other Srvcs.	38.6	23.1	9.0	29.3	38.2	20.2	10.2	32.2	-0.5	-2.9	1.2	3.0
Construc-tion	25.9	24.0	14.7	35.5	24.9	25.1	14.4	36.8	-0.9	1.1	-0.3	1.3
Wholesale Trade	33.3	31.5	5.7	29.5	21.3	31.2	10.5	37.2	-12.0	-0.3	4.8	7.7
Public Admin.	36.5	20.4	9.0	34.1	35.2	18.0	15.6	31.0	-1.3	-2.4	6.6	-3.1
Fin. & Ins.	52.9	13.5	6.5	27.1	44.2	16.8	9.5	29.6	-8.7	3.3	2.9	2.6
Information	37.3	28.9	3.3	30.5	36.5	48.1	2.4	14.0	-0.8	19.2	-0.9	-16.5
Trans. & Ware.	51.1	14.4	6.2	28.3	40.3	15.1	10.5	34.3	-10.8	0.7	4.3	6.0
Arts, Ent., & Rec.	36.0	25.2	7.3	31.5	39.1	19.0	7.2	29.7	3.2	-6.2	-0.1	-1.9
RE, Rental, Leasing	43.3	22.5	6.4	27.8	37.3	24.8	9.0	28.8	-6.0	2.3	2.6	1.1
Other	16.0	26.5	46.2	11.3	19.4	19.5	38.3	23.2	3.4	-7.0	-8.0	11.9
Total	32.3	29.4	8.6	29.6	30.0	28.3	10.9	31.0	-2.3	-1.2	2.3	1.4

Source: BLS; calculations by Bay Area Council Economic Institute

Sorted by Industry Size in the Bay Area for 2011

SF=San Francisco; SB=South Bay; NB=North Bay; EB=East Bay

Not surprisingly, this pattern roughly describes the experience of almost all industries. In particular, San Francisco has lost employment shares in all but three industries: Education Services; Information; and Arts, Entertainment, and Recreation. The largest declines took place in Wholesale Trade and in Transportation and Warehousing, where considerable share has been lost by San Francisco to both the North Bay and East Bay sub-regions. Most of the share losses, however, were to the East Bay, coinciding with the solid growth at the Port of Oakland in both maritime and air cargo movements. Another shift, and perhaps one that is more noteworthy, is the loss of share of Finance and Insurance jobs to other parts of the Bay Area. Over the 21-year period, San Francisco lost nearly 9 percentage points of its share, roughly evenly split between the three other regions.

Manufacturing has also seen significant shifts in regional employment shares. From 1990 to 2011, Santa Clara and San Francisco lost a combined 10.6 share points. Most of this went to the North Bay, which experienced significant growth not only in Beverage Manufacturing but also in Animal and Fruit and Vegetable Processing. The gains in Manufacturing in the East Bay stem from a comparatively broad-based growth of relative Manufacturing employment.[9] Much of this gain in share by the East Bay is in southern Alameda County, representing an expansion outside of the traditional technology corridor of Silicon Valley into the East Bay.

The Information sector likewise experienced a significant geographical shift in industry concentration. In 1990, nearly one-third (30.3%) of all Information sector employment was in the East Bay. By 2011, the East Bay had lost 17.4 share points, all of which were gained by Santa Clara. This transfer is a result of both employment losses in the East Bay and significant gains in Santa Clara, primarily in the Technology, Social Media, and Data Storage sub-sectors.

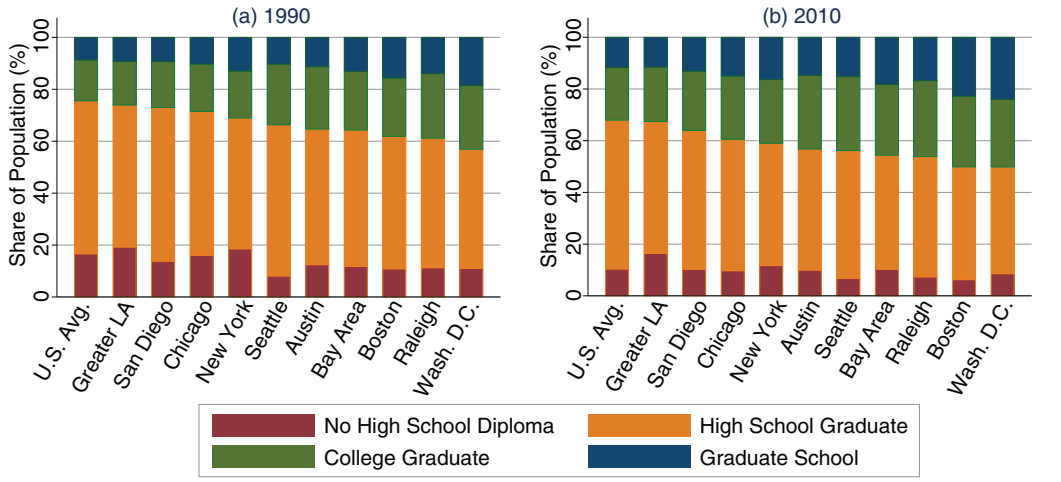
[9] See "Building on Our Assets: Economic Development and Job Creation in the East Bay," East Bay Economic Development Alliance, October 2011.

Appendix D: Labor Force

The Bay Area is often described as thriving because of the high-skilled nature of its labor force. In this section we examine the Bay Area's labor force more closely, assessing the overall levels of education, identifying which occupations are over-represented or under-represented, and examining the residential concentrations of workers with various levels of education.

Figure 28 indicates the level of education in the Bay Area labor force relative to commonly referenced peer metropolitan areas. In 1990, with 37% of the population having a bachelor's degree or higher (the blue and green bars combined) the Bay Area was pushing ahead in the middle of the pack, ranking higher than Seattle and Austin but lower than Boston, Raleigh, and Washington, D.C. By 2010, although the Bay Area's position in the middle of the pack remained relatively unchanged, the portion of the Bay Area's population having at least a bachelor's degree had grown to 42%. This share is considerably higher than the share seen in the overall population of the United States, where just 28% of residents have at least a bachelor's degree.

Figure 28: Labor Force Education Levels in Selected Metropolitan Areas



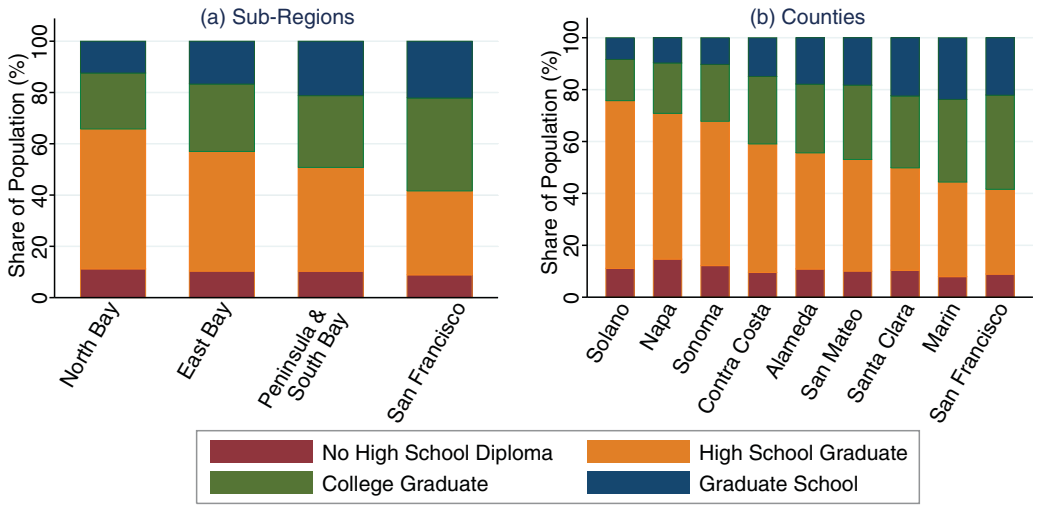
Source: U.S. Census and American Community Survey; calculations by Bay Area Council Economic Institute.

Relative to other major metropolitan areas of the state, the Bay Area labor force has had higher levels of education since at least 1990. From 1990 to 2010, the Bay Area extended its lead in this regard.

Among the sub-regions of the Bay Area, there is in general a high level of educational attainment. San Francisco has the highest proportion of workers with at least a bachelor's degree, at an astonishing 61.2% (Figure 29). From

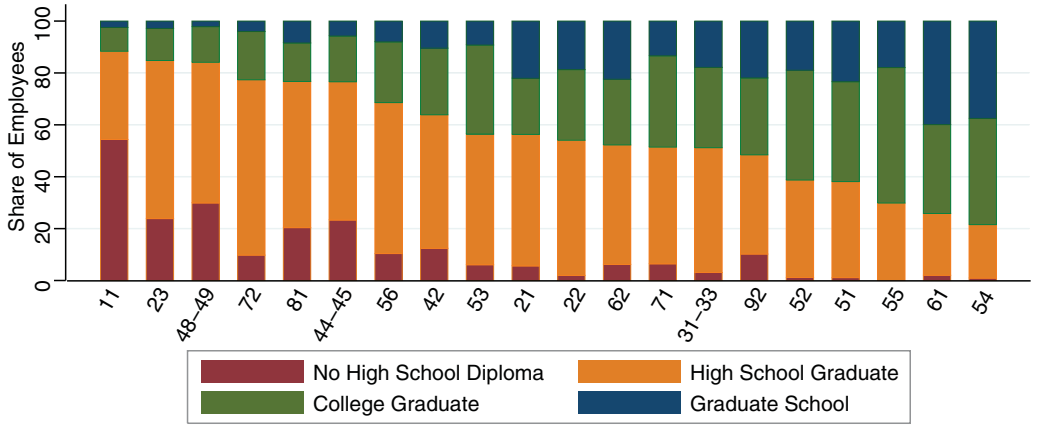
1990 to 2010, all regions of the Bay Area increased the proportion of the population with at least a bachelor's degree, though the North Bay experienced the smallest gains.

Figure 29: Labor Force Education Levels in the Bay Area



Source: U.S. Census and American Community Survey; calculations by Bay Area Council Economic Institute

Figure 30: Labor Force Education Levels in the Bay Area by Industry



Source: U.S. Census and ACS; calculations by Bay Area Council Economic Institute

11=Agriculture, Forestry, Fishing and Hunting
21=Mining
22=Utilities
23=Construction
31–33=Manufacturing
42=Wholesale Trade
44–45=Retail Trade
48–49=Transportation and Warehousing
51=Information
52=Finance and Insurance
53=Real Estate and Rental and Leasing
54=Professional, Scientific, and Technical Services
55=Management of Companies and Enterprises
56=Admin. & Support & Waste Mgmt. & Remediation Srvcs.
61=Educational Services
62=Health Care and Social Assistance
71=Arts, Entertainment, and Recreation
72=Accommodation and Food Services
81=Other Services (except Public Administration)
92=Public Administration

Nonetheless, the levels of educational attainment in the Bay Area do vary significantly by sub-region. Table 15 shows the regional distribution, with the top panel of the table indicating the percentage of the Bay Area or sub-region's labor force that has achieved each level of education, while the bottom panel shows the percentage that have achieved *at least* that level of education. For example, the top panel indicates that 26.7% of the labor force in the Bay Area has a bachelor's degree. The bottom panel, on the other hand, indicates that 43.4% of the labor force has at least a bachelor's degree.

Table 15: Educational Attainment Levels In and Around the Bay Area

	Percent of Labor Force with Specific Education Level				
Level of Education	Bay Area	San Francisco	Peninsula	East Bay	North Bay
Less than High School	11.0	7.9	10.3	9.6	11.9
High school graduate	18.0	12.0	15.9	19.0	19.5
Some college, but less than 1 year	4.9	2.7	4.2	5.2	6.4
One or more years of college, no degree	14.9	10.6	13.7	15.2	18.5
Associate's degree	7.8	5.6	7.9	7.7	9.6
Bachelor's degree	26.7	39.3	27.9	26.8	22.8
Master's degree	11.7	14.3	14.6	11.5	7.6
Professional school degree	2.6	4.9	2.4	2.4	2.5
Doctorate degree	2.4	2.7	3.2	2.4	1.2
	Percent of Labor Force with AT LEAST the Specific Education Level				
Level of Education	Bay Area	San Francisco	Peninsula	East Bay	North Bay
High school graduate	89.0	92.1	89.7	90.4	88.1
Some college, but less than 1 year	71.0	80.1	73.8	71.4	68.6
One or more years of college, no degree	66.1	77.4	69.6	66.1	62.2
Associate's degree	51.2	66.8	55.9	50.9	43.7
Bachelor's degree	43.4	61.2	48.0	43.2	34.1
Master's degree	16.7	21.9	20.2	16.4	11.3
Professional school degree	5.0	7.6	5.6	4.8	3.7
Doctorate degree	2.4	2.7	3.2	2.4	1.2

Source: 5-year 2010 American Community Survey; calculations by Bay Area Council Economic Institute

Breaking down the data in this way provides insight into the educational attainment figures presented earlier. In particular, in the lower panel of this table we can see that 61.2% of the labor force in San Francisco has at least a bachelor's degree. The top panel of the table indicates that it is the percentage of people with a bachelor's degree that is highly irregular. While those living in San Francisco do have professional degrees in somewhat higher numbers than residents in the other regions of the Bay Area, the proportions of people with a master's degree or a doctorate degree do not stand out.

The percentage of the labor force with just a high school diploma in the East Bay and the North Bay is worth noting. At roughly 19%, both of these shares are significantly higher than those observed in other parts of the Bay Area.

Relative to the state and other metro areas of the state, the Bay Area has a highly skilled labor force. In each degree category above associate's degree, the Bay Area has a higher proportion of workers having earned that degree. Relative to the state overall, more people in the Bay Area have at least a college education than statewide, by about 12 percentage points. Likewise, Bay Area residents surpass residents of San Diego—the next most educated region in the state—with respect to having at least a college education by more than 6 percentage points (Table 16).

Table 16: Educational Attainment in California

	Percent of the Labor Force with Specific Education Level			
Level of Education	Bay Area	Los Angeles	San Diego	California
Less than High School	11.0	19	11.6	16.4
High school graduate	18.0	21.6	18.6	21.3
Some college, but less than 1 year	4.9	4.9	6.4	6.0
One or more years of college, no degree	14.9	15.6	17.8	16.6
Associate's degree	7.8	7.1	8.3	7.9
Bachelor's degree	26.7	21.3	24.0	20.8
Master's degree	11.7	7	8.7	7.6
Professional school degree	2.6	2.2	2.3	2.0
Doctorate degree	2.4	1.2	2.2	1.4

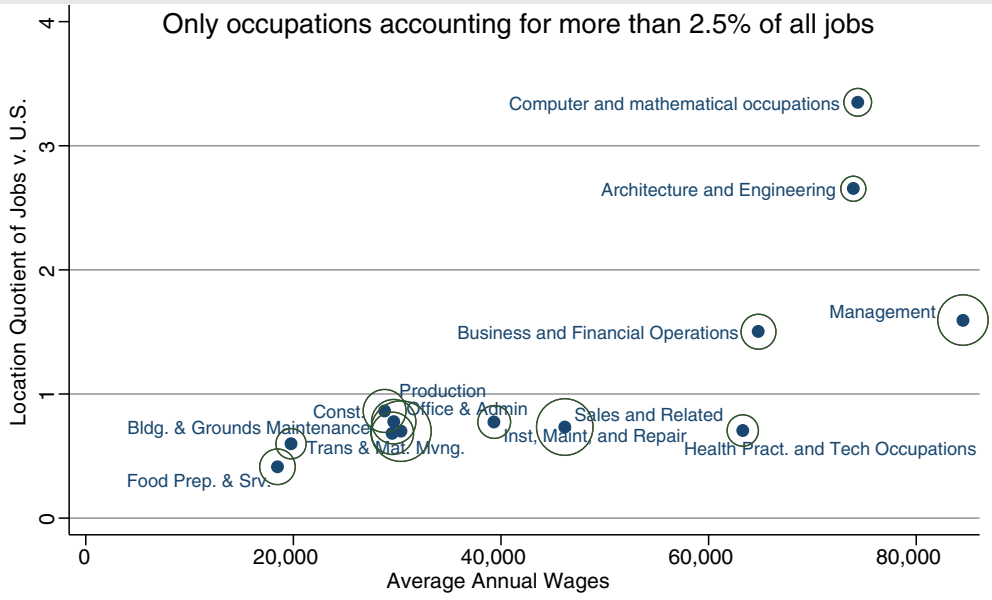
	Percent of the Labor Force with AT LEAST the Specific Education Level			
Level of Education	Bay Area	Los Angeles	San Diego	California
High school graduate	89.0	81.0	88.4	83.6
Some college, but less than 1 year	71.0	59.4	69.8	62.3
One or more years of college, no degree	66.1	54.5	63.4	56.3
Associate's degree	51.2	38.8	45.6	39.7
Bachelor's degree	43.4	31.7	37.2	31.8
Master's degree	16.7	10.4	13.2	11.0
Professional school degree	5.0	3.4	4.5	3.4
Doctorate degree	2.4	1.2	2.2	1.4

Source: 5-year 2010 American Community Survey; calculations by Bay Area Council Economic Institute

Another way of assessing the Bay Area's labor force is by looking at the occupations that are over-represented and under-represented in the region. As in our previous analysis of industries, we can calculate location quotients for the Bay Area's labor force with respect to occupations. These location quotients will tell us which occupations have a heavier concentration (a higher percentage of the labor force) in the Bay Area than in the nation.

When we look at these location quotients, along with average annual wages, there are two occupations that stand out as being highly over-represented in the Bay Area: Computer and Mathematical Occupations and Architecture and Engineering (Figure 31). Both are present in the Bay Area at more than 2.5 times their share of the U.S. labor force overall. Though not quite as heavily concentrated, Management is also over-represented, as are occupations in Business and Financial Operations. Both of these industries have a location quotient of about 1.5, indicating that shares in the Bay Area are 50% higher than in the U.S. more broadly.

Figure 31: Bay Area Occupation Concentrations, 2010

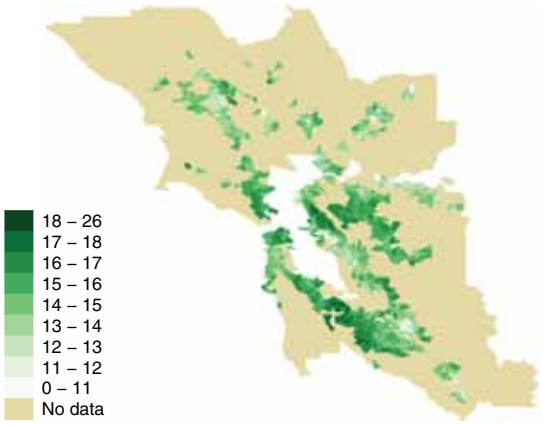


Source: Bureau of Labor Statistics; calculations by Bay Area Council Economic Institute
Ring size reflects the relative size of the industry.

In addition to being heavily concentrated in the Bay Area, these four occupational categories are also associated with high average annual wages. Average wages for full-time workers in the United States reached $44,410 in 2010. The wage averages in the four most heavily over-represented occupations in the Bay Area are all in excess of $60,000, with most closer to $80,000. This suggests both a significant demand for and a robust supply of skilled, highly educated workers in the Bay Area.

Figure 32 provides a more fine-grained depiction of the distribution of residents by level of educational attainment. Those with less than a bachelor's degree are most heavily concentrated in Solano County, Oakland, and along the I-80 corridor through Alameda County, as well as on the outskirts of the Bay Area. Residents with a bachelor's degree, and no higher degree, are relatively evenly distributed around the region, with a relative concentration in San Francisco's North Beach area. Those with graduate degrees are more heavily concentrated in Silicon Valley.

Figure 32: Average Educational Attainment (Years)



Source: American Community Survey 2006–10; calculations by Bay Area Council Economic Institute

Appendix E: Establishment-Level Analysis

An analysis of industries and employment dynamics in a region is incomplete without consideration of the underlying dynamics of the region's establishments. Although employment in a particular industry may grow, the underlying dynamics may be such that there is tremendous dislocation of employment. In particular, although new businesses are created at a rapid rate in most regions throughout California, existing businesses are at the same time expanding employment, contracting employment, or going out of business. These underlying dynamics provide valuable information about the nature of the local economy.

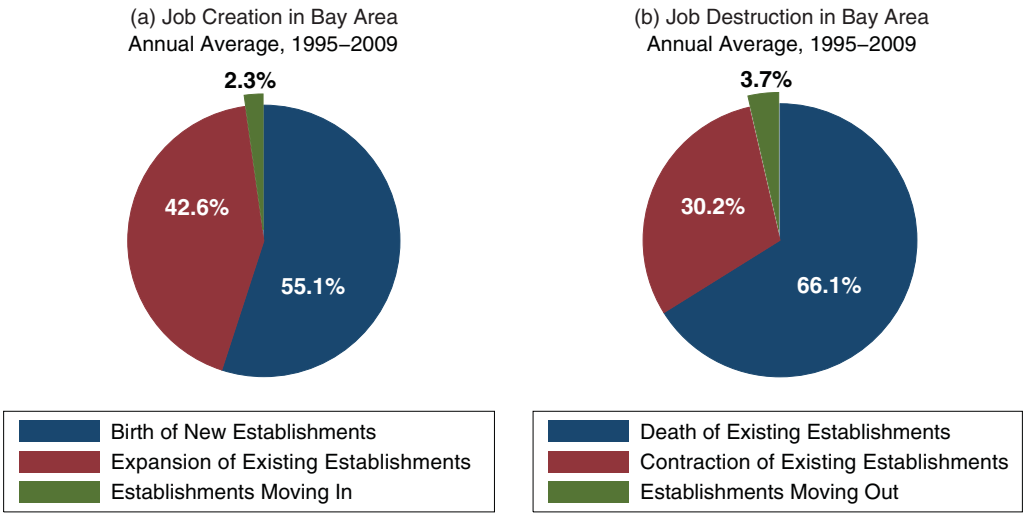
Thinking about employment growth at the industry level is akin to thinking of the industry as a single business. In fact, there are many thousands of business establishments with any number of characteristics. Understanding the age, size, and expansion patterns of specific industries leads to a more nuanced understanding of the health of the local economy.

The underlying dynamics are often understood in the context of job creation and job destruction. Jobs are created through three avenues in an economy: new establishments are born, existing establishments expand, or existing establishments move into the region. Similarly, jobs are destroyed or taken out of the local economy through three avenues: existing establishments go out of business (die), existing establishments reduce their employment (contract), or existing establishments move out of the region.

By examining the data, we can gauge the relative importance of each of these phenomena in the Bay Area economy (Figure 33(a), Figure 33(b)). More than half of job creation (55.1%) comes from the opening of new business establishments (Figure 33(a)). These can be standalone companies or new establishments being opened by existing firms (a new Starbucks, for example). Another 42.6% of job creation comes from the expansion of employment at existing establishments, and just 2.3% of employment growth is from existing establishments moving into the region.

With respect to job destruction, two-thirds (66.1%) comes from the closure of existing business establishments, just under one-third (30.2%) comes from the contraction of employment at existing establishments, and 3.7% stems from establishments choosing to move out of the area.

Figure 33: Job Creation and Destruction in the Bay Area



Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

Together, job creation and job destruction are indicators of "job churn" in an economy—they provide evidence of the dynamic nature of the economy or of shifts in particular industries. Table 17 provides statistics on job churn for the major industry groups in the Bay Area. Looking first at the bottom line of Table 17, the first three numbers correspond to those displayed in Figure 33(a), the second three to those displayed in Figure 33(b), while the last two present summary measures of job creation and job destruction on an average annual basis between 1995 and 2008. In an average year, jobs equivalent to 8.9% of the existing level of employment are added to employment in the Bay Area through job creation. At the same time, 8.6% of existing jobs are lost through one or another avenue of job destruction. This paints a distinctly different picture of the economy from the simple observation that employment in the Bay Area grows at an average rate of 0.8% per year; that small percentage masks a great deal of job turnover.

Table 17: Sources of Job Creation and Job Destruction by Industry

	Average Annual Figures, Percent of Total							
	Job Creation			Job Destruction			Job Churn	
Industry	Births	Growth	Move In	Deaths	Con-trac-tion	Move Out	Crea-tion	Destruc-tion
Ag., Forestry, Fish-ing & Hunting	51.2	46.8	2.1	62.4	33.2	4.4	7.3	6.6
Mining	42.1	44.3	13.6	53.8	29.3	16.9	9.0	14.3
Utilities	54.9	42.5	2.7	73.4	20.3	6.4	3.6	8.9
Construction	48.4	50.3	1.4	62.8	33.1	4.1	9.7	8.1
Manufacturing	41.9	53.5	4.6	62.0	32.9	5.1	8.2	10.0
Wholesale Trade	51.6	45.2	3.2	71.5	23.7	4.8	9.1	10.5
Retail Trade	64.9	33.1	2.1	72.6	25.3	2.1	8.4	7.4
Transportation & Warehousing	55.6	41.7	2.7	60.1	35	4.9	7.2	10.5
Information	49.0	47.3	3.7	70.0	23.3	6.7	12	10.8
Finance and Insurance	57.1	41.2	1.7	63.6	30.4	6	8.6	9.4
Real Estate and Rental and Leasing	60.9	37.8	1.3	69.0	28.6	2.5	9.4	8.6
Prof., Sci., and Tech. Services	51.9	45.0	3.1	67.5	28.1	4.4	11.3	10.1
Admin. Support & Waste Mgmt. Srvcs.	66.2	32.7	1.1	65.4	30.1	4.5	13.6	9.7
Educational Srvcs.	43.4	55.7	0.8	54.5	43.9	1.6	4.5	4.7
Health Care and Social Assistance	53.4	45.7	0.9	67.9	30.8	1.3	7.0	6.6
Arts, Entertain-ment, & Recreation	62.9	35.6	1.6	72.3	25.4	2.3	9.8	7.4
Accommodation & Food Services	69.3	29.5	1.2	73.1	25.5	1.4	6.8	6.5
Other Services (ex-cept Public Admin.)	59.0	39.8	1.2	65.3	33.1	1.5	9.0	8.6
Public Admin.	55.6	44.3	0.2	57.6	41.9	0.4	7.5	8.2
Other	98.6	0.1	1.2	89.8	0.1	10.1	23.7	19.0
All Industries	55.1	42.6	2.3	66.1	30.2	3.7	8.9	8.6

Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

The other rows of Table 17 present the same information for each major industry group in the Bay Area. In particular, the job churn in the PSTS sector tends to be greater than in the economy as a whole, with a job creation rate of 11.3% and a job destruction rate of 10.1%. The Information sector, another important sector for the Bay Area, exhibits even more job churn. At the industry level, establishment moves can be more important as a source of job churn. In particular, movements in the Mining sector are equal to 13.6% for moves in and 16.9% for moves out in an average year. There are other industries that are much less mobile. Education Services, for example, gains only 0.8% from moves into the region and loses 1.6% from moves out of the region.

The birth and death rates of establishments play distinct roles in different industries. Accommodation and Food Services relies heavily on the birth of new establishments and experiences a large number of deaths, while Manufacturing relies much less on the birth of new establishments (41.9%) and loses jobs at a slower rate than average due to deaths (62.0%). Contractions are relatively commonplace in Education Services and in Public Administration, as are expansions.

Table 18: Cumulative Job Growth and Job Loss Across California Regions

	Average Annual Figures, Percent of Total					
	All Industries			Prof., Sci. and Tech. Srvcs.		
	Bay Area	Greater Los Angeles	San Diego Metro Area	Bay Area	Greater Los Angeles	San Diego Metro Area
	1990 to 2008					
Job Growth						
Establishment Birth (incl. Move-in)	113.6%	119.5%	139.2%	172.7%	172.5%	189.5%
Establishment Expansion	76.5%	67.6%	83.5%	122.5%	88.2%	112.4%
Job Loss						
Establishment Death (incl. Move-out)	114.4%	110.4%	115.0%	165.6%	150.4%	153.4%
Establishment Contraction	55.1%	51.8%	58.8%	72.1%	60.3%	68.1%
	2003 to 2008					
Job Growth						
Establishment Birth (incl. Move-in)	20.1%	23.5%	23.2%	20.5%	25.6%	25.1%
Establishment Expansion	17.0%	16.1%	17.2%	23.6%	19.2%	20.6%
Job Loss						
Establishment Death (incl. Move-out)	24.4%	23.4%	21.6%	25.6%	27.7%	23.6%
Establishment Contraction	11.8%	10.5%	11.3%	12.0%	9.9%	9.9%

Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

Table 19: Cumulative Job Growth and Job Loss within the Bay Area

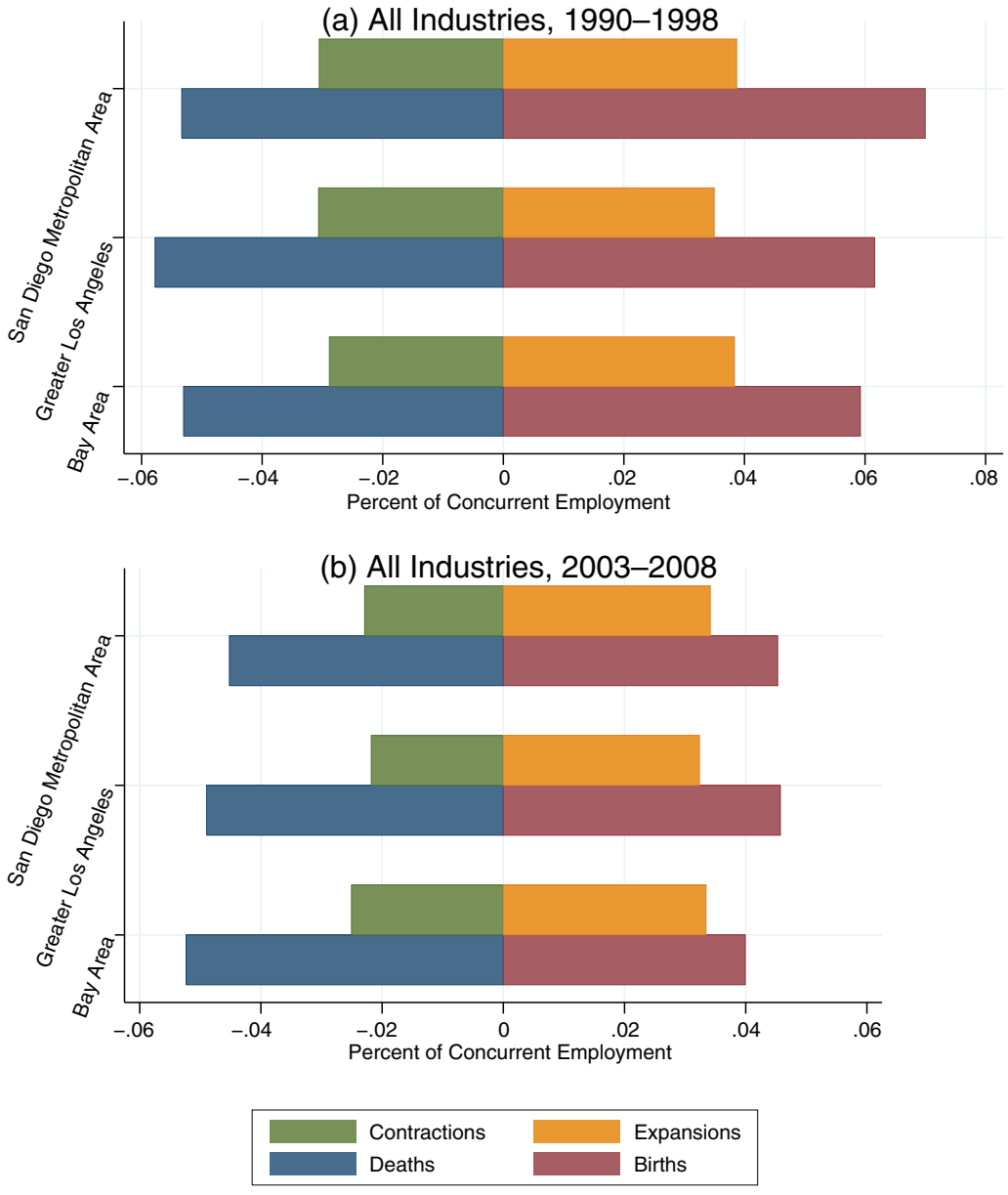
	Average Annual Figures, Percent of Total							
	All Industries				Prof., Sci. and Tech. Services			
	San Francisco	Peninsula & South Bay	East Bay	North Bay	San Francisco	Peninsula & South Bay	East Bay	North Bay
	1990 to 2008							
Job Growth								
Establishment Birth (incl. Move-in)	99.20%	115.80%	136.40%	122.90%	177.60%	182.20%	177.80%	206.30%
Establishment Expansion	68.00%	82.80%	76.30%	67.50%	124.90%	142.80%	101.50%	80.00%
Job Loss								
Establishment Death (incl. Move-out)	113.50%	126.30%	123.00%	107.00%	178.80%	190.80%	152.30%	161.00%
Establishment Contraction	51.70%	57.50%	55.70%	49.80%	77.20%	73.90%	68.30%	58.30%
	2003 to 2008							
Job Growth								
Establishment Birth (incl. Move-in)	18.70%	20.70%	23.10%	21.40%	23.00%	20.60%	23.10%	26.10%
Establishment Expansion	15.40%	18.30%	17.10%	14.90%	19.00%	27.10%	23.90%	16.70%
Job Loss								
Establishment Death (incl. Move-out)	25.70%	27.10%	25.60%	21.00%	26.20%	28.60%	26.90%	25.10%
Establishment Contraction	13.50%	11.30%	12.50%	9.20%	10.70%	10.50%	16.00%	9.90%

Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

A comparison of these Bay Area statistics with those other regions is revealing. In particular, we can look at the contributions of the components of job creation and destruction in the Bay Area relative to Greater Los Angeles and the San Diego metro area (Figure 34(a) and 34(b)). Here, moves are absorbed into births and deaths for a clearer exposition. These figures present evidence from before and after the dot-com bubble to avoid conflating the experience of that extraordinary time with the more fundamental long-run

dynamics in the region. The top figure is from the eight years prior to the bubble, and the bottom figure reflects the experience of the five years following the bursting of the dot-com bubble, 2003–2008. The latter period is also chosen to exclude the experience of the recent recession, which is not helpful in understanding long-term trends.

Figure 34: Employment Flow Decomposition by California Region

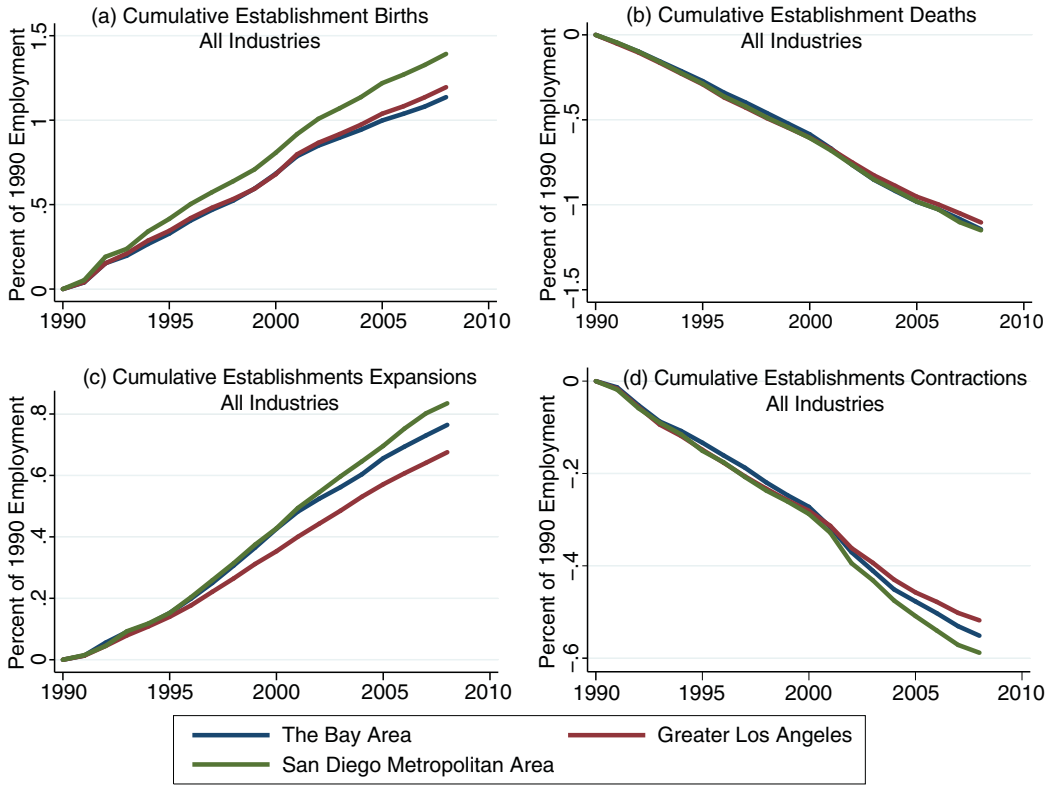


Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

In the earlier period, 1990–1998, the Bay Area experienced less of an impact from the births and deaths of establishments than seen in Greater Los Angeles and San Diego. Contractions and expansions took place at a rate similar to the pace of contractions and expansions in other regions. The story changes in the post-dot-com era—during this time, deaths are still quite important in the Bay Area, possibly owing to the lingering effects of the bursting dot-com bubble. The pattern in which the Bay Area creates less employment through the birth of new establishments remains true in the latter period.

Among regions, the differences in birth rates for establishments appear to be small, but the cumulative effect over 18 years is quite important. From Figure 35, it is clear that the lower birth rate for new establishments has resulted in a substantial difference in the numbers of jobs created from births across regions. As a share of 1990 employment levels, births generated approximately 20% fewer jobs in the Bay Area than in Los Angeles or San Diego; the effect of the dot-com bubble is clear, though quite small. There is no specific explanation for this finding other than perhaps that there are regulatory barriers or other barriers to births that exist locally that are not as prevalent in the other two regions. A likely explanation is simply that the cost of starting a new business (owing to rents or other costs) is higher here. The cumulative effects of differences in other measures of job change are not as significant as with births, though the region appears to perform at a high level in terms of the expansion of existing businesses and to experience greater employment loss through deaths and contractions.

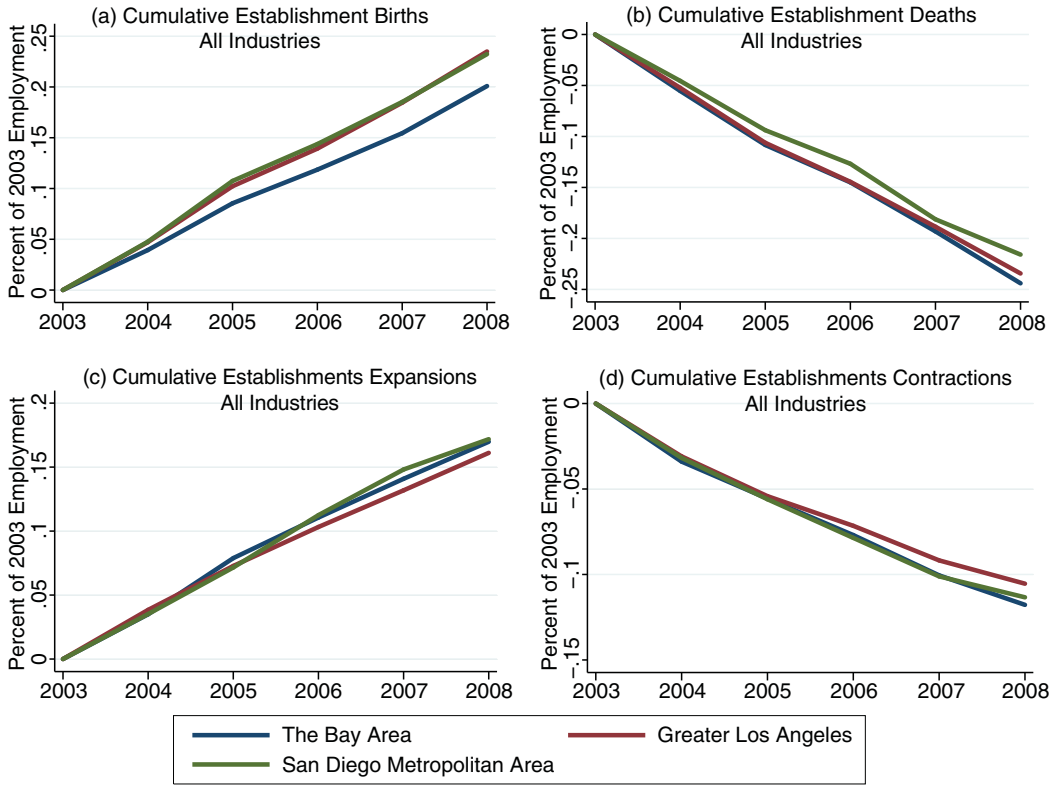
Figure 35: Establishment Dynamics in California Metro Regions Since 1990



Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

Note: Establishment births and deaths include inbound and outbound establishment moves, respectively.

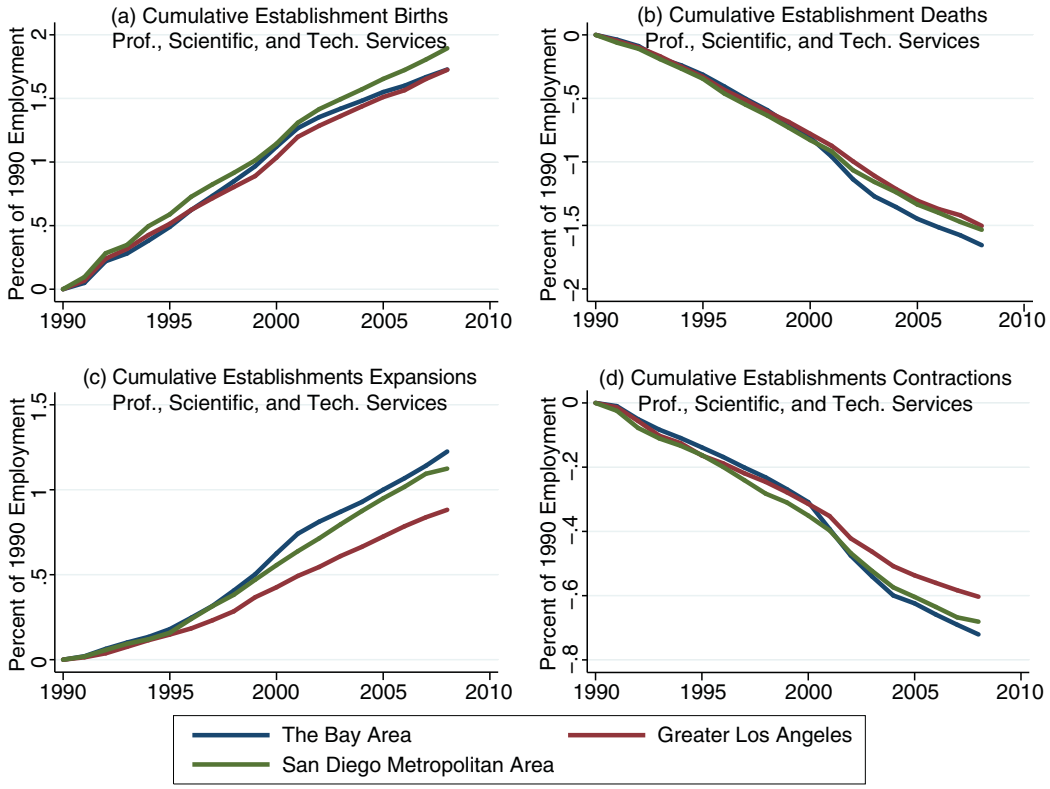
Figure 36: Establishment Dynamics in California Metro Regions Since 2003



Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute
Note: Establishment births and deaths include inbound and outbound establishment moves, respectively.

This pattern holds even for the Bay Area's most prominent driving industry, PSTS (Figure 37). In particular, births have been slower since 2003, while expansions have been higher over the 18 years; most of the difference appears related to the dot-com era. Contractions and deaths have not been significantly different in the Bay Area, but both are on the high side as contributors to overall job destruction. This is particularly true of contractions in the wake of the bursting of the dot-com bubble; in the 10 years between 1990 and 2000, establishment contractions had been relatively benign in the Bay Area.

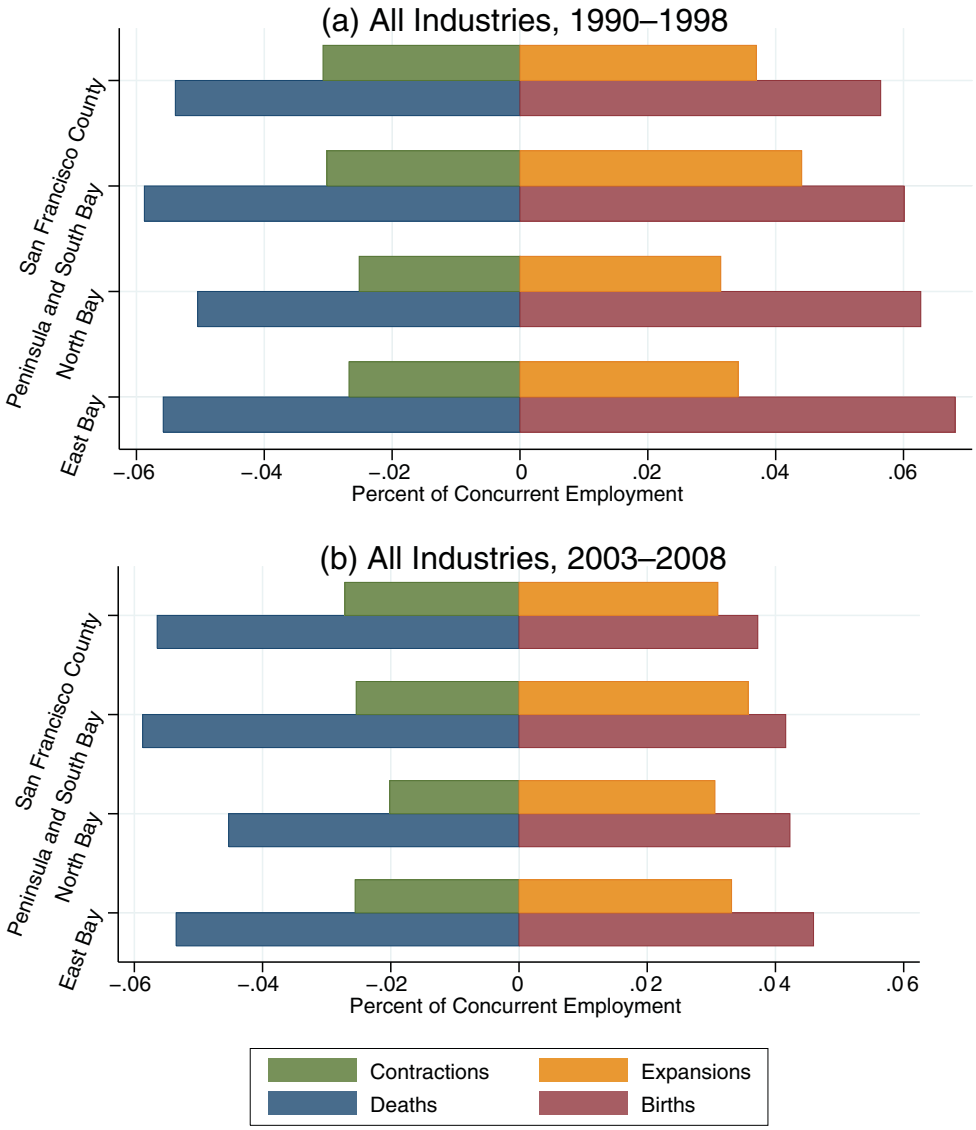
Figure 37: Establishment Dynamics in California Metro Regions Since 1990



Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute
Note: Establishment births and deaths include inbound and outbound establishment moves, respectively.

Within the Bay Area, these sources of job churn vary across sub-regions (Figure 38). In particular, births appear more likely to occur in the East Bay, both before and after the dot-com bubble, while deaths are a leading cause of job destruction in the Peninsula and South Bay region. Deaths and contractions are more likely in the Bay Area, and within the Bay Area they are more likely in San Francisco and on the Peninsula. Expansions are a larger source of job creation on the Peninsula than elsewhere, while contractions are lower in the North Bay and the East Bay.

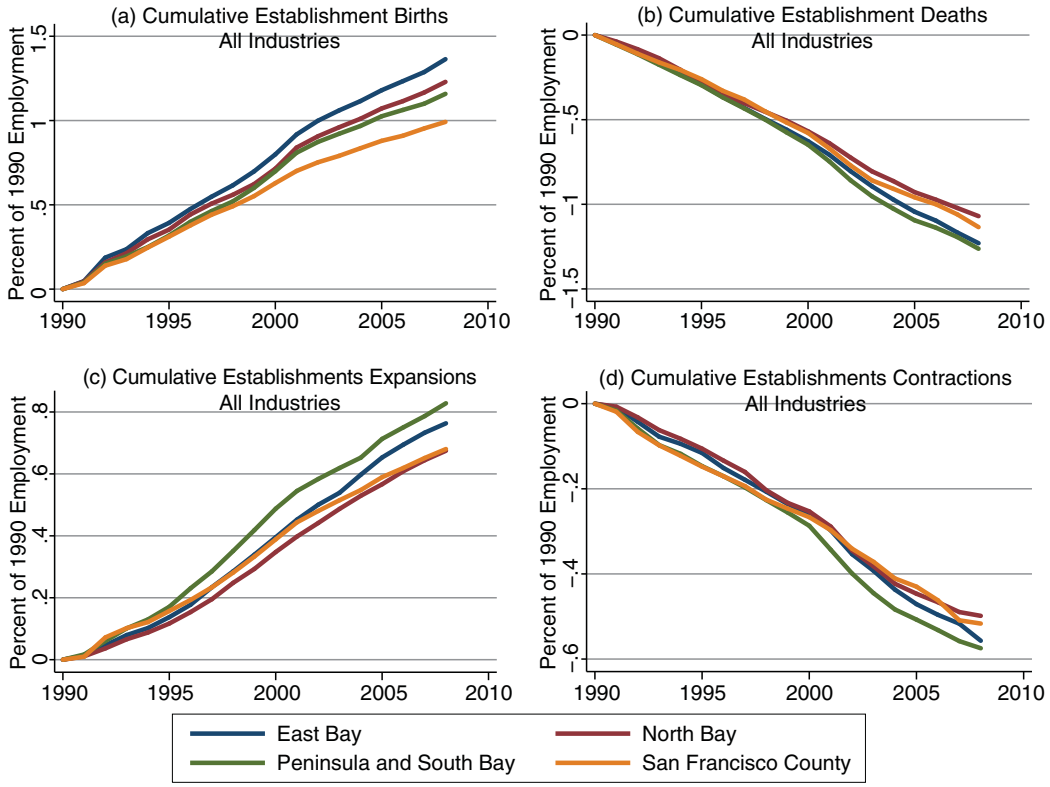
Figure 38: Employment Flow Decomposition in Bay Area Sub-Regions



Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

These subtle differences play out in more significant cumulative differences within the Bay Area than those reported between metro areas in California (Figure 39). In particular, new establishments in the East Bay were responsible for about 50% more job growth in the East Bay than in San Francisco, and expansions accounted for about 40% more job growth on the Peninsula than in the North Bay.

Figure 39: Establishment Dynamics in Bay Area Sub-Regions Since 1990



Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute
Note: Establishment births and deaths include inbound and outbound establishment moves, respectively.

Establishment Movements

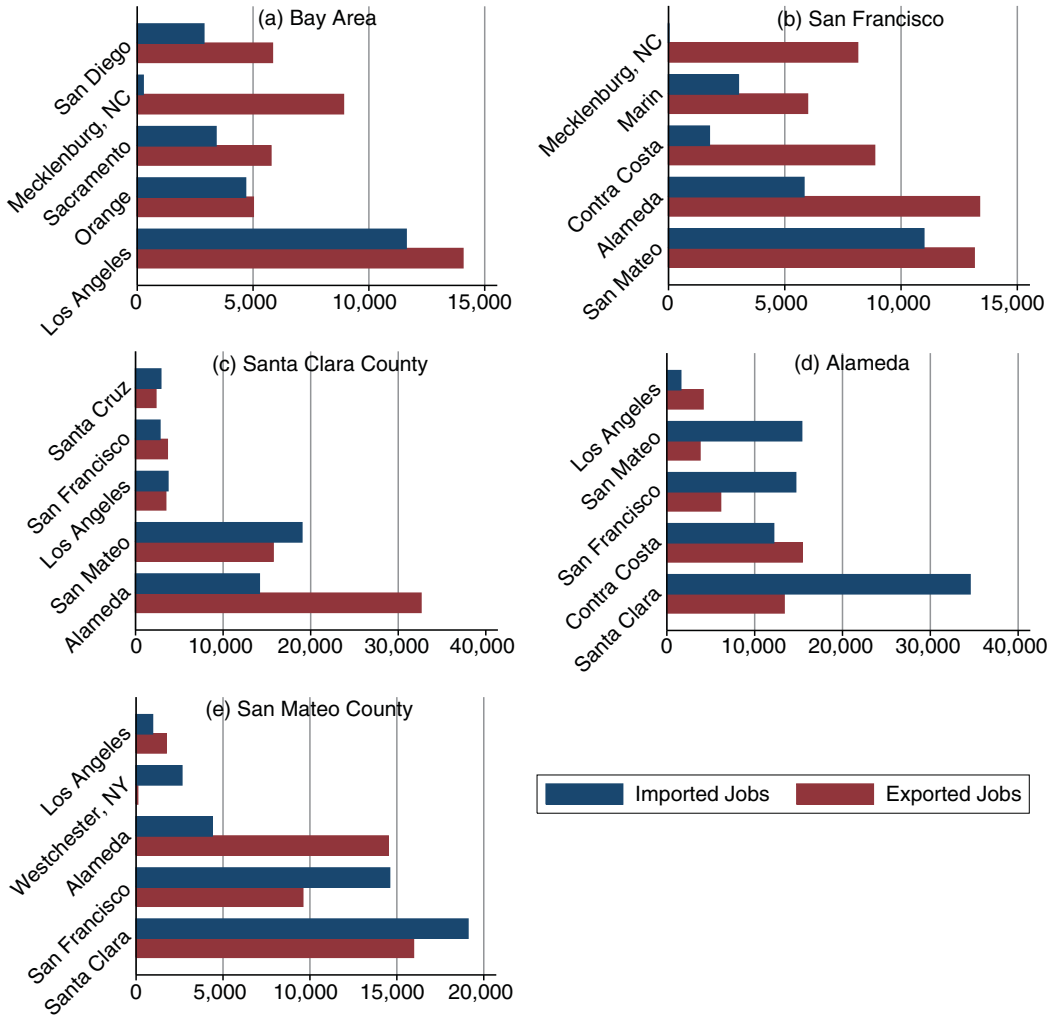
In the previous discussion, establishment moves were included in the reporting of births and deaths: a move in was equated with a birth and a move out with a death. There is much to be learned, however, from looking more specifically at the movement of establishments across county lines. At the same time, however, it should be noted that the majority of recorded establishment moves are local.[10] From 1990 to 2008, there were 141,000 recorded moves involving Bay Area establishments. Within the Bay Area, 91,000 of the moves took place within the same county and just 49,000 crossed county lines. During this period, about 1.8 million Bay Area jobs were moved: about 62% were moved within the same county, 20% were

[10] The word "recorded" is used here because some movements of establishments involve the shuttering of one location and the simultaneous opening of another location. This activity is sometimes misclassified as a birth and a death, rather than the movement of an establishment even when it is tantamount to a move.

moved into or out of the Bay Area, and the remaining 18% were moved between counties within the Bay Area.

Figure 40 presents evidence on the geographical flow of those moves across county lines. Figure 40(a) indicates the major sources and destinations of establishment moves into and out of the Bay Area. Only one county, Los Angeles, stands out as a major trading partner with the Bay Area, and four of the top five counties are in California. The fifth, Mecklenburg, North Carolina, is on the list only because Bank of America moved from San Francisco to Charlotte, North Carolina. The remaining figures illustrate movements between the four major Bay Area counties and their primary trading partners.

Figure 40: Bay Area Establishment Moves



Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

The primary takeaway from these findings is that moves tend to be local. In particular, 80% of all moves were within the Bay Area. On a county-by-county basis, the vast majority of moves that are not within the same county are with the two or three counties that either border the county or are closest in geographical proximity. San Francisco County trades jobs most commonly with San Mateo, Alameda, and Contra Costa counties. Santa Clara trades jobs most often with Alameda and San Mateo, and so on.

Accordingly, it is likely that moves are not generally driven by regulations or levels of taxation, but are more often driven by some other establishment-specific consideration. Those considerations include the need for a different space, the desire to move closer to a particular market, or a change in the relative costs of doing business (e.g., rent costs in the East Bay versus San Francisco). Much of this is evidenced by the fact that so many moves are within a specific county; a large number of moves within the Bay Area are from the core economies to the periphery (from San Francisco or San Jose to the East Bay, for example).

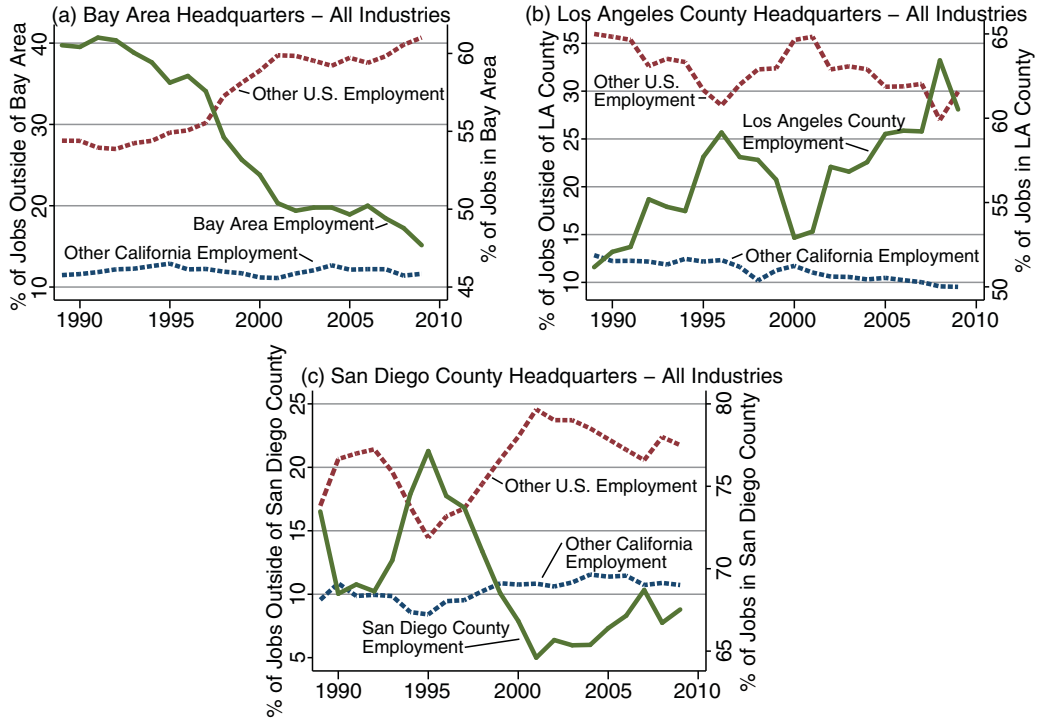
One concern with the discussion of moves is that it does not pick up changes in location choice for expansion by companies headquartered in the region. In particular, as a region becomes less competitive, the argument goes, the less likely it is that the companies headquartered in the region will expand employment locally. Figure 41 provides evidence for the Bay Area, Los Angeles County, and San Diego County. In Figure 41(a), the solid line indicates the proportion of employment in the Bay Area from establishments headquartered in the Bay Area (to be read off of the right-hand axis). The top (red) and bottom (blue) dashed lines indicate the proportion of employment in establishments related to these headquarters that are employed outside of California and within California but outside of the Bay Area, respectively. Figures 41(b) and (c) are analogous, but for Los Angeles and San Diego counties.

The figures present starkly differing experiences in the three metropolitan areas. In particular, employment in establishments that are headquartered in the Bay Area has been shifting out of the region since 1990, with an acceleration of that decline between 1995 and 2002. Most of this employment shift has been due to employment outside of the state. In Los Angeles, the opposite is roughly true, with an apparent consolidation of headquarters employment in the county, and reduced employment shares both in the rest of California and out of the state. San Diego experienced the same decline from 1995 to 2002 as seen in the Bay Area, but has since been consolidating headquarters employment in the county.

Headquarters employment can shift for a variety of reasons. Chief among these are the expansion of production to new markets (think Starbucks); the expansion of the location of headquarters activity within a particular region;

or the distribution of production, lower-skill activities, or value-added activities to cheaper locations. The first and second of these are likely positive for a region, while the third represents an unfortunate consequence of local business conditions. Further investigation will shed light on which of these factors is at work in the Bay Area relative to Los Angeles and San Diego.

Figure 41: Employment Patterns of Locally Headquartered Companies



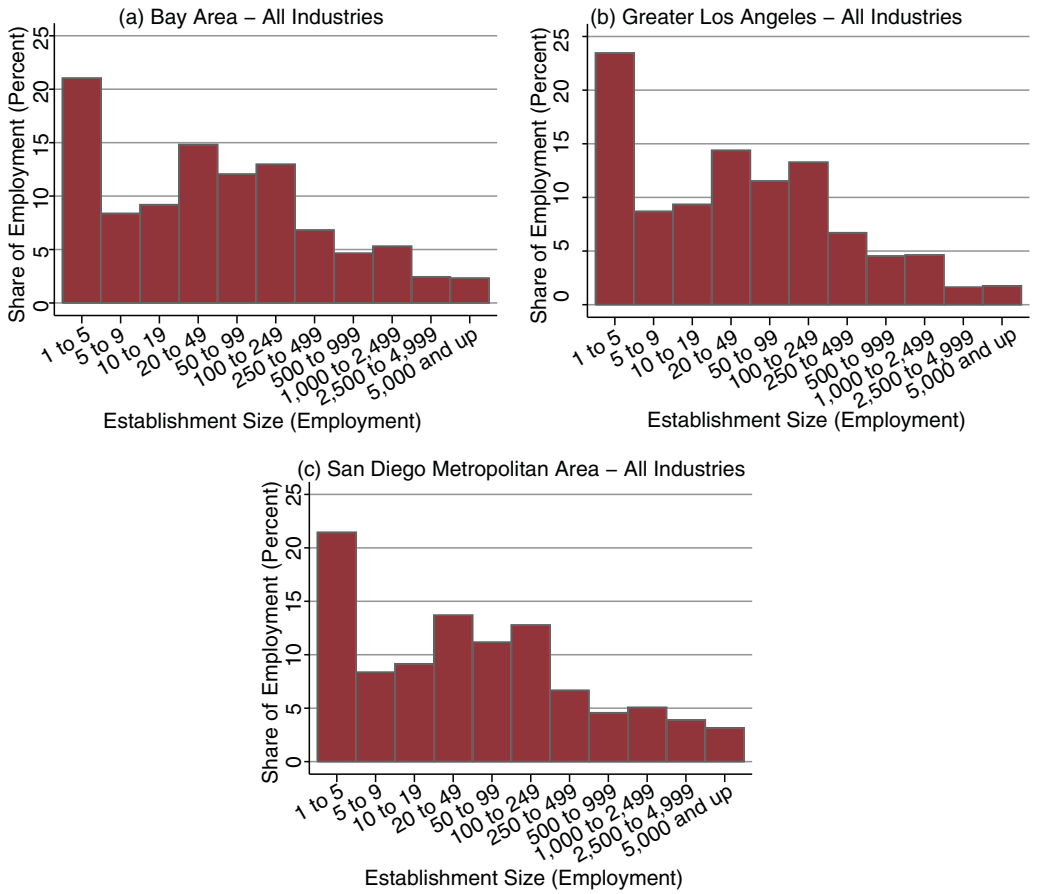
Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

Establishment Size

Another metric by which an economy can be measured is the size of its business establishments. Having a considerable number of larger-sized establishments may be an indicator of a more mature economy. Many economies have gone through their start-up phases and are largely populated by older, more stable companies. Having a significant number of large establishments could also be an indication of industry composition—some industries naturally have larger numbers of employees per establishment. In California, for example, Educational Services, Utilities, and Manufacturing all have significantly larger average establishment sizes than do other sectors of the economy.

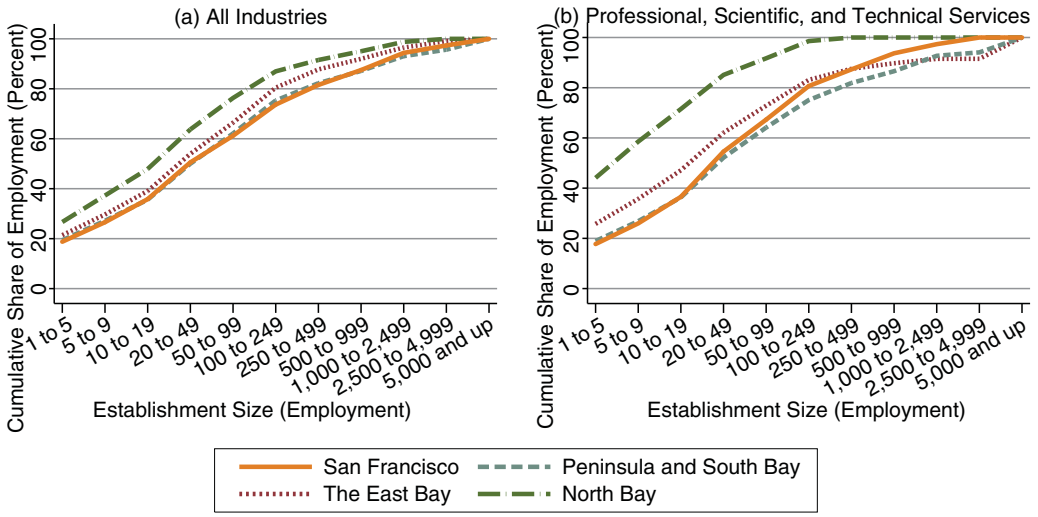
Figures 42 and 43 present evidence on the size distributions of establishments, first across regions in California and second, within the Bay Area. Establishment sizes differ relatively little across California, while there are significant differences within the Bay Area. The North Bay tends to have much smaller establishments, while San Francisco is more heavily populated with older, larger businesses.

Figure 42: Establishment Size Distribution, All Industries



Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

Figure 43: Establishment Size Distribution in Bay Area Sub-Regions



Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

Table 20: Establishment & Employment Distribution by Establishment Size, 2008

	Number of Employees					
Region	1-2	3-25	26-100	101-250	251-1,000	1,001+
	Distribution of Establishments					
Bay Area	66.3	29.7	3.3	0.5	0.2	0.0
Los Angeles County	67.1	29.4	2.9	0.4	0.2	0.0
San Diego County	65.6	30.6	3.1	0.5	0.2	0.0
California	66.5	29.7	3.1	0.5	0.2	0.0
San Francisco MD	65.5	30.6	3.2	0.5	0.2	0.0
Santa Clara	65.1	30.4	3.7	0.6	0.2	0.0
East Bay	67.5	28.5	3.3	0.5	0.2	0.0
	Distribution of Employment					
Bay Area	14.3	29.5	24.3	11.3	11.4	9.2
Los Angeles County	16.1	30.4	22.5	11.3	11.3	8.4
San Diego County	14.2	29.5	22.4	11.4	11.1	11.4
California	15.3	30.6	23.6	11.3	11.2	8.1

Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

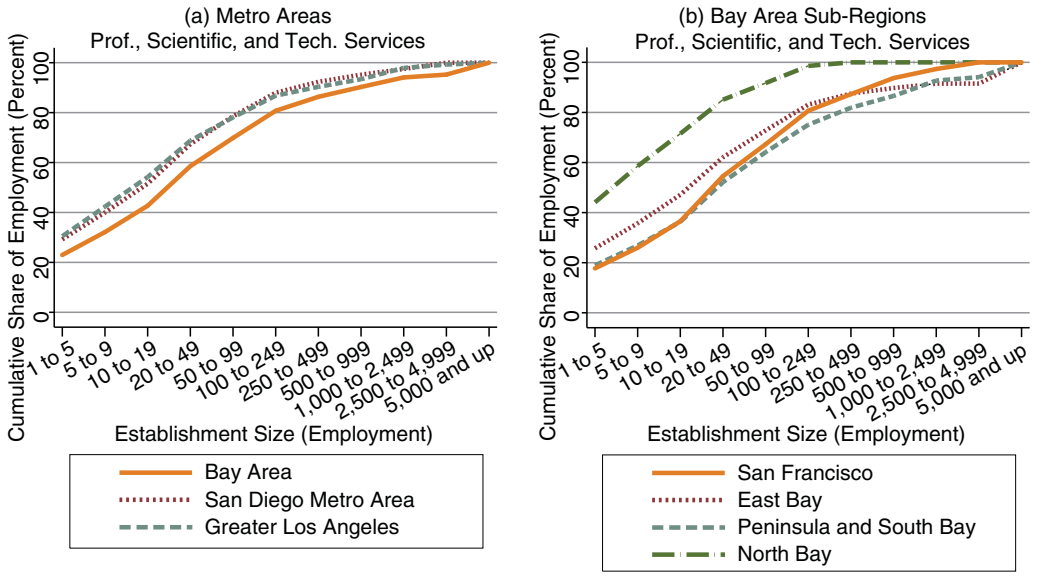
Table 20 provides an indication of business establishment sizes in the Bay Area, comparable California metropolitan areas, the state as a whole, and sub-regions within the Bay Area. There are several lessons to be taken from this data. The first is that business establishment sizes are remarkably similar across California. There is almost no difference in the size distribution

in California and the state as a whole or other major metropolitan regions. Within the Bay Area, there are some differences. In particular, the East Bay has a larger number of small establishments relative to the other major regions. Santa Clara County appears to have the largest average establishment size.

On a sector-by-sector basis, the relationships can be different. As Figure 44 indicates, the average size of a firm in the PSTS sector in the Bay Area is larger than in either Los Angeles or San Diego. The lines in the chart represent the cumulative distribution of establishment sizes. A higher line indicates that a larger proportion of establishments within the region are of the particular size category or smaller. For example, in the "5 to 9" category in Figure 44(a), the solid line for the Bay Area is below either of the other two lines. This indicates that a larger proportion of the establishments in the PSTS sector in Los Angeles and San Diego have nine employees or less than is the case in the Bay Area. The gap between the sets of lines closes as the size categories increase, indicating that a higher proportion of establishments are larger in the Bay Area.

The size of establishments within specific sectors in the sub-regions of the Bay Area varies significantly. With respect to the PSTS sector, it is clear that the North Bay has a much higher number of small establishments than do other parts of the Bay Area. San Francisco has a higher proportion of establishments in the mid-range of establishment sizes than either the East Bay or the Peninsula (Figure 44(b)), evidenced by the steeper slope of the solid line in the figure.

Figure 44: Establishment Size Distributions

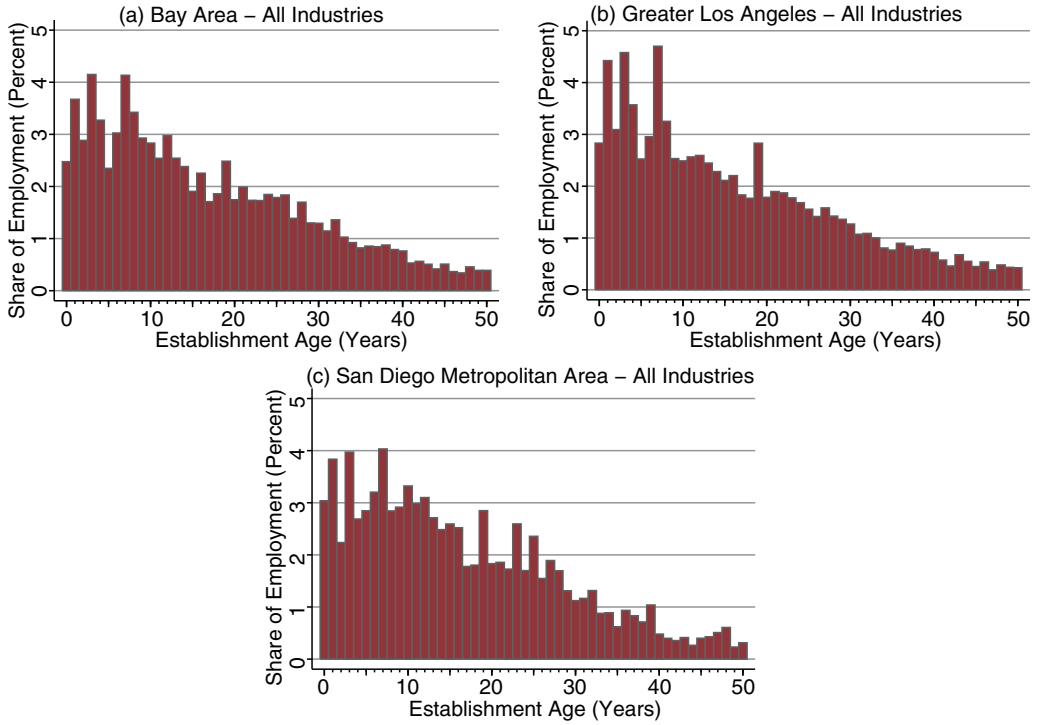


Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

Establishment Age

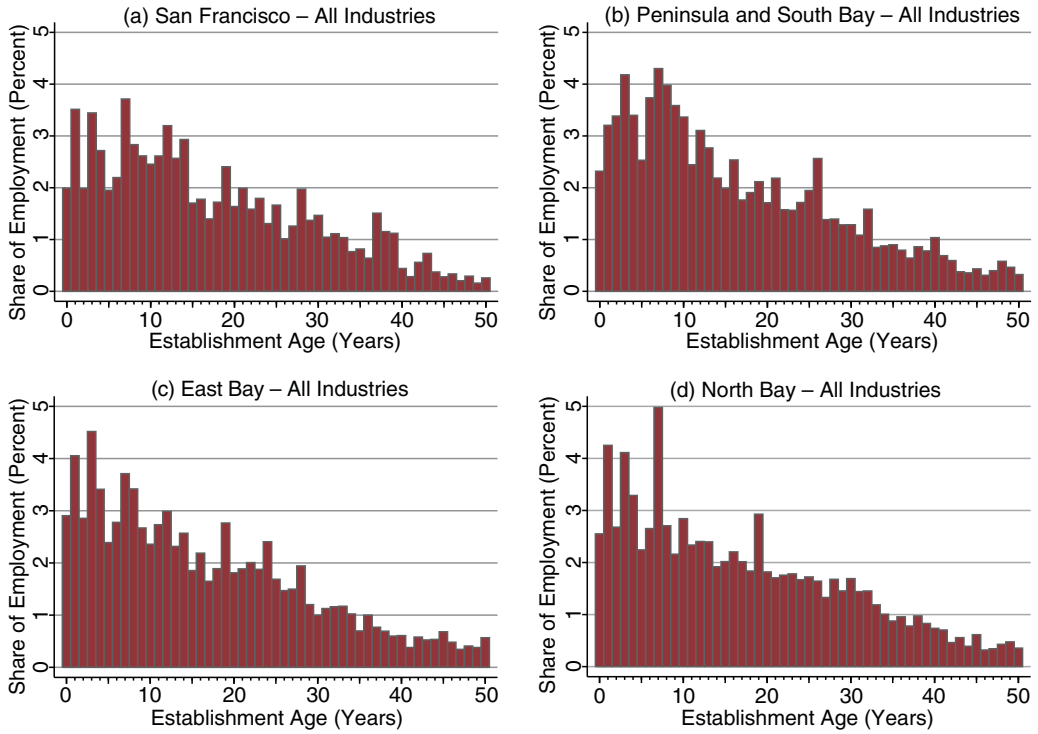
It was suggested earlier that establishment size could be correlated with age, or a more mature economy. This section looks directly at the age question. Establishments in the Bay Area tend to be somewhat younger than those in other California metro regions, though the distributions are quite similar (Figure 45). There is more diversity of ages within the Bay Area: San Francisco has the oldest set of establishments, the Peninsula has on average younger establishments, and the North Bay and the East Bay fall between the two (Figure 46). This relationship is particularly true for the PSTS sector.

Figure 45: Establishment Age Distribution in California Metropolitan Regions



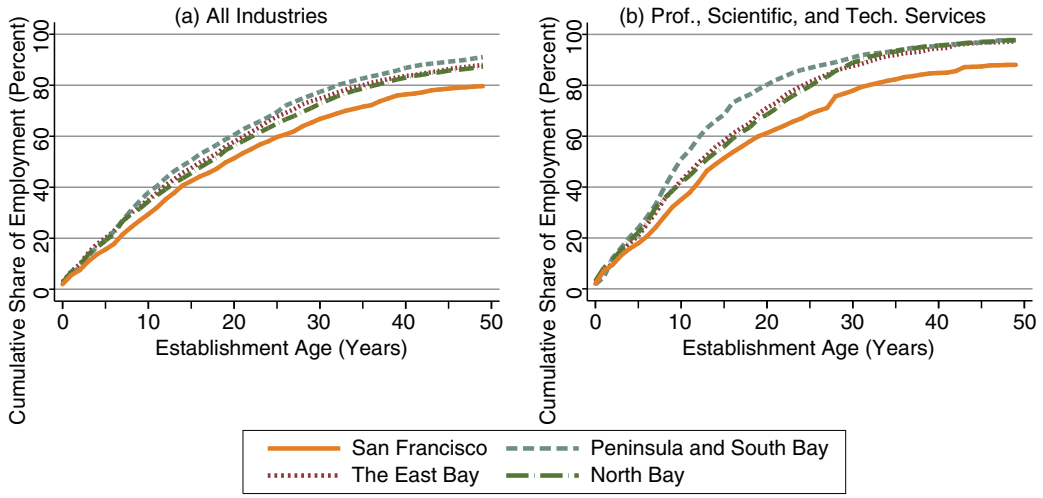
Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

Figure 46: Establishment Age Distribution in Bay Area Sub-Regions



Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

Figure 47: Establishment Age Distribution



Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute

Establishment Starts

The evidence on establishment age would suggest differing patterns of establishment start-ups, as seen from 1985 to 2009 (Table 21). Perhaps the most striking feature of Table 21 is that no particular region stands out as having new establishment activity that is dramatically different from the rest of the region. Santa Clara and Solano counties do have activity that is higher than the regional average, but by less than a single percentage point. Relative to the state as a whole, new establishment formation in Santa Clara occurs at approximately the same rate, with new establishments entering the market at a rate of just 11 new establishments per 100 existing establishments. The counties with notable activity in the state are on the periphery of Los Angeles—Orange, Riverside, and San Bernardino counties. This has to do with two aspects of the region. First, these are rapidly growing regions absorbing the overflow from Los Angeles County. Second, businesses in these counties are heavily concentrated in retail and restaurant sectors, sectors with notoriously high rates of turnover.

Survival rates are more in line with expectations, though there are only very small differences across counties. In particular, Santa Clara County has one of the lower rates of survival to age five among the Bay Area counties, and the Los Angeles border counties mentioned above have establishment survival rates among the lowest around the state.

Table 21: New Establishment Activity, 1985 to 2009—Average Annual Statistics

	# Estabs.	# Births	New Estab. Activity	5 Year Survival
Alameda County	81,172	8,530	10.5	54.1
Contra Costa County	52,188	5,656	10.8	54.4
Marin County	25,467	2,471	9.7	55.5
Napa County	8,508	784	9.2	58.4
San Francisco County	62,473	5,951	9.5	56.1
San Mateo County	45,306	4,533	10.0	55.1
Santa Clara County	98,238	10,711	10.9	54.4
Solano County	16,902	1,913	11.3	53.9
Sonoma County	30,588	2,879	9.4	57.1
Bay Area	420,841	43,428	10.3	54.9
California	1,937,407	214,456	11.1	53.7
Los Angeles County	546,459	64,068	11.7	53.0
San Diego County	163,309	18,604	11.4	55.3
Orange County	197,570	23,555	11.9	51.4
Riverside County	73,829	9,287	12.6	53.7
San Bernardino County	74,036	9,065	12.2	51.4
Sacramento County	63,481	7,767	12.2	50.4

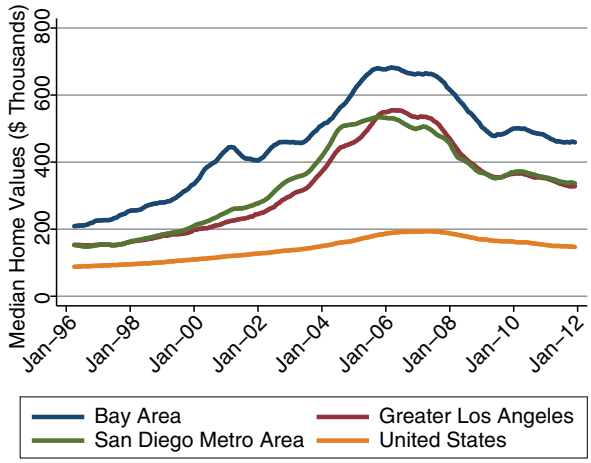
Source: 2010 National Establishment Time-Series Database; calculations by Bay Area Council Economic Institute
New Establishment Activity is births as a proportion of all establishments.

Appendix F: Housing Costs

Real estate prices are notoriously high in the Bay Area and in California more generally. Often cited as contributing to a poor business climate, high home prices do have the potential to make it more difficult to attract workers to the region. This section compares real estate prices across regions of California and also within the Bay Area to assess how housing costs have changed over the last two decades. The last 17 years—and especially the last 10 to 12 years—have been some of the most volatile in residential real estate history. This has been true in California as well as in many residential markets across the country. States such as Arizona, Florida, and Nevada have been hit particularly hard.

Figure 48 illustrates the boom and bust in housing prices around California and, to a lesser extent, nationwide. Between 1996 and 2007, the median home price in the Bay Area increased by 215%, reaching nearly $675,000.[11] The same period saw somewhat smaller price increases in Los Angeles and San Diego, but prices still more than tripled. Nationwide, home prices simply doubled during this period.

Figure 48: Median Home Prices for California Metropolitan Regions



Source: Zillow.com; calculations by Bay Area Council Economic Institute

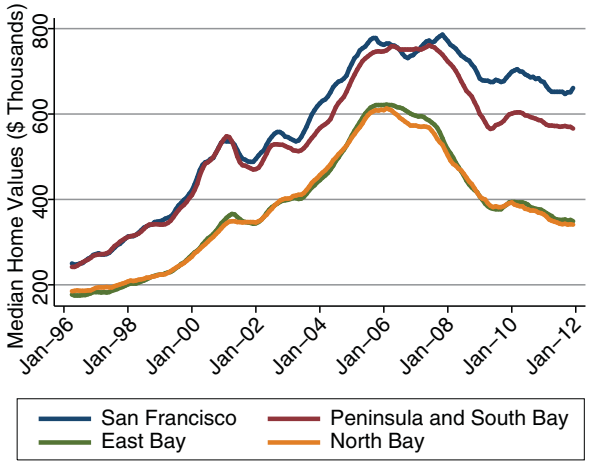
Note: Zillow housing price indices are estimates of the (nominal) median home value.

[11] Source: Zillow.com. The Zillow Home Value Index is the median Zestimate valuation for a given geographic area on a given day. The Zestimate (pronounced ZEST-ti-met, rhymes with estimate) home valuation is Zillow's estimated market value, computed using a proprietary formula. It is not an appraisal. it is a starting point in determining a home's value. The Zestimate is calculated from public and user submitted data.

In the aftermath of the bubble, prices have fallen all around the country. In the Bay Area, the median home price has fallen by more than $200,000, to just over $450,000. Similar declines were witnessed in other parts of California, with smaller but proportional declines experienced nationwide.

Among the Bay Area's sub-regions, similar trends have occurred in home prices, but to varying degrees. Beginning in about 1996, home prices increased significantly through late 2000 (Figure 49). This episode of price increases was primarily driven by the dot-com bubble and had a greater effect in San Francisco and on the Peninsula than elsewhere. By 2002, this housing price bubble had softened somewhat, with prices around the region falling from their 2000 peaks. Between 2002 and 2005, a housing bubble of another sort began, driven by a number of factors—in particular, by the increased availability of subprime mortgages.

Figure 49: Median Home Prices for Bay Area Sub-Regions



Source: Zillow.com; calculations by Bay Area Council Economic Institute

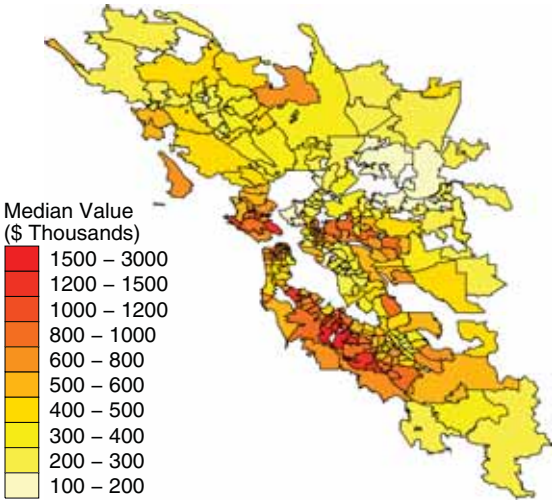
Note: Zillow housing price indices are estimates of the (nominal) median home value.

From 2002 to 2005, home prices in the East Bay and the North Bay kept pace with prices in San Francisco and the Peninsula, with a relatively constant gap of just under $200,000. In 2002, East Bay and North Bay prices were lower than prices in the other regions, but they were increasing at a faster pace, experiencing a proportionately bigger bubble. Beginning in about 2005, home prices in the East Bay and the North Bay began a precipitous decline, plummeting by as much as 60% in some regions. The price declines in other parts of the region did not begin in earnest until the economy slipped into recession, in late 2007 and early 2008.

Home prices have currently stabilized, with small increases and decreases occurring throughout most of the Bay Area. Figure 50 provides a more detailed indication of pricing patterns around the region. Median prices are

indicated by zip code around the Bay Area, with darker zip codes indicating higher prices. The highest prices are clustered around the Silicon Valley region, with some pockets of high prices in Marin as well.

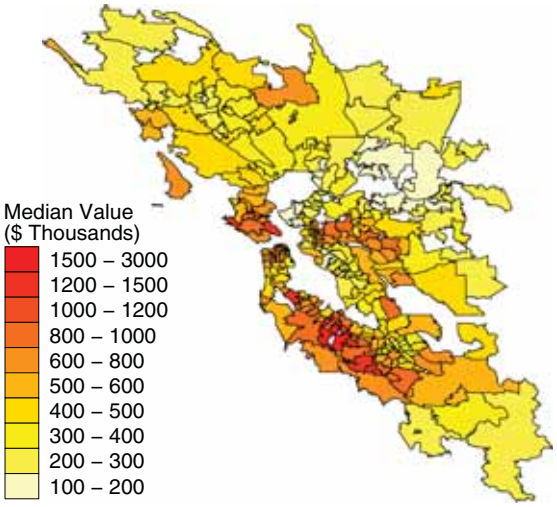
Figure 50: Median Home Prices in the Bay Area



Source: Zillow.com, Census; calculation and mapping by Bay Area Council Economic Institute

Overall price changes have been more widespread around the Bay Area (Figure 51). Despite the collapse of the housing bubble, some regions have seen significant increases since 1999. As housing prices are the single largest contributor to the Bay Area's higher cost of living relative to comparable regions, this presents an ongoing cause for concern.

Figure 51: Overall Home Price Changes



Source: Zillow.com, Census; calculation and mapping by Bay Area Council Economic Institute

Appendix G:
Demographic and Economic Futures

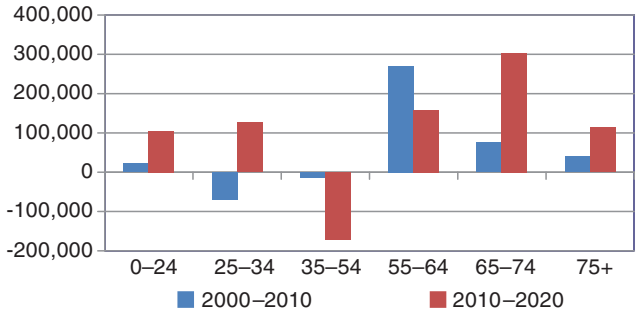
The Demographic Shift from 2010 to 2020

The Bay Area is in the midst of a substantial change in the age composition of its population. As the baby boomers grow older, we will see a decline in the number of residents in the prime family group, those aged 35–54. After large increases in this age group between 1975 and 1995, with a correspondingly large influence on the region's workforce and housing trends, the number of residents in this key age group leveled off between 2000 and 2010 and is now poised to decline substantially in the decade ahead. Baby boomers who were 55 to 64 years old between 2000 and 2010 will now move into the 65–74 age group as the remaining baby boomers continue to fill the 55–64 cohort.

These trends have three important implications:

1. A growing number of baby boomers will retire as we move toward 2020.
2. These retirements will produce a large number of replacement job openings across a wide range of occupations and skill categories.
3. These job openings will need to be filled by the growth in the workforce, particularly by workers ages 25 to 34, by existing workers, and by new immigrants.

Figure 52: Bay Area Population Growth (Thousands)



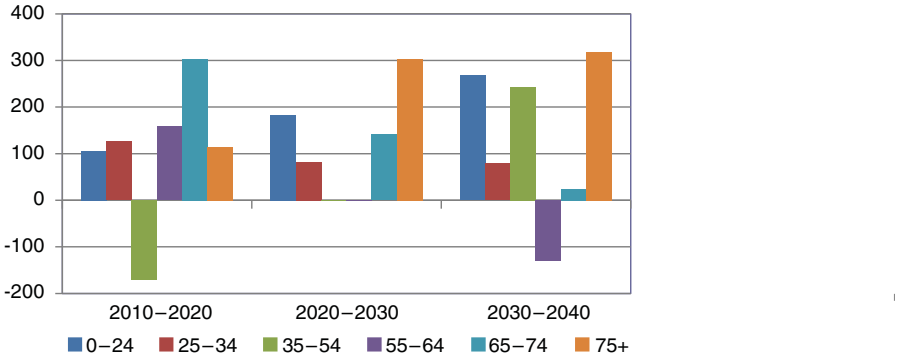
Source: Center for Continuing Study of the California Economy

From 2010 to 2020, the largest population growth will take place in the older age group (65–74), and their decisions about how long to work and where to live will be critical in regional workforce and housing planning. The younger population (under 35) will also grow from 2010 to 2020, after seeing declines from 2000 to 2010, as many residents move into the high school, college, and young adult age groups.

Demographic Changes from 2020 to 2040

From 2020 to 2030, the aging and retirement of the baby boom generation will continue, with the majority of population growth occurring in the age groups over 65 and the remaining gains taking place for those under 24 and for those in the young adult group (25–34) (Figure 53). During this decade, there will be virtually no growth in the 35–54 age group or in the 55–64 age group. From 2030 to 2040, we will see a return in growth in the number of children and residents in the family age group (35–54) and a continuing surge in the older population (over 75) as the last of the baby boomers turn 75.

Figure 53: Bay Area Population Growth (Thousands)

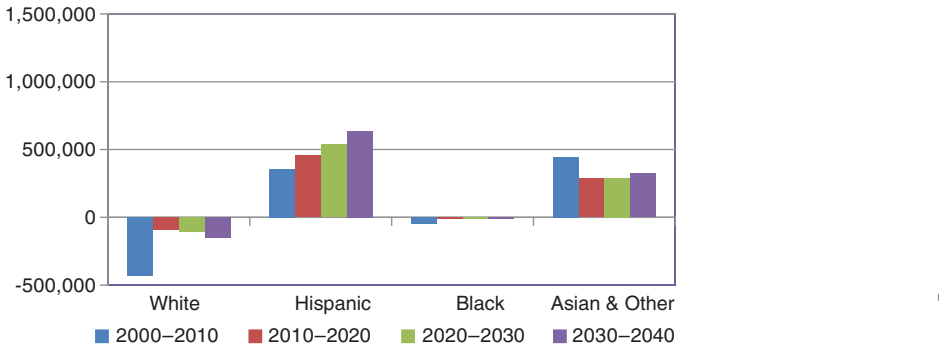


Source: Center for Continuing Study of the California Economy

Population Change by Ethnic Group

The ethnic composition of the population will change as Hispanic, Asian, and multiracial residents account for all of the region's recent and expected population growth (Figure 54).

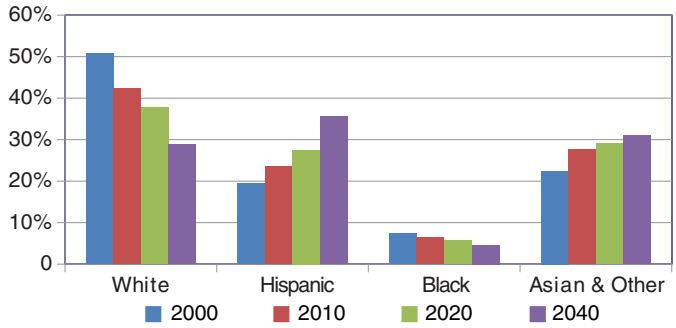
Figure 54: Bay Area Population Growth by Ethnic Group



Source: Center for Continuing Study of the California Economy

The white non-Hispanic population saw a substantial decline in the past decade. This decline is expected to continue at a modest level, as deaths will exceed births. Continuing growth is expected in the number of Hispanic and Asian residents. The "Asian & Other" group includes residents who mark multiple races on the census form. These increases are the result of continuing high levels of immigration and births to the existing population. As a result, the composition of the Bay Area population will change in the decade ahead and the following 20 years. By 2020 there will be a roughly equal number of Hispanic, Asian, and white non-Hispanic residents in the region with continuing changes in the ethnic make-up of the region to 2040 (Figure 55).

Figure 55: Bay Area Population by Ethnic Group



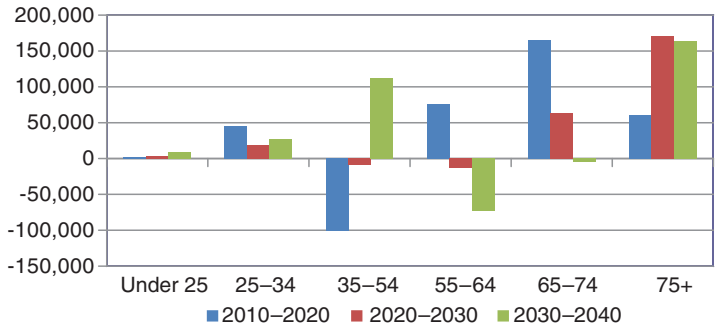
Source: Center for Continuing Study of the California Economy

Household Trends and Implications for Housing

These demographic changes have important implications for housing preferences in the next decade and beyond. There will be a decline in households headed by residents aged 35–54, the prime family housing group, with no growth in the number of households in this age group until after 2030. Household growth until 2020 will be largest for households headed by residents ages 65–74 (boosted by the aging baby boomers), followed by growth in households headed by residents ages 55–64, over 75, and 25–34.

These trends could support demand for smaller housing units and for new housing in areas close to shops and restaurants. Already the growth in demand from younger households is leading to rent increases and new apartment development in amenity-rich areas in San Francisco, San Jose, and other Bay Area locations. The choices made by older households, where most of the growth will occur, will supplement the demand for smaller units in amenity-rich neighborhoods.

Figure 56: Bay Area Household Growth by Age Group



Source: Center for Continuing Study of the California Economy

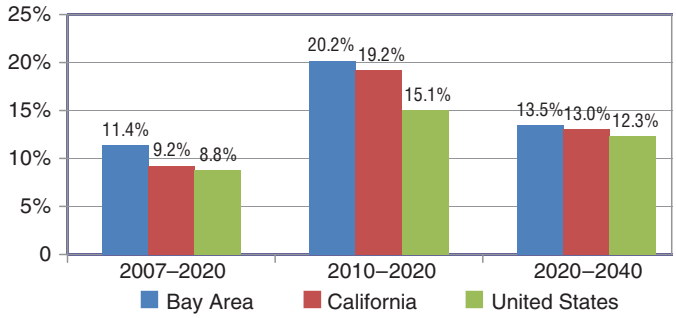
From 2010 to 2020, the number of households headed by residents aged 35–54 will decline by approximately 100,000 households (Figure 56). If some of the baby boomers choose to downsize as they age (perhaps as their children leave the household), these trends will simultaneously increase the demand for smaller living spaces (including apartments, condos, and townhomes), while providing a large enough supply of larger single-family homes for the next generation of family households. The supply of single-family residences has also been boosted by the number of homes that are currently vacant or in some stage of foreclosure.

Job Growth

Job growth in the Bay Area is projected to outpace that of the state and nation to 2020 and 2040, although the differences between the regional, state, and national job growth rates are not large. The Bay Area is projected to add nearly 700,000 jobs between 2010 and 2020, for an increase of 20.2%, although nearly 300,000 of these jobs represent a recovery of jobs lost during the recession. With 2007 as the starting point, job growth in the Bay Area is projected to reach a more modest 11.4% to 2020, still outpacing the projected job growth of 9.2% for the state and 8.8% for the nation (Figure 57).

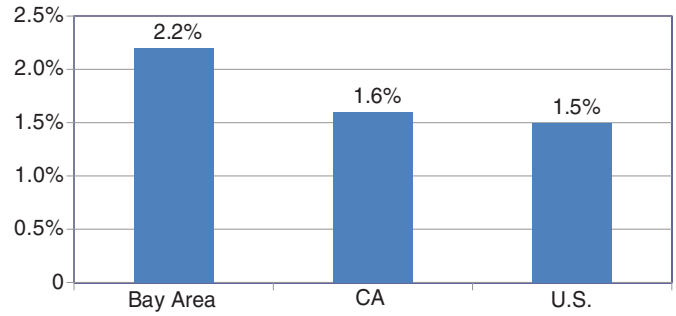
The Bay Area has begun a strong job recovery, adding 44,000 jobs in 2011 and posting a gain of 67,500 jobs (seasonally adjusted) for the 12 months ending in March of 2012. As a result, the Bay Area outpaced the state and nation with a 2.2% increase in jobs during this period (Figure 58).

Figure 57: Growth in Total Jobs



Source: Center for Continuing Study of the California Economy

Figure 58: Wage and Salary Job Growth: March 2011-2012

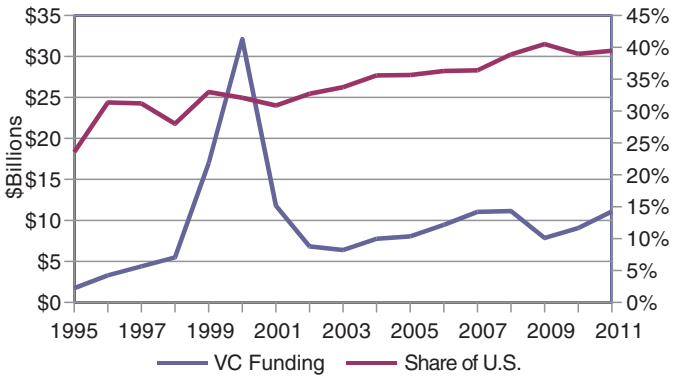


Source: Center for Continuing Study of the California Economy

Job growth in the Bay Area will be driven by the region's large competitive advantage in technology and innovation. That advantage can be seen in the region's large and growing share of U.S. venture capital (VC) funding and by the region's competitive advantage in faster-growing high-wage industries (Figure 59).

Bay Area VC funding is rising again and the region accounts for two dollars of every five dollars (40%) of national funding. Recent successful IPO offerings for Bay Area firms, such as LinkedIn, Facebook, and Zynga, bode well for future VC funding.

Figure 59: Bay Area VC Funding



Source: Center for Continuing Study of the California Economy

The region had 2.4% of national jobs in 2010 but a much larger share of technology sector jobs as shown in Table 22.

Table 22: Bay Area Share Advantage in Key Technology Sectors (2010 Data)

Jobs in Thousands	Bay Area	U.S.	Bay Area Share of U.S.
Computer & Electronics Manufacturing	132.5	1,100.1	12.0%
Pharmaceuticals	16.0	276.5	5.8%
Medical Equipment	11.1	359	3.1%
Software	26.7	259.8	10.3%
Internet-Related	31.8	383.5	8.3%
Architectural & Engr. Services	42.1	1,276.7	3.3%
Computer Services	100.9	1441.5	7.0%
Management & Technical Serv.	41.7	991.4	4.2%
Scientific R&D Services	50.0	620.3	8.1%
Total Jobs	3,401.8	141,821.3	2.4%

Source: BLS, EDD and CCSCE

Bay Area projected job growth to 2020 is shown in Table 23 in comparison to both 2007 pre-recession levels and 2010 levels. The largest job growth in absolute numbers is expected in Professional and Business Services, which includes the fast-growing Professional, Scientific, and Technical Services sector, and in Education and Health Services, where the primary growth is in the Health and Social Service sector as the region's population ages.

While Construction is poised for a rebound, the number of construction jobs in 2020 is expected to fall below the number of positions in 2007, and a similar result is expected in Manufacturing, although output and exports will increase and some advanced manufacturing sectors may see job gains.

A similar pattern is expected in the Finance, Retail Trade, and Government sectors. On the other hand, Leisure and Hospitality and Self-Employment are expected to post job gains.

Table 23: Bay Area Jobs (Thousands)

	2007	2010	2020
Farm	23.2	20.7	21.7
Natural Resources and Mining	2.4	1.9	2.3
Construction	193.9	130.5	184.3
Manufacturing	348.0	308.3	319.1
Wholesale Trade	129.2	113.6	134.9
Retail Trade	343.1	308.0	345.4
Transportation, Warehousing and Utilities	102.2	90.5	111.1
Information	113.4	111.0	139.6
Financial Activities	201.4	170.6	210.4
Professional and Business Services	581.1	547.1	719.8
Educational and Health Services	385.6	410.5	516.5
Leisure and Hospitality	332.5	324.3	392.7
Other Services	112.1	109.3	139.2
Government	486.0	457.5	482.6
Self-Employment	317.5	298.0	368.7
Total Jobs	3671.6	3401.8	4088.3

Source: 2007, 2010 EDD and ACS; 2020 CCSCE

The results are similar in terms of percentage gains except that the Information sector, which includes key Internet-related firms, is expected to post strong percentage gains on a comparatively small initial job base.

Implications of the Job Projections

Technology is the strongest sector in the region's economic base, followed by foreign trade and tourism. Together these sectors are expected to determine the growth rate of jobs in the Bay Area to 2020 and beyond. These sectors stand out as the focus for efforts to sustain and improve the region's competitive position (Table 24).

Table 24: Bay Area Job Growth

			Thousands	
	2010–20	2007–20	2010–20	2007–20
Farm	4.8%	-6.5%	1.0	-1.5
Natural Resources and Mining	21.0%	-4.2%	0.4	-0.1
Construction	41.2%	-5.0%	53.8	-9.6
Manufacturing	3.5%	-8.3%	10.8	-28.9
Wholesale Trade	18.7%	4.4%	21.3	5.7
Retail Trade	12.1%	0.7%	37.4	2.3
Transport., Warehousing and Util.	22.8%	8.7%	20.6	8.9
Information	25.8%	23.1%	28.6	26.2
Financial Activities	23.4%	4.5%	39.8	9.0
Professional and Business Services	31.6%	33.9%	172.7	138.7
Educational and Health Services	25.8%	33.9%	106	130.9
Leisure and Hospitality	21.1%	18.1%	68.4	60.2
Other Services	27.3%	24.1%	29.9	27.1
Government	5.5%	-0.7%	25.1	-3.4
Self-Employment	23.7%	16.1%	70.7	51.2
Total Jobs	20.2%	11.3%	686.5	416.6

Source: 2007, 2010 EDD and ACS; 2020 CCSCE

While the Bay Area currently retains competitive advantages in technology, trade, and tourism as a result of strong VC funding, innovative companies, ample amenities, and a Pacific Rim location, a prosperous future is not guaranteed in an increasingly competitive world.

Recent studies of workforce challenges in the high-tech sector combined with annual surveys conducted by the Bay Area Council and the Silicon Valley Leadership Group confirm two major findings for sustaining competitiveness in the region:

- Access to skilled labor is the primary competitive advantage of the region, and firms are having increasing trouble finding enough skilled workers as the recovery progresses.
- Firms cite many competitive concerns, but the common theme is that the region competes for both companies and workers (and their families).

The Association of Bay Area Governments (ABAG) asked the Center for Continuing Study of the California Economy (CCSCE) to develop job projections based on success in addressing at least some of the region's competitiveness challenges. CCSCE's analysis assumes that over the next 30 years many of the challenges facing the nation, state, and region will be

addressed. In addition, this analysis assumes that at the regional level, the Bay Area will address challenges of housing, transportation, and quality of life as well or better than other regions in the United States.

Providing investors and families with a high quality of life is essential to maintaining the Bay Area's competitive advantage in the technology sectors that are expected to drive the region's job growth. Up until now, the region has done well in the competition for providing great places to live and work. A study of Silicon Valley high-tech employers completed in 2011 for the NOVA workforce board reported:

> Silicon Valley's top competitive advantage is its highly skilled pool of talent. Executives interviewed for the study say there is nowhere else in the world with such a concentration of highly skilled tech professionals, which is essential for businesses that require a steady stream of talent. The Valley's high quality of life—including beautiful weather, excellent schools, and the ability to live and work in the suburbs—was another major advantage, making CEOs want to locate their companies there and attracting talented workers and their families.

On the other hand, maintaining a high quality of life is increasingly difficult. A 2011 survey of Silicon Valley CEOs states the quality of life imperative succinctly. The Silicon Valley Leadership Group 2011 CEO Survey reported "a deteriorating state infrastructure in areas ranging from public education to public transportation has added to the difficulties of recruiting the best workforce, finding them housing, and educating their children to be tomorrow's world-class workforce."

The Leadership Group's 2012 Survey finds that employee recruitment and retention is the number one challenge for Bay Area businesses.

Innovation and Investment: Building Tomorrow's Economy in the Bay Area, the Bay Area Council Economic Institute's 2012 Bay Area Economic Profile report, identifies a list of well-known Bay Area competitiveness challenges:

Housing Affordability

Although median home prices have fallen and affordability is higher than it has been in several years, Bay Area median home prices and rents are still well above the national average.

K–12 and Higher Education

Both K–12 and higher education are facing continuing budget cuts throughout California, and tuition levels are rising at the state's public and private colleges. Moreover, average test scores are at or below nationwide levels and high school dropout rates remain high. While

immigration can continue to supply a part of the region's workforce needs, most jobs will be filled by residents who are born, educated, and trained in California.

Transportation Infrastructure

Despite the ongoing work by MTC and local transit districts, and despite the billions of dollars planned for improving highway and public transit travel, the region does not yet have sufficient funding for all needed transportation infrastructure investments. Although transportation funding is a nationwide problem, it is an especially important challenge in a region that needs to be able to move people and goods efficiently to compete in the 21st century global economy.

Governance Challenges

California does not as yet have a plan to develop state and local budgets that are balanced and able to provide high-quality public services

The bottom line is that Bay Area competitiveness depends on creating great places to work and live. Families, like entrepreneurs, have choices as to where to locate. And families, like entrepreneurs, demand a great quality of life, including world-class education, infrastructure, and public services, as well as ample housing opportunities to offset the high cost of living in the Bay Area. In addition, businesses will demand great customer service to continue locating and expanding in the region.

Many strategies identified in these Bay Area studies serve double duty as they help respond to the needs of businesses and residents simultaneously. Education and training, as well as infrastructure and housing, rank high on the list of firms and residents. And even in regulatory strategies, there may be win-win reforms that benefit all.

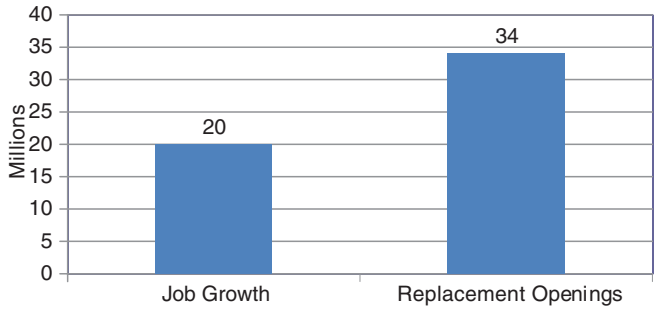
Occupational and Skill Requirement Trends

In February 2012, the U.S. Bureau of Labor Statistics released new industry and occupational projections reflecting both long-term trends and the impact of the recent recession and very large job losses. These projections provide a guide to trends that should continue in the Bay Area in the period from 2010 to 2020.

The first major finding is that more than 60% of job openings will come from replacing existing workers and not from job growth. And if we consider that much of the job growth replaces jobs lost in the recession, the importance of replacement jobs becomes even greater in the last five years of the decade. The driving factor in the replacement job opening surge is the retirement of the baby boom generation reflected in the age trends shown earlier.

Replacement job openings come from two sources. One source is the churn in many low-wage job sectors as young workers start in sectors such as Food Service and Retail Trade and then move to higher-wage sectors as they gain education and skills. There are large continuing replacement needs in occupations such as being a waiter or waitress, or a retail clerk. But most high-wage replacement job openings come from the second source—the result of retirements from the labor force. These openings will surge in the coming decade (Figure 60).

Figure 60: U.S. Job Openings from Growth and Replacement



Source: Center for Continuing Study of the California Economy

The rising importance of replacement job openings has critical implications for the Bay Area. Workforce policy must recognize the large size and critical nature of these replacement needs and not focus the majority of efforts in identifying fast-growing sectors, a common practice today. While sectors with high rates of job growth are important and do have their own workforce needs, this is not where a majority of students and workers will find jobs, nor is it where a majority of employers need skilled workers.

The replacement job opening situation is a story of both opportunity and challenge. It is a story of opportunity because the retirement of the baby boom generation will create a large number of job openings across a wide range of skill requirements. But the replacement story brings challenge—in part because the baby boom generation on average was our most highly educated workforce cohort, and in part as a result of concerns about educational quality and access in California's fiscally stressed schools and public colleges.

The second important finding is that all major occupational categories and nearly all smaller occupations will show growth measured from 2010, even though, in some cases, the growth merely replaces jobs lost between 2006 and 2010. Overall job and occupational growth is 20.4 million, or 14.3%, between 2010 and 2020, and all major groups show a gain of more than 10% measured from 2010. The fastest-growing major occupational groups are Healthcare and Computer, Engineering, and Science occupations.

However, measured from 2006 job levels, the large Sales and Office Occupation group shows little growth and the large Construction, Installation, Production and Goods Movement group never recovers to 2006 job levels during this period (Table 25).

Table 25: U.S. Occupational Trends by Major Occupations (Millions)

				Percent Change	
	2006	2010	2020	2010–20	2006–20
Mgmt., Business, and Financial	15.6	15.6	17.4	11.5	11.2
Computer, Engineering, and Sci.	7.1	7.2	8.4	17.0	19.2
Education, Legal, Community, Arts, and Media	15.3	15.5	18.0	15.9	17.4
Healthcare and Healthcare Support	10.9	12.0	15.5	28.9	41.5
Protective, Food, Bldg. Maintenance and Personal Care	25.1	24.9	28.4	13.9	13
Sales and Office	40.3	37.5	41.7	11.2	3.5
Construction, Installation, Production and Goods Movement	35.2	29.4	33.2	13.3	-5.6
Total, All Occupations	150.6	143.1	163.5	14.3	8.6

Source: U.S. Bureau of Labor Statistics

The third major finding is that a very large share of occupations is in low- and moderate-wage sectors. This includes most Sales and Office occupations, the Protective Service, Food Service, Building Maintenance, and Personal Care sectors and most occupations in the Construction, Installation, Production, and Goods Movement sectors. These sectors account for 103.3 million jobs in 2020, or 63% of all jobs. While occupations with higher skill requirements and pay are expected to increase as a share of the total economy, the increase is modest because these sectors are relatively small to begin with.

It is often said that the recovery will not bring back the same jobs as were lost during the recession. While this is certainly true in some sectors, such as Manufacturing, where globalization is a major factor, as well as in some technology sectors, for the overall economy most of the recovery jobs will be very nearly the same as the jobs lost. The heavy losses were in Construction, Installation, and Goods Movement, and in the Sales and Office occupations. And most of these jobs will be the same, requiring the same skills as the economy recovers.

We now look at occupations in a little more detail and include a comparison of overall job gains and replacement job openings. Table 26 includes occupational categories that experienced job losses of 4% or more during the

recession. For example, Construction occupations saw a 23.7% decline between 2006 and 2020 and will have 559,300 fewer jobs in 2020 compared to 2006. Even so, there will be job gains of 1.4 million between 2010 and 2020, replacing some of the job losses during the recession. And there will be 2.8 million job openings in Construction occupations, including recovery growth and replacement job openings.

Production occupations will recover only a small portion of the jobs lost during the recession but still will produce 2.2 million job openings between 2010 and 2020. Sales and Office occupations will show small job gains by 2020 compared to 2006 levels but will produce over 14 million job openings. Most of the job openings in these sectors will come from replacement job openings.

Table 26 reinforces the finding that baby boom retirements will produce job openings in occupations that have little or modest overall job growth.

Table 26: Occupational Trends (Millions)

Industries that lost 4% or more of jobs 2006–10						
	2006	2010	2020	2006–10	2006–20	Job Openings 2010–20
Architecture and Engineering	2,583.2	2,433.4	2686.2	-5.8%	10.0	797.9
Building and Maint.	5,744.6	5,498.5	6,162.5	-4.3%	417.9	1654.6
Sales	15,985.4	14,915.6	16,784.7	-6.7%	799.3	6453.6
Office and Admin. Support	24,344.0	22,602.5	24,938.2	-7.2%	594.2	7449.7
Construction	8,294.5	6,328.0	7,735.2	-23.7%	-559.3	2760.1
Inst., Maint., and Repair	5,883.5	5,428.6	6,228.7	-7.7%	345.2	2025.8
Production	10,674.6	8,594.4	8,951.2	-19.5%	-1723.4	2231.2
Goods Movement	10,350.8	9,004.8	10,333.4	-13.0%	-17.4	3597.2

Source: U.S. Bureau of Labor Statistics

The occupations in Table 27 had little change in job levels between 2006 and 2010. As a result, the job growth is nearly the same measured from 2010 as from 2006. All of the occupations will have higher job levels in 2020 compared to 2006. Roughly half of the job openings in these occupations will come from replacement job openings.

Table 27: Occupational Trends (Millions)

Industries that had little change in jobs 2006–10						
	2006	2010	2020	2006–10	2006–20	Job Openings 2010–20
Management Occupations	8,771.9	8,776.1	9,391.9	0.0%	620.0	2,567.7
Business and Financial	6,831.9	6,789.2	7,961.7	-0.6%	1,129.8	2,555.2
Community and Social Service	2,385.5	2,402.7	2,985.0	0.7%	599.5	1,098.1
Legal	1,222.2	1,211.9	1,342.9	-0.8%	120.7	343.6
Education, Training, and Library	9,033.7	9,193.6	10,597.3	1.8%	1,563.6	3,397.8
Arts, Design, Ent., Sports, and Media	2,677.0	2,708.5	3,051.0	1.2%	374.0	1,066.7
Food Preparation and Serving	11,352.4	11,150.3	12,242.8	-1.8%	890.4	5,102.7
Personal Care	4,877.6	4,994.7	6,331.4	2.4%	1,453.8	2,582.9

Source: U.S. Bureau of Labor Statistics

There are four large occupational groups that experienced job gains between 2006 and 2010, and in each case job growth is expected to continue to 2020. In two sectors—Computer and Mathematical occupations and Healthcare Practitioners and Technical Healthcare occupations—most job openings will come from job growth and not replacements, as these are fast-growing sectors (Table 28).

Table 28: Occupational Trends (Millions)

Industries that gained 4% or more jobs 2006–10						
	2006	2010	2020	2006–10	2006–20	Job Openings 2010–20
Computer and Mathematical	3,313.2	3,542.8	4,321.1	6.9%	1,007.9	1,437.8
Life, Physical and Social Science	1,172.6	1,228.8	1,419.6	4.8%	247.0	545.7
Healthcare Practitioners and Technical	7,197.6	7,799.3	9,819.0	8.4%	2,621.4	3,591.3
Protective Service	3,162.9	3,302.5	3,667.0	4.4%	504.1	1,195.5

Source: U.S. Bureau of Labor Statistics

Bottom Line

There will be job openings across a broad spectrum of occupations. A majority of job openings will come from replacements: (1) openings stemming from the normal churn of low-wage jobs such as retail clerks and (2) the need to replace a growing number of retiring baby boomers. The other way to look at this finding is that the economy will need new workers in nearly every occupation whether it is growing rapidly, slowly, or not at all. This is the twin finding of opportunity and challenge.

Replacements will account for most job openings in slower-growing occupations and will account for a majority of job openings in all but the very fast-growing occupations associated with computer skills and healthcare.

Job Growth and Openings by Education Category

The Bureau of Labor Statistics has introduced new analyses of the educational and training requirements associated with specific occupations. The results and methodology are discussed in the occupational employment projections to 2020 published in the January 2012 issue of *Monthly Labor Review*.[12] A summary of the results is shown below.

It is true that occupations requiring more than high school graduation are expected to grow faster than the average job growth rate between 2010 and 2020. The growth rates for occupations requiring post-graduate degrees, bachelor's degrees, associate's degrees, or some post-secondary education are all projected to grow faster than the 14.3% average for all jobs. And occupations requiring high school graduation or less are expected to grow at below-average rates to 2020. But the differences in growth rates for varying levels of education is not great, and most jobs in 2020 will still require only a high school education or less according to the BLS research.

It is possible that this data understates the level of educational improvement required for the U.S. economy over the coming years. These projections assume that occupations in the future will require the same level of education and training as current workers possess. On the other hand, it may be true that most occupations will require continuing skills upgrading to accommodate the growing influence of technology in the workplace and continuing improvement in the education and training of workforces globally (Table 29).

[12] C. Brett Lockard and Michael Wolf, "Employment outlook: 2010–2020, Occupational employment projections to 2020," *Monthly Labor Review* (U.S. Dept. of Labor and U.S. Bureau of Labor Statistics), Volume 135, Number 1, January 2012, http://www.bls.gov/opub/mlr/2012/01/art5full.pdf

Table 29: U.S. Job Growth and Job Openings by Education Category (Millions)

	2010	2020	Change	% Change	Job Openings
Post-graduate degree	6,395.7	7,703.5	1,307.8	20.4%	2,605.7
Bachelor's degree	22,171.1	25,827.2	3,656.1	16.5%	8,562.4
Associate's degree	7,994.6	9,434.6	1,440.0	18.0%	2,941.0
Some post-secondary	7,335.6	8,578.7	1,243.1	16.9%	2,751.6
High school graduate	62,089.6	69,665.7	7,576.1	12.2%	21,745.9
Less than high school	37,081.7	42,372.4	5,245.7	14.1%	16,180.8

Source: U.S. Bureau of Labor Statistics

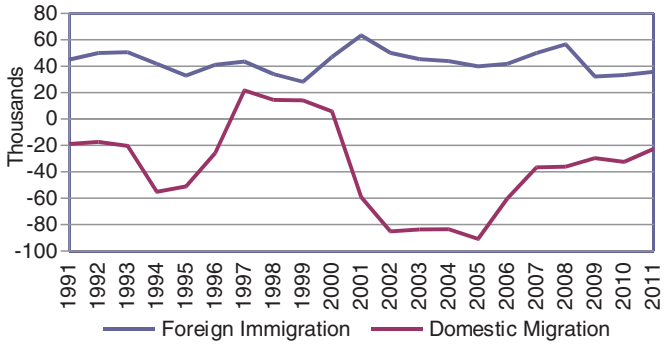
Implications and Issues

The generation of baby boomers who are retiring had the highest educational attainment of any American labor force cohort in history. Replacing them and providing for the increasing skill requirements of new jobs will be a challenge that, at the broadest policy level, requires four components: (1) training opportunities for existing workers, (2) improved K–12 education and access to higher education, (3) immigration policies that welcome workers at all skill levels and (4) policies that provide incentives for highly skilled workers in other areas of the country to come to the Bay Area to live and work.

The education and training challenges come at a time when funding for training, K–12, and higher education in California is being cut and the number of residents with access to training or a college education, or both, has been falling.

Foreign immigration flows have been large and important in the Bay Area for the past two decades. Annual foreign immigration levels have been between 40,000 and 60,000 per year (Figure 61). A high share of Bay Area immigrants come from Asia, with China and India being the largest countries of origin.

Figure 61: Migration Flows to the Bay Area



Source: Center for Continuing Study of the California Economy

Net domestic migration has been negative, especially in the years after defense cuts in the early 1990s and at the end of the dot-com boom in 2001, but within this trend there has been some in-migration of highly educated residents to the Bay Area. Immigration policies are mentioned as important competitiveness considerations in all surveys of Bay Area businesses.

County-by-County Trends

The county-by-county projections in this section are from the current preliminary ABAG projections being circulated for review. The regional projections are based on CCSCE's analysis, although the totals are slightly lower than the CCSCE projections as a result of ABAG assumptions. The regional population and household projections are based on CCSCE's analysis. The county projections were developed by ABAG staff.

Jobs

Jobs and job growth are concentrated in five counties, led by Santa Clara and Alameda and joined by San Francisco, Contra Costa, and San Mateo. These counties account for approximately 85% of the region's total jobs and 85% of the projected job growth (Table 30).

Table 30: Jobs and Job Growth (Thousands)

	2010	2020	2040	2010-20	2010-40
Alameda	694.4	826.4	946.9	132.0	252.4
Contra Costa	344.9	408.1	467.8	63.1	122.9
Marin	110.7	120.4	130.0	9.7	19.3
Napa	70.7	81.5	90.2	10.9	19.6
San Francisco	568.7	663.9	743.8	96.2	175.1
San Mateo	345.2	413.5	457.9	68.3	112.7
Santa Clara	926.3	1,088.0	1,222.9	161.8	296.6
Solano	132.3	156.7	183.3	24.4	51.0
Sonoma	192.0	228.5	262.4	36.5	70.3
Regional Total	3,385.3	3,987.1	4,505.2	601.8	1,119.9

Source: ABAG

The pattern of growth is similar for both the 2010–2020 and 2010–2040 periods. Under the ABAG projections, all counties will see job recovery and growth by 2020. Approximately half of all job growth is expected in the first ten years as a result of the recovery, after which slow labor force growth is expected as baby boomers retire.

Population

Regional population and household growth is somewhat more dispersed compared to jobs and job growth. Still, 82% of regional population is centered in the five largest counties, with Solano and Sonoma contributing slightly more to population growth than was true for job gains. In part, these projections reflect the ABAG policy goals of planning for population and household growth closer to job growth.

The largest gains are expected in Santa Clara and Alameda counties. Contra Costa is the third largest growth center for population while San Francisco was third largest for job growth. Population growth is more evenly distributed among the 30 years from 2010 to 2040 (Table 31).

Table 31: Population and Growth (Thousands)

	2010	2020	2040	2010–20	2010–40
Alameda	1,510.3	1,649.7	1,976.6	139.4	466.3
Contra Costa	1,049.0	1,128.4	1,350.2	79.4	301.2
Marin	252.4	265.7	293.7	13.3	41.3
Napa	136.5	146.5	168.8	10.0	32.3
San Francisco	805.2	880.4	1,062.3	75.1	257.0
San Mateo	718.5	773.9	903.3	55.5	184.8
Santa Clara	1,781.6	1,958.6	2,370.6	177.0	589.0
Solano	413.3	455.5	543.8	42.2	130.5
Sonoma	483.9	527.9	629.9	44.0	146.1
Regional Total	7,150.7	7,786.7	9,299.2	635.9	2,148.4

Source: ABAG

Households

Household growth has the same general pattern as population growth. The largest growth is expected in Santa Clara and Alameda counties, followed by Contra Costa and San Francisco (Table 32). Household growth is slightly slower in the first ten years as the first wave of job recovery will not require much population growth; many jobs will go to current residents who are unemployed.

Table 32: Households and Household Growth (Thousands)

	2010	2020	2040	2010–20	2010–40
Alameda	545.1	596.9	703.0	51.8	157.8
Contra Costa	375.4	400.9	465.4	25.5	90.0
Marin	103.2	106.9	114.4	3.7	11.2
Napa	48.9	51.9	58.1	3.0	9.3
San Francisco	345.8	376.5	439.3	30.7	93.5
San Mateo	257.8	277.0	316.1	19.1	58.3
Santa Clara	604.2	668.6	800.6	64.4	196.4
Solano	141.8	153.5	177.4	11.7	35.7
Sonoma	185.8	201.6	233.8	15.7	48.0
Regional Total	2,608.0	2,833.7	3,308.1	225.6	700.1

Source: ABAG

201 California Street, Suite 1450, San Francisco, CA 94111
(415) 981-7117 • Fax (415) 981-6408
www.bayareaeconomy.org • bacei@bayareacouncil.org

The Bay Area Council Economic Institute is a partnership of business with labor, government, higher education and philanthropy, that works to support the economic vitality and competitiveness of the Bay Area and California. The Association of Bay Area Governments is a founder and key institutional partner. The Economic Institute also supports and manages the Bay Area Science and Innovation Consortium (BASIC), a partnership of Northern California's leading scientific research universities and federal and private research laboratories. Through its economic and policy research and its many partnerships, the Economic Institute addresses key issues impacting the competitiveness, economic development and quality of life of the region and the state, including infrastructure, globalization, science and innovation, energy, and governance. A public-private Board of Trustees oversees the development of its products and initiatives.