

The Evolution of Human Capital, Workforce, and Innovation in Los Angeles Over the Past Two Decades

Evidence From 1995 to 2012

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Even though it is difficult to believe, based on the findings of the First 5 LA/UCLA City Human Capital Index, Los Angeles is falling behind. L.A.'s human capital ranked a staggering 28th among the 30 largest metropolitan areas in the country. The question is: how did we get here? This report uses Census data from 1990 and 2000 to display the evolution of human capital in L.A. and other cities/counties over the past two decades. We suggest that one of the main explanations for L.A.'s lag is the exodus of high-skilled workers and the concurrent influx of low-skilled immigrants in the 1990s.

In the following sections, we will first show the city human capital index in 1990 and 2000. Secondly, we present the relationship between L.A.'s human capital and its in- and out- migration, and finally, suggest some policy implications for workforce development in L.A. in the 21st century.

THE CITY HUMAN CAPITAL INDEX BY METROPOLITAN AREAS

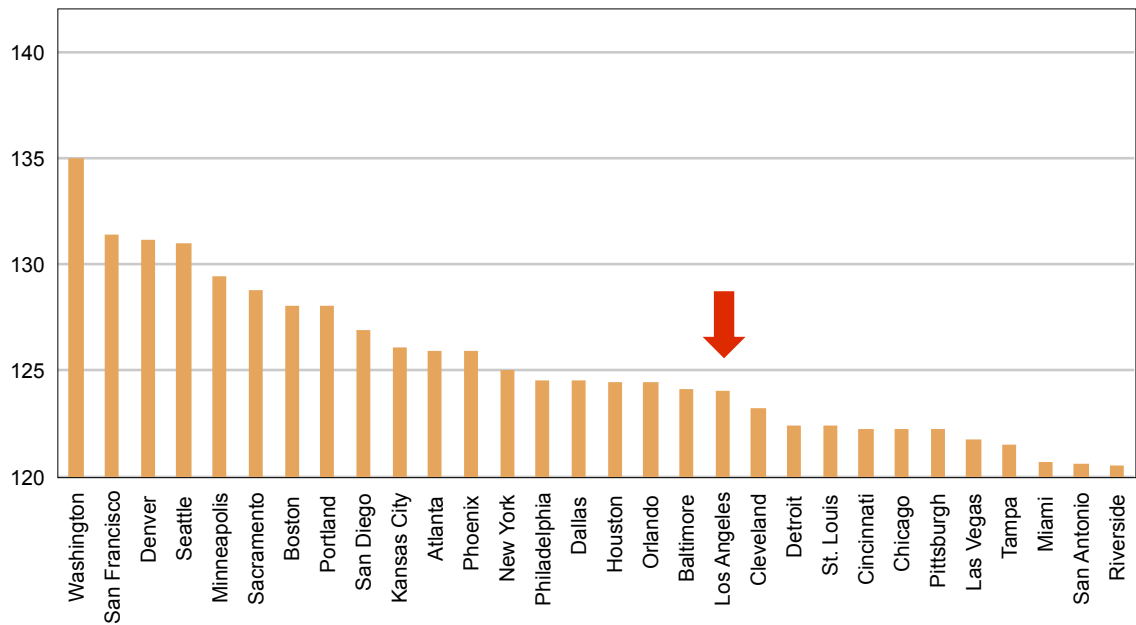
Figure 1 displays the First 5 LA/UCLA City Human Capital Index (CHCI) for the 30 largest cities in 1990. By

and large, one tenth of the index number is the average number of schooling years for adult residents in each of the metropolitan areas.¹ In 1990, the index for L.A. (which includes Los Angeles and Orange Counties) was 124.1, meaning that the average education attainment was 12.4 years. L.A. ranked 21st among 30 major cities in 1990, trailed by Chicago, Pittsburgh, Las Vegas, Miami, and San Antonio. Washington DC ranked number one with a CHCI of 135. The leading cities in 1990 include San Francisco, Denver, Seattle, Minneapolis, and Sacramento. To be fair, in 1990 L.A. was neither amazingly good nor terribly bad in terms of its human capital level.

However, in 2000, it was a whole different picture. Figure 2 shows the CHCI for the 30 largest cities in 2000. L.A.'s CHCI went down to 122.6 in 2000 from 124.1 in 1990. As a result, its ranking among 30 cities plummeted from 21st to 29th. During the 1990s, the average CHCI increased by 4.3 for these 30 cities. Among them, *L.A. was the only metro area with a declining human capital level.* Some cities like Boston, Minneapolis, Baltimore, and Chicago increased their CHCI by more than 6 points throughout the 1990s.

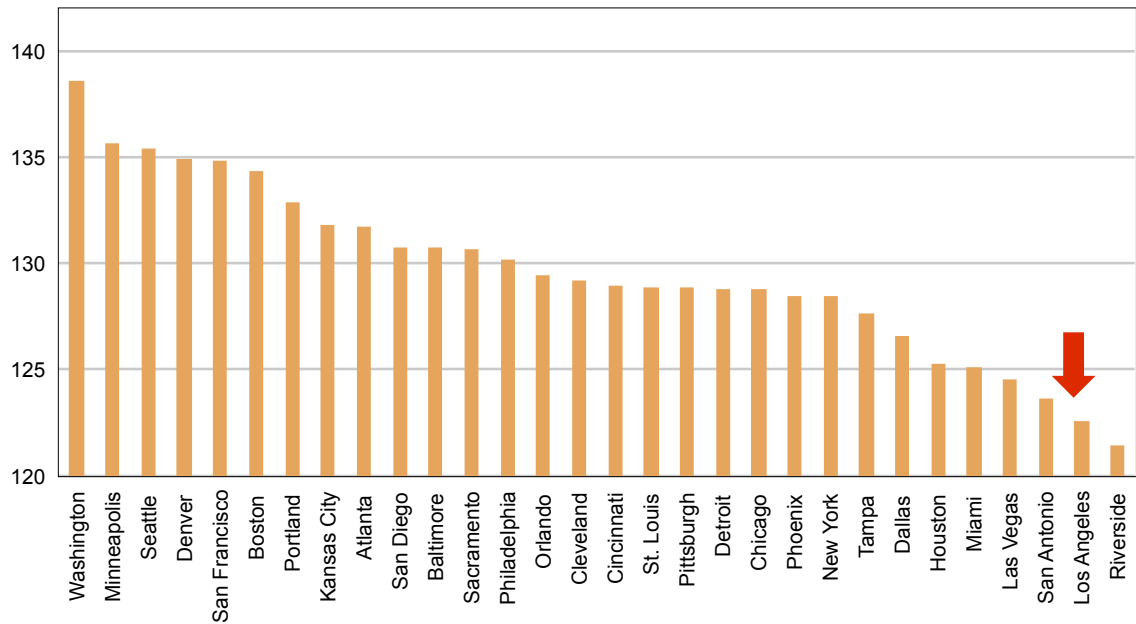
THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION
IN LOS ANGELES OVER THE PAST TWO DECADES

Figure 1 1990 City Human Capital Index for the 30 Largest Cities in the U.S.



Source: Author's calculation based on the U/S/ Census, 1990.

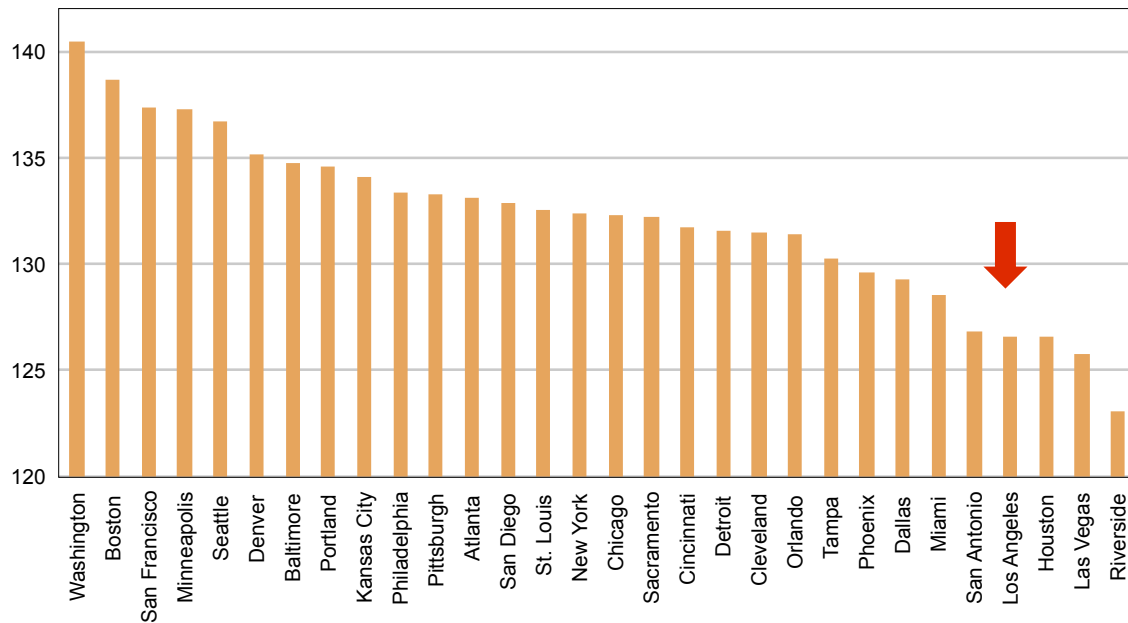
Figure 2 2000 City Human Capital Index for the 30 Largest Cities in the U.S.



Source: Author's calculation based on the U.S. Census, 2000.

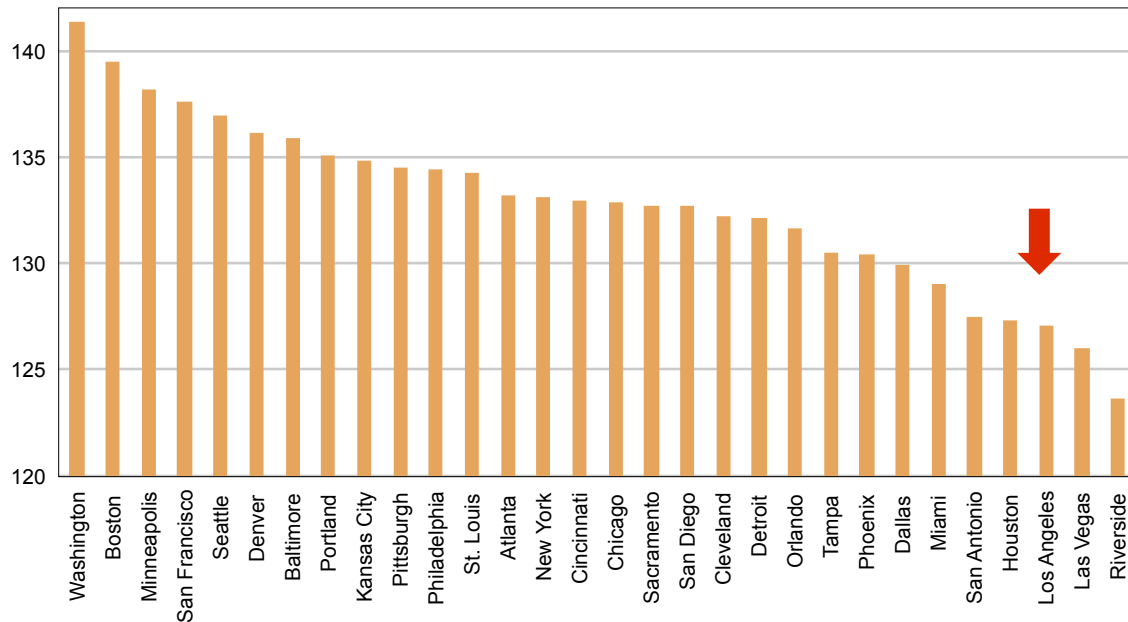
THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION IN LOS ANGELES OVER THE PAST TWO DECADES

Figure 3 2008 City Human Capital Index for the 30 Largest Cities in the U.S.



Sources: Author's calculation based on the 5-year American Community Survey, 2006-2010.

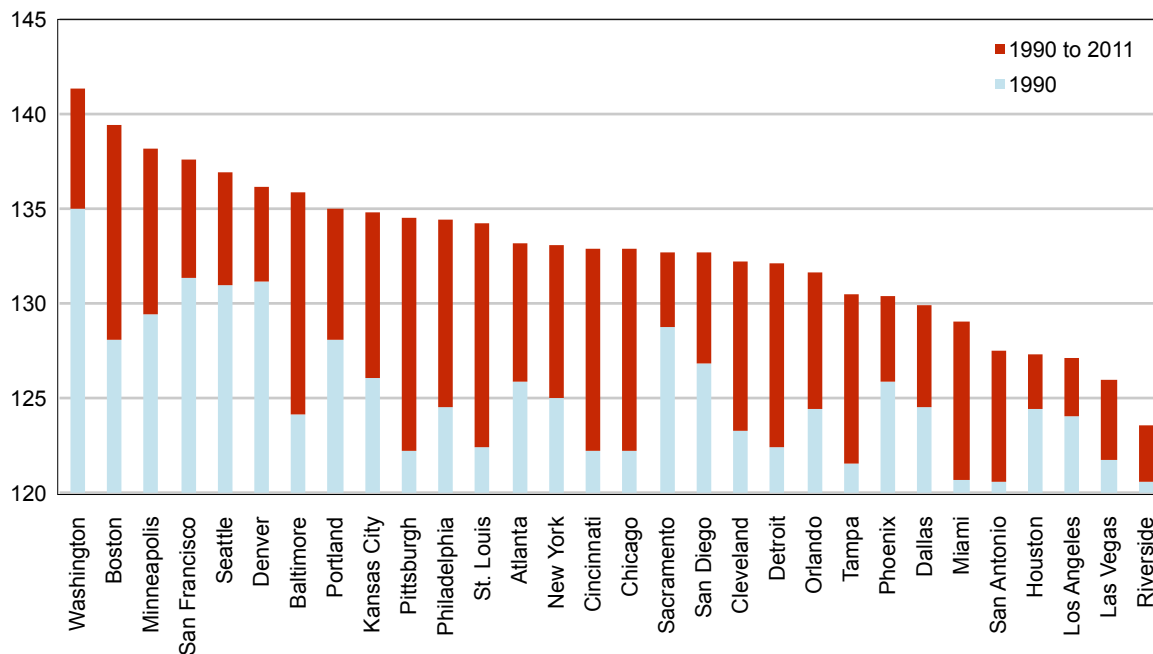
Figure 4 2011 City Human Capital Index for the 30 Largest Cities in the U.S.



Sources: Author's calculation based on the 1-year American Community Survey, 2011

THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION IN LOS ANGELES OVER THE PAST TWO DECADES

Figure 5 1990 to 2011 City Human Capital Index for the 30 Largest Cities in the U.S.



Source: Author's calculation based on Census 1990 and the American Community Survey, 2011.

Figures 3 and 4 present the CHCIs in 2008 and 2011. L.A.'s CHCI returned to 126.6 in 2008 and 127.1 in 2011. However, since the decline through 2000 was so significant, the improvement of CHCI did little to increase L.A.'s ranking among 30 major cities. L.A. remains near the bottom. Figure 5 exhibits the 1990 CHCI in light color and the increased CHCI from 1990 to 2011 in dark color. Some cities like Boston, Baltimore, Pittsburgh, and St. Louis have a more than 11-point increase of CHCI and therefore raised their rankings to better positions, while L.A. has barely a 3-point increase over the past two decades.

THE CITY HUMAN CAPITAL INDEX AT THE COUNTY LEVEL

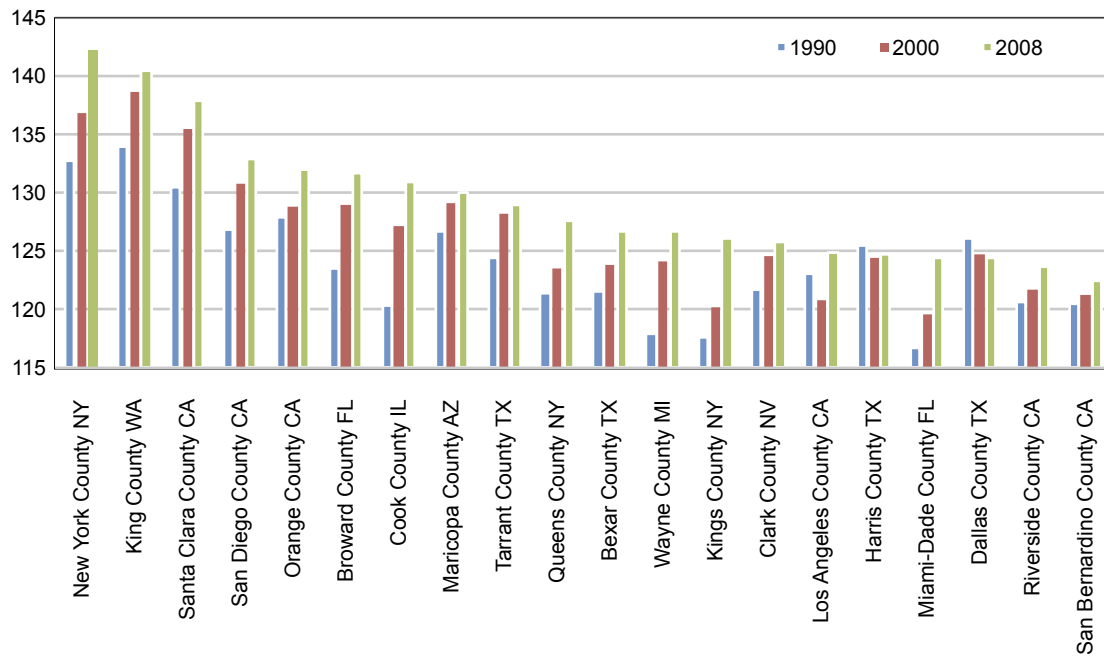
The previous rankings are based on the larger metropolitan areas. L.A. includes both Los Angeles and Orange Counties. To look at the detailed county level of human capital, Figure 6 presents the CHCI of 1990, 2000, and 2008 for the 20 largest counties in the U.S. L.A. County's CHCI is

123, 120.7, and 124.8 in 1990, 2000, and 2008, respectively. Among the 20 largest counties, L.A. ranked 15th in human capital. L.A. County has a lower level of human capital than L.A. metro because Orange County has a higher level of human capital. According to the three-period bars, we can see most counties have, more or less, steady increases of CHCI over the past two decades with only two exceptions: L.A. County and Dallas County.

The leading counties in terms of human capital in 2008 are New York County (Manhattan): 142, King County, WA (Seattle): 141, Santa Clara County (Silicon Valley): 138, San Diego County: 133, and Orange County: 132. Figure 7 illustrates the CHCI of 1990 (with light colored bar) and the change from 1990 to 2011 (dark colored bar). During these two decades, some counties had large increases of CHCI, e.g. Cook County IL (Chicago): +11.6, New York County: +10.3, and Kings County NY (Brooklyn): +9.6, while L.A. County had a weak growth of only +2.4.

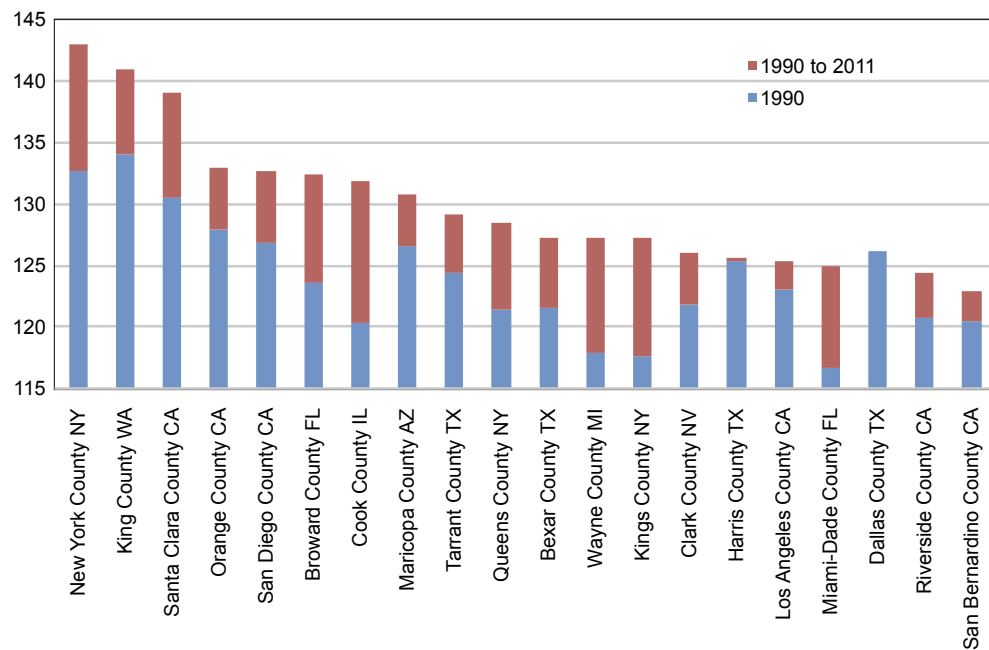
THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION IN LOS ANGELES OVER THE PAST TWO DECADES

Figure 6 1990, 2000, 2008 City Human Capital Index



Source: Author's calculation based on Census 1990, 2000 and the American Community Survey, 2006-10.

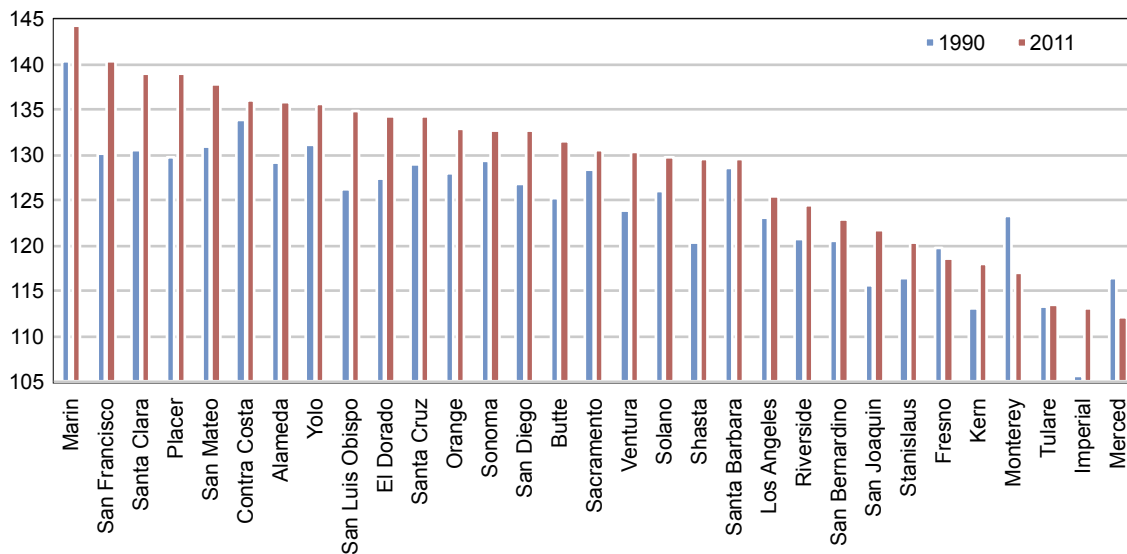
Figure 7 1990-2011 City Human Capital Index for the 20 Largest Counties in the U.S.



Source: Author's calculation based on Census 1990 and the American Community Survey, 2011.

THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION IN LOS ANGELES OVER THE PAST TWO DECADES

Figure 8 1990-2011 City Human Capital Index for the 30 Largest Counties in California



Source: Author's calculation based on Census 1990 and the American Community Survey, 2011.

THE CITY HUMAN CAPITAL INDEX IN CALIFORNIA COUNTIES

Now let's take a look at the counties of California. Figure 8 lays out the CHCI of 1990 and 2011 for the 30 largest counties in California. L.A. County ranks 21st. From 1990 to 2011, while L.A.'s 2.3% increase in CHCI proved a better performance than those counties which experienced decreases, such as Fresno (-1.2), Merced (-4.3), and Monterey (-6.3) Counties, L.A.'s growth of human capital is falling behind counties' such as San Francisco (+10.2), Santa Clara (+8.5), and Placer (+9.2).

WHAT CAUSED THE FALL OF HUMAN CAPITAL IN L.A. IN THE 1990S?

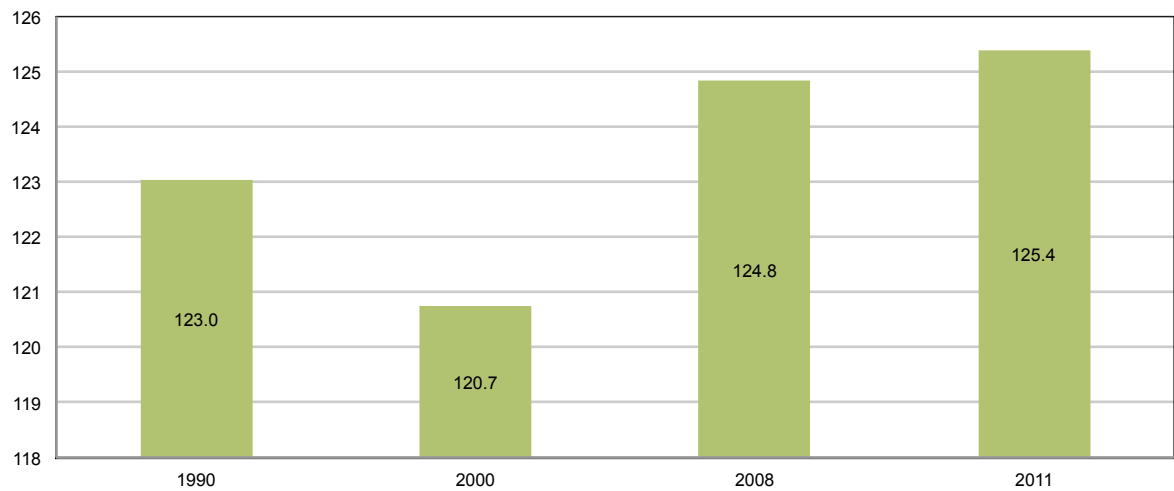
As we summarize the facts of the CHCI in previous sections, we conclude the following: the low level of human capital in L.A. nowadays can be traced back to the 1990s, if not earlier. While all other major cities in the U.S. were accumulating their average level of human capital, and some more than others, L.A., on the contrary, depleted its human capital in the 1990s, as shown in Figure 9. What was happening in L.A. during the 1990s? We believe that there were two main factors that directly contributed to the decline of human capital in L.A.

First, the dismantling of the aerospace/defense industry in L.A. in the early 1990s could have driven out many of the high-skilled and highly educated workforce. For those permanently displaced high-skilled workers, if they could not find a well-paid position in L.A., the most rational thing to do next was to move to other cities. For instance, in Los Angeles County, the aerospace manufacturing payrolls declined consecutively from 130,100 in 1990 to 52,400 in 2000, resulting in roughly 60% job destruction for the high-skilled.

Second, during the 1990s, L.A. attracted more low-skilled/low-educated foreign immigrants while attracting fewer high-skilled/highly educated foreign immigrants compared to other major cities. In the Brookings' report; "The Geography of Immigrant Skills" presents the education profile of foreign-born immigrants² in 2009³ across the nation. The report categorizes foreign-born citizens between age 25 and 64 into the following groups: (1) Low-skilled: immigrants who lack a high school diploma, (2) Middle-skilled: immigrants with a high school diploma or some college but no degree, (3) High-skilled: immigrants with a college degree or more.

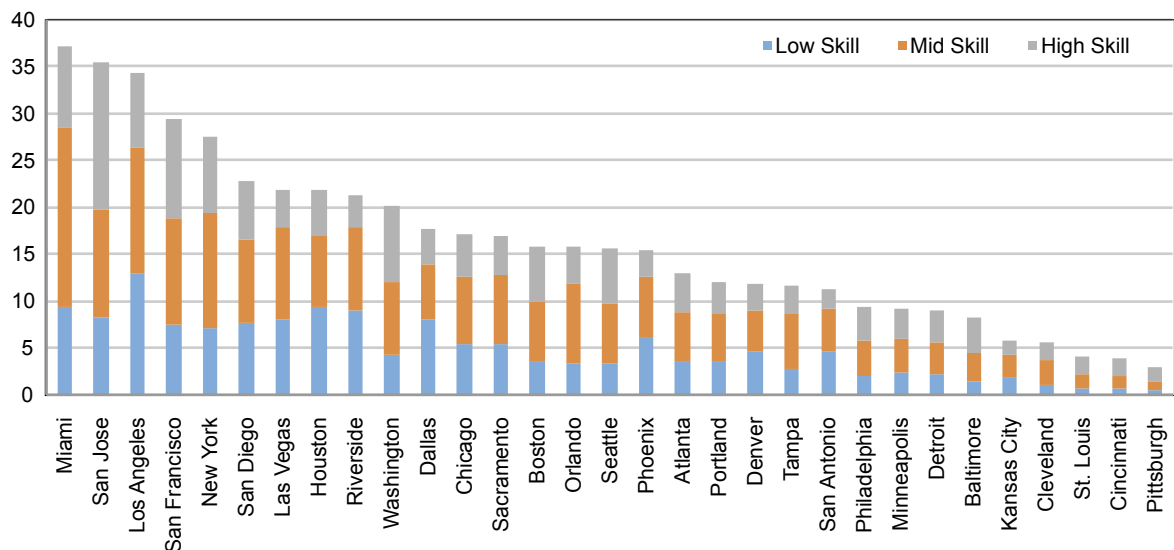
THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION IN LOS ANGELES OVER THE PAST TWO DECADES

Figure 9 1990-2011 City Human Capital Index for Los Angeles County



Source: Author's calculation based on Census 1990, 2000 and the American Community Survey, 2006-2010, 2011.

Figure 10. Immigrant Population Ratio Based on Skill for the 31 Largest Cities in the U.S.



Source: The Geography of Immigrant Skills: Educational Profiles of Metropolitan Areas from Metropolitan Policy Program at Brookings, 2011

THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION IN LOS ANGELES OVER THE PAST TWO DECADES

Table 1 Immigrant Skills for the 31 Largest Cities in the U.S. in 2009

	Immigrant Percentage	Immigrant Skill Group /Adult Immigrants			Skill Ratio	Immigrant Skill Group /Adult Population		
		Low Skill	Mid Skill	High Skill		Low Skill	Mid Skill	High Skill
Miami	37	25	51	23	0.92	9	19	9
San Jose	36	23	33	44	1.93	8	12	16
Los Angeles	34	38	39	24	0.62	13	13	8
San Francisco	30	25	38	36	1.43	8	11	11
New York	28	26	44	30	1.15	7	12	8
San Diego	23	34	39	27	0.80	8	9	6
Las Vegas	22	37	45	18	0.49	8	10	4
Houston	22	43	35	22	0.52	9	8	5
Riverside	21	42	42	16	0.39	9	9	3
Washington D.C.	20	22	38	41	1.89	4	8	8
Dallas	18	45	33	22	0.48	8	6	4
Chicago	17	31	42	27	0.88	5	7	5
Sacramento	17	32	43	25	0.78	5	7	4
Boston	16	23	41	37	1.61	4	6	6
Orlando	16	21	54	25	1.16	3	8	4
Seattle	16	21	41	38	1.82	3	6	6
Phoenix	15	40	41	19	0.47	6	6	3
Atlanta	13	27	42	32	1.19	3	5	4
Portland	12	29	42	29	0.99	3	5	3
Denver	12	39	37	24	0.62	5	4	3
Tampa	12	24	51	25	1.06	3	6	3
San Antonio	11	42	40	19	0.45	5	5	2
Philadelphia	9	22	40	38	1.74	2	4	4
Minneapolis	9	27	39	34	1.25	2	4	3
Detroit	9	25	38	36	1.44	2	3	3
Baltimore	8	17	36	47	2.79	1	3	4
Kansas City	6	32	40	27	0.85	2	2	2
Cleveland	6	20	45	34	1.69	1	3	2
St. Louis	4	15	39	46	3.05	1	2	2
Cincinnati	4	17	36	47	2.75	1	1	2
Pittsburgh	3	14	33	54	3.91	0	1	2

Source: *The Geography of Immigrant Skills: Educational Profiles of Metropolitan Areas from Metropolitan Policy Program at Brookings, 2011*

THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION IN LOS ANGELES OVER THE PAST TWO DECADES

Table 2. Non-Immigrant Skills and Whole Adult Population Skills for the 31 Largest Cities in the U.S. in 2009

	Non-Immigrant Skill Group /Adult Non-Immigrant			Skill Group /Adult Population		
	Low Skill	Mid Skill	High Skill	Low Skill	Mid Skill	High Skill
Miami	13	57	30	18	55	28
San Jose	10	47	43	15	42	43
Los Angeles	14	52	34	22	47	30
San Francisco	8	46	46	13	43	44
New York	12	50	38	16	49	36
San Diego	9	54	37	15	51	35
Las Vegas	11	66	23	17	61	22
Houston	14	57	29	20	52	28
Riverside	16	64	20	21	60	19
Washington	7	44	49	10	43	47
Dallas	12	56	32	18	52	30
Chicago	10	55	35	14	52	34
Sacramento	9	60	31	13	57	30
Boston	7	50	43	9	48	42
Orlando	11	62	27	13	61	27
Seattle	6	56	37	9	54	37
Phoenix	11	60	29	15	57	27
Atlanta	11	54	34	13	53	34
Portland	7	58	35	10	56	34
Denver	7	53	39	11	51	38
Tampa	12	64	24	14	62	25
San Antonio	16	59	26	19	57	25
Philadelphia	11	57	32	12	56	32
Minneapolis	6	56	38	8	55	38
Detroit	12	63	25	13	61	26
Baltimore	11	55	34	12	53	35
Kansas City	9	58	33	10	57	33
Cleveland	12	62	26	12	61	27
St. Louis	11	60	29	11	59	29
Cincinnati	12	60	28	12	59	29
Pittsburgh	9	64	27	9	63	28

Source: Author's calculation based on the *Geography of Immigrant Skills: Educational Profiles of Metropolitan Areas from Metropolitan Policy Program at Brookings, 2011* and *American Community Survey, 2009*.

THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION IN LOS ANGELES OVER THE PAST TWO DECADES

Table 1 presents the 31 largest metropolitan⁴ areas in the U.S. by order of the percentage of foreign-born immigrants in the city based on Brookings' report. Miami has the highest percentage of foreign-born immigrants with 37%, followed by San Jose's 36%, L.A.'s 34%, San Francisco's 30%, and New York's 28%. On the other hand, Pittsburgh only has a 3% immigrant population. When we look at the skill/education mix, we also find dramatic differences across cities. For instance, L.A. (38%), Riverside (42%), Houston (43%), and Dallas (45%) have a higher proportion of low-skilled immigrants. Yet, San Jose, San Francisco, and Washington DC have a higher proportion of high-skilled immigrants.

If we calculate the skill ratio, the ratio of high skilled to low skilled, the ratio over one means that the city has more high skilled immigrants than low one. If the ratio is smaller than one, the city has attracted more low-skilled immigrants than high ones. Cities with higher ratios are San Jose (1.93), San Francisco (1.43), Washington DC (1.89), Boston (1.61), Seattle (1.82), etc. Cities with low ratios are L.A. (0.62), Las Vegas (0.49), Houston (0.52), Riverside (0.39), Dallas (0.48), etc.

Let's take a closer look at L.A. The percentages for immigrant skill groups are 38%, 39%, and 24% for low skilled, middle skilled, and high skilled, respectively. For non-immigrant skill groups (born in the U.S.) as shown in Table 2, the percentages are 14%, 52%, and 34%, respectively. That said, the larger percentage of the low-skill group—22%—in L.A. compared to other cities could be mainly attributed to low-skilled immigrants.

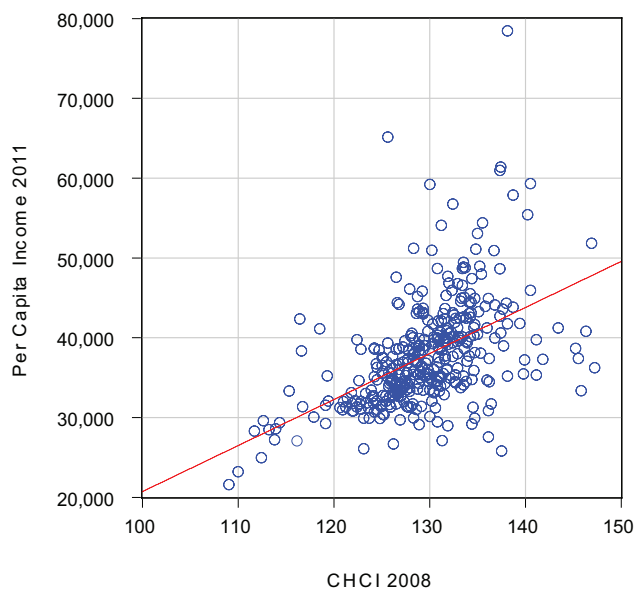
How do we know these low-skilled immigrants mostly came to L.A. in the 1990s? In fact, we do not know because of data limitation. What we do know from the 2009 American Community Survey is that 76.5% of foreign-born immigrants entered L.A. before 2000. Additionally, we are not certain the underlying reasons for the exodus of high-skilled workforce and the influx of low-skilled in L.A.

THE CORRELATION BETWEEN HUMAN CAPITAL, ECONOMY, AND INNOVATION

In previous Forecast reports, we have explained the high correlation between human capital and per capita personal income. Now, we find that even more, the correlation could be across time. For instance, Figure 11 illustrates the evident correlation between the CHCI of 2008 and per capita income in 2011 for 365 metropolitan areas. That is to say, high human capital in 2008 predicts high per capital income in 2011. The correlation could cross a long time span. Figure 12 presents the correlation between the CHCI of 2000 and per capita income in 2011. The correlation is still similarly strong.

We can find this correlation even further back. Figure 13 illuminates the correlation between the CHCI of 1990 and per capita income in 2011. The correlation is remarkably

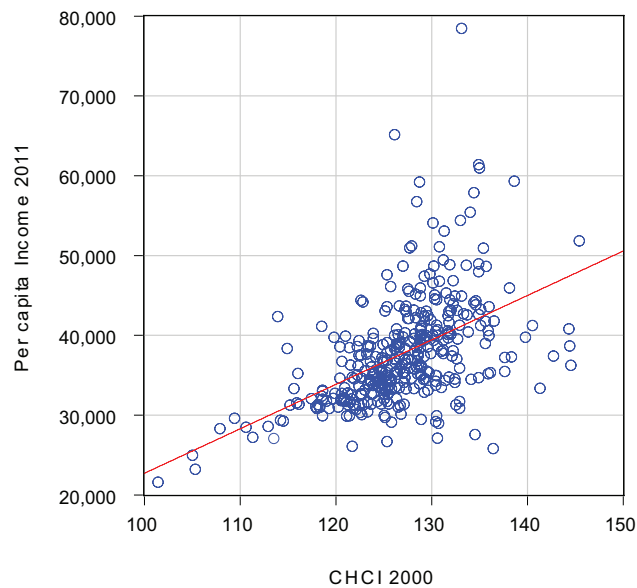
Figure 11 The Correlation between the CHCI of 2008 and Per Capita Personal Income in 2011 across 365 Metropolitan Areas



Source: American Community Survey 2006-2010 and Bureau of Economic Analysis

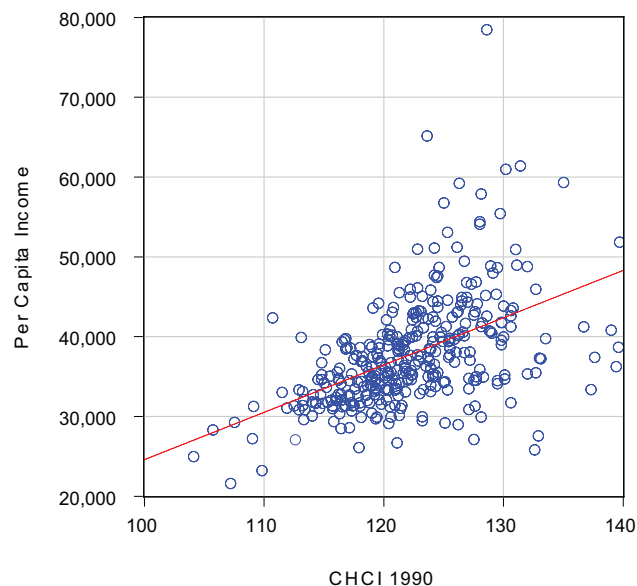
THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION IN LOS ANGELES OVER THE PAST TWO DECADES

Figure 12 The Correlation between the CHCI of 2000 and Per Capita Personal Income in 2011 across 365 Metropolitan Areas



Source: U.S. Census 2000 and Bureau of Economic Analysis

Figure 13 The Correlation between the CHCI of 1990 and Per Capita Personal Income in 2011 across 365 Metropolitan Areas



Source: U.S. Census 1990 and Bureau of Economic Analysis

strong. This tells us two things. First, the level of human capital in each city is highly persistent. The human capital could evolve gradually over a year, or even over a decade. Don't expect a revolution in which the human capital of a city jumps ahead. Second, today's human capital level in a city could, by and large, decipher her future income level and economic prosperity in 10 years or even 20 years.

In the 21st century, we know that the most competitive and vibrant sector in the U.S. is the high-tech industry. It is the cutting edge of the U.S. economy that leads the world. We also know that innovation is the driving force propelling our long-term productivity, economic growth, and standing of living. The question here is: How do cities perform in this regard? Is it related to city's human capital?

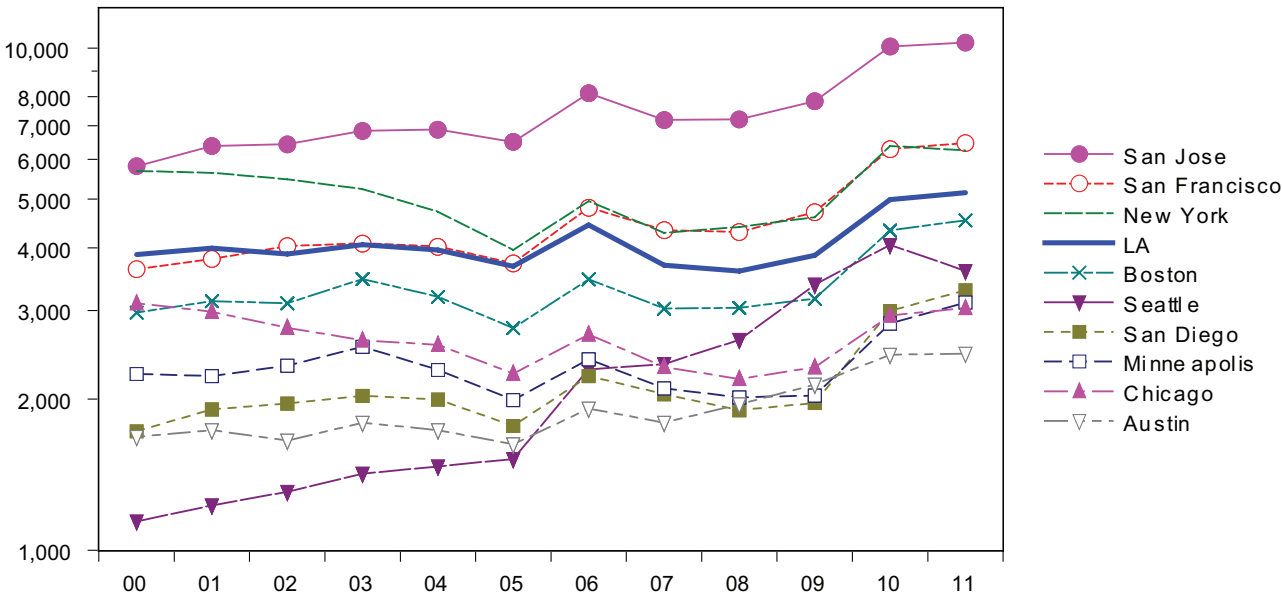
Figure 14 shows the top 10 metro areas for their total utility patents (patents for invention), which could be a simple indicator of competitiveness of innovation. San Jose (Silicon Valley) has always been leading and growing with 10,256 patents in 2011. L.A. with 5,154 patents has been surpassed by San Francisco with 6,468 patents in 2011. Figure 15 displays the top 10 counties in total patents granted. Santa Clara (Silicon Valley) with 10,221 patents in 2011 is leading far above the second county, San Diego with 3,293 patents, followed by King County (Seattle). L.A. ranks 4th with 2,844 patents in 2011.

From 2000 to 2011, King County (Seattle) increased its annual patents by 240%, San Diego: 91%, San Mateo County: 87%, Santa Clara: 76%, Middlesex County (Boston): 69%, Alameda County (East Bay): 65%, Orange County: 59% while L.A. County only increased its patents by 18%.

A city or county with a larger population is more likely to have more patents granted because of its size. To control for size, Figure 16 exhibits the per capital utility patents granted (per 10,000 population). Santa Clara County is leading with 57 patents per 10,000 people, followed by San Mateo County with 37 patents. L.A. County, with its low human capital level, only has 3 patents per 10,000 people. In other words, we can conclude that human capital is correlated to a city's innovation. Not surprisingly, high human capital comes with high innovation for a city.

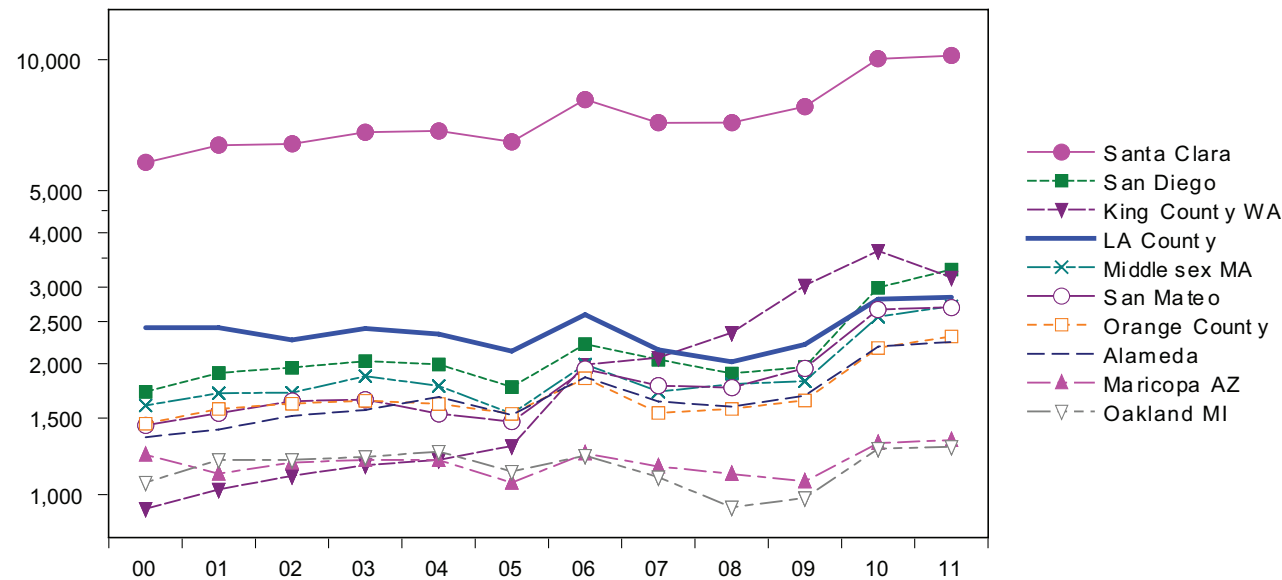
THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION IN LOS ANGELES OVER THE PAST TWO DECADES

Figure 14 Utility Patents Granted for Top 10 Metro Areas, 2000-2011



Source: US Patent and Trademark Office, Department of Commerce

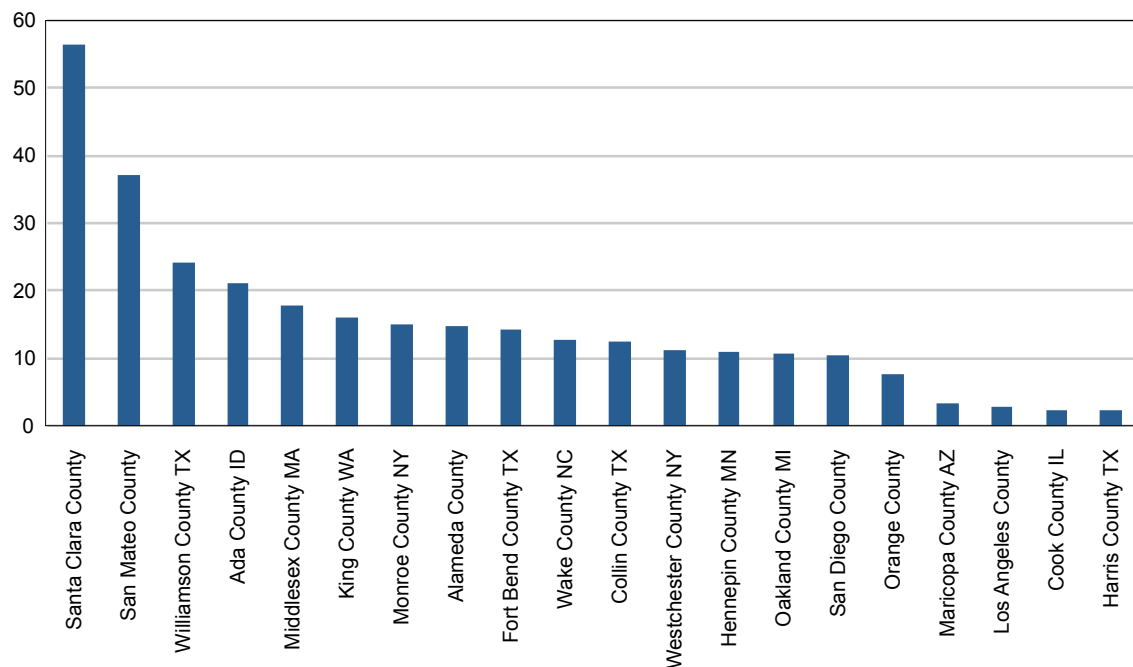
Figure 15 Utility Patents Granted for Top 10 Counties, 2000-2011



Source: US Patent and Trademark Office, Department of Commerce

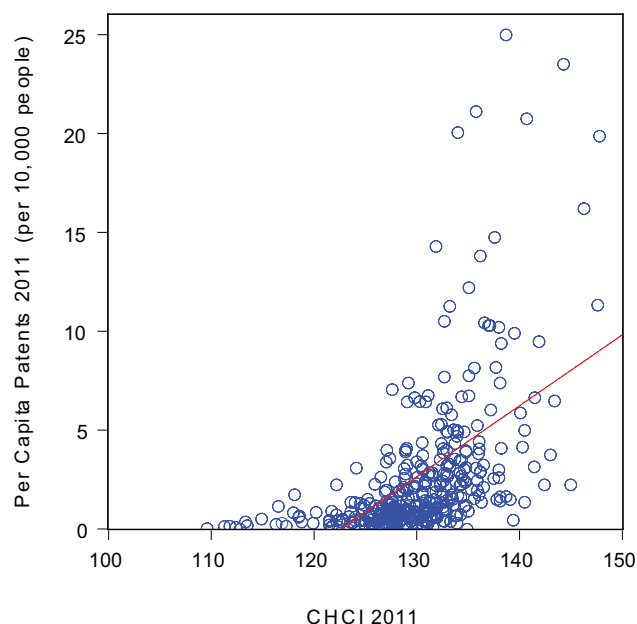
THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION IN LOS ANGELES OVER THE PAST TWO DECADES

Figure 16 Per Capita Utility Patents Granted for Top 20 Total Patents Granted Counties, 2011, (per 10,000 people)



Source: Author's calculation based on the US Patent and Trademark Office, Department of Commerce

Figure 17 The Correlation Between Per Capita Utility Patents Granted and the CHCI of 2011 across 365 Metropolitan Areas



Source: Author's calculation based on the US Patent and Trademark Office, Department of Commerce

Note: San Jose in off the chart with 55 Per Capita Patents in 2011

WHAT SHOULD L.A. DO?

Faced with such a low level of human capital compared to other major cities, what should L.A. do? In particular, we now know that a large portion of the low-skilled/low-educated group is foreign-born immigrants. In the short-run, we could help them get a job if they don't have one. By achieving that, L.A. should become more business friendly and thus attract and encourage more businesses, start-ups, and employers to our city. If L.A. does not have appropriate or available jobs for them, we should guide and encourage those who are unemployed to get a job in other states, such as Texas or North Dakota, where unemployment rates are low. On the other hand, once the immigration reform is passed in Congress in the future, the quota of high-skilled immigrants will be increased. L.A. should prepare herself as an ideal city for these immigrants.

In the long-run, L.A. could commit herself to the most important investment a government could make—education. From early childhood education (ECE) through K-12, investment in our children is the key to our city's long-term economic prosperity. With the access of quality public education in urban areas, the next generation of low-income

THE EVOLUTION OF HUMAN CAPITAL, WORKFORCE, AND INNOVATION IN LOS ANGELES OVER THE PAST TWO DECADES

families would have more of a chance and be better prepared to go to college. Faced with a large percentage of low-skilled residents, L.A. needs to allocate more resource to quality ECE. Based on Nobel Laureate James Heckman alongside many studies and experiments, quality ECE is the most efficient and effective investment to promote economic growth and accelerate social mobility. Moreover, when competing to attracting high-skilled talents with other cities, it will be an advantage to have a good public school system in L.A. because those highly educated workers will be taking their children's education into consideration. And with a higher percentage of highly educated immigrants, the quality of public schools will naturally improve. The vicious cycle could be turned into a virtuous cycle. In short, enhancing our educational environment could be potentially the most effective workforce development policy, by not only raising human capital locally but also enticing talents from other states and abroad.

In terms of government resources, it is unwise and inefficient to spend little on these at-risk children at an early age but instead to spend on law enforcement, correction, and prisons and for when they grow up. Compared to the national average, L.A. and California have spent more money on public safety than on public education. It might be time

to reallocate the misallocation. Because of the advancement of technology and globalization, the return on human capital is increasing rapidly. A person and a city with low human capital will fall behind even more in the 21st century.

CONCLUSIONS

The take-away points from our report are as follow:

- L.A.'s human capital has been falling behind other major cities.
- While all other major cities have seen increased human capital in the 1990s, L.A. is the only major metro with a decreased human capital level.
- A high level of human capital will predict high levels of income in 10 years or even 20 years. A high level of human capital is also correlated with innovation.
- For those disadvantaged children, an investment in early childhood education could be the most efficient and effective way to achieve vibrant growth and shared prosperity in our city.

ENDNOTES

1. *Note that using only adult education attainments is not the best measurement of a city's human capital. The quality of schooling and the human capital created at work are ignored. Once we have more consistent data, we will use it to improve the human capital index.*
2. *The data in their report do not distinguish immigrants are documented or not.*
3. *Based on 2009 American Community Survey.*
4. *We add the 31st largest metro, San Jose (Silicon Valley) for comparison because San Jose has a unique immigrant skill profile.*