City Growth, Cost of Living, and Human Capital

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Ten years ago, the U.S. economy hit its business cycle peak and then slumped to troughs of the financial crisis and the Great Recession. Ever since, the economy has been slowly recovering at a 2% rate. Have our major cities and metros been growing at a similar pace? The answer is no. In fact, we will show that the economy is growing unequally across the nation.

A prosperous city is naturally related to higher earnings and higher cost of living for residents. So the question is: are residents better off living in a thriving city in terms of their real purchasing power? To answer this question, we present a City Cost of Living Index by measuring the differential of cost of living across metros focused on their rental price differential. In 2012, we launched the City Human Capital Index, which measures the average educational attainment for adult residents. We emphasize that the key to long-term prosperity for a city in the 21st century is based on its human capital.

Uneven Employment Growth Across the Country

The total U.S. payroll growth is 5.7% from 2006 to 2016. But if we look at the employment growth for the 40 major metros, we find that job growth among these 40 metros are very uneven. Figure 1 displays the nonfarm payroll growth from 2006 to 2016 for the 40 largest metros. Austin is number one with a stunning 36% payroll growth in the past decade, (3.1% growth a year), followed by San Antonio’s 24%, Nashville’s 21%, Houston’s 21%, Dallas’s 20%, San Jose’s 19%, Denver’s 18%, Charlotte’s 16%, San Francisco’s 15%, and Seattle’s 14%. New York’s 9% is in the middle as is Washington DC’s 8%. Los Angeles’s 4% and Chicago’s 3% are on the slower-growing end among these 40 metros. Three metros have negative job growth in the period: Providence, Detroit, and Cleveland.

Now let’s compare the job growth between these 40 metros and the rest of the country (smaller metros, towns, and rural area). We find another uneven pace of growth. These 40 metros account for 57% of total payroll jobs in the U.S. in 2016. The total job growth for these 40 metros is 9.2% from 2006 to 2016. In contrast, the total job growth for the rest of the country is only 1.5% at the same period.

There are two possible reasons for this growth dichotomy between the major metros and the rest. First, the conglomerate of large metros could increase productivity, innovation, and quality of life as suggested by prominent urban economist – Edward Glaeser in his book: Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier (2012). Second, many manufacturers which used to be the economic center in small towns had left the country in the globalized economy. Many manufacturing jobs were also lost to automation. Brick and mortar retailers have also left small cities as a result of competition from e-commercers. It is worth more discussion on whether this dichotomy is good for the U.S.

Demand, Supply and Home Prices

As shown in Figure 1, we have seen a disparity of job growth across the country’s 40 largest metros. How does the job growth differential explain the home price growth in the past decade? The answer is job growth can explain a lot for the difference in home price growth among these 40 metros from 2006 to 2016, the period of housing price bust and recovery. Figure 2 illuminates this common-sense relationship. As a metro creates more jobs and attracts more people, the population and household formation rise and therefore, demand for housing increases. For better or for worse, home prices rise accordingly.

Metros like Denver, Dallas, Nashville, Austin, Houston and San Antonio have high home price growth while metros like Las Vegas, Cleveland, and Detroit still have negative home price growth during this period.

In addition to the demand side, housing supply could also contribute to the differential of home price appreciations among metros. Figure 3 shows the correlation between housing unit supply growth from 2000 to 2016 and home price growth 2006 to 2016. The chart doesn’t show a clear correlation. But if we treat Austin, Dallas, Nashville, Houston, Denver, San Antonio as a group for high job growth and the rest of the metros as a group for medium or low job growth, the correlation is more apparent. Your chart should show this pattern.
growth, we can get two negative correlations. That means high housing supply is related to low home price growth.

By putting these two variables together, the following simple regression demonstrate how both job growth (2006 to 2016) and housing units supply growth (2000 to 2016)\(^2\) could predict home price growth from 2006 to 2016. Both coefficients of job growth and housing supply growth are statistically significant. High job growth leads to high home price growth while high housing supply growth leads to low home price growth. This is a confirmation of basic economics 101. It is worth noting that our simple regression could only demonstrate correlation not causality. The relationship could go from home price growth to job growth and housing supply growth as well. So we should take these coefficients with a grain of salt.

Nevertheless, our result is consistent with the main literature which has documented plenty of evidence that housing supply impacts home prices. For instance, Glaeser, Gyourko, and Saiz (2008)\(^3\) suggested that places with more elastic housing supply have smaller price increases following a fundamental increase in housing demand. Grimes and Aitken (2010)\(^4\) suggested that higher housing supply elasticities help contain price spikes following demand shocks. Glaeser and Ward (2009)\(^5\) argued that U.S. cities have seen increases in

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\text{Home price growth 06-16} = -0.06 + 2.34 \times \text{Job growth 06-16} - 0.61 \times \text{House unit growth 00-16}
\]

\begin{align*}
\text{(t-stat)} &\quad -1.5 &\quad 7.4 \\
\text{Adj. R squared} &\quad 0.58 &\quad \text{Observations} = 40
\end{align*}

\(^2\) Data is from American Community Survey where they only show the housing units built between 2000-2009, 2010-2013, and 2013 to 2016. We cannot break it down to 2006 to 2016.


in housing prices and decreases in new construction. And land use regulations are associated with reduction in the housing supply. Caldera and Johansson (2013)\textsuperscript{6} suggested that in the long run, a more flexible supply of housing is desirable as it allows a better match of housing construction to changes in housing demand. Hsieh and Moretti (2017)\textsuperscript{7} pointed out that high productivity cities in the U.S. have adopted stringent restrictions to new housing supply. As a result, misallocation arises because these high productive cities limits the entrance of workers with high productivity from other part of the country.

City Cost of Living Index (CCLI) and Real Earnings

In the previous section, we discussed that demand and supply factors of the housing markets will drive differentials of home price growth across metros. It will eventually cause wide differences in home price, rents, and cost of living across metros. Given the availability of transportation, e-commerce, and mobility in the country, we believe there is little difference in costs for most tradable goods and services across metros. We suspect that a major cause of cost of living differences among metros is the rental price/home

Figure 4  
City Cost of Living Index (Based on Rents), 2016

Source: American Community Survey and author’s calculation


price (mortgage payment). In the future, we will develop a more complete index to incorporate more components in addition to rents.

We assume that rental prices and home prices (mortgage payments) are highly correlated, thus we only use rental prices for a metro to calculate its City Cost of Living Index (CCLI). We use the data of median rents for 511 metros from the American Community Survey in which the average of these 511 median rents ($847) is the base index of 1. We adopt the same weight (30%) of rents calculated in Consumer Price Index by Bureau of Labor Statistics.

Let’s use Los Angeles as an example. Los Angeles’ median rent is $1,403 in 2016. So we compute the CCLI for L.A. by $0.3 \times \frac{(1,403-847)}{847}+1 = 1.2$. The number means that cost of living in Los Angeles is 20% higher than the national metro average because of its high rent. Figure 4 lists the CCLI in 2016 for 40 major metros. San Jose is the most expensive metro with CCLI of 1.42, followed by San Francisco’s 1.32, Washington DC’s 1.26, San Diego’s 1.23, and Los Angeles’s 1.20.

The CCLI is similar to the regional price parity developed by Bureau of Economic Analysis and State Cost of Living Index developed by Missouri Economic Research and Information Center. With CCLI at hand, we can now answer the question: Are residents, in general, better off living in a thriving city with soaring housing cost in terms of their real purchasing power? We calculate the real earn-

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Figure 5  
Real Earnings Adjusted for City Cost of Living Index, 2016

Source: American Community Survey and author’s calculation

ings across metros by adjusting the nominal earnings with CCLI. For instance, Los Angeles’ nominal earning in 2016 is $36,696. After adjusting, the real earning becomes $30,659 ($36,696/1.2). Figure 5 presents the real earnings (CCLI adjusted) for 40 major metros. The richest metro in terms of purchasing power is Washington DC ($43,846), followed by Minneapolis’ $43,597, Baltimore’s $43,199, and Boston’s $43,127. Los Angeles is ranked at the bottom number 3 with a real earning of $30,700 for a median earner, followed by Orlando’s $29,500 and Miami’s $28,000.

City Human Capital Index (CHCI)

How can we explain the dispersion of real earnings (adjusted for CCLI) across these 40 metros? One simple explanation is human capital. In our previous reports, we have documented the methodology of calculating the City Human Capital Index (CHCI). In general, we calculate the average schooling years of local adult residents and use it as a proxy for human capital. For instance, a resident without a high school degree is counted as having 5 schooling years, a resident with a high school degree is counted with 12 years, an Associate’s degree is 14 years, a Bachelor’s degree is 16 years, and a Master’s degree or higher is 19 years. The index is then multiplied by 10 for a simple reading. That said, we can interpret that one-tenth of CHCI is about the average schooling year of local residents.

Figure 6 presents the CHCI in 2006 (yellow bar) and in 2016 (blue bar) for the 40 largest metros. By and large, we can see across-the-board enhancement of CHCI. This could be due to migration, and more investment and better out-

Source: American Community Survey
comes in education. The four most educated metros in 2006 are still in the same leading position in 2016: Washington DC is first, at 164 (16.4 schooling years), followed by Boston’s 160, San Jose’s 160, and San Francisco’s 160. On the other hand, the four least educated metros in 2006 are still in the same order in 2016. Riverside (Inland Empire) is at 133, Las Vegas at 137, San Antonio at 140 and Los Angeles at 142.

Figures 7 shows the correlation between human capital (CHCI) and real earnings for 40 major metros. We can see a clear correlation between human capital and real median earning of a metro. Note that we use the CHCI in 2006 at the horizontal axis to illuminate that the likely relationship is from human capital to productivity/real earnings, not the other way around.

Our simple regression result tells us that one more schooling year is associated with $4,500 more earnings in these 40 metros. That is equivalent to 12% over the average real earnings in these 40 metros. The estimate is similar to the literature evidence. For instance, a seminal paper, “Estimates of the Economic Return to Schooling from a New Sample of Twins” by Ashenfelter and Krueger (1994) indicated that an additional year of schooling increases wages by 12 to 16%. Despite the non-linear returns of education, a private return to a schooling year was estimated ranging from 7% to 13% after controlling all other possible factors in the literature.11

Inequality Within Los Angeles

Figure 8 shows the unequal human capital and real earnings across the major metros. We find that the inequality also exists within a metro. Figure 8 depicts the CHCI by zip code in the Los Angeles metro, in which red represents zip codes with high human capital while blue represents areas with low human capital. The darker the red, the higher the human capital for the region. The darker the blue, the lower the human capital. Figure 8 demonstrates the inequality of human capital in the L.A. It shows a distinct contrast, for example, between West L.A. and South L.A. The average CHCI in West L.A. is above 160 (16 schooling years; beyond bachelor’s degree) while the average CHCI in South L.A. is below 100 (below high school diploma).

It is not surprising to find that there is a strong correlation between CHCI and earning by zip code within a metro as we have seen in Figure 7. That said, to have a shared prosperity for a city, it is imperative to focus on investment in education and enhancing human capital for all the children in our city, especially for those disadvantaged children in South L.A.

Conclusions

The takeaways of the report are as follows:

- There was a wide disparity of economic growth among 40 major metros from 2006 to 2016, ranging from Austin’s total 36% of job growth to Cleveland’s -2%. The major 40 metros had a total job growth of 9.2% as opposed to only 1.5% for the rest of the country.
- We find that two variables which could partly explain the differential of home price growth for 40 major metros: job growth and housing supply growth. We develop the City Cost of Living Index (CCLI) by calculating the differential of median rents across the metros.
- Residents in metros with high human capital earn high real wages, such as Washington DC, Minneapolis, Boston, and San Jose. Metros with low human capital, on the other hand, earn low real wages, such as in Riverside and Las Vegas.
- To achieve long-term shared prosperity, Los Angeles could focus on two things: (1) enhance education and human capital, especially for disadvantaged children. (2) increase housing supply elasticity thus housing supply could be more flexible to meet the demand. By doing so, we could slow down the pace of rising cost of living in L.A. in the future.