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Inequality in and across Cities

By Jessie Romero and Felipe Schwartzman

Inequality in the United States has an important spatial component. More-skilled workers tend to live in larger cities where they earn higher wages. Less-skilled workers make lower wages and do not experience similar gains even when they live in those cities. This dynamic implies that larger cities are also more unequal. These relationships appear to have become more pronounced as inequality has increased. The evidence points to externalities among high-skilled workers as a significant contributor to those patterns.

Imagine you have just completed an advanced degree and are entertaining multiple job offers. One offer would take you to a large city, such as Washington, D.C.; your other offers are in smaller cities, such as Greenville, South Carolina, or Roanoke, Virginia. The large city probably offers more job opportunities down the line, as well as a greater number of people to interact with and learn from. In Washington you also will enjoy a greater variety of cultural amenities, such as restaurants and theaters. At the same time, housing is very expensive there; even if the job in the large city pays a higher salary, you may still have to settle for a smaller home or a longer commute.

Imagine you have completed high school and do not wish, or are unable, to pursue post-secondary education. If you move to Washington, it's unlikely you will find a job with a salary that enables you to pay the high housing costs, much less provides you with enough disposable income to eat at restaurants and attend plays. You might find better job opportunities in a smaller town and be able to purchase a better home relative to your wage.

In the end, where one lives is also influenced by personal preferences — a highly educated worker might choose to live in a small town, or a less-educated worker in a large city, to be closer to relatives or because they find the lifestyle more appealing.

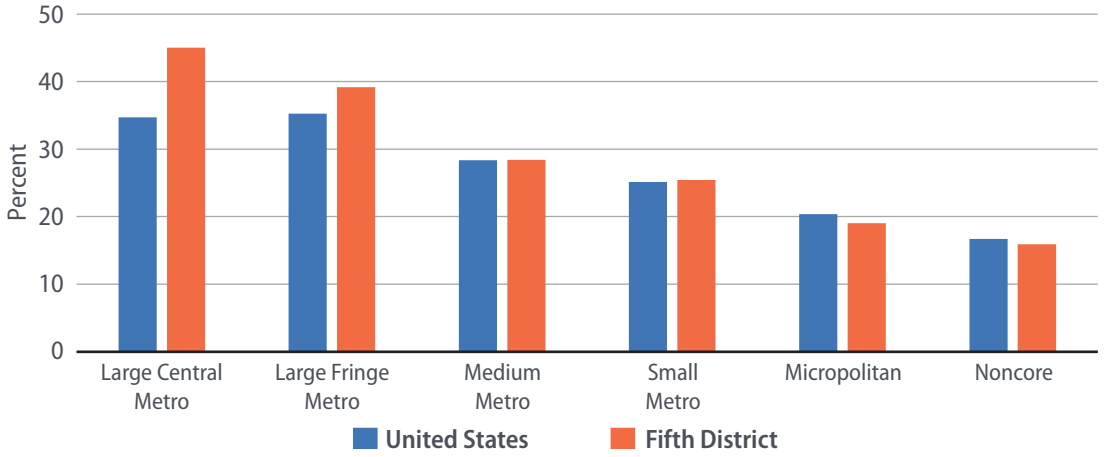
Together, all these factors determine what's known as a "spatial equilibrium" — people choose where to live, and wages and housing prices adjust accordingly.[1] Over the past few decades, this equilibrium has shifted. Certain cities have experienced faster and more concentrated wage growth, a higher share of college-educated workers, and higher rents. In a recent article, one of the authors of this *Economic Brief*, Schwartzman, reviews the literature documenting these shifts and organizes some of its main lessons with the help of a stylized spatial equilibrium

model.[2] He finds that the trend is driven by relative increases in the demand for skilled labor in large cities where there is already a high proportion of high-skilled workers.

Key Facts about Spatial Inequality

A large body of research has identified several key facts about inequality across and within cities. First, larger cities have a greater concentration of high-skilled workers.[3] In the Fifth District, for example, the share of the population over age twenty-five with a bachelor's degree is 45 percent in the most urban areas, compared with 16 percent in the most rural areas. In the United States as a whole, the proportion ranges from 35 percent in the most urban areas to 17 percent in the most rural areas. (See Figure 1.)

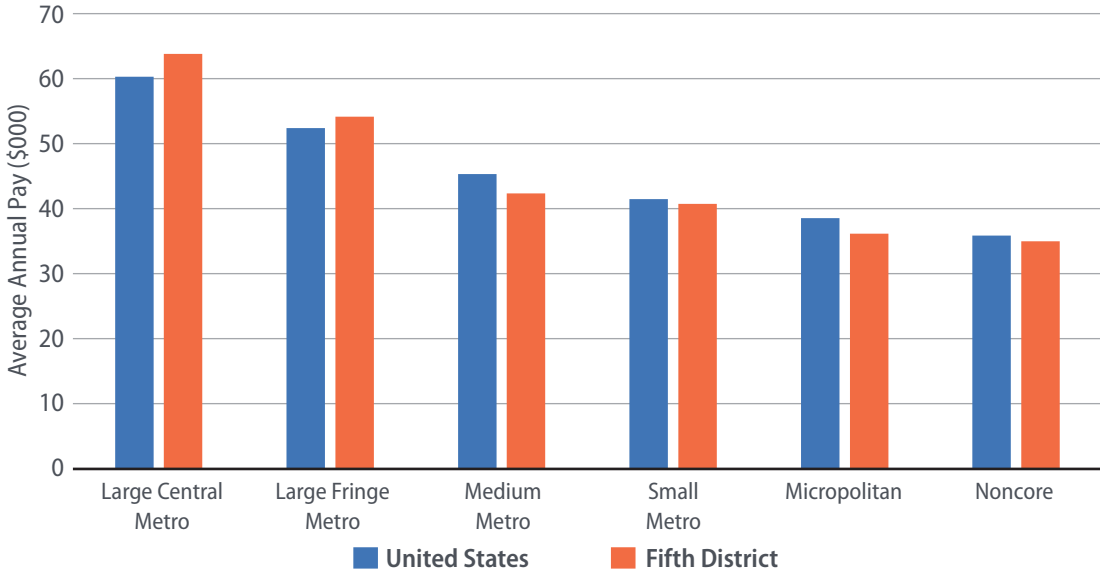
Figure 1: Large Metro Areas Tend To Have Higher Percentages of College Graduates



Sources: Bureau of Labor Statistics; National Center for Health Statistics

Notes: The figure depicts the share of the population over age twenty-five with at least a bachelor's degree. The National Center for Health Statistics' urban-rural classification scheme ranges from the most urban category, "large central metro," to the most rural category, "noncore."

Figure 2: Wages Tend To Be Higher in Large Metro Areas



Sources: Bureau of Labor Statistics; National Center for Health Statistics

Note: The National Center for Health Statistics' urban-rural classification scheme ranges from the most urban category, "large central metro," to the most rural category, "noncore."

Second, nominal wages are higher in larger cities and in cities with a larger proportion of high-skilled workers. In the most urban areas of the Fifth District, average annual pay in 2016 was nearly $64,000; in the most rural areas, it was less than $35,000. Nationwide, workers in the most urban areas earned about $60,000 on average in 2016, while workers in the most rural areas earned about $36,000. (See Figure 2.) In recent research, Nathaniel Baum-Snow, Matthew Freedman, and Ronni Pavan find that nominal wages increase 0.065 percent for every percentage point increase in city size (based on data from 2005–07). They also find that the relationship between city size and wages has strengthened over time and that the wage gap between urban and rural areas has increased.[4]

While nominal wages are higher in larger cities, the same is not necessarily true of real wages. That's because the largest cities and the cities with the most skilled workers also tend to have the highest rents and have experienced the largest rent increases in recent decades; high housing costs somewhat offset high wages.

One challenge for researchers studying local price levels is accounting for differences in the quality and variety of goods — such as the larger selection of restaurants and theaters one finds in a large city. In a 2015 article, for example, Jessie Handbury and David E. Weinstein conclude that even when focusing on groceries, typical price indices used to compare cities are biased because they don't account for quality and variety.[5] In addition, Rebecca Diamond finds in a 2016 article that other contributors to quality of life, such as schools and air quality, are better in larger, more-skilled cities.[6] Factoring in such amenities suggests that standards of living increase with city size. Thus, while high housing costs in cities may suggest that there is less inequality in standards of living than one would infer based on nominal wage data alone, the quality and variety of goods and other amenities in cities could mean the opposite.

The third key fact about cities is that larger cities and cities with more skilled workers are more unequal and have become more unequal over time. Baum-Snow and Pavan found in a 2013 article that from 2004 through 2007, the variance of log hourly wages in rural wages was 0.28 percent. The variance was nearly double — 0.53 — in the three largest metropolitan areas, meaning that the gap between the highest and the lowest earners in metro areas was much larger than the gap in rural areas. In 1979, the variance in rural areas was 0.19 and just slightly more in the three largest metropolitan areas at 0.24.[7]

In addition, the skill premium increases with city size, and it appears to increase with the share of skilled workers already living in a city. This might seem surprising because basic supply and demand implies that when the supply of something (in this case skilled workers) goes up, the price (in this case wages) should go down. In fact, prior to 1980, cities with more skilled workers had lower skill premia, but this correlation reversed by the early 2000s.[8]

Explaining the Facts

The most natural explanation for these facts is that the demand for skilled workers has increased more in larger cities and in cities with a high share of skilled workers, while the demand for unskilled workers has not increased much anywhere. Schwartzman develops a stylized model that illustrates this explanation. In the model, cities are in fixed locations and are equipped with a production technology for a tradeable good. Production in each city depends on the number of high- and low-skilled workers in the city. While low-skilled workers are similarly productive in different cities, the productivity of high-skilled workers varies by city. More productive cities try to attract more workers, and the resulting increase in workers pushes up housing demand and rents. So firms have to increase wages to retain workers in those cities. Workers' utility depends on their preferences about location, housing, and consumption, and can also vary with a city's amenities. Consequently, the supply of labor in a city is a function of wages and rental prices. In this model, variation in firms' demand for skilled labor can explain the spatial equilibrium described above, in which wages and wage inequality are higher in larger cities and in cities with a greater share of skilled workers.

This invites the question, what accounts for that variation in demand? Researchers have explored three main possibilities: information technology, industrial composition, and externalities.

Information technology plays a role by making skilled workers more productive; it is a complement to skilled labor but not to unskilled labor. As computers become cheaper, firms increase their use, which gives them an incentive to use more high-skilled workers. At the same time, firms have a greater incentive to adopt technology in cities where there is already a high supply of skilled labor that can use the technology. Together, these trends increase the demand for skilled workers in high-skill cities. Still, while technology can help explain the shift from a negative correlation between college-educated workers and wage inequality to no correlation, this explanation does not readily support the shift to a positive correlation.

Another contributing factor could be the industrial composition of cities. Different industries have different skill intensities; so the extent to which cities specialize in these different industries could explain cross-city variation in the number of and demand for skilled workers. It's also the case that cities with a large fraction of skilled workers have large business services sectors, such as accounting or law firms. Lutz Hendricks proposes in a 2011 article that the output of these service firms is complementary to skilled workers. As it becomes cheaper to hire an external accountant, for example, firms may choose to outsource those services rather than hire them internally.[9] Other research suggests that availability of business services might contribute to firms' decisions to locate their managers and executives in cities, while locating their production facilities in more rural areas.[10] Hendricks finds, however, that cross-city variation in industrial composition accounts for only a small fraction of cross-city variation in skill composition and that the special role of the business services sector has to be explained by increasing returns to that sector.

This takes us to the final explanation for increasing demand for skilled workers, and the one for which Schwartzman finds the most support in his model and in the literature: externalities. These externalities may operate in various ways. For example, there are more opportunities for knowledge transfer when people are in close proximity; because high-skilled workers perform more knowledge-intensive tasks, they stand to benefit more, in terms of increasing their productivity, from these transfers than do lower-skilled workers. Alternatively, a larger supply of high-skilled workers might also facilitate better matching of workers and firms, leading to higher productivity. These externalities are one example of what urban economists call "agglomeration economies," or the idea that there are advantages to concentrating economic activity in one place.[11]

The above explanations all refer to factors that influence the demand for skilled labor. It's possible, however, that the observed wage trends could result instead from workers sorting themselves; that is, the highest-skilled workers move to the cities with the most amenities, and the high wages they receive in those cities are just reflections of the high productivity that they would have irrespective of where they live. However, there are a variety of reasons why sorting does not appear to be the explanation, including the fact that a sorting explanation may require unrealistic assumptions in the model. Most importantly, recent empirical work using detailed administrative data has found little role for sorting.[12]

Conclusion

After considering multiple explanations, Schwartzman concludes that externalities that benefit high-skilled but not low-skilled workers are a major contributor to inequality across and within U.S. cities. This explanation creates a challenge for policymakers, who then face a tradeoff between equality and efficiency. From the perspective of productivity and economic growth, there are potentially large gains to policies that incentivize high-skilled workers to become even more concentrated — but these policies would tend to make cities even more unequal. Exploring these tradeoffs, and what they imply for optimal policy, is an important direction for future research. ■

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Endnotes

[1] For an overview, see Edward L. Glaeser, "The Economics Approach to Cities," NBER Working Paper No. 13696, December 2007.

[2] Felipe Schwartzman, "Inequality across and within US Cities around the Turn of the Twenty-First Century," Federal Reserve Bank of Richmond *Economic Quarterly*, First–Fourth Quarter 2017, vol. 103, nos. 1–4, pp. 1–35.

[3] This remains true regardless of how skill is defined, for example, by education level, occupation, or the degree of cognitive processing required for the position.

[4] Nathaniel Baum-Snow, Matthew Freedman, and Ronni Pavan, "Why Has Urban Inequality Increased?" *American Economic Journal: Applied Economics*, October 2018, vol. 10, no. 4, pp. 1–42.

[5] Jessie Handbury and David E. Weinstein, "Goods Prices and Availability in Cities," *Review of Economic Studies*, January 2015, vol. 82, no. 1, pp. 258–296.

[6] Rebecca Diamond, "The Determinants and Welfare Implications of U.S. Workers' Diverging Location Choices by Skill: 1980–2000," *American Economic Review*, March 2016, vol. 106, no. 3, pp. 479–524.

[7] Nathaniel Baum-Snow and Ronni Pavan, "Inequality and City Size," *Review of Economics and Statistics*, December 2013, vol. 95, no. 5, pp. 1535–1548.

[8] Paul Beaudry, Mark Doms, and Ethan Lewis, "Should the Personal Computer Be Considered a Technological Revolution? Evidence from U.S. Metropolitan Areas," *Journal of Political Economy*, October 2010, vol. 118, no. 5, pp. 988–1036.

[9] Lutz Hendricks, "The Skill Composition of U.S. Cities," *International Economic Review*, February 2011, vol. 52, no. 1, pp. 1–32.

[10] Gilles Duranton and Diego Puga, "Micro-Foundations of Urban Agglomeration Economies," in *Handbook of Urban and Regional Economics Vol. 4*, edited by J. Vernon Henderson and Jacques-François Thisse, Amsterdam: Elsevier, 2004, pp. 2063–2117.

[11] For a discussion of agglomeration economies in the Fifth District, see Sonya Ravindranath Waddell, "A Tale of Three Cities: Richmond, Charlotte, and Baltimore," Federal Reserve Bank of Richmond *Regional Matters*, October 18, 2017.

[12] See Nathaniel Baum-Snow and Ronni Pavan, "Understanding the City Size Wage Gap," *Review of Economic Studies*, January 2012, vol. 79, no. 1, pp. 88–127; also, see Jorge De La Roca and Diego Puga, "Learning by Working in Big Cities," *Review of Economic Studies*, January 2017, vol. 84, no. 1, pp. 106–142.