How Long is the Yellow Brick Road?: Does Proximity to a City Affect Relative Mobility?

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Intoduction

It's an old story. Young people full of optimism and dreams of prosperity leave home and head to the big city to make their dreams a reality. I would like to examine this trope, does proximity to a city have a statistically significant effect in intergenerational mobility? Prior literature (Chetty et al., 2014), opines rather than a land of opportunity, the U.S. is "better described as a collection of societies, some of which are 'lands of opportunity' " While inequality of intergenerational mobility across demographic lines has been well documented in the literature, I would like to examine how geographic location alone affects mobility.

According to the U.S. Census Bureau (2023c), commuting times are steadily on the rise as the effects of the COVID-19 pandemic wane. Lund et al. (2021) predicted that that work from home (WFH) trends would be persistent after the pandemic ended with up to 25% of the workforce being deployed in an entirely work from home or hybrid environment. The data are promising for WFH and there doesn't appear to be evidence for lost productivity for WFH accompanying a drop in turnover where at least hybrid models are implemented. (Bloom et al., 2024) Immediately before the pandemic 9.8% of workers had a commute time of over 60 minutes. While this dropped to a low of 7.7% as lock downs were lifted and work-from-home became more en-vogue [1], the rate rose again to 8.9% by the end of 2023. (U.S. Census Bureau, 2023b) This could indicate that workers continue to be willing to participate in the labor market of a large city should they have access to one.

Recent literature that suggests that return to office (RTO) policies are being implemented regardless of the data supporting a WFH model. Senior managers may blame poor performance on WFH policies in spite of evidence to the contrary, however not without a measure of regret after implementing. (Ding & Ma, 2024) Therefore, this trend may not hold long-term as employees continue to demand WFH and hybrid models and the costs of implementing RTO,

[1] Rising from 5.7% in 2019 to 17.9% in 2021, falling back to 13.8% by the end of 2020 (U.S. Census Bureau, 2023b)

including the damage to employee morale, continue to manifest without an accompanying improvement in productivity.

This also begs the question. How is distance to a city affecting intergenerational mobility? While more people may on average be willing endure longer commute times for work, this endurance isn't infinite and the literature suggests that this willingness to endure is waning. Today, workers will either move closer to more lucrative opportunities, or they will make-do with relatively limited opportunities closer to home. It would appear that workers since the end of the nineteenth century have opted for the former. By 1920 over half the population of the United States lived in a city, and by 2010 only 19% lived in a rural area, with 14% living in a non-metro county. (Slack & Jensen, 2020) In this context, access to the resources and labor opportunity that a city provides continues to be attractive to workers, even in a post COVID-19 world, albeit with a caveat that this relationship may be increasingly strained.

My hypothesis is that there will be a negative relationship between the distance from the most densely populated county to other counties within an MSA and the measure of relative mobility. The null hypothesis is that distance is there is no relationship. Another alternative is that there is, in fact, a positive relationship.

Literature Review

The importance of location for intergenrational mobility is well documented in the literature. Chetty et al. (2014) offers a granular analysis of the U.S. geography, using measurement methods largely derived from Dahl and DeLeire (2008), and their treatment on the data from income tax returns and W-2 forms made available from the IRS was replicated in 2022, offering a post COVID-19 sample to test. (Chetty et al., 2022) Their analysis tests residential segregation, income inequality, quality of schooling, social capital, and family stability. They reject the null hypothesis on each of these covariates.

Chetty et al. (2014) uses what they call rank-rank specification. This is derived from a simple correllation of the percentile rank of a child's income and their parents' income yielding a coefficient for a single varialbe OLS regression.

Let:

R_{ic} : National income percentile rank of a child i, who grew up in location c

c : U.S. County [2]

$\rho_{PR} = Corr(P_i, R_i)$: Slope of rank-rank relationship

P_{ic} : Parents' percentile rank of child i

$$R_{ic} = \alpha_c + \rho_{PR} P_{ic} + \varepsilon_{ic} \tag{1}$$

Both Chetty et al. (2014) and Dahl and DeLeire (2008) reject using intergenerational elasticity (IGE) as the measure of mobility. Chetty et al. (2014) indicates the "most common method of estimating IGE" as:

$$IGE = \rho_{XY} \frac{SD(log(Y_i))}{SD(log(X_i))} \tag{2}$$

"where $\rho_{XY} = Corr(log(X_i), log(Y_i))$ is the correlation between log child income and parent income and $SD(\cdot)$ denotes the standard deviation."

Method

I will be testing whether the distance between the most populous county in a Metropolitan Statistical Area (MSA) and other counties within will have a statistically significant impact on relative mobility.

Let:

M_c : Rank-rank slope measuring relative mobility in a county

d : Distance from the centroids in each county

p : Population Density

b : A dummy variable for whether a county is considered outlying or central

γ_c : Firm fixed effects for county c

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[2] In Chetty et al. (2014), commuting zones were used, however I will be using U.S. counties in place of this which is available in the Chetty et al. (2022) dataset.

$$arsinh(M_c) = \alpha_0 + arsinh(\beta_1(d)) + arsinh(\beta_2 \times |\Delta p|) + arsinh(\beta_3(d + |\Delta p|)) + \delta(b) + \gamma_c + \varepsilon_c \quad (3)$$

Data

In addition to the Chetty et al. (2022) replication data which includes the rank-rank slope [3] for each U.S. county; distance and population density data will need to be accumulated for testing.

County level data needed for the test is readily available from the U.S. Census bureau. This includes descriptions of each MSA and their counties including whether they are considered outlying or central. (U.S. Census Bureau, 2023a) Population density data can be obtained using the 2020 Decennial Census (U.S. Census Bureau, 2020) and distance data can be derived from centroids using the tigris R package. (Walker & Rudis, 2024)

Measures

Procedure

Results

Discussion

Limitations and Future Directions

Conclusion

References

Bloom, N., Han, R., & Liang, J. (2024). Hybrid working from home improves retention without damaging performance [Journal Article]. *Nature*, *630*(8018), 920–925. https://doi.org/10.1038/s41586-024-07500-2

Chetty, R., Hendren, N., Kline, P., & Saez, E. (2014). Where is the land of opportunity: The geography of intergenerational mobility in the united states. *Quarterly Journal of Economics*, *129*(4), 1553–1623. http://qje.oxfordjournals.org/content/129/4/1553.full.pdf

[3] Equation 1

Chetty, R., Hendren, N., Kline, P., & Saez, E. (2022). *Replication Data for: Where is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States* (Version V1) [dataset]. Harvard Dataverse. https://doi.org/10.7910/DVN/NALG3E

Dahl, M., & DeLeire, T. (2008). *The association between children's earnings and fathers' lifetime earnings: Estimates using administrative data* (DP 1342-08). Institute for Research on Poverty, University of Wisconsin–Madison. https://irp.wisc.edu/publications/dps/pdfs/dp134208.pdf

Ding, Y., & Ma, M. (Shuai). (2024). Return-to-office mandates. *SSRN Electronic Journal*. https://ssrn.com/abstract=4675401

Lund, S., Madgavkar, A., Manyika, J., Smit, S., Ellingrud, K., Meaney, M., & Robinson, O. (2021). *The future of work after COVID-19*. McKinsey Global Institute. https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-after-covid-19#/

Slack, T., & Jensen, L. (2020). The changing demography of rural and small-town america. *Population Research and Policy Review*, *39*(5), 775–783. https://doi.org/10.1007/s11113-020-09608-5

U.S. Census Bureau. (2020). *2020 decennial census data*. https://api.census.gov/data/2020/dec/dp

U.S. Census Bureau. (2023a). *Core based statistical areas (CBSAs), metropolitan divisions, and combined statistical areas (CSAs)* [dataset]. https://www.census.gov/geographies/reference-files/time-series/demo/metro-micro/delineation-files.html

U.S. Census Bureau. (2023b). *Means of transportation to work: Public transportation and worked from home* [American Community Survey Report]. U.S. Census Bureau. https://www2.census.gov/programs-surveys/commuting/guidance/acs-1yr/Mean-public-worked-from-home.pdf

U.S. Census Bureau. (2023c). *Percentage of workers traveling 60 minutes or more* [American Community Survey Report]. U.S. Census Bureau. https://www2.census.gov/programs-surveys/commuting/guidance/acs-1yr/Percent-60-or-more-minutes.pdf

Walker, K., & Rudis, B. (2024). *Tigris: Load census TIGER/line shapefiles*. https://doi.org/10.32614/CRAN.package.tigris

Appendix

Title for Appendix