

THE UNIVERSITY OF CHICAGO

THE RELATIONSHIP BETWEEN TRANSIT ACCESS AND
CONCENTRATED DISADVANTAGE WITHIN CHICAGO

A THESIS SUBMITTED JOINTLY TO THE FACULTY OF THE PUBLIC POLICY
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BY
DANIEL ALEXANDER WEISS

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Dedicated to my amazing support network.

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Table of Contents

ABSTRACT	7
INTRODUCTION	7
LITERATURE REVIEW	13
REDLINING WITH REGARD TO HISTORICAL TRANSPORTATION PLANNING IN CHICAGO.....	14
THE ROLE OF HOUSING POLICY IN PERPETUATING TRANSPORTATION INEQUITY	15
TRANSPORTATION INEQUITY MANIFESTED WITHIN THE TRANSIT NETWORK	16
DEINDUSTRIALIZATION’S ROLE IN SHAPING TRANSPORTATION INEQUITY	18
A GLOBAL-CITY THAT PRIORITIZED ECONOMIC GROWTH OVER CONNECTIVITY.....	19
TRAINS AS THE BEST MODE OF TRANSPORTATION FOR CONNECTIVITY	20
TRANSIT ACCESS PROVIDES A SOCIAL BENEFIT OF EXPANDING EMPLOYMENT OPPORTUNITIES	22
BETTER SOCIOECONOMIC OUTCOMES AS A SOCIAL BENEFIT FROM TRANSIT CONNECTIVITY	23
BETTER HEALTHCARE COVERAGE AS A SOCIAL BENEFIT FROM TRANSIT ACCESS	24
IMPROVED EDUCATIONAL OUTCOMES AS A SOCIAL BENEFIT FROM TRANSIT ACCESS	25
METHODOLOGY	26
DATA COLLECTION FROM NHGIS	26
INDEPENDENT AND DEPENDENT VARIABLES	26
DATA TRANSFORMATION WITHIN EXCEL FOR LATER USAGE WITHIN STATA TO RUN REGRESSIONS	27
GIS CONSTRUCTION TO ILLUSTRATE DISPARITIES IN THE FIVE DEPENDENT VARIABLES (APPENDIX)	28
GIS MODELS GENERATION USING ISOCHRONES TO ASSESS DIFFERENT TOLERANCES OF TRANSIT ACCESS	29
DIFFERENT VARIATIONS OF GENERATED MODELS.....	30
DATA	31
QGIS GENERATED ISOCHRONES (FOR REFERENCE)	32
LIMITATIONS	34
ANALYSIS	35
DISCUSSION AND POLICY RECOMMENDATIONS.....	43
ENCOURAGE TRANSIT-ORIENTED DEVELOPMENT, WHILE ALSO BEING WARY OF GENTRIFICATION.....	43
EXPANDING THE CTA ‘L’ NETWORK	44
CONVERTING THE METRA SOUTH CHICAGO BRANCH INTO AN ‘L’ LINE	45
METRA-CTA INTEGRATED FARE STRUCTURE WITHIN CITY LIMITS.....	46
EMBRACING MICRO-MOBILITY AND IMPROVING CONVENTIONAL BUS SERVICE	47

MAKING SCOOTER-SHARE SAFER..... 49
IMPROVING CYCLING INFRASTRUCTURE IN ORDER TO ENCOURAGE CYCLING AND MICRO-MOBILITY..... 51

CONCLUSION 51

CONTEMPORARY REFLECTION IN THE TIMES OF THE COVID-19 PANDEMIC..... 55

APPENDIX 57

MISCELLANEOUS FEELINGS 63

REFERENCES..... 64

Abstract

This thesis explores whether there is a relationship between transit access and concentrated disadvantage within Chicago. Using various regression models with different distance thresholds around rail stations, I was able to find a partial relationship between transit access and concentrated disadvantage within Chicago at the limited scale (0.5-mile range from a transit station), indicating that employment rate and health insurance coverage were positively related with transit access, and that minority status was negatively related with transit access. While there were some surprising results at the liberal scale (0.75-1 mile range from a transit station) and conservative scale (1.5-2 mile range from a transit station), most of the results at these scales were insignificant. The main takeaway was that it appears that transit is related to concentrated disadvantage at a smaller-scale, and that existing transit modes, notably the bus, are insufficient at overcoming the “last mile problem” and connecting individuals from transit-poor areas to the rail network that can enable these individuals to reach job opportunities, educational opportunities, and healthcare resources in other parts of the city. Recommendations center on increasing mobility options, including the improvement of existing bus services.

Introduction

Transit access is more than just trains and buses but is a whole network unto itself that fundamentally changes the social and economic dynamics of cities. In particular, public transit is perceived as a great equalizer in the sense that it transports residents, both rich and poor, long distances and enables cities to be better connected socially and spatially.¹ However, this is conditional on public transit being equally accessible to communities of different socioeconomic

¹ Mikayla Bouchard, “Transportation Emerges as Crucial to Escaping Poverty,” The New York Times (The New York Times, May 7, 2015).

backgrounds. Unfortunately, this is often not the case.² Transit access is also credited with having significant positive benefits for cities, such as better connecting individuals with greater employment jobs that match their skill sets, a wider range of educational opportunities, and additional healthcare resources.³ Yet while transit access is hailed as a great benefit to cities, and somewhat of a benchmark of many “world-class” cities, such as New York, London, Paris, Tokyo, and Chicago, there is an underlying problem of who has access to the greater transit network in the first place, and how the “last mile problem” results in certain communities being shut out from transit networks.⁴

The “last-mile problem” is a general problem for all types of transportation, as it symbolizes the final leg of transport from a distribution network to the final destination, with this portion of the journey usually being the most inefficient per unit of distance from both a time and cost perspective.⁵ Within a public transportation context, the “last mile problem” represents the challenge of bringing residents from their homes or places of work, to a public transit network, which in the context of this thesis, is Chicago’s rail network. The most common method for addressing the “last mile problem” within Chicago is the bus network, since nearly every resident has access to a local bus stop, which in theory should bridge the distance from one’s home to a transit stop for longer distance journeys.⁶ Chicago is well-known for having one of the

² Dong Liu and Mei-Po Kwan, “Measuring Spatial Mismatch and Job Access Inequity Based on Transit-Based Job Accessibility for Poor Job Seekers,” *Travel Behaviour and Society* 19 (2020): pp. 184-193, <https://doi.org/10.1016/j.tbs.2020.01.005>.

³ Samina T. Syed, Ben S. Gerber, and Lisa K. Sharp, “Traveling Towards Disease: Transportation Barriers to Health Care Access,” *Journal of Community Health* 38, no. 5 (2013): pp. 976-993, <https://doi.org/10.1007/s10900-013-9681-1>.

⁴ Eric Jaffe, “Public Transit Is Worth Way More to a City Than You Might Think,” CityLab, August 14, 2013.

⁵ Genevieve Giuliano and Susan Hanson, *The Geography of Urban Transportation*, 4th ed. (New York: The Guilford Press, 2017).

⁶ *System Map, System Map* (Chicago, IL: Chicago Transit Authority, Planning, Development & Marketing Division, 2020).

most expansive and historical transit networks in the United States.⁷ Yet, Chicago is also known for being one of the most segregated cities in the country, ranking as the 13th most segregated metropolitan area in the United States.⁸ ⁹ Given the relationship between minority poverty and urban segregation, one must question how the spatial distribution of Chicago's transit networks contributes to concentrated disadvantage and segregation.¹⁰ A cursory view at a subway map invites the question: why are there large swaths of rail transit deserts in Chicago's South and West Sides (e.g. Auburn Gresham, Chicago Lawn, and South Deering), which have predominately disadvantaged African American and Hispanic communities, whereas Chicago's North Side, which is predominately affluent and white, has a far more dense rail network? Using this question, one can then ponder whether the variation in transit accessibility between different areas of Chicago is correlated with different elements that contribute to concentrated disadvantage.

It is my goal to explore the current relationship between transit connectivity and concentrated disadvantage in Chicago, while also taking into account the historical conditions of economic entitlement and racism that have shaped its transportation and urban planning. This research is important because defining transit access is highly subjective due to its political and social implications, and I want my research to help classify transit access using a quantifiable standard that builds upon commonly accepted threshold distances and general transportation theory that is commonly accepted within urban planning. These standards include a 0.5-mile pedestrian buffer for accessing transit stops, in addition to a preference for rail-based transit for

⁷ Lori Aratani, "Chicago Remade Its 127-Year-Old Rapid Transit System. Are There Lessons for Metro?," *The Washington Post* (WP Company, August 2, 2019).

⁸ Alana Semuels, "Chicago's Awful Divide," *The Atlantic*, March 29, 2018.

⁹ Bob Goldsborough, "Chicago Is the 13th Most Segregated Metro Area in U.S., Study Finds," *chicagotribune.com* (Chicago Tribune, May 20, 2019).

¹⁰ Douglas S. Massey, "American Apartheid: Segregation and the Making of the Underclass," *American Journal of Sociology* 96, no. 2 (1990): pp. 329-357.

long-distance travel, with buses serving more effectively as localized transit that is best suited for the “last-mile problem.”¹¹

Because transit access is highly context-specific, some individuals may consider a local bus stop as “access,” whereas other individuals may only consider “access” to consist of having the ability to access the majority of the transit network in a reasonable amount of time.¹² This subjectivity can be problematic for public policy since transit accessibility is correlated with many other socio-economic factors and should accurately reflect the ways in which users use transit to move around a network on a consistent basis (e.g. using buses for short-distance trips versus using buses for long-distance trips). In particular, qualifying the entire transportation map as a form of transit access is troubling because in that case nearly every citizen within Chicago has “access” to some type of transportation within a close proximity.¹³ While this may seem like a good thing from a political perspective, since it implies some form of transportation equity, this is far too simple of a deduction—access to a form of transportation does not necessarily translate to access to the greater transportation network, which is necessary for accessing employment opportunities, healthcare resources, and education centers elsewhere in the city. Despite every citizen in Chicago being able to technically access any other point in the transportation network, many of the commutes that require multiple transfers and/or traveling lengthy distances on a bus before an individual reaches a train station, are not realistic transportation options for everyday commuting, either because these commutes require too much time for one’s schedule or the cumulative stress, and subsequent damage to one’s mental and physical health, make these

¹¹ Genevieve Giuliano and Susan Hanson, *The Geography of Urban Transportation*, 4th ed. (New York: The Guilford Press, 2017).

¹² Katrin Lättman, Lars E. Olsson, and Margareta Friman, “A New Approach to Accessibility – Examining Perceived Accessibility in Contrast to Objectively Measured Accessibility in Daily Travel,” *Research in Transportation Economics* 69 (2018): pp. 501-511, <https://doi.org/10.1016/j.retrec.2018.06.002>.

¹³ *System Map, System Map* (Chicago, IL: Chicago Transit Authority, Planning, Development & Marketing Division, 2020).

commutes unsustainable.¹⁴ In other words, a cursory look at the entire transit network map's coverage won't accurately depict the vast differences in commuting time using different modes of transit.

Transit access influences many different socio-economic factors in cities, including the ability to pursue employment opportunities, educational outcomes, and other cultural events.¹⁵ In addition, transit access is part of a bigger movement involving infrastructure equity, in which cities are encouraged to invest resources in disadvantaged communities that have long suffered from a lack of investment and attention from local and state governments.¹⁶ Because capital projects involving transit are costly and often come at the expense of other capital projects, it is important for cities to prioritize projects that will optimally benefit increasing transit access, since transit access has so many other social benefits that are not available to individuals that live in transit-poor areas. As part of my inquiry, I build on existing research and literature that demonstrate both the history and current trajectory of transit inequity in Chicago, with previous governments, notably Mayor Richard M. Daley's administration, prioritizing a business-orientated strategy with transit development being used to strengthen and expand the urban downtown core. I then use the pre-existing research to shift towards my own research in GIS and STATA to demonstrate the contemporary relationship between inequitable transit access and concentrated disadvantage.

Starting with an analysis of Woodlawn and Englewood performed by Alaa Mukahhal, my goal is to show how the effects of modernist transportation planning in the 20th century

¹⁴ Annette Schaefer, "Commuting Takes Its Toll," *Scientific American* (Scientific American, October 1, 2005).

¹⁵ Gwendolyn Y. Purifoye, "Transporting Urban Inequality Through Public Transit Designs & Systems," *City & Community* 16, no. 4 (March 2017): pp. 364-368, <https://doi.org/10.1111/cico.12266>.

¹⁶ Genevieve Giuliano and Susan Hanson, *The Geography of Urban Transportation*, 4th ed. (New York: The Guilford Press, 2017).

dramatically changed urban neighborhoods, with suburbanization, redlining, and regressive public transit priorities resulting in the economic deterioration of African American and Hispanic working-class communities within Chicago, as these communities were disconnected from the transportation grid. This research demonstrates how public transit access has been insufficiently implemented in disadvantaged neighborhoods within Chicago towards the turn of the century. In particular, I highlight the impact of Mayor Richard M. Daley's policies and how his vision for Chicago to exist as a "Global City" resulted in capital rail projects having an emphasis on addressing the high-profile economic development of the city, more so than the economic equity of connecting deindustrialized working-class communities with the emerging and thriving economy that was based in the downtown core. I also use pre-existing research to demonstrate how the transition from a public housing model in the 1990's towards a voucher model resulted in recipients relocating from transit rich areas where the housing projects were, to transit poor areas, as the demolition of the housing projects enabled these neighborhoods to develop and gentrify, resulting in voucher recipients being unable to afford to stay in the transit-rich neighborhoods around the former housing projects.

While there are many layers that can explain how the current transit network and spatial distribution of Chicago residents came to be, the essential problem is that the legacy of transit and urban planning has resulted in a transit network that appears to insufficiently serve working-class African American and Hispanic neighborhoods in Chicago's West and South Sides. The goal of my research is to explore the link between concentrated disadvantage and transit access, by looking at various proxies that are commonly associated with quantifying concentrated disadvantage, such as employment, educational attainment, healthcare coverage, etc. In my analysis, I find a negative relationship between proximity to transit access and concentrated

disadvantage, and support for the argument that gentrification contributes to transportation inequity. I then use these results to make various policy recommendations with the goal of expanding transit access, increasing the options to better address the “last mile problem” using emerging micro-mobility solutions, in addition to arguing for a solution to better integrate the fare structure for the CTA and Metra into a unified Ventra program.

Literature Review

Prior research demonstrates how transportation planning practices have inadequately considered the socioeconomic ramifications for African American and Hispanic neighborhoods in Chicago’s South and West Sides, and have contributed to contemporary problem of transportation inequity. This research will show how swaths of working-class African American and Hispanic neighborhoods came to be disadvantaged through deindustrialization, redlining, disinvestment, and insufficient market-based approaches to social assistance. This research will also show how transit access in the past few decades has been seen more as a tool for economic development, more so than to remedy transportation deserts and connect deindustrialized, disadvantaged neighborhoods with new economic opportunity elsewhere in the city and serve as a tool of investment in less-developed communities. I will also use pre-existing research to substantiate the various proxies I use to quantify concentrated disadvantage by individually demonstrating how transit access will be shown to have various associated social benefits, including higher access to employment opportunities, educational opportunities, and healthcare resources.

Redlining with Regard to Historical Transportation Planning in Chicago

While the policy of redlining has had a pervasive impact on the overall spatial layout of segregation and concentrated disadvantage throughout various American cities, redlining has had a direct impact on transportation policy within Chicago. According to research performed by Alaa Mukahhal, the practice of redlining in Englewood and Woodlawn was one of the key factors behind the economic decline of these communities, with the long-term result being the reduction in quality of Green Line service.¹⁷ This was especially tragic for Englewood, which had been a historic economic hub for African American businesses during the 20th Century. While the Green Line originally had 16 stations between the Jackson Park and Englewood branches, the decades of disinvestment and economic disadvantage within Englewood and Woodlawn resulted in transit cuts to Green Line service due to lower ridership figures. In the 1990's, the CTA closed all but four stations on the Jackson Park and Englewood branches, and demolished the Green Line infrastructure past Cottage Grove Avenue. By reducing the length of the Green Line and closing multiple stops, the CTA effectively prevented these communities from having the opportunity to once again experience transit-oriented development in the future, since the train line had been instrumental in establishing these communities prior to the redlining era. In a cruel twist of fate, the planned Barack Obama Presidential Center in Jackson Park would have been directly served by the former terminus of Green Line, had the CTA never demolished the Jackson Park branch past Cottage Grove in 1997.¹⁸ The CTA currently has no plans to rebuild the Green Line back to its former terminus, despite there being tremendous

¹⁷ Mukahhal, Alaa. 2017. "Examining the Impact of Residential Segregation on Rapid Transit Development in Chicago's South Side."

¹⁸ Mary Wisniewski, "Ghost of Old 'L' Branch Haunts Obama Library Project," Chicago Tribune, March 19, 2018.

public pressure for the Center to act as a hub for economic and communal development in Woodlawn.¹⁹

The Role of Housing Policy in Perpetuating Transportation Inequity

In addition to redlining, the spatial make up of Chicago neighborhoods has been affected by the expansion of Chicago's voucher programs during the past few decades as the city attempted to transition from a public housing model to a market-based voucher model.²⁰ This may have resulted in low-income African Americans migrating to transit-poor neighborhoods, rather than remaining in transit-rich neighborhoods where the housing projects were constructed. According to research performed by Deirdre Oakley and Keri Burchfield, the demolition of public housing projects and subsequent replacement with mixed-income housing, resulted in most displaced people on vouchers not being able to move back to their neighborhoods because of a lack of units and rising rents due to new real estate development and gentrification.²¹ In addition, racial discrimination on the part of landlords left many voucher recipients unable to secure apartments outside of high-poverty areas, with higher percentages appearing to concentrate in the far-West and South Sides of the city, both of which are transit deserts.

It appears that both market economics (since the demolition of the housing projects enabled the surrounding neighborhood to develop) combined with systemic racism that was inherent in the voucher system may have left these individuals in a less advantageous position than they were in when the housing projects were in place. Oakley and Burchfield call this

¹⁹ AJ LaTrace, "CTA Has 'No Plans' to Extend Green Line to Jackson Park," *Curbed Chicago*, August 18, 2017.

²⁰ Maya Dukmasova and Meribah Knight, "The CHA's 'Supervoucher' Program: a Desegregation Strategy That Never Was," *Chicago Reader* (Chicago Reader, May 22, 2020).

²¹ Deirdre Oakley and Keri Burchfield, "Out of the Projects, Still in the Hood: The Spatial Constraints on Public-Housing Residents' Relocation in Chicago," *Journal of Urban Affairs* 31, no. 5 (2009): pp. 589-614.

migration a “lateral” move, since it appears that these individuals traded one highly disadvantaged neighborhood for another, which is typical in a transit poor area, far away from the economic prosperity in the urban core. The unseen consequences of the voucher system demonstrate the connection between public housing and the value of land, which is highlighted by Mary Pattillo in her book *Black on the Block: The Politics of Race and Class in the City*. While Pattillo was concerned about how the economics of high land prices in affluent, whiter parts of Chicago resulted in public housing being constructed mostly on cheaper land in poor/working-class neighborhoods, Oakley and Butchfield showed that the connection between public housing and vouchers holds true, and that the housing projects were demolished partially so that the land they occupied, in addition to the surrounding neighborhood, could be developed.²²

Transportation Inequity Manifested within the Transit Network

While it is common to look at transportation inequity at the macro-scale through the use of maps and other economic indicators, it is also important to note how there are various inequities at the micro-scale within transportation networks. With regard to social interaction, ethnographic research performed by Eva Swyngedouw demonstrates the ways in which Chicago’s residential segregation has a profound effect on the de-facto social segregation amongst riders on the Red Line.²³ Swyngedouw notes riders of the same race tend to cluster together and demonstrate a sense of homophily with regard to sitting next to one another and helping one another (e.g. picking something up that someone else dropped or removing an item

²² Mary Pattillo, *Black on the Block: the Politics of Race and Class in the City* (Chicago: The University of Chicago Press, 2008).

²³ Eva Swyngedouw, “The Segregation of Social Interactions in the Red Line L-Train in Chicago,” *Symbolic Interaction* 36, no. 3 (October 2013): pp. 293-313, <https://doi.org/10.1002/symb.64>.

from an adjacent chair). Swyngedouw also notes how the social norms change between the predominately African American South Side and predominately whiter and wealthier North Side, with there being more noise and interactions along the South Side, and more solitary behavior on the North Side. Swyngedouw concludes that this divergence in behavior is a likely consequence of spatial segregation. This research is important for my work because it complicates the commonly held idea that mass transit is an equalizing experience where riders of all races and socioeconomic backgrounds can sit side-by-side and come together as one. While mass transit is equalizing in the sense that it can be diverse, Swyngedouw's research demonstrates ways in which there is a subconscious racial bias amongst individual units of riders and connects to other research that describes the role of other service inequalities within Chicago mass-transit. The social norms that accompany racial and class segregation within Chicago's urban environment appear to be scaled-down and manifested within the transit network.

Qualitative research performed by Gwendolyn Purifoye demonstrates the vast differences in station quality along the Red Line, and these differences align with the racial composition of the ridership at different stations.²⁴ By comparing the two terminuses of the Red Line, Purifoye notes how the southern terminus, 95th-Dan Ryan, which serves a predominately African American populace, has no benches for the adjoining bus depot and is surrounded by trash dumpsters which is especially problematic during the summer months, due to the flies and odor. In comparison, the northern terminus, Howard, which serves a predominately white populace, has benches at the bus depot, and surrounding shops and restaurants. Purifoye argues that this disparity in service quality is representative of "transportation racism"—the concept that transportation access is inequitably used to limit the mobility of certain groups—and manifests

²⁴ Gwendolyn Y. Purifoye, "Transporting Urban Inequality Through Public Transit Designs & Systems," *City & Community* 16, no. 4 (March 2017): pp. 364-368, <https://doi.org/10.1111/cico.12266>.

itself in other ways, such as poorer minority communities being served with older and dirtier buses, less frequent scheduling, and crumbling physical structures. Purifoye also notes how the lack of transit availability for minority residents in the South and West Sides of Chicago reinforces segregation and social distancing, because these individuals are not able to access social and cultural events in the downtown core, such as festivals, parades, and Cubs games, which are unifying events for the city's population.

Deindustrialization's Role in Shaping Transportation Inequity

In addition to a legacy of racism, Chicago has undergone a significant economic transformation in the past few decades, as it has effectively transitioned from a Midwestern industrial hub, to a dominant service-sector economy that is primarily centered in the downtown core.²⁵ As a result, many of the outer neighborhoods in South Side and West Side that were once thriving during the 20th Century have fallen on hard times, as the lack of steel mills and factories have left these communities without a localized economic engine. According to research performed by Stephanie Farmer, Chicago became obsessed with developing a "Global City" image of itself, where instead of using public funds to increase access to working-class, minority communities that lived in transit-poor areas, the city dedicated funds towards enhancing the downtown core.²⁶ In particular, Mayor Richard M. Daley believed that the city had to be entrepreneurial and attractive to the businesses community and tourists alike, which is why the city spent considerable sums of public funds on the development of Millennium Park, Navy Pier, Soldier Field, McCormack Place, and the Lakefront, along with considerable growth in available

²⁵ Terry N Clark, "Trees and Real Violins: Building Post-Industrial Chicago," (2000).

²⁶ Stephanie Farmer, "Uneven Public Transportation Development in Neoliberalizing Chicago, USA," *Environment and Planning A: Economy and Space* 43, no. 5 (2011): pp. 1154-1172, <https://doi.org/10.1068/a43409>.

downtown office space and luxury residential housing.²⁷ While Farmer concedes that Mayor Daley's pro-growth strategy has solidified the city as a regional powerhouse in the national and global economy, she still argues that the lack of an expanded transit network limits the city's potential since many disadvantaged communities are excluded from the economic prosperity that is centered in the downtown core. In a sense, I perceive that Chicago under Mayor Daley was being constructed for the businessman, tourist, and outside investor, at the expense of minority and disadvantaged communities in the deindustrialized parts of Chicago.

A Global-City that Prioritized Economic Growth over Connectivity

With regard to transit expansion, Mayor Daley was supportive of transit projects that benefitted the downtown core, rather than projects that would have better addressed transit-poor regions of the city.²⁸ One of Mayor Daley's goals was for an airport express train, which would have operated as a premium express service using the Blue Line trackage and would result in a reduction of service for the regular Blue Line customers, due to the need to accommodate the faster airport trains. According to Farmer, this demonstrated a clear goal by city planners to prioritize affluent businesspeople and tourists over the everyday needs of disconnected residents. Mayor Daley also pushed for a Circle Line route with the intention of expanding economic growth outside of the Loop by creating a proposed Central Area, which the Circle Line would circumscribe. The Circle Line would have connected the Red Line at the North/Clyborn to the Orange Line at Ashland/Archer using a new right-of-way along Ashland Avenue. According to CTA officials, the Circle Line would serve as a catalyst for private real estate development.

²⁷ Costas Spirou, "Cultural Policy and Urban Restructuring in Chicago," in *Tourism, Culture, and Regeneration* (Wallingford, Oxfordshire, UK: CABI Pub., 2006), pp. 123-131).

²⁸ Stephanie Farmer, "Uneven Public Transportation Development in Neoliberalizing Chicago, USA," *Environment and Planning A: Economy and Space* 43, no. 5 (2011): pp. 1154-1172, <https://doi.org/10.1068/a43409>.

Meanwhile, the Mid-City Transitway, a separate transit line that had been languishing on the planning board since the 1990's was promoted leaders on the West Side of Chicago as an alternative to the Circle Line. The Mid-City Transitway would have had 3.5 times the length of track as the Circle Line and connected various working-class African American, Hispanic, and Polish communities on the West Side of Chicago along Cicero Avenue, while still being roughly equivalent in cost to the Circle Line. While the CTA deemed the proposed line to be economically viable, they decided to downgrade the route from a rail line to a rapid bus transit (BRT) corridor (which has still yet to be implemented). Farmer argues that this solution is representative of a trend in environmental justice literature where middle-class white communities have access to rail lines, and African American, Hispanic, and working-class neighborhoods get downgraded with rapid bus transit.²⁹ In this sense, a pro-growth business strategy to expand the Loop further out perpetuated elements of transportation racism for Chicago's working class and minority neighborhoods on the West Side.

Trains as the Best Mode of Transportation for Connectivity

This brings me to the crux of my problem. If we look at a service map for the CTA, nearly every citizen has access to a bus. But although every citizen has access to a bus and can get from A to B in some period of time, many of these commutes require too much of a time cost in order to make these commutes viable on a consistent basis, as is evidenced by Chicago having the highest average commuting time out of all American cities, according to compiled Census data.³⁰ While the prior literature demonstrates various inequities of the 'L,' it is still important to

²⁹ Bus Rapid Transit is the use of limited stop buses that usually have a dedicated right-of-way traffic lane and can potentially be fitted with traffic signal prioritization. BRT is usually used as a substitute for a rail line corridor.

³⁰ Kelly Kane, "Study Confirms: Chicagoans Have the Nation's Worst Commute," NBC Chicago (NBC Chicago, April 5, 2017).

note that a subway line is a more efficient and effective mode of transportation than a bus in transporting individuals farther and faster. This is due to trains having a faster operating speed and more reliable headways of service.³¹ The main problem with buses as a mode of transportation is demonstrated by quantitative research performed by Carlos Daganzo which demonstrates the problems in keeping buses on a reliable schedule, due to a problem called “bunching.”³² Essentially the problem is that if a single bus is significantly delayed, then it results in more riders waiting for the bus further down the line, and consequently the bus begins to fall back on its schedule due to the negative feedback loop of more passengers boarding the bus. Eventually the bus falls behind far enough that it bunches with the bus that is scheduled behind it. This creates problems for other parts of the route, since the buses are not equally spaced and result in inconsistent service for passengers, which contributes to rider frustration and longer commuting times. This is why it is common to be waiting at a bus stop for fifteen minutes and then suddenly see three buses appear in quick succession.

In addition to the problem with “bunching,” buses have other negative characteristics that make them more suited for local short-distance transportation. Buses are ideal for short distances because they generally have frequent stops and low service speeds, which makes them useful for connecting passengers to faster forms of transportation, such as rail transport, for longer commuting distances.³³ Giuliano and Hanson argue buses can serve the “last-mile(s) problem” but shouldn’t be used for longer distance commutes that are better served by rail-based transit modes. In addition, Giuliano and Hanson highlight that Bus Rapid Transit (BRT), which was

³¹ Genevieve Giuliano and Susan Hanson, *The Geography of Urban Transportation*, 4th ed. (New York: The Guilford Press, 2017).

³² Carlos F. Daganzo, “A Headway-Based Approach to Eliminate Bus Bunching: Systematic Analysis and Comparisons,” *Transportation Research Part B: Methodological* 43, no. 10 (2009): pp. 913-921, <https://doi.org/10.1016/j.trb.2009.04.002>.

³³ Genevieve Giuliano and Susan Hanson, *The Geography of Urban Transportation*, 4th ed. (New York: The Guilford Press, 2017).

proposed for Chicago's West Side as an alternative to the proposed Mid-City Transitway, is also inadequate for long-distance travel, since BRT is still affected by congestion and can never match the speed or capacity of rail-based transit. In addition, Giuliano and Hanson highlight how rail-based transit represents a commitment to neighborhoods that can serve as an anchor for residential, commercial, and employment development, since rail projects are expensive capital improvements that are usually permanent. Bus service on the other hand can be altered, whether it is through the modification of bus routes, changing the frequency of service, or adding/removing bus lanes. As a result, rail transit is generally considered a superior form of transportation, due to its higher operating speed, greater reliability, and permanence (even though the aforementioned case study of Woodlawn and Englewood demonstrate that this is not always guaranteed).

Transit Access Provides a Social Benefit of Expanding Employment Opportunities

In trying to establish why transit access is important for other social benefits, it is important to note the positive relationship between transit access and employment access. Quantitative research performed by Inshu Minocha et al., demonstrates that there is a direct relationship between transit access and employment opportunities in disadvantaged Chicago neighborhoods, such as Englewood, Woodlawn, Chatham, and Grand Crossing.³⁴ Inshu Minocha et al. were able to generate an index of transit quality (TAI) for each neighborhood by analyzing the frequency of service, hours of operation, and the range of coverage for each form of transportation. In addition, they created an index for employment accessibility by generating an

³⁴ Inshu Minocha et al., "Analysis of Transit Quality of Service and Employment Accessibility for the Greater Chicago, Illinois, Region," *Transportation Research Record: Journal of the Transportation Research Board* 2042, no. 1 (2008): pp. 20-29, <https://doi.org/10.3141/2042-03>.

algorithm that took into account origin and destination specific factors, an impedance parameter, and travel times between destinations.

However, while I agree with their general results (that the disconnect between access and employment accessibility is emblematic of insufficient connectivity to transit for employment purposes), I believe that their methodology can't be adequately applied for neighborhoods in South Side, Chicago. This is due to their index taking into account the frequency of service, which in these communities, mostly came in the form of a bus. As mentioned earlier with the problems of bus "bunching" and unreliable service, buses are an inferior method of transport for employment accessibility in the city. This problem is evident in their methodology for figuring out employment accessibility, which included a time component within the equation. This disconnect between transit accessibility and employment opportunity is due to frequency of service and time of travel not being directly comparable, especially in instances where the bus ride is fast, but the waiting period for the bus is long. My research attempts to expand on their work within disadvantaged communities, by restricting transit access by bus from nearby train stations using set distance thresholds. By limiting my definition of transit access to the rail network, using buses only for the "last mile problem," I can demonstrate which communities have access to the greater transportation network, and thus greater employment opportunities in other parts of the city.

Better Socioeconomic Outcomes as a Social Benefit from Transit Connectivity

By analyzing welfare recipients in Los Angeles, a city that is fairly comparable to Chicago from a population and de-industrialization standpoint, Paul Ong and Douglas Houston argue that the "spatial" mismatch of job skills translates into a geographic barrier where welfare

recipients have to travel further to find jobs, even in instances where they live in transit rich environments.³⁵ This is because welfare recipients tend to have poor basic skills, and thus have limited job opportunities available to them. In addition, nearly 40% of recipients don't have access to a car and have to rely on public transit or some form of ride from a family member or friend. Their research found that for every ten additional transit stops, there was a 2-3 percent increase in transit usage, with a 3-4 percent increase in employment. This was sufficient for Ong and Houston to conclude that expanding and improving transit service can help welfare recipients take advantage of more employment opportunities that match their skill set. While I am interested in qualifying what is considered transit access, by focusing primarily on rail transit and limited bus connections at either end, I feel that this research is useful for substantiating my claims that increased access to the greater transportation network is essential for accessing additional employment opportunities.

Better Healthcare Coverage as a Social Benefit from Transit Access

In addition to employment opportunities, greater transit access may also be linked with access to quality healthcare. According to research performed by Samina Syed et al., patients with transportation barriers experience a higher burden of disease because they experience delays in clinical intervention and are more likely to experience worse healthcare outcomes.³⁶ In particular, these transportation barriers were also correlated with higher rates of poverty. Syed et al. argue that it is, therefore, logical to address transportation barriers as a means to reduce

³⁵ Paul M. Ong and Douglas Houston, "Transit, Employment and Women on Welfare1," *Urban Geography* 23, no. 4 (2002): pp. 344-364, <https://doi.org/10.2747/0272-3638.23.4.344>.

³⁶ Samina T. Syed, Ben S. Gerber, and Lisa K. Sharp, "Traveling Towards Disease: Transportation Barriers to Health Care Access," *Journal of Community Health* 38, no. 5 (2013): pp. 976-993, <https://doi.org/10.1007/s10900-013-9681-1>.

negative healthcare outcomes. Given the immense cost of healthcare in the United States, combined with pressure from public health experts to better address preventative healthcare access, the public health benefits that accompany transit expansion is yet another social benefit that I will highlight in my analysis of transit access. While there aren't many health metrics within the Census or American Community Survey (ACS) database, my research used the ratio of uninsured individuals (by Census block-group) as a proxy to determine healthcare resources. Although there are many components that determine why an individual has health insurance (including cost and availability), access to quality medical care in distant locations of the city through an efficient transit system provides an incentive to obtain and utilize health insurance.

Improved Educational Outcomes as a Social Benefit from Transit Access

Another potential benefit of increased transit access is the ability to enroll in better schools. Research performed by Andrew Dustan and Diana Ngo attempts to examine the connection between transit expansion in Mexico City with the Suburban Train and high school choices and assignments.³⁷ Their research found that high performing students that were far from the urban core had access to more school choices and increased the likelihood that they would enroll in elite high schools. Their research demonstrates the ways in which increased transit access can potentially connect gifted students with education opportunities that are elsewhere in the city. While I have my reservations about directly comparing Mexico City with Chicago, it is challenging to find a differences-in-differences study that has been recently performed in the U.S., because there has been relatively minimal expansion in commuter rail infrastructure in the

³⁷ Andrew Dustan and Diana K.I. Ngo, "Commuting to Educational Opportunity? School Choice Effects of Mass Transit Expansion in Mexico City," *Economics of Education Review* 63 (2018): pp. 116-133, <https://doi.org/10.1016/j.econedurev.2018.01.006>.

past few decades. Nonetheless, this research is important for my application within Chicago, since Chicago has a diverse and widespread student population that may be able to access distant magnet schools through the utilization of the transit network.

Methodology

Data Collection from NHGIS

In order to show a connection between contemporary concentrated disadvantage and transit access, I had to use available data to quantify what concentrated disadvantage meant. For my demographic data collection, I downloaded American Community Survey (ACS) data from the National Historical Geographical Information Systems (NHGIS) using the five-year summary from 2013-2017. Using the block-group level, I downloaded the following tables: “race” (NHGIS code: AHY2), “attainment for the population 25 years and over” (NHGIS code: AH04), “median household income in the past 12 months *NHGIS code: AH1P), employment status for the population 16 years and over (NHGIS code: AH3P), and types of health insurance coverage by age (NHGIS code: AH6I). I also downloaded the corresponding block-group shapefiles from NHGIS, so that I could later match up the demographic data with the shapefile data within QGIS.

Independent and Dependent Variables

Dependent Variables	<ul style="list-style-type: none"> • Ratio of Transit Access Coverage for Census Block-Groups.
Independent Variables	<ul style="list-style-type: none"> • Median Household Income for Census Block-Groups.

	<ul style="list-style-type: none"> • Ratio of Block-Group Population with complete High School education and/or higher education attainment. • Ratio of Block-Group Population with Healthcare Coverage. • Ratio of Block-Group Population that is considered part of a minority group. • Ratio of Block-Group Population that is employed.
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Data Transformation Within Excel for Later Usage within STATA to Run Regressions

Using the downloaded table, I then compiled an Excel spreadsheet. Within the spreadsheet I determined the ratio of minorities in each block-group by subtracting the number of whites from the population of each block-group and divided the resulting value by the population of each block-group. The reason why I couldn't sum the other minority labels was because some individuals considered themselves biracial, which resulted in the total sum of each sub-group being greater than the total population for each block-group. For my education attainment ratio, I summed the number of high school graduates, college graduates, and graduate school graduates, and divided the total value by the total population greater than 25 years old in each block-group. For median household income, I didn't have to transform any of the data, with the exception of converting the values from string values to numerical values later on in my project. For employment status, I divided the number of individuals in the labor force by the total population for each block-group to generate a labor force ratio. And finally, for my healthcare data I summed the total number of uninsured individuals and divided the resulting value by the total block-group population, which gave me a ratio for uninsured individual for each block-group.

GIS Construction to Illustrate Disparities in the Five Dependent Variables (Appendix)

For the GIS portion of this project, I first loaded in OpenStreetMap as the base layer, followed by the block-group shapefile from NHGIS. Because I downloaded shapefile data for all of Illinois, I then used a Query builder function to filter out block-groups that were outside of Cook County by using the FIPS code for Cook County as a condition. I then loaded a shapefile from the Chicago Data Portal that showed the boundaries of Chicago and used this boundary to then remove block-groups that were outside of the city by manually selecting each one and deleting them by hand. I chose this method over a clip function because the city boundaries did not line up exactly with each block-group, so there would have been a lack of precision. Because Chicago has two independent enclave townships, Harwood Heights and Norridge, I had to manually remove block-groups within their boundaries as well. I decided that it was appropriate to remove these communities because I am concerned with transportation in Chicago, and these two communities are technically not part of the city. Now that my boundaries were set, I uploaded the excel block-group data and linked the data to each block-group shapefile by using the GISJOIN identifier.

With the boundaries and data settled, my focus shifted towards generating spatial models. For my first step, I uploaded the shapefiles for the 'L' stations and lines and Metra stations and lines. Because the Metra lines extend far into the suburbs and beyond (the Metra Union Pacific-North line terminates all the way up in Kenosha, Wisconsin), I eliminated the stops that were more than a half mile outside of the city boundaries, since I wanted my maps to be Chicago-centric. I kept stations that were within a half-mile of the city's borders because I thought that there may be situations where a Chicago resident living exactly on the border may find it more convenient to use a station that is barely outside of city limits. I then used the ratios from the five

aforementioned demographic characteristics to create greyscale maps, all which showed glaring regional discrepancies between the North Side and South/West Sides. While I initially used chlorophyll maps, all the final published maps used a generic template featuring a grayscale overlaid on a black background. Using this template, I generated two different series of maps, one with the transit lines overlaid, and the other series with the transit lines omitted, so that the maps could be compared side-by-side. My intention with the side-by-side maps for each independent variable was to show that there are visual discrepancies for certain demographics between the communities with transit access and the communities without transit access.

GIS Models Generation Using Isochrones to Assess Different Tolerances of Transit Access

With these maps completed, my goal shifted towards generating six different regression models: 1) 'L' network with a conservative tolerance for the "last mile problem," 2) 'L' network and Metra network with a conservative tolerance, 3) 'L' network with a liberal tolerance for the "last mile problem," 4) 'L' network and Metra network with a liberal tolerance, 5) 'L' network with a limited tolerance for the "last mile problem," and 6) 'L' network and Metra network with a limited tolerance. To create each model, I first had to decide how to define a limited, liberal, and conservative tolerance by experimenting with different isochrone buffers within QGIS using the ORS Tools plugin. I decided that the 2-minute buffer was appropriate for a conservative tolerance, since this roughly corresponded to 0.75-1 miles in distance traveled by a high-gross weight vehicle (e.g. a city bus). Similarly, I felt that the 4-minute buffer was appropriate for a liberal tolerance, since this roughly corresponds to a 1.5-2-mile range from the nearest rail station. Because the limited tolerance was a later addition that was meant to represent walking from a rail station, I used a 1-minute buffer, since this corresponded to 0.5-miles in distance. By

creating a limited, liberal and a conservative tolerance for isochrones, I then calculated the overlapping area for each block-group for the four different transit models and used the intersecting area to then calculate a percentage for the total amount of area of a block-group that was covered by transit. By computing a percentage for transit coverage for each block group, I was then able to run a multivariable regression using STATA, with transit coverage being the dependent variable and the five aforementioned demographic characteristics being the independent variables, in order to test the connection between transit access and concentrated disadvantage.

Different Variations of Generated Models

CTA ‘L’ Only Models	Combined (CTA ‘L’ and Metra) Models
1-Minute “Limited” Isochrone using Bus (0.5-Mile Range)	1-Minute “Limited” Isochrone using Bus (0.5-Mile Range)
2-Minute “Conservative” Concentric Isochrone using Bus (0.75-1 Mile Range)	2-Minute “Conservative” Concentric Isochrone using Bus (0.75-1 Mile Range)
4-Minute “Liberal” Concentric Isochrone using Bus (1.5-2 Mile Range)	4-Minute “Liberal” Concentric Isochrone using Bus (1.5-2 Mile Range)

Data

In order to study disadvantage with regard to transit access, my models use demographic data from the US Census Bureau to measure different contributing factors of concentrated disadvantage using multivariable regression analysis. In addition, because this project utilizes spatial data through Quantum Geographical Information Systems (QGIS) software, I am relying on publicly accessible shapefiles to help assist with my spatial models. As mentioned in my literature review section, I feel that pre-existing research suggests that the following Census metrics could be used as proxies to assess concentrated disadvantage: median household income, ability to access healthcare (with insurance coverage as a proxy), high school attainment, minority status, and labor force participation. Because I am trying to find applicable data at the block-group level, I am using the 2013-2017 American Community Survey (ACS) 5-year summary. My reasoning for this is that using the 5-year summary, instead of the 2010 Census, puts me in a better situation for analyzing the current problem of transit access. In addition, I am concerned that the 2010 Census would be inapplicable to my model, since the 2010 Census was performed during the height of the Great Recession, and Chicago has seen tremendous economic growth and change throughout the previous decade during the period of economic recovery, which may be better reflected in the ACS 5-year data. For the QGIS component of my research, I generated my models using transit stop and transit line shapefiles from the Chicago Data Portal. These shapefiles included CTA 'L' stations, CTA bus stops, Metra stations, CTA 'L' lines, and Metra lines.

OGIS Generated Isochrones (For Reference)

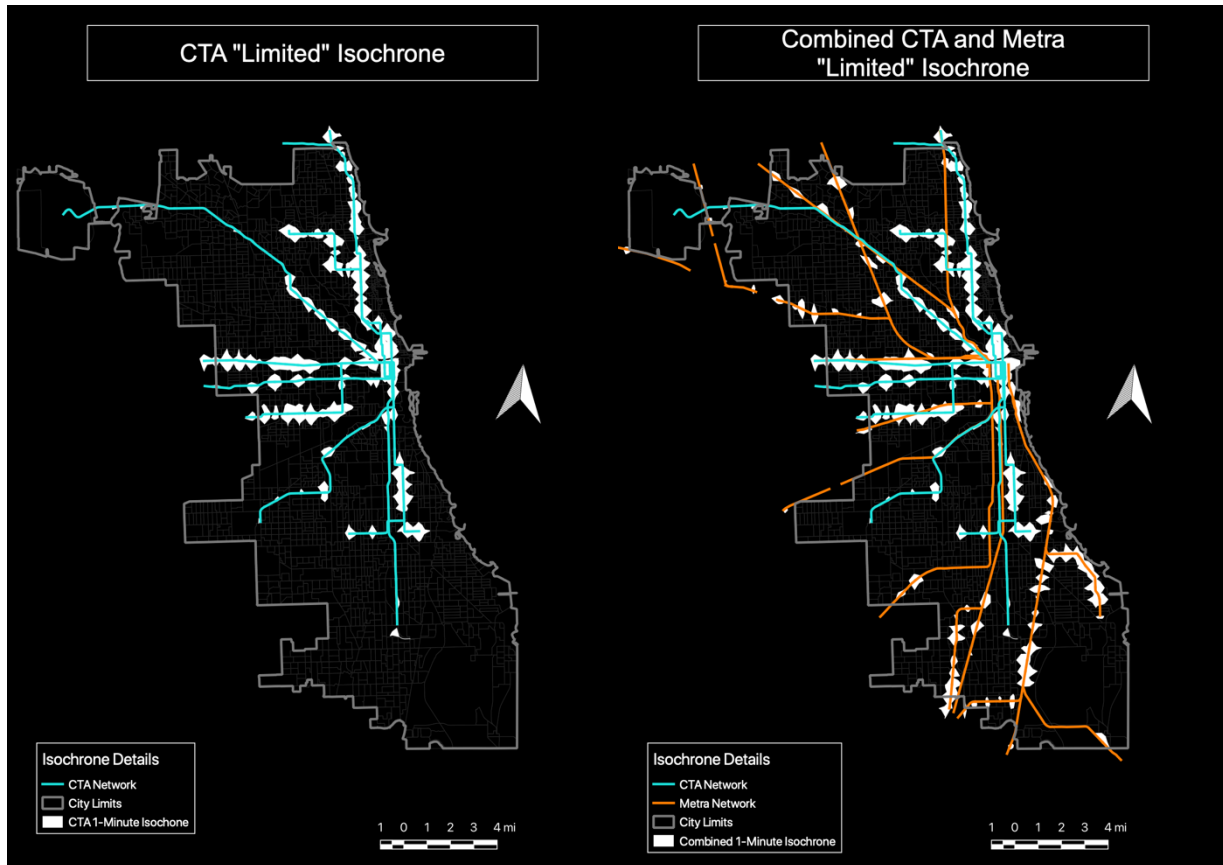


Figure 1: 1 Minute "Limited" Isochrone. Roughly Equates to a 0.5-Mile Walking Distance.

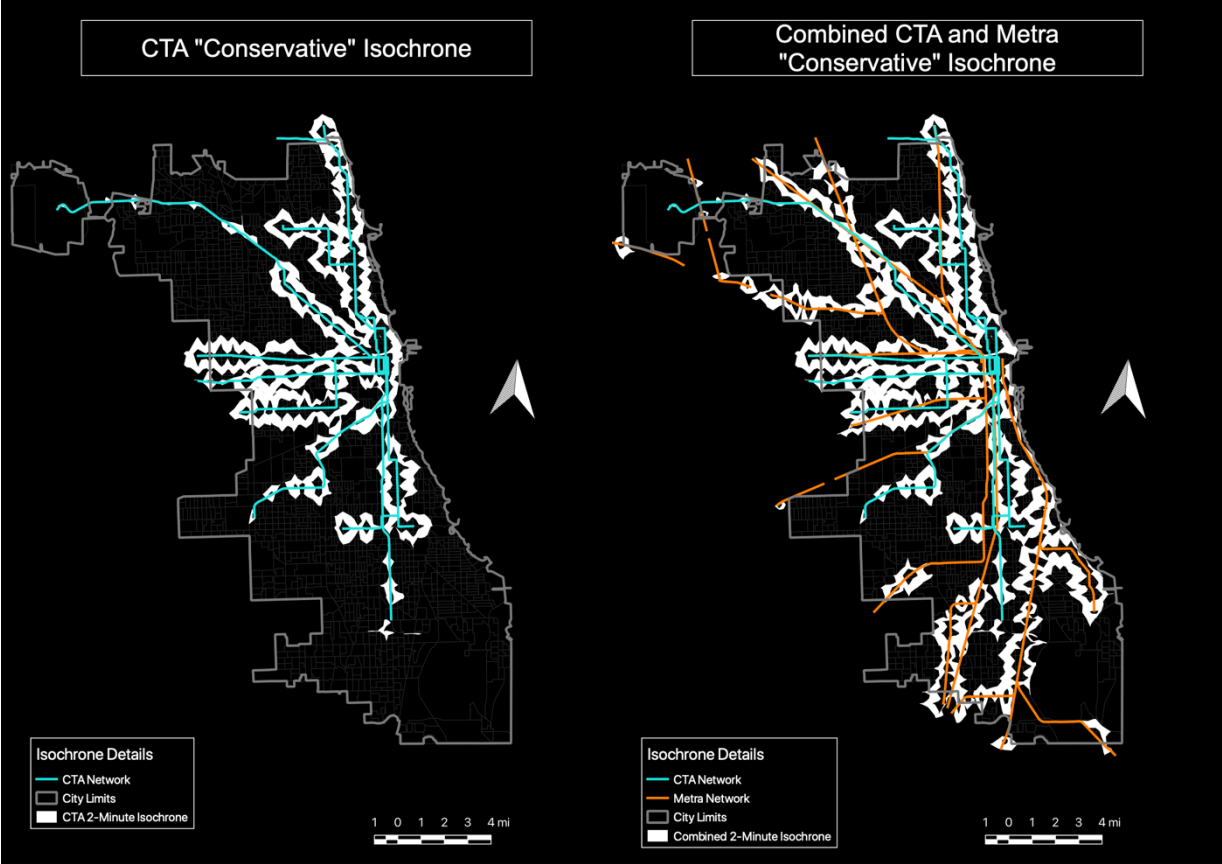


Figure 2: 2-Minute Concentric "Conservative" Isochrone. Roughly equates to a 0.75-1 Mile bus ride for the "Last Mile Problem."

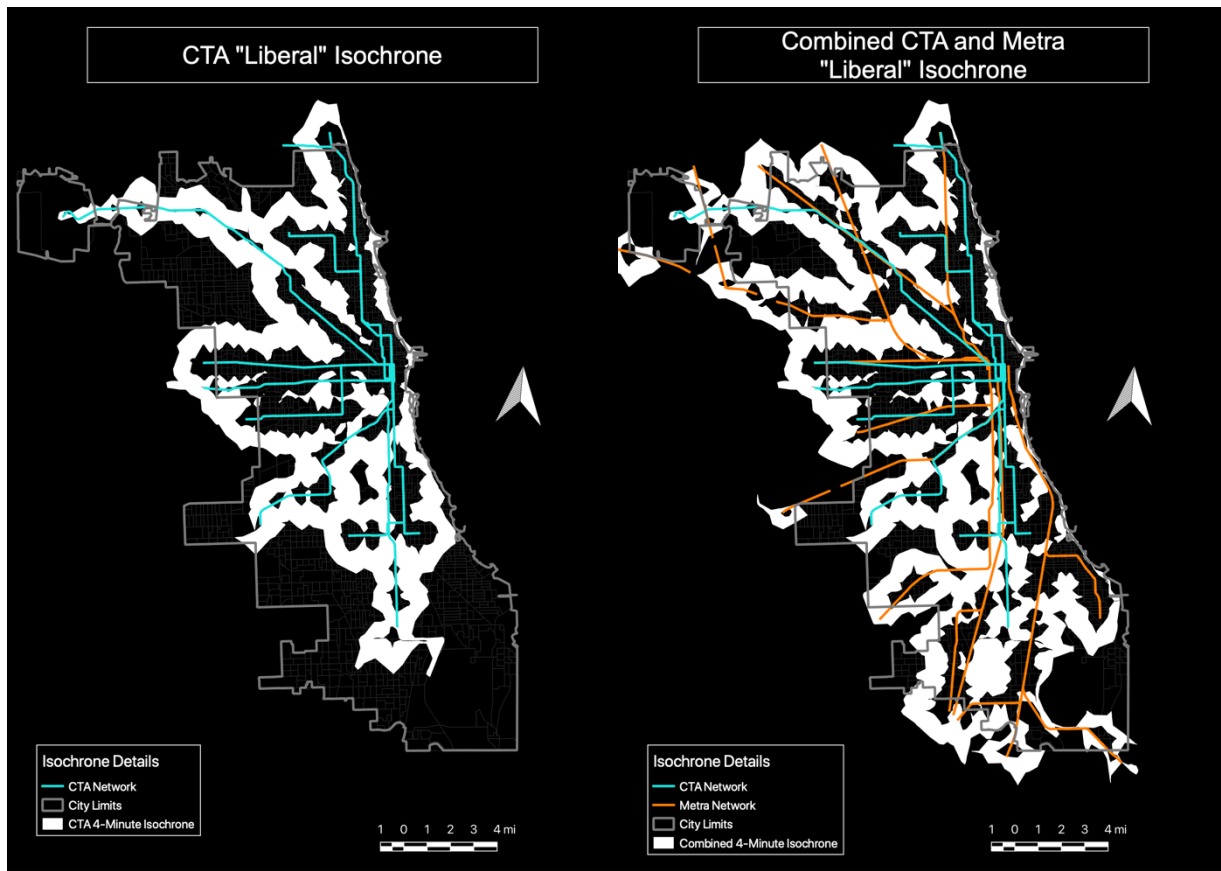


Figure 3: 4-Minute "Liberal" Isochrone. Roughly equates to a 1.5-2-mile bus ride for the "Last Mile Problem."

Limitations

Part of the limitations in my research was that I made generalizations about bus routes and rail routes, such as by giving no time penalty for certain train lines that have considerably inferior service, such as the Blue Line, nor do I assign a time penalty for rail stations that are farther away from the loop. I essentially treated all the subway lines as equals, with the assumption being that the subway can transport a customer throughout the network in an acceptable amount of time, when in reality a commute from O'Hare Airport to the University of Chicago takes over an hour and is likely not a reasonable daily commute. In determining the limited, liberal and conservative tolerances for walking and bus transfers, I used my personal

experiences taking the 55 CTA bus, since I believed that this bus represented the average experience of bus ridership. However, buses in the downtown Loop generally move slower than a bus on the periphery of Chicago, since the downtown Loop has more congestion. My model also didn't include Pace buses or express buses, since I didn't have a cohesive way in which I could test for the highway portions of these bus routes, and felt that many of the stops near the express portions were already covered in the model by redundant rail stations (e.g. the 47th Street stop on the #6 Jackson Park Express already being covered by the 47th Street Metra stop). Finally, my models are only relevant for one's origin (since the Census is tied to an individual's residence), so I didn't have the data to examine where individuals generally traveled. While there are likely more comprehensive models that can address my research question, such as examining origin-data flows using proprietary movement data, I lacked both the technical expertise and access to proprietary data to create such models.

Analysis

Using QGIS to formulate models and STATA to run multivariable regressions resulted in mixed results for analyzing the connection between transit access and characteristics of concentrated disadvantage, depending on the distance of tolerance (limited, liberal, and conservative) and the type of model used (CTA 'L' v. Combined 'L' and Metra). It appeared that the characteristics of concentrated disadvantage—employment rate, ratio of uninsured individuals, median household income, and ratio of minorities—were mostly significant at the limited scale but were mostly insignificant at the liberal and conservative scales, although there were some surprising results for the conservative combined model (refer to table below). For all models, the adjusted R-squared value was relatively low, meaning that my data only explains a small portion of the variation in transit access, however I believe this is to be expected since

transit lines are planned with many considerations and although racism and classism has had a role in shaping transit planning, both in the past and in the present, there are a multitude of other factors that contribute to where transit lines are placed, such as geography and the available right-of-way corridors. In addition, there are other aspects of transit racism mentioned in the literature that focus on qualitative characteristics beyond transit availability, such as the quality of service.

Included in the appendix are a series of maps generated in QGIS (refer to figures 4-8), that demonstrate the distribution and density of different proxies for concentrated disadvantage, with each map representing a different independent variable that was used in the STATA regression. As seen in all of the maps, there is a glaring discrepancy between neighborhoods on the North Side of Chicago and neighborhoods on the South and West Sides of Chicago. Neighborhoods on the North Side are characterized as being whiter, wealthier, having higher employment rates, higher educational attainment, and higher rates of insurance coverage. Neighborhoods in the North Side also have a higher density of transit coverage—as demonstrated by the isochrone maps in the methods section—whereas neighborhoods in Chicago’s South and West sides have notable transit deserts where there are no rail stations for either the ‘L’ or Metra. On the surface when referring to the maps, it appears that there is a relationship between transit access and characteristics of concentrated disadvantage, since there are noticeable gaps in the transit network for parts of Chicago’s South and West Sides. However, when analyzing the statistics from the regressions (featured in the table below), the extent to which these characteristics of concentrated disadvantage are related to transit access vary with distance.

Table 1

	(1) CTA “Limited”	(2) Combined CTA+Metra “Limited”	(3) CTA “Conservative”	(4) Combined CTA+Metra “Conservative”	(5) CTA “Liberal”	(6) Combined CTA+Metra “Liberal”
High School+ Ratio	1.322 (0.24)	11.87* (1.99)	-3.083 (-0.48)	14.62* (2.09)	-4.332 (-0.52)	-17.17* (-2.07)
Employment Ratio	24.63*** (4.60)	20.83*** (3.62)	28.22*** (4.51)	10.64 (1.57)	-0.709 (-0.09)	-16.67* (-2.08)
Ratio of Uninsured Individuals	-22.19** (-2.60)	-23.02* (-2.51)	-11.10 (-1.11)	-5.746 (-0.53)	50.88*** (3.93)	29.27* (2.29)
Median Household Income	-0.0000997* (-2.17)	-0.000134** (-2.71)	-0.0000592 (-1.10)	-0.00000409 (-0.07)	-0.000104 (-1.50)	0.000115 (1.67)
Minority Ratio	-4.704* (-2.40)	-0.427 (-0.20)	-2.875 (-1.25)	3.760 (1.52)	1.463 (0.49)	8.508** (2.90)
_cons	2.868 (0.55)	-0.669 (-0.12)	9.693 (1.58)	12.35 (1.86)	33.77*** (4.24)	55.62*** (7.06)
<i>N</i>	2073	2073	2073	2073	2073	2073

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As demonstrated within the regression tables, at a “limited” tolerance (roughly equated to a half-mile from each rail station), there is a significant relationship between four out of the five variables for both the CTA and Combined models. In the CTA model, every variable is statistically significant except for “HSRatio,” indicating that I can’t draw any conclusions about the relationship between transit access and education attainment within this model. For the Combined CTA and Metra model, every variable is significant except for “RatioMinority,” indicating that I can’t draw any conclusions about the relationship between transit access and neighborhood minority status at this scale.

With regard to the relationship between transit access and employment, there is statistical evidence that there is a strong positive relationship at the limited distance. This is not a surprising result, since prior studies have concluded that transit access enables individuals to reach more job opportunities that match individuals’ skillsets, which is particularly important for disadvantaged communities, since these individuals tend to have a more restricted skillset.³⁸ At the limited scale, there is no “last-mile problem,” since individuals are within a short walking distance of a rail service that can transport them to various parts of the city, especially economic hubs, within a reasonable period of time. Because the relationship between employment and transit access is no longer significant at the conservative distance, and is negative at the liberal distance, I believe that this demonstrates the ineffectiveness of the existing “last-mile problem” solutions, most notably local buses, in transporting individuals from the rail network to their origin or destination that is situated past a reasonable walking distance from a rail station. As mentioned earlier in the literature review, buses are not only slow moving forms of

³⁸ Paul M. Ong and Douglas Houston, “Transit, Employment and Women on Welfare,” *Urban Geography* 23, no. 4 (2002): pp. 344-364, <https://doi.org/10.2747/0272-3638.23.4.344>.

transportation, due to their size, frequency of stops, and traffic congestion, but buses also tend to suffer from a phenomenon called “bunching,” in which buses tend to fall out of sync with their schedules, and end up being inconsistently spaced along the route, which leads to longer waiting times for passengers, and makes it more challenging for passengers to reliably access distant job opportunities because of the variability in service time.

In addition, the relationship between uninsured individuals and transit access also supports my claim that inadequate transit access contributes to concentrated disadvantage. This can be seen in the regression table, where both limited models have a negative relationship, indicating that living within a walkable distance to the rail network results in a given individual being less likely to be uninsured. While there is no significant relationship for the conservative models, the liberal models show a positive relationship, in which a given individual is more likely to be uninsured. These results demonstrate that the farther away from the rail network a given individual lives, they are likely to have less access to medical insurance coverage. While this result may have to do with pure economics, since disadvantaged individuals may not be able to afford healthcare coverage, this may also be due to individuals deciding that healthcare coverage is not worth the cost, due to the lack of local healthcare options, since doctors and private practices are consolidating with large hospital networks that tend to be located in transit-rich, economically-thriving areas. In essence, transit deserts are likely also healthcare deserts.

For the relationship between median household income and transit access, there was a significant positive relationship only at the limited scale. This result is similar to the relationship between employment and transit access and may also highlight the similar issues with the aforementioned “last-mile problem” in bridging individuals’ commutes from train stations. In this instance, it may be the case that individuals that live close to rail stations are not only able to

find more optimal job opportunities, due to the shorter travel time relative to distance, but may also be able to work longer at their jobs, since they don't need to rely on slow mode of transportation (e.g. a local bus) to bridge their commute to the train

The relationship between minority density and transit access was only significant for two of the models, with the CTA limited model showing a negative relationship and the combined CTA and Metra liberal model showing a positive relationship, demonstrating that within proximate distances to 'L' stops, populations were more likely to be white, and more diverse at further distances from rail stops. I believe that the relationship was negative for the CTA limited model because rail transit development has historically favored affluent, white neighborhoods. In addition, the demographic shift of white, affluent millennials towards cities and away from car-oriented suburbs, has resulted in transit-oriented development and gentrification around rail stations in working-class, minority-majority neighborhoods. This demographic shift, and the return of the "Creative Class"—mostly young white college graduates and artists- from the suburbs back to cities raises questions about gentrification within working-class minority neighborhoods, as the demographics in the direct vicinity of the station may not reflect the demographics for the rest of the neighborhood.^{39 40}

My theory as to why there is a positive relationship for minority ratio and transit coverage in the combined CTA and Metra liberal model is that this model is especially generous in how it defines transit "access," since the concentric isochrones extend 1.5-2 miles from every rail station. Given the information seen in the majority-minority maps (refer to Appendix), there are many swaths of majority-minority Census blocks that are relatively far from a rail station,

³⁹ Mary Wisniewski, "New Buildings near 'L' Mostly Aimed at Well-to-Do," *chicagotribune.com*, May 2, 2016.

⁴⁰ Nona Tepper, "City Working on First Plan to Promote Growth, Avoid Gentrification Near South and West Side Train Stations: Sidetracks Chicago by 'L'," *WTTW Chicago*, March 4, 2020.

whereas heavily white communities tend to be closer to the rail stations. Essentially, the combined CTA and Metra liberal model is sampling neighborhoods that are more likely to be majority-minority in the first place. While one may interpret the combined liberal model favorably under a transportation racism framework, since it shows a positive relationship between minority composition and transit access, I caution that this model must be analyzed in relation to the other variables, especially labor ratio and uninsured ratio, since these models show that beneficial labor outcomes and insurance outcomes decline with distance, which I argue is due to buses being currently an inadequate solution to the “last-mile problem.” The demographics of the liberal combined model has to be considered in relation to the rest of the models, since there appears to be a racial demographic shift that is associated with distance from a train station.

Despite none of the CTA models being significant for high school attainment (HSratio), all of the combined CTA and Metra models were significant. While I am not entirely sure what is motivating this outcome, I have two potential explanations: My first explanation is that the Metra and CTA better serve white, affluent neighborhoods in the first place, as can be seen in the minority and median household income maps (refer to Appendix), which in turn likely have better educational outcomes overall, since affluent white neighborhoods have more political influence with public education than poor minority neighborhoods. My second explanation is that the Metra in particular is able to connect students with more educational opportunities. Either way, there is something unique and interesting about the Metra in this analysis that shows that it is related with high school attainment rates, and I believe this relationship should be explored in further detail. Upon submitting my first version of this BA thesis, my advisor, Professor Raymond Lodato, suggested that a third possible explanation is that the Metra’s lack of

frequent stops better connects students with schools that are far-flung. My intuition would have me agree with Professor Lodato's suggestion, and I believe future research should explore whether the Metra (and commuter rail in general) increases access to distant educational opportunities for disadvantaged individuals within Chicago (and possibly other metropolitan areas).

Discussion and Policy Recommendations

Encourage Transit-Oriented Development, While Also Being Wary of Gentrification

Both the pre-existing literature and my own research indicate that there is a relationship between lack of transit access and concentrated disadvantage, and that policy makers and transportation planners should prioritize expanding the rail network in order to enable better connectivity within the city of Chicago, as the current use of buses is insufficient for the “last mile(s) problem.” However, while transit expansion has the potential to improve access to employment and healthcare, as well as educational opportunities at the limited level (walking distance from rail station) for disadvantaged residents, it is a double-edged sword. The same trains that carry disadvantaged workers and students to the downtown loop, also make it possible for affluent professionals to gentrify their communities.

While gentrification is a separate policy problem that I will not address in the scope of this project, gentrification can be combatted through the implementation of strong rent control laws, which Chicago does not have, combined with incentives for mixed income housing within new developments. This will create more neighborhood diversity and not result in the segregation and self-sorting that was seen from both the public housing-era and vouchers program-era. Because of the other social benefits associated with newly expanded transit access, I believe that transit-oriented development can be an additional benefit for disadvantaged

communities, since it supports new businesses and job opportunities, and creates street life around transit stations. In addition, transit-oriented development itself may reduce concentrated disadvantage, since disadvantaged homeowners will experience an increase in property values. The communities that I mentioned in my literature review—Woodlawn and Englewood—have been unable to experience redevelopment, because the CTA disconnected large swaths of these communities to the rail network by truncating the Green Line and closing multiple stations.

Expanding the CTA ‘L’ Network

By using transit-oriented development as a vehicle to revitalize disadvantaged neighborhoods in South Side that are currently transit deserts, I recommend that the CTA considers expanding the Green Line in two directions: 1) back to its former terminus at Stony Island along the Jackson Park Branch and 2) expanding the Ashland Branch to Midway Airport. I recommend that the Cottage Grove Branch be re-extended because the upcoming Barack Obama Presidential Center is expected to serve as a community hub for development, and the Green Line would help bring more tourists and visitors to the area, which lead to greater development along the 63rd Street corridor, and enable residents in Woodlawn to better access the downtown core. I also recommend extending the Ashland Branch to Midway Airport, since this would have a two-fold effect. The first effect would be that current transit deserts, such as West Lawn, Gage Park, and Chicago Lawn would be connected to the subway system. The second effect—which is a concession to the pro-growth philosophy held by Mayor Daley—is that the Green Line would enable travelers flying into Midway Airport to take the train to the University of Chicago, McCormack Place, and the proposed Amazon/corporate campus site in Bronzeville. This policy recommendation would not only address “transportation racism” by

providing current transit deserts with a rail connection to the rest of the city but would also enable business development to occur at existing (and proposed) centers of commerce that are outside of the downtown Loop.

Converting the Metra South Chicago Branch into an ‘L’ line

Another project that I would recommend is the conversion of the Metra South Chicago Branch into a fully-fledged CTA ‘L’ line. This proposal was made in the run up to the bidding process for the 2016 Olympics, in which Chicago lost out to Rio de Janeiro.^{41 42} By converting the Metra line into a subway line, service headways could be decreased from a frequency of thirty minutes to only a couple of minutes, as is seen on other subway lines during peak hours. In addition, a subway service could accelerate and decelerate more optimally than a commuter train, which would enable for new transit stops to be created in-between 18th Street and 47th Street. This new service would address the transit deserts that exist along the lakefront in South Side, since the Green Line is 1-1.5 miles to the west of Lake Shore Drive, and the express buses bypass the communities that are north of 47th Street. This new transit line would allow for development on the South Works brownfield (the former US Steel facility) in far-South Side, in addition to the revitalization of the surrounding residential area. So far, there have been three attempts to develop housing on the South Works site, but all three attempts were not viable due to the remoteness of the site, combined with the slow and inconsistent service of the Metra South

⁴¹ Steven Vance, “South Side Groups: Make the Metra Electric Run Like the CTA ‘L,’” Streetsblog Chicago, January 14, 2016, <https://chi.streetsblog.org/2016/01/14/south-side-groups-make-the-metra-electric-run-like-the-cta-l/>.

⁴² Risa Lynch, “Instead of Extending the Red Line, Some See Promise in the Metra Electric,” Chicago Reporter, October 14, 2018, <https://www.chicagoreporter.com/instead-of-extending-the-red-line-some-see-promise-in-the-metra-electric/>.

Chicago branch.⁴³ By converting the line into a subway line and enabling quicker and more frequent service to the rest of the city, the South Works site may finally be viable for development, which can potentially create economic opportunities in the far-South Side. Because the tracks already exist, the capital cost of this conversion would be far less expensive than building a new subway line altogether, such as the Red Line extension, as the only capital costs would be the creation of new stations and the purchase of new subway cars. While there was resurgent interest to convert the South Chicago Branch under Mayor Rahm Emmanuel's administration, there are currently no plans for this conversion to occur.⁴⁴

Metra-CTA Integrated Fare Structure within City Limits

With regard to the Metra, I argue that the city and state governments need to work out their differences and figure out a plan to better integrate the Metra service and fare structure within city limits, so that it is more compatible with CTA service under a unified Ventra system. Currently Chicagoans that rely on the Metra have to pay a higher fare for the Metra relative to the CTA, that is often more than double the cost of a CTA fare. In addition, Metra riders have to pay the full CTA fare if they transfer and aren't eligible for the \$0.25 transfer that is available for intra-CTA transfers (e.g. transferring from a CTA bus to the 'L'). The main issue that prevents the integration of both transit systems is that the Metra and CTA compete for riders, as they are separate transit agencies with their own revenue streams, and thus fight for the same customer base. This is especially a problem in South Side, where the Metra Electric District and Rock

⁴³ Alby Gallun, "Massive Plan to Turn South Works into a Neighborhood Dies," Crain's Chicago Business, May 24, 2018.

⁴⁴ Mary Wisniewski, "Idea to Convert Metra Electric to Rapid-Transit Line Draws Mayor's Interest," chicagotribune.com (Chicago Tribune, June 10, 2018).

Island line compete with CTA buses, such as the #6, #2, #26, #71, and #115.⁴⁵ This makes it challenging to implement a unified fare structure between the CTA and Metra within city limits because a unified fare of \$2.50 would shift customers to the Metra from competing bus routes, thus hurting the fare box for the CTA.

Currently there is a proposed pilot plan to implement a trial for a unified fare structure on the Metra Electric District line that is backed by Cook County Board President Toni Preckwinkle (who lost the 2019 mayoral election to Mayor Lori Lightfoot). However, Mayor Lightfoot is opposed to this plan because it result in a “transfer of CTA passengers to the Metra line.”⁴⁶ This conflict demonstrates how the competition between both transit organizations ultimately hurts the commuter and constituent, since disadvantaged residents may not be able to afford the Metra’s higher fare, despite the Metra being more convenient and enabling a quicker service to work, hospitals, and schools. In essence the current conflict between the CTA and Metra may be adversely hurting disadvantaged residents by either preventing them from accessing transit, through Metra’s prohibitive cost, or limiting their network of travel, since these residents may only be able to afford the CTA fare, which may result in a longer commute with more transfers.

Embracing Micro-Mobility and Improving Conventional Bus Service

While expanding rail transit will bring with it various social benefits at a localized level that will combat concentrated disadvantage, it is important to note that it is unfeasible for rail transit to have the same network coverage as Chicago’s bus networks, and that there will always

⁴⁵ David Zegeye, “Frequent and Affordable Metra Service Would Improve Quality of Life on the South Side,” Streetsblog Chicago, September 24, 2019.

⁴⁶ Greenfield, John. “Don't Let Competition between Agencies and Politicians Block Better South Side Transit.” Streetsblog Chicago, September 21, 2019. <https://chi.streetsblog.org/2019/09/20/dont-let-competition-between-agencies-and-politicians-block-better-south-side-transit/>.

be a “last mile problem” challenge. Because my research has shown that buses are currently not a magical solution for the “last mile problem,” especially at farther distances (refer to the liberal regression models), I suggest that the city implements alternative forms of micro-mobility transportation modes, such as scooter-share and better cycling infrastructure, in addition to improving bus service by utilizing emerging technologies and innovations. Scooter-share—a system of rentable scooters for one-way journeys— has become popular in the past few years in various cities, such as San Francisco, Los Angeles, Tel Aviv, and Austin. Benefits of scooter-share are that scooters are faster than taking a bus for short commutes (since buses are subject to congestion and inconsistent scheduling due to “bunching”) and are cheaper than taking a ride-share service, such as Uber and Lyft.⁴⁷ While micro-mobility can help increase transportation accessibility options, I want to reiterate that the bus will remain the backbone option of choice for the “last mile problem,” as children, the elderly, and individuals that are mobility-challenged won’t be able to utilize electric scooters and bikes. In addition, micro-mobility transit modes may be seasonal, since these modes may not be popular during Chicago’s rough winter conditions. As a result, the CTA should continue their effort to increase the service speed and reliability of conventional buses by implementing all-door boarding (rather than only using the front door), dedicated bus lanes, transit signal priority to avoid long waits at red signals, and GPS technology that can help manage the spacing of buses and avoid the “bus bunching” problem.^{48 49}

Chicago recently finished a four-month trial of scooter-share back in October, but the data analysis is still too premature to determine the effect that scooter-share had on improving

⁴⁷ Neil Sipe and Dorina Pojani, “Can e-Scooters Solve the ‘Last Mile’ Problem? They’ll Need to Avoid the Fate of Dockless Bikes,” *The Conversation*, September 21, 2018).

⁴⁸ Mary Wisniewski, “Tired of Being Stuck on Slow CTA Buses? City Awards \$20 Million to a Program That Aims to Speed Things up.,” *chicagotribune.com* (Chicago Tribune, October 19, 2019).

⁴⁹ John Greenfield and Steven Vance, “With New All-Door Boarding Pilot, CTA Takes a Modest Step towards Modernizing Buses,” *Streetsblog Chicago*, February 24, 2020.

access to transit. However, according to a survey conducted by the City of Hoboken, New Jersey, following a six-month trial of scooter-share, 73% of respondents agreed or strongly agreed that scooter-share made it easier to connect with public transit, 73% of respondents reported that they used taxis and ride-share services less during this period, and 60% of respondents reported that they drove less during this period.⁵⁰ These survey results are aligned with the expectation by scooter-share proponents in Chicago that scooter-share can enable better connectivity and access for transit-poor neighborhoods, especially African American and Hispanic neighborhoods in Chicago's South and West Sides.^{51 52 53} The benefits for scooter-share are apparent and have multiple social benefits other than increasing mobility, such as reducing traffic congestion, since many of the scooter-share trips will replace existing ride-share trips, in addition to reducing CO2 emissions, since the scooters are electric and use far less overall energy than an automobile.

Making Scooter-Share Safer

However, while scooter-share has been hailed as a revolution in micro-mobility, there are still concerns about the passive and active safety of scooters. From a passive safety standpoint, the lack of regulation within the scooter-share market has resulted in cities suddenly being inundated by scooters as new operators enter the market, and then having to deal with scooters being parked carelessly on the sidewalk.⁵⁴ In places, such as Santa Monica, scooters have

⁵⁰ "HOBOKEN RELEASES RESULTS OF E-SCOOTER SURVEY" (City of Hoboken, November 25, 2019).

⁵¹ "POLICY RECOMMENDATIONS FOR E-SCOOTER SHARING" (Active Transportation Alliance, October 2019).

⁵² John Greenfield, "Black Advocates Call for Expanding Chicago's Scooter Program with a Focus on Equity," Streetsblog Chicago, October 16, 2019.

⁵³ Sara Freund, "Scooters Are Leaving Chicago, but Some Argue the Transit Option Is a Necessity," Curbed Chicago, October 15, 2019.

⁵⁴ Tracey Lien and Melissa Etehad, "Santa Monica Proposes Tougher Rules for Bird and Other Scooter Rental Companies," Los Angeles Times, June 8, 2018.

developed a negative reputation for being trip hazards on sidewalks, in addition to blocking driveways, entranceways to businesses, and being an overall nuisance and danger for mobility-challenged individuals. The problem of sidewalk clutter may be resolved through the use of designated parking spots, as is currently being implemented in Seattle, in which users that fail to park in the designated spots are penalized.⁵⁵

From an active safety standpoint, the increasing popularity of scooter-share has been connected with a rise in scooter-share injuries, especially with injuries to the head, for both users and pedestrians.^{56 57} This has resulted in controversy over the implementation of scooter-share since some residents in affected cities are concerned over the clutter from parked scooters, in addition to the risk of being hit by a user. In addition, it is difficult to analyze the true risk to pedestrians, since hospitals don't have a consistent way to medically document scooter-related injuries, which makes it difficult to estimate the true risk that scooter-share poses on the general public.⁵⁸ According to an observational study performed by Tarak Trivedi in Los Angeles, 26.4% of observed riders rode on the sidewalk.⁵⁹ This observation highlights the need for adequate bike lane coverage that scooter-share users and cyclists can safely utilize.

⁵⁵Monica Nickelsburg, "Seattle Explores on-Street Bike and Scooter Parking to Clear up Cluttered Sidewalks," *GeekWire*, September 4, 2019.

⁵⁶ Jessica Glenza, "Electric Scooter Injuries Tripled in One Year among US Millennials, Study Finds," *The Guardian*, January 8, 2020.

⁵⁷ Andrew J. Hawkins, "Electric Scooter Use Results in 20 Injuries per 100,000 Trips, CDC Finds," *The Verge*, May 2, 2019.

⁵⁸ Ryan Felton, "E-Scooter Ride-Share Industry Leaves Injuries and Angered Cities in Its Path," *Consumer Reports*, February 6, 2019.

⁵⁹ Tarak K. Trivedi et al., "Injuries Associated with Standing Electric Scooter Use," *JAMA Network Open* 2, no. 1 (2019).

Improving Cycling Infrastructure in Order to Encourage Cycling and Micro-Mobility

While Chicago has 248 miles of bike lanes, the city has only constructed 4 miles of protected bike lanes in the past three years.⁶⁰ This lack of expansion for protected bike lanes runs contrary to Chicago's overall goals of expanding bicycle access, through the expansion of DIVVY to more neighborhoods in South Side and West Side.⁶¹ In addition, this lack of expansion is insufficient for the implementation of scooter-share, especially since many scooter-share users tend to have never used a bike lane prior to using scooter-share, so more protected lanes will have to be created in order to accommodate this new demographic of users.⁶² By having more protected bike lanes, Chicago would not only have the infrastructure to support scooter-share implementation, but will also better their current initiatives to increase cycling commuting through the expansion of DIVVY, since bike lanes attract more cycling activity. In addition, designated bike lanes should in theory reduce conflicts with pedestrians, since scooter users and cyclists wouldn't have the incentive to ride on sidewalks, which should result in increased safety and less hostility/controversy towards cycling and scooter-share as a mode of transit.

Conclusion

The goal of this research was to establish whether there is a relationship between transit access and concentrated disadvantage within Chicago, while also taking into account the historic transit and social planning decisions that have contributed to the classism and segregation within contemporary Chicago. When looking at Chicago, there is an apparent relationship between

⁶⁰ Sara Freund, "Chicago Needs Safer Streets and Protected Bike Lanes Now, Advocates Say," Curbed Chicago, November 20, 2019.

⁶¹ AC Shilton, "The Best Bike Cities in America," Bicycling, March 13, 2019

inadequate transit access and concentrated disadvantage. This result is not surprising considering the historical lens of Chicago's transportation development. Chicago has long been, and continues to be, one of the most segregated cities in American by race and class.⁶³ Whereas neighborhoods, such as Englewood and Woodlawn, had thriving commercial corridors with African American businesses and entrepreneurship during the 20th century, back when the Green Line had nine more stations, these corridors are shells of their former selves, with the CTA Green Line service stripped service down to two stations in Englewood, and completely razed past Cottage Grove in Woodlawn. Under the leadership of Mayor Richard M. Daley, disadvantaged communities in South Side and West Side were largely absent from his rail transportation initiatives, which prioritized business and tourism development in the downtown core. Instead of backing the Mid-City Transitway, a proposed subway line that would better connect marginalized neighborhoods on the West Side, Mayor Daley backed an express train to O'Hare Airport and the Circle Line, which would have benefitted business travelers at the expense of ordinary residents using the Blue Line, and increased real estate development and gentrification in neighborhoods at the periphery of the Loop, respectively.

When looking at the data, it is apparent that there is a general negative relationship between distance to rail stations and social well-being for employment access and insurance converge, both of which sustain concentrated disadvantage. This demonstrates an issue with the "last mile problem," since individuals at farther distances from a rail station lack the ability to access destinations in an acceptable amount of time, due to the "last-mile" transit mode either being too inefficient, too expensive, or simply not available. The data also shows that areas in the direct vicinity of rail stations are more likely to be whiter in composition, whereas areas further

⁶³ Alana Semuels, "Chicago's Awful Divide," *The Atlantic*, March 29, 2018.

away from rail stations are likely more diverse in composition. This relationship is likely affected by two different factors in a classic chicken-and-egg problem. Historically, rail access development in Chicago prioritized white neighborhoods over African American and Hispanic neighborhoods. This is not unique to rail development, but was the attitude held by urban planners throughout the 20th century and resulted in the segregation and suburbanization of many American cities today. The other factor is that the “Creative Class”—predominately white, college-educated millennials—prefer living in transit-rich cities as opposed to the suburbs that many of them grew up in, which has resulted in transit-oriented real estate development around train stations in lower-income communities. This has resulted in concerns about gentrification and has created stark divisions in poor neighborhoods between the affluent, white residents in new development towers around the train stations, and the pre-existing residents in the older row houses that extend beyond the new developments.

Because of the social benefits that are associated with transit access, including the potential to reduce concentrated disadvantage, I recommend three initiatives: The first policy recommendation would be to extend the Green Line to Midway Airport. This would not only enable communities in-between the current terminus and airport to be better connected to the transportation grid, but would also enable better access from Midway Airport to McCormack Place and the potential Amazon/corporate campus in Bronzeville, which would satisfy the pro-development perspective towards transportation planning that was held by Mayor Daley. The second policy recommendation would be to better integrate the Metra with the CTA, by having a unified fare structure and converting the Metra South Chicago Branch into a CTA ‘L’ line that could run more frequently and enable more stops, which would better connect neighborhoods along the coast, far South Side, and Calumet with the downtown Loop and rest of the

transportation network. While I believe that this policy recommendation would be fairly affordable from a capital funding perspective, it is important to note that the competing interests of the CTA and Metra, due to separate governments and non-shared revenue streams, make it difficult for both operators to cooperate, despite cooperation not only resulting in better commutes for thousands of disadvantaged individuals, but also correcting some of the historical biases in transportation planning that left these communities poorly connected to the rest of the city in the first place.

While CTA ‘L’ expansion and CTA-Metra fare integration are necessary for filling in transit deserts, there is still the issue of the “last-mile problem” for individuals that live outside of walking distance from a train station (greater than 0.5 miles). The bus is by far the most popular form of transit for the “last mile problem,” but is especially inefficient at longer distances due to problems with traffic congestion, slow operating speed, and inconsistent scheduling due to “bunching.” Ride sharing has also become a popular transit mode but can be cost prohibitive due to its relatively high expense in comparison to a transit fare (in addition to contributing to congestion and urban CO2 emissions). As a result, I recommend that Chicago continues to improve bus service, in addition to embracing other forms of micro-mobility by introducing scooter-share, to supplement the existing policy of encouraging cycling through the expansion of DIVVY. I believe that scooter-share can be particularly useful for short commutes to train stations, and that many of the downsides of scooters can be mitigated through the implementation of more protected bike lanes and designated scooter parking zones, which should reduce conflicts with pedestrians.

The distribution of Chicago’s rail network is similar to the distribution of its demographics—largely on racial and class lines. This is especially problematic because transit

access has the transformative potential to reduce concentrated disadvantage, by enabling individuals to be better connected with the city, find jobs that match their skills, access healthcare resources, and enjoy the social and cultural events that Chicago has to offer. The move to expand transit access is not only necessary for restorative justice reasons, but for purely economic reasons as well. Currently, Chicago is considered one of the most segregated cities in the country with a compelling tale of two cities, where the affluent, college-educated whites are well-connected to a booming service sector economy downtown, and the disadvantaged minority neighborhoods are disconnected from this prosperity and lack the local industrial jobs that sustained these communities during the 20th century.⁶⁴ Yet while Chicago has managed to successfully transition to a post-industrial economy, whereas other Midwest cities have not, Chicago's African American and Hispanic declining population indicate that these communities lack the connectivity to reach jobs elsewhere, which is imperative considering the lack of opportunities in many disadvantaged neighborhoods that have weathered redlining, disinvestment, and the particularly harsh Great Recession. It is imperative that Chicago expands transit access, because doing so not only makes economic sense and moral sense but is necessary if Chicago truly wants to be a "global city," since a "global city" requires a thriving diverse populace, which is currently not the case.

Contemporary Reflection in the Times of the COVID-19 Pandemic

From my experience in New York, it is inspirational see many of these essential workers wake-up and take the train to their hospitals, fire stations, and other important workplaces. Yet, there has been a growing problem of decreasing public transit service, since the transit authority

⁶⁴ Alana Semuels, "Chicago's Awful Divide," The Atlantic, March 29, 2018.

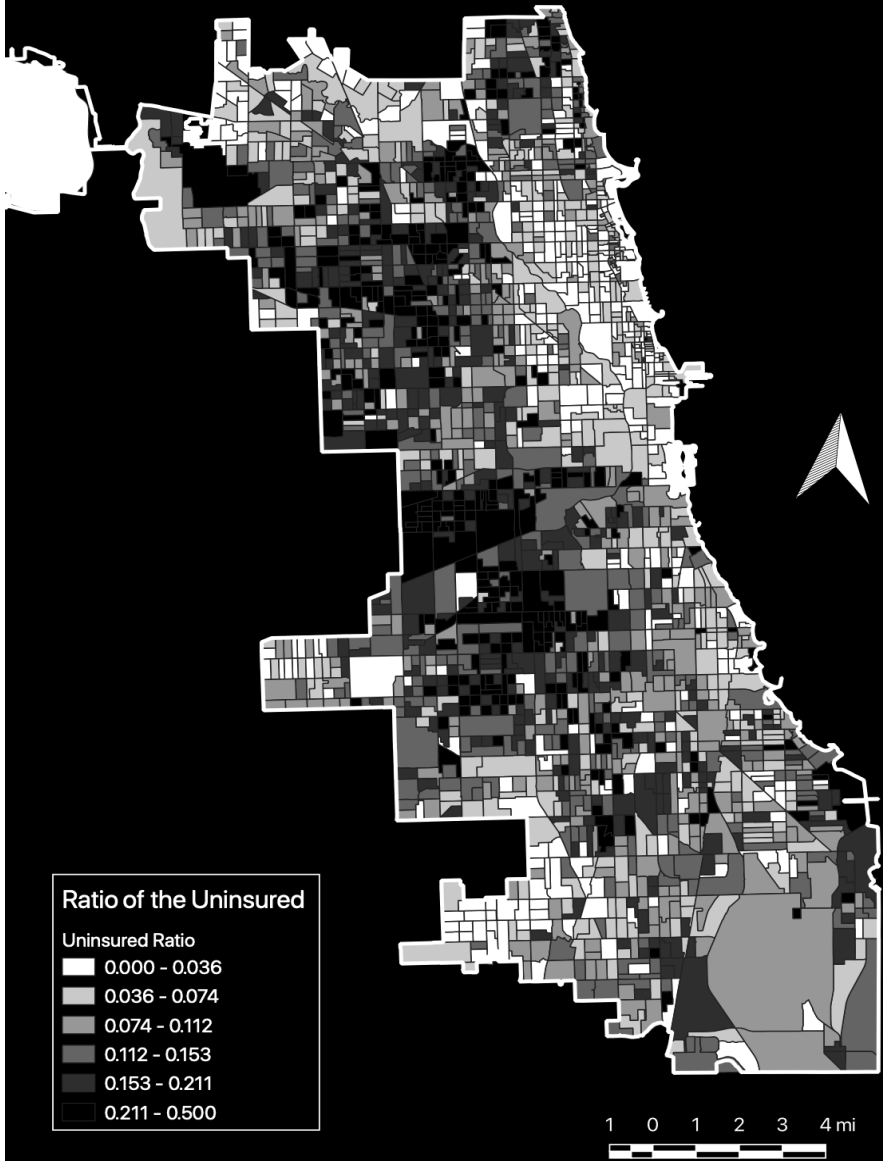
is battling a staffing shortage, as an alarmingly high rate of transit employees are getting sick and dying. As a result, trains and buses are running with less frequency, and therefore, essential workers are having to commute in increasingly crowded conditions for longer periods of time. While this may not be an issue for doctors that commute from the suburbs of Connecticut and Westchester in their car, it is deeply problematic for nurses, hospital support staff, and working-class essential workers, such as custodial staff, caterers, and other individuals that are doing absolutely essential work during this pandemic, but are not highlighted because they are not on the front lines within hospitals. This pandemic is demonstrating the inequalities within the NYC transit system and highlights the types of individuals that are more affected by decreases in service—less affluent, working-class individuals who live outside of Manhattan.

On another note, this pandemic will undoubtedly shelve my policy recommendations for the foreseeable future. In an effort to keep essential workers moving, transit agencies, including the CTA and Metra, have attempted to keep a relatively normal level of service, in order to keep density low and increase social distancing within the vehicles. The problem is that since many individuals are (rightfully) staying at home, transit agencies are running huge deficits, since their revenue has collapsed, but their operating costs have remained constant. When this is over, transit agencies all across the US will require a bailout in order to stabilize their operating finances. The need to stabilize operating expenses will likely require transit agencies to forego capital plans, which means that the expansion and integration proposals that I believe are necessary for Chicago to achieve better transit equity, will be put on the backburner. While there is a whole political argument about what entities deserve to be prioritized for bail outs, subsidies, and financial stabilization, and I understand that transit agencies have a more important need to stabilize their existing service networks, I think it is also important to note how this pandemic

has exposed the massive inequalities in public transportation, especially amongst individuals that we as a society have deemed “essential” during this time.

Appendix

Block Group Uninsured Ratio



Block Group Uninsured Ratio (CTA and Metra Included)

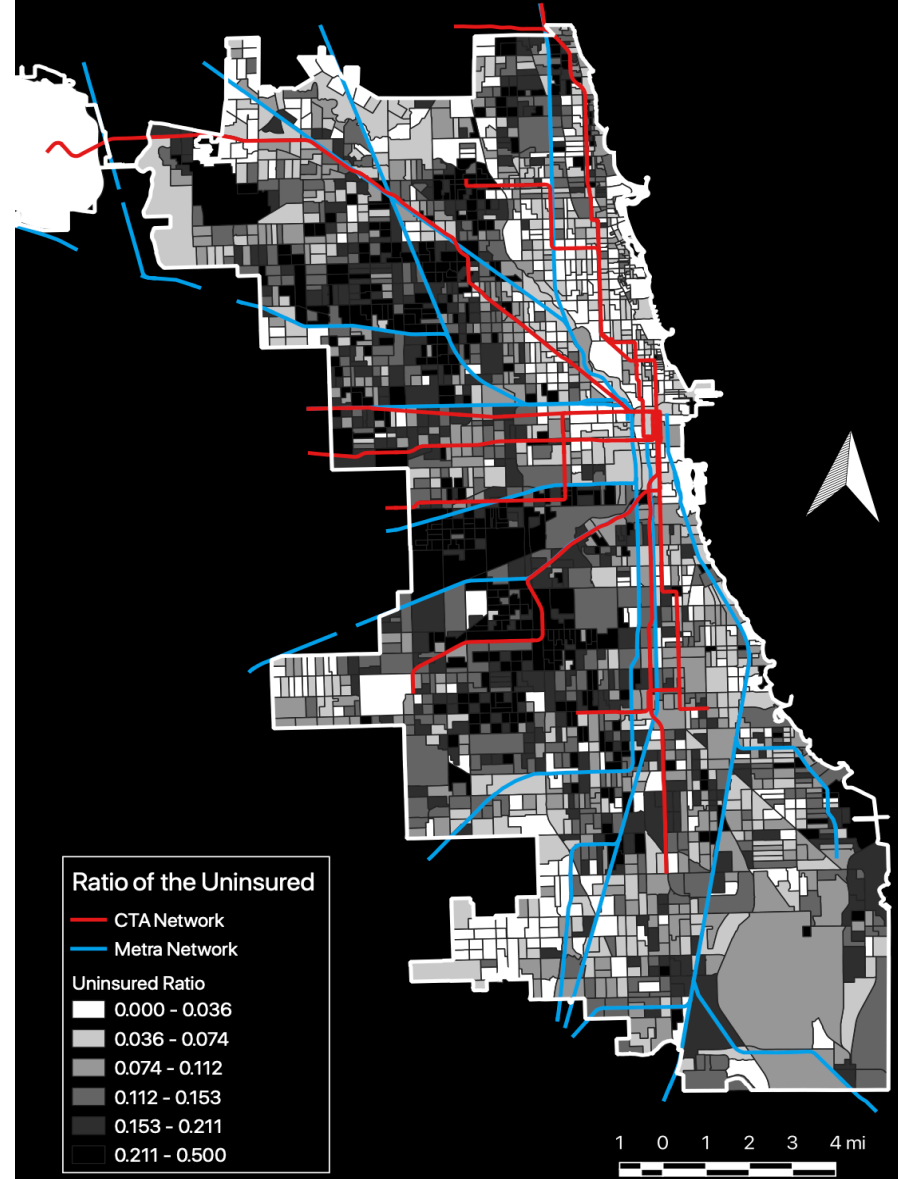


Figure 4

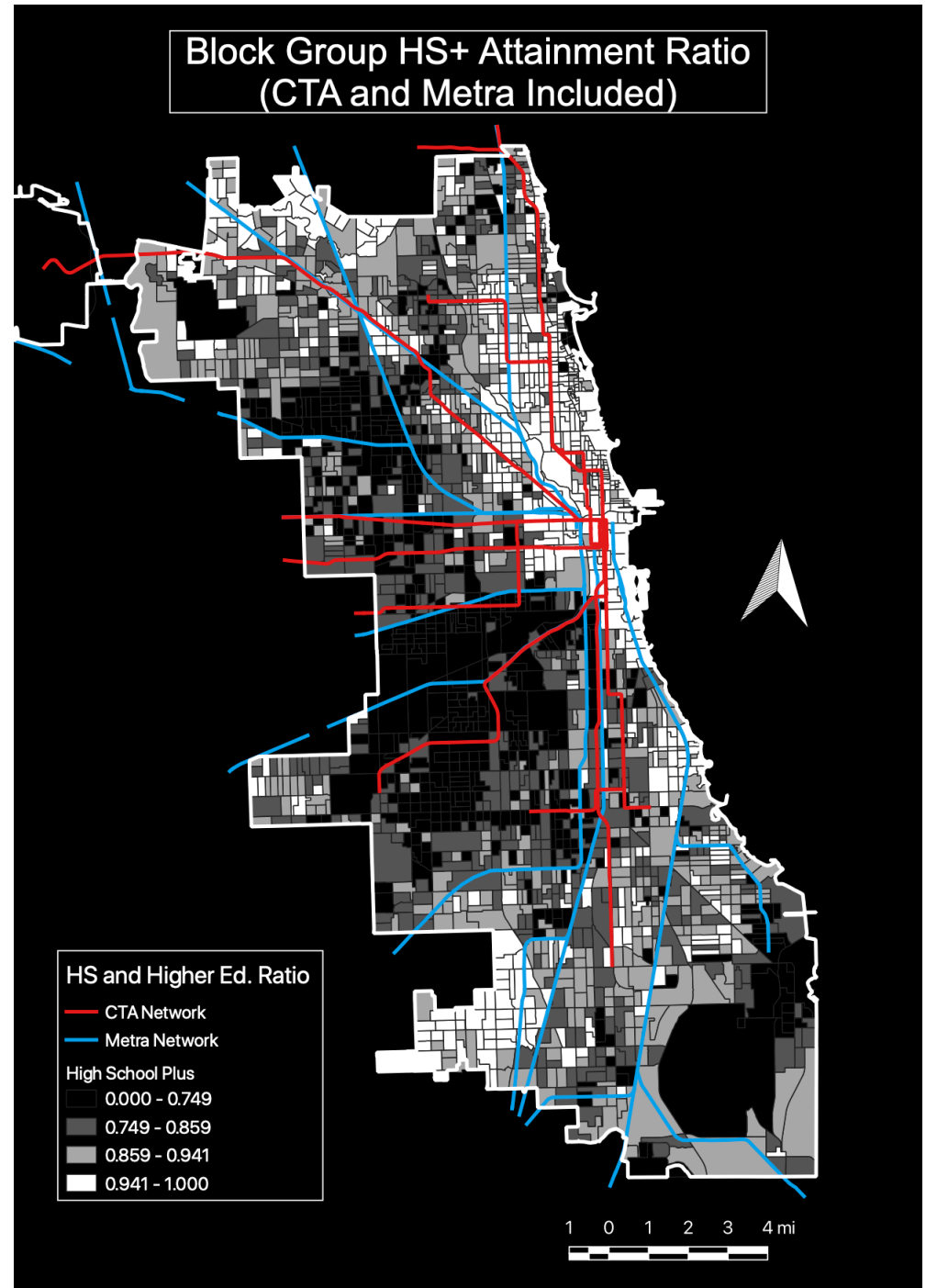


Figure 5

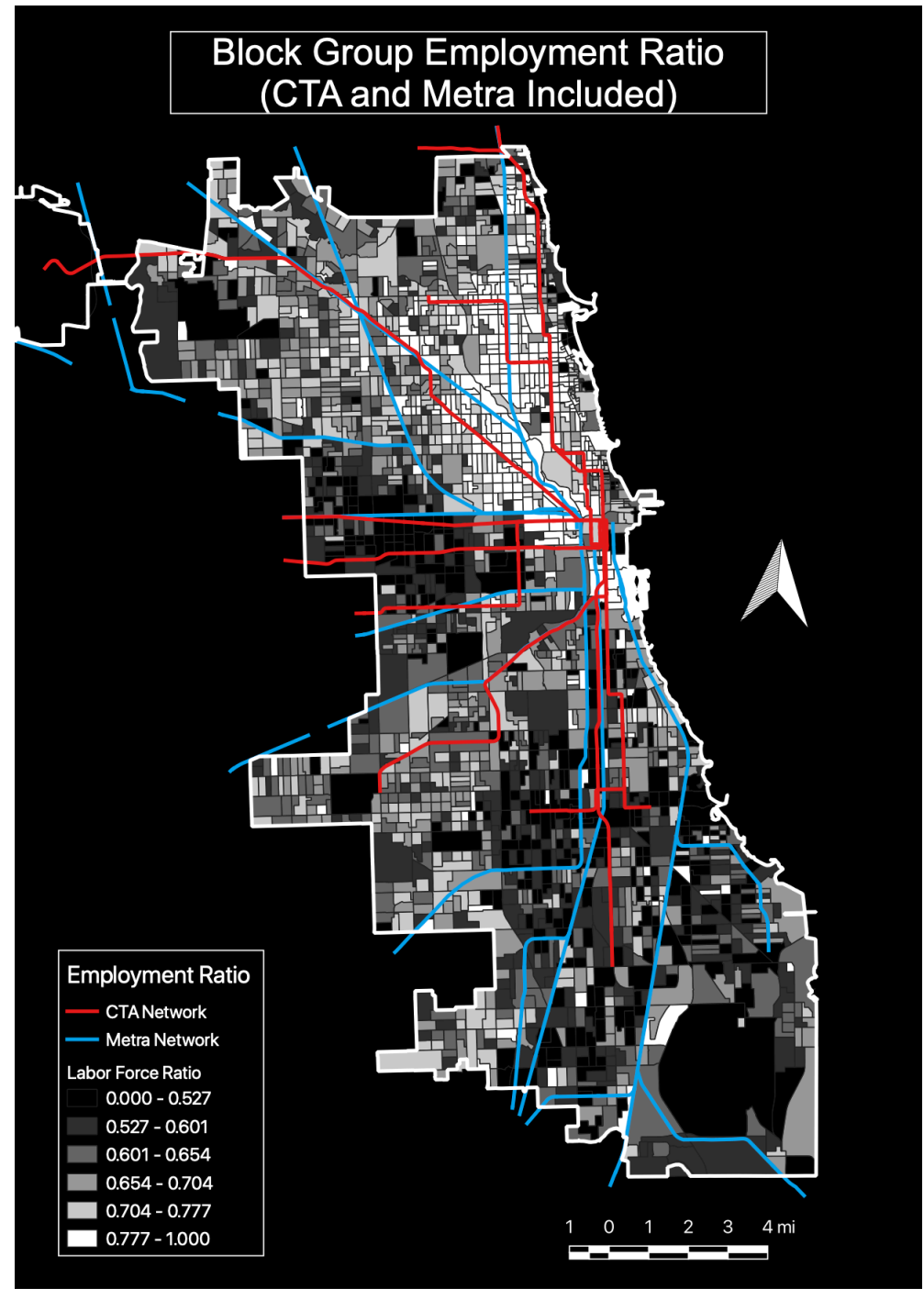
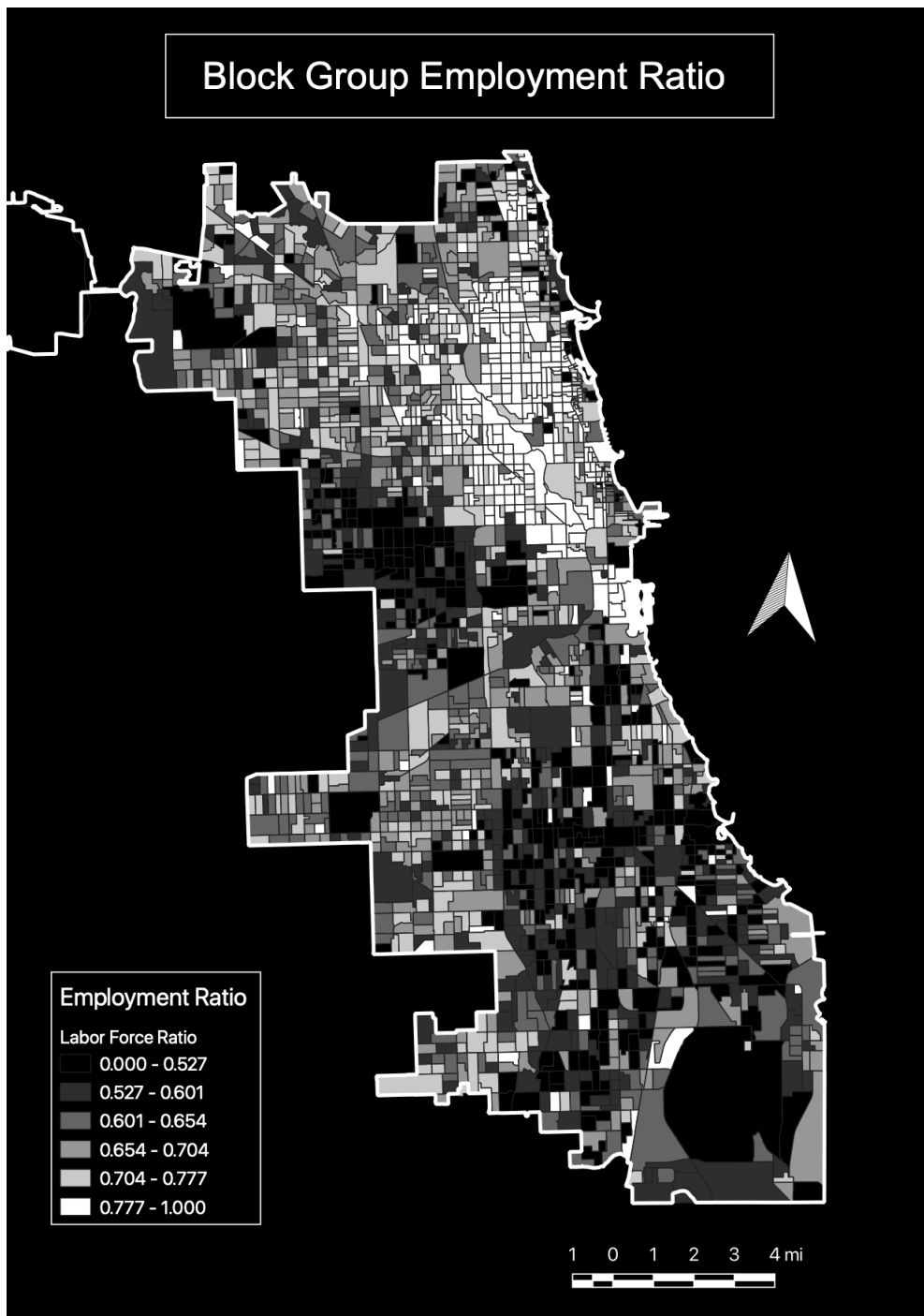


Figure 6

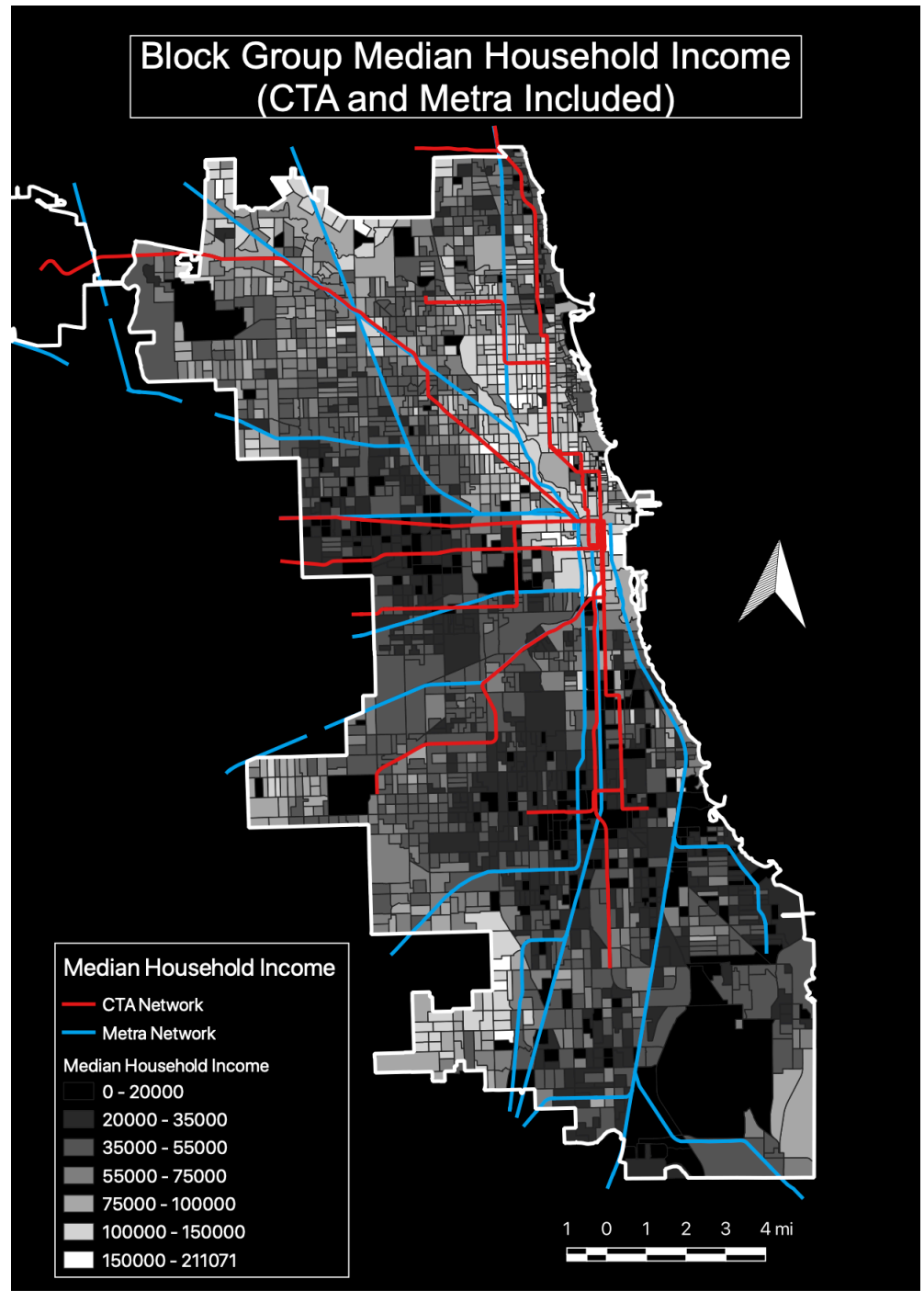
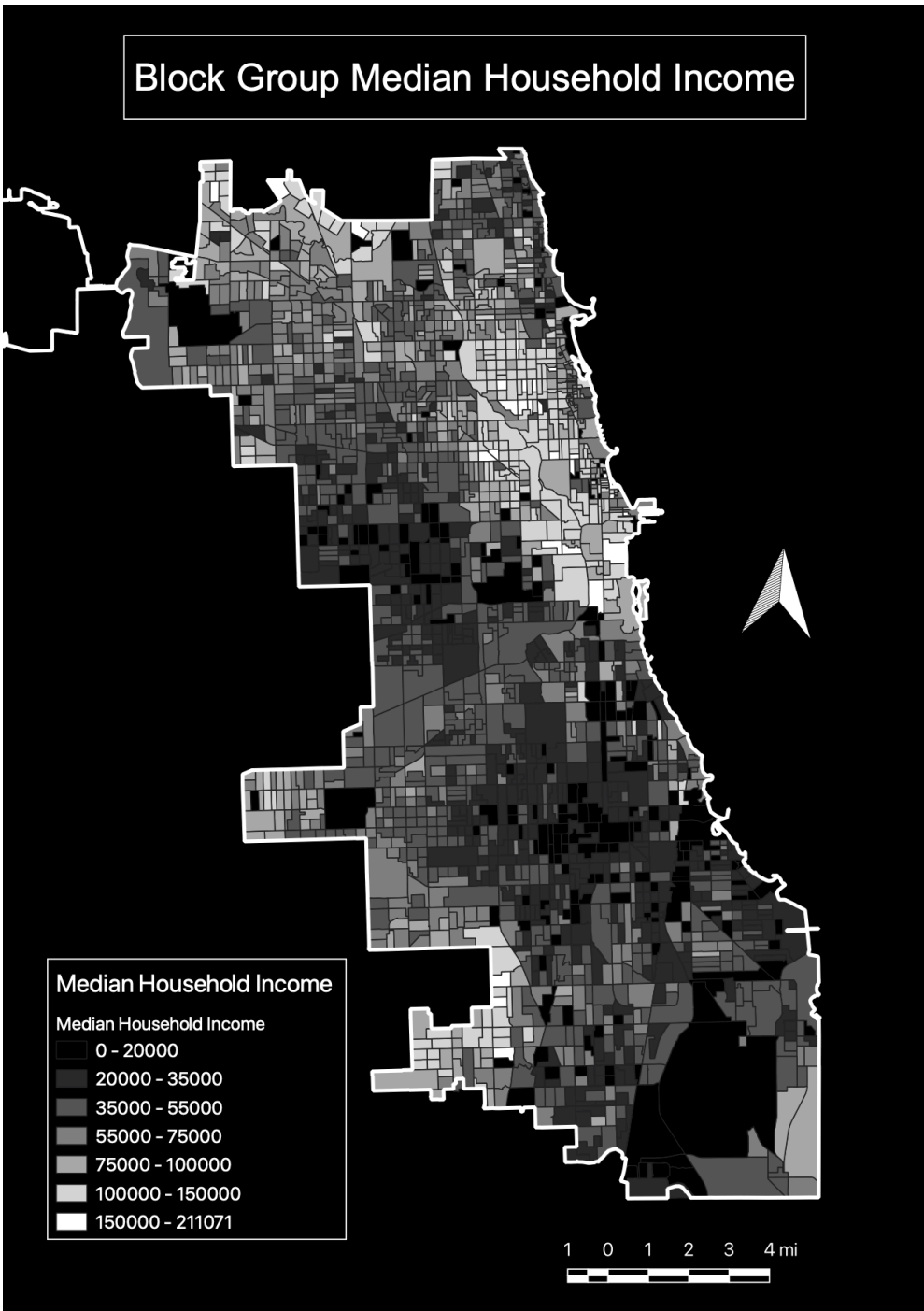


Figure 7

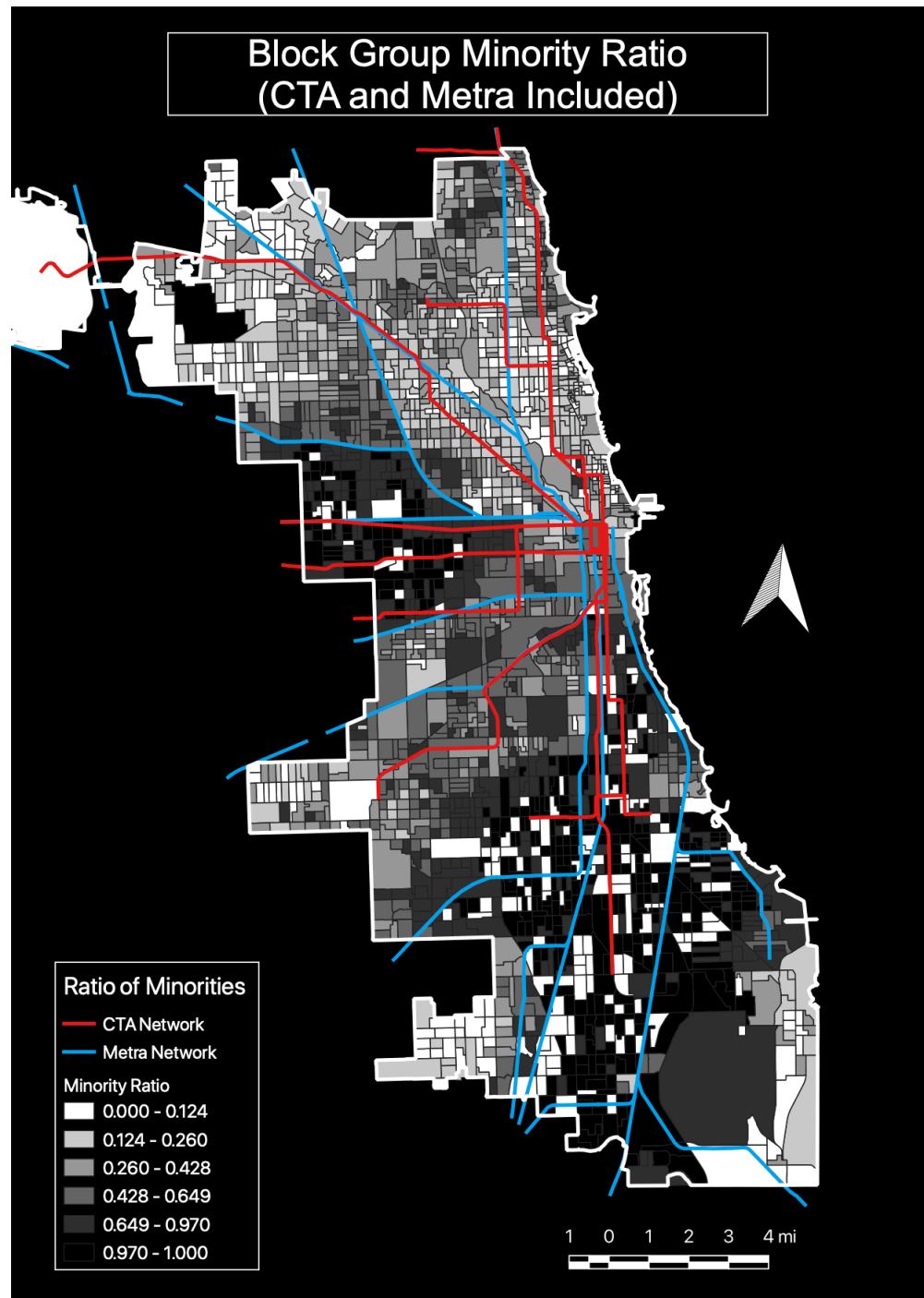
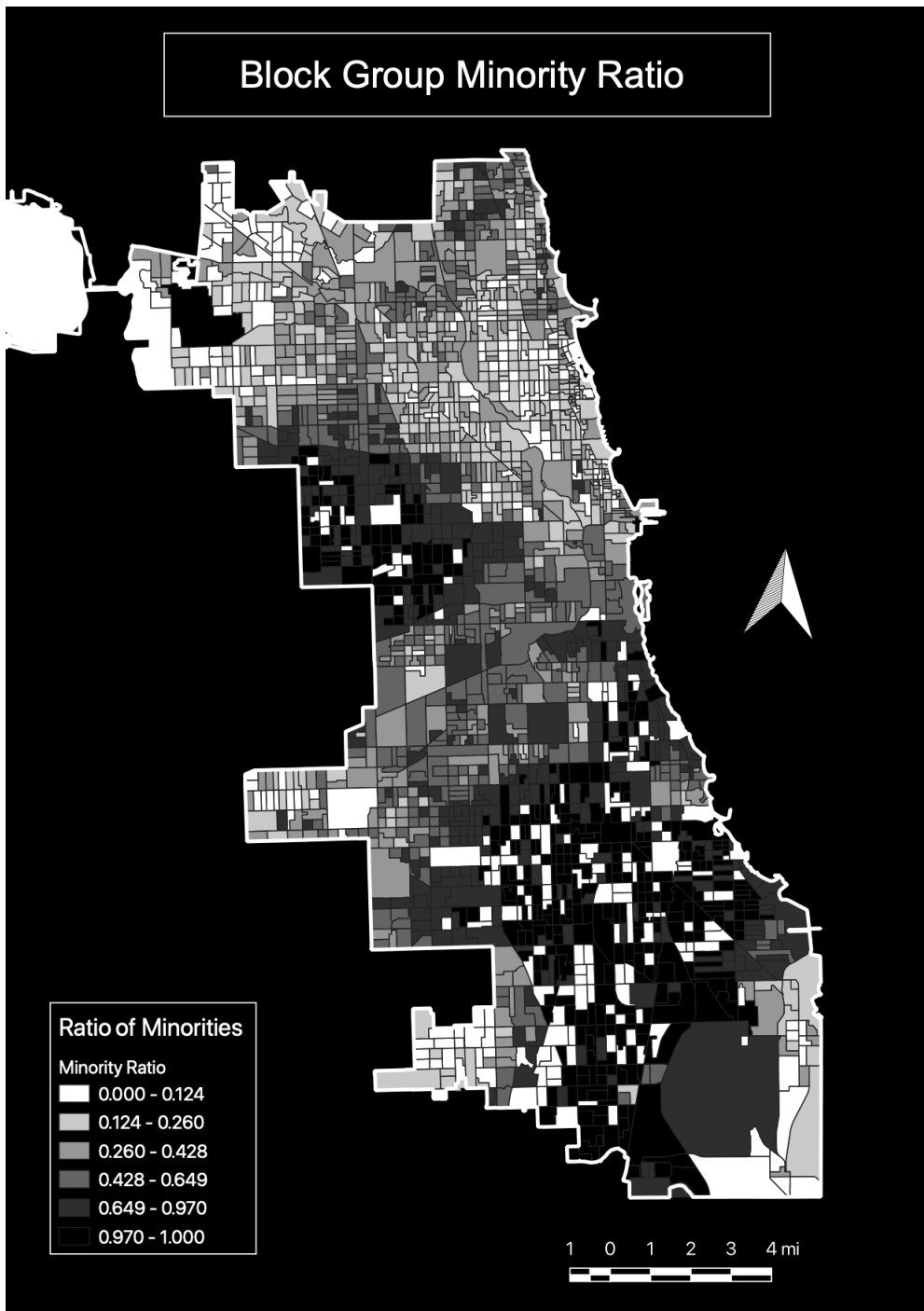


Figure 8

Miscellaneous Feelings

While I am hoping that my work can be part of a bigger push to resolve transit inequity within Chicago, it is important to note and reconcile the unique feelings that come with generating maps, sifting through relevant data, and making policy recommendations. In the end, this project is somewhat top-down in the sense that I have had to make decisions about what data I feel is relevant, what distances are appropriate for quantifying transit access, and even to what extent is it appropriate to limit my research to Chicago's official city borders by excluding communities that are barely outside of the city. Because I am focused on the role of racism and deindustrialization in shaping this current issue of transit inequity, I have to note how top-down analysis has been at the root of many urban social problems in the past, whether it was redlining maps, school district maps, or gerrymandering. While I have done my absolute best to limit any bias or prejudice throughout the writing of this thesis, I felt that it is important to acknowledge the individual power that I have had, in addition to recognizing how this power has been used both intentionally and unintentionally to marginalize certain communities within Chicago.

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