Staying for Opportunity:
Industry Trajectories as Place-Based Stratification

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Abstract

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Local governments in the U.S. are increasingly diversifying the industries in their area. This push is in response to many of the problems brought by the specializations in the recent past. Concentration into private industries wrought many problems for locals, including lower wages and difficulty retaining residents. Concentration, once seen as a foundation, is now partly to blame for the stagnated growth of many of the mid-sized and smaller towns in the U.S. In this dissertation, I examine the trajectories of industry composition to improve our understanding of how the transition to varied industry arrangements comes about and, more importantly, how they impact residents. I contribute to a growing body of literature on the spatial distribution of local economic arrangements by highlighting the place of industry–what we do, with outcomes–how we are.

In the first paper, I build a typology of industry trajectories. I constructed a data-driven strategy for assessing the transitions between primary industries over the past forty years. The typology uncovers the simultaneity of industry composition and particular work characteristics to allow for a unified language for comparing

deindustrialized Rust Belt towns to the emerging tech towns of the West Coast. In the second, I apply this typology as a pathway to understanding the wages of service sector workers. The wages in the service industry are spatially distributed, and I test how much this distribution is tied to work trajectories. In other words, were some labor markets primed to manage a national shift to service work? And are those prime markets giving higher wages? I find evidence that places with a history of service work have modest wage gains compared to their counterparts in other industry trajectories. In the final paper, I examine this question of population growth by assessing recent changes to internal migration due to the push for diversifying the industries in a local labor market. I find that economic diversification may be one of the few factors promoting internal migration in the U.S. amid slowing rates for the past few decades.

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I will add that I wrote this. At the time of this writing, large language models are newly accessible resources. They are primitive and specious. Still, folks plug and chug whole chapters. I want to acknowledge that I did not. For better or worse, caffeinated, fleshy hands wrote this document. The mistakes are all mine.

Chapter 1
INTRODUCTION

The clustering of economic activity has tremendous importance to the well-being of local communities in the U.S. (Mackay 1981, Delgado et al. 2014, Strangleman & Rhodes 2014, Blyton et al 2017). Many towns and cities identify with the primary industries in their area, tying together the histories of work content, prosperity, and the inhabitants who live there (Milkman 1997, Friedman et al 2021). What kind of housing people can find, how much money they earn, and what places are viable destinations for moving are all directly tied to the structures and trajectories of the local labor market (Dwyer & Lassus 2015). While this fundamental relationship between the type of work conducted in place and the dealings of inhabitants shapes sociological outcomes, the relevant dimensions of industry-place for shaping these outcomes is an open question (Walker 2017). In this project, I developed a line of research related to industrial development and composition.

The historical trajectory and the compositions of industries in place are critical pieces of economic development in the U.S. Both changed under globalization. In the past twenty years, many towns and cities throughout the U.S. have intentionally diversified their industries (Brown & Greenbaum 2017). These diversification efforts aim to make place more resilient against many problems stemming from concentration in one industry (Martin & Sunley 2015). My aim with this work is to examine how past industries imprint in locations even as efforts to diversify emerge (Stinchcombe 1965). In other words, are the individual outcomes we see today in diversifying local

labor markets path-dependent on what primary industries were in place before?

I am motivated by cases like Dalton, GA. Dalton is about 100 miles north of Atlanta, near the Tennessee border. In the 1970s and 80s, the town was a self-made powerhouse in carpet manufacturing. "Self-made" because the success grew from innovation in the carpet-making process in Dalton rather than companies moving south in search of lower taxes and absent labor unions (Denton 1998). As a result, the town grew in terms of wages and population in lockstep with its manufacturing success. In the 90s, Dalton carpets' market dominance diminished as commercial carpets' buyers went overseas. This globalization-induced deindustrialization did not follow the same outcomes as, say, Lordstown, Ohio where average wages declined, unemployment increased, and out-migration grew (Sallaz 2004). Instead, Dalton saw population growth, wages above average for the area, and growth in other industries, namely the service sector and public administration (Davis 2009). This continued growth appears to be related to the move toward a diversified industrial base. As the decline in carpet manufacturing occurred, the city of Dalton successfully converted that sizable workforce, spurred to size by the promise of carpet jobs and the flows of immigration from Mexico into other fields, construction and real estate, which allowed for increasing agglomeration of other industries into the area. Dalton illustrates a key idea of this dissertation, the interconnectedness of a historical sector in place and the potential paths for growth that come out of the evolution of the place (Martin & Sunley 2014). The modern outcomes we see in Dalton are born from the past work history and how that evolution into a diversified job market occurred.

In this dissertation, I investigate how past work and current compositions shape stratification. The first dimension is the trajectory of industry development in a local labor market. Drawing on Stinchcombe's "imprinting," I suggest that industrial

characteristics persist within labor markets (Stinchcombe 1965). As a place develops economically, it takes on features in the labor market and the built environment related to that evolution. Local labor markets were susceptible to imprinting during the shift to the service economy, delineating the features of the job market that can persist through today. The existence and proliferation of public transportation is a helpful example. Where public transportation goes is intertwined with what work is done, the number of people doing it, and where they live (Attoh 2016). I contend that these relationships between industry and place-making are a mechanism of inequality. Main streets persist even after the "main" economy moves elsewhere (Kosta 2018). In this way, industry trajectories indicate what structural barriers exist in a local labor market. Access to opportunities is levied by what work is going on, what amounts of that work is occurring, and what work has been done.

The second dimension is the composition of industries in place and time. The diversity of industries within a local job market has historically shaped precarity and resilience (Brown and Greenbaum 2017). Resilience has been a debated term, but it boils down to the notion that a local labor market can endure disturbances impacting the workers in the market, like layoffs, natural disasters, and policy changes. The intuition around resilience is common parlance in political discussions around employment and shifts in work. Coal mining maintains the well-being of a place and its inhabitants, and moving away from coal power would hurt their ability to work and live (Lewis 2016). In Appalachia, there are few levers for finding this kind of resilience. This discussion points to a composition where most workers work in one industry, and the only other work in town are complementary industries and town subsistence. In this way, the composition exposes the influence on individual outcomes: the town's well-being tied to one industry with no alternative above subsistence versus a town

that could absorb industry-specific layoffs into the rest of the labor market. I analyze the weight of industry shares to determine how they can shape stratification. This dissertation takes to empirical task this common expression of the relationship between industry compositions and individual outcomes.

This dissertation proceeds as three papers. First, I develop industry composition over time into a typology of trajectories. This tool aims to incorporate both dimensions of industry composition: diversity and trajectory. Second, I apply this measurement to understand the wage attainment of service workers. Lastly I focus on the industrial diversity of local labor markets as a mechanism for internal migration. With this project I aim to contribute to a research program that improves the measurement and conceptualization of industry shares and to highlight how its application advances our understanding of fundamental outcomes in the field: wage attainment and migration.

1.1 Industry Composition As Mechanism

Scholarly research on industry composition can be found throughout the social sciences, but there is little in the way of a unifying language or measurement. The outcomes of interest are similarly varied. Scholars point to the "resilience" attributable to diverse industry composition, but the specification of compositions is varied (Brown & Greenbaum 2017, Sutton and Arku 2022). To complement this measurement issue, the theory is siloed from other literatures. Too often, the implications of diversifying labor markets are noted only for the variety, failing to connect outcomes to the experiences of industry change in other local contexts (Herbert et al. 2012, Seo 2021). This dissertation addresses this measurement and language issue by honing measurement for industry compositions in time and over the long run to outcomes suggested in the

literature across industrial contexts.

In this project, I propose an improvement in the measurement of industry composition to clarify the role of labor market settings on individual outcomes. Past work has highlighted some valuable ideas for understanding the relative position of industries within a market. First, **concentration** refers to the relative size of industries and the magnitude of the competitiveness for employment in a given location. On the other hand, there is **diversity**. This is the amount of shares of industries in each labor market. Diversity is often tied to labor market stability and area resilience (Brown & Greenbaum 2017). I frequently consider the trajectory of a geographic labor market in terms of its industrial composition. Trajectory refers to the historical arc of industry compositions. Dalton, Georgia, was once highly concentrated in manufacturing, and its trajectory moved toward a diverse composition that included related industries like construction and real estate. Compare with the case of Lordstown, Ohio where historically, there was a large concentration in the manufacturing industry, and over the past forty years, this concentration has persisted. Manufacturing continues to be the primary industry in Lordstown, and it has a lower diversity of industries relative to Dalton. These recurring concepts provide language for the historical industries of interest in a place, and the long-run shape of the evolution of a local labor market that make up the comparative cases of this dissertation.

This dissertation draws on relational inequalities literature to understand the cycle of industry compositions and individual outcomes. Industries directly shape stratification at the foundation, functioning as a critical generator of inequality by distributing wages in globalized markets (Ndubuisi & Owusu 2022). The outcomes of individuals connected to primary industries tend to stop at this connection, favoring point-in-time relationships between an industrial shock event and wage declines (Tschopp 2015). In

this dissertation, I develop the idea that to trace industry setting to individual outcomes requires a view of current and historical employment. This condition derives from three characteristics of industries that have been underexplored in the literature: the imprinting of industries onto space, the sorting of capital in conversation with industries, and the alignment of industries and their employees in geographic space.

Relational inequalities frameworks provide tools for discussing long-run conditioning related to industrial compositions and how relative employment shares can create inequalities. Industry and place studies note this relationship's reciprocal quality (Paulsen 2004, Zilberstein 2019). If we think about historically completed work: the buildings where it was done, the roads that people used to commute, and the market streets where commerce was conducted, these items remain, often despite the industrial changes around them. Narratives of neighborhood change have frequently related the past industrial work of an area to the identity of inhabitants and the experienced conditions of a place (Brown-Saracino 2010). The structural inequality introduced by this imprinting of industry compositions on place is vital to our understanding of place-based stratification. It has been described in disparate literatures like neighborhood change and agglomeration economies.

In this project, a relational inequalities view of industries of local labor markets expands on some core sociological concepts. The literature on job searches describes the sorting mechanism of employment where firms sort the job applicant pool for the best talent and exchange wages for that talent (Kalleberg and Sorenson 1979, Hirsch and MacPherson 1994). Traditional studies of this process discuss this sorting in light of single job markets. I expand on this process by connecting industry compositions to internal migration to uncover how sorting may occur at larger geographic scales.

Insights from the literature on agglomeration point to the benefits of complementary industries near each other, such as access to greater human capital and knowledge spillovers (Peck 2017). Therefore, the relative sizes of particular industries may pull migration in a market and their wages in larger areas than is traditionally studied. This project provides a clearer view of this relationship.

1.2 Chapter Overview

This project converses with a few literatures related to industries and the outcomes of wage attainment and internal migration. These discussions are through the prism of relational inequalities (Tomaskovic-Devery 2014). This framework defines the approach of the questions and analysis. One key piece from relational inequalities is **historicism**. The idea is that understanding the formation and pathway to social stratification outcomes is critical to understanding inequality. Social conditions become actualized in systems that are continually reinforced. With the view that categorical distinctions can continue to determine outcomes long after their inception, even as we work to undo them, this project aims to analyze how industries become a concrete part of modern outcomes. For my project, historicism of industry aims to analyze how industry compositions of the past have shaped the structural barriers we see today.

This project also draws on relational inequalities to understand the relative position of industries as a source of stratification. Relational inequality researchers point to group configurations like monopolies or newcomers as essential characteristics of structural inequality. This project treats the relative shares of industries as a pathway to precarity or resilience. The composition of industries as a group that impacts the constituent inhabitant outcomes is vital in this research because it clarifies under

what conditions the neighbor's workplace affects one's outcomes.

In Chapter 2, I use a multichannel sequence analysis to uncover industry trajectories in the U.S. for the past forty years. This analysis is used to generate a typology of six trajectories that are applied in Chapter 3. The trajectories are constructed through a combination of NAICS industry codes and measurements of industry concentration. Then I validate the typology through a close reading of the results, an analysis of spatial dependence, and a regression model of commute times under each trajectory. This chapter completes the necessary first step of unifying measurement to allow for comparisons across industry transitions and concentration levels. It contributes to examining the outcomes in later chapters and future work.

In Chapter 3, I investigate the wage attainment of service workers in the U.S. as a function of the trajectories constructed in Chapter 2. The idea is that past work arrangements have been imprinted on locations through the composition of industries—these trajectories condition wages by concretizing commutes, norms of benefits, and residential opportunities. I use service workers as the case because of their importance as the figures of the deindustrialization theories. I find that expectations from the literature related to industry trajectories do not hold, and my expectation of a connection to work trajectories does not hold strongly either.

In Chapter 4, I examine the internal migration patterns in the U.S. over the past fifteen years. While internal migration makes up the majority of migration in the U.S., the absolute amount of internal migration has declined precipitously. I test the notion that increasing the diversity of industries within local labor markets is discouraging out-migration. I find that sorting of migrants into local labor markets may be occurring at a larger scale, and the increasing diversity of local labor markets may actually promote internal migration.

This dissertation aims to contribute to sociological research by improving a measurement currently deficient in the literature and illustrating how that tool can be rigorously applied. The real-world implications are much more valuable. Industry trajectories have been tied to many social problems (Wilson 1996, Case Deaton 2020). This dissertation can serve as an analysis blueprint for examining how industry shares shape individual outcomes and a notion of what strings to pull for praxis. The limited view of industry shares that we currently employ has been connected to difficult issues that necessitate quality attention in kind.

Chapter 2

JOBS IN A BUCKET: THE TRAJECTORIES OF INDUSTRY COMPOSITION IN THE U.S.

In this chapter, I build a typology of county-level industry trajectories in the US. I suggest that primary industries imprint on the economic development paths of labor markets and that our understanding of these paths can be improved. Industries imprint on labor markets in two key ways. First, they shape the economic opportunities of inhabitants, influencing who can afford to live where. Second, structuring the built environment around the industry's production influences what is constructed and how workers access employment. I define a handful of industry trajectories to clarify the path dependence of economic development and the related outcomes for workers. Workers I view as beholden and therefore stratified according to these imprinting conditions for where they live and work. The spatial dependence and possible interjection of industry growth on the built environment are tested and results indicate that the typology captures changes to the built environment that can be rendered spatially.

2.1 Introduction

Industry compositions and their development shape local labor markets and their inhabitants' lives. The access to job opportunities across different forms of capital, the cost of housing, and commute times are all related to economic development trajectories in one's local labor market. Deindustrialization is one such trajectory, and its prevalence and consequences for individuals have received particular scholarly at-

tention (Strangleman 2017). In these accounts, manufacturing employment declines and the subsequent replacement with "bad" jobs in service work have contributed to poverty and the erosion of the American Dream (Bluestone and Harrison 1982). While this lore describes many of America's cities over the past few decades, the story's weight pervades political discourse and theories of prosperity (Strangleman and Rhodes 2014). Meaningful comparison cases are missing from these accounts: the geographically adjacent places that did not have a concentration in manufacturing. There are various transitions from manufacturing to other industry work or even those that have never transitioned away from such production. This lack of clear comparison cases partly results from a measurement problem. The changes in industrial composition for local labor markets are too often cast as either deindustrial or not. With inadequate measurement, understanding the consequences is spurious, diminishing the value of the story. To address this problem, I apply a sequence analysis to more accurately categorize and distinguish between deindustrialization and its variants.

Deindustrialization looms large in our understanding of economic restructuring in the U.S. because it reified many places, from big cities to small towns (Rowthron & Ramaswamy 1997, Kollmeyer 2018). Recent work describes deindustrialization as disrupting economic, gender, and racial inequality, increasing populist attitudes, and worsening physical and mental health (Rodrik 2015, Linkon 2018, King et al. 2022). Case and Deaton (2020) place these related changes as a cause of increased addiction and mortality in the U.S. These findings draw from in-place changes over time or comparisons of groups of people enduring the process. While this strategy shows how industry compositions impact individuals, it fails to conceptualize the meaning of industry in shaping a place or industry's role (Morgan and Winship 2015). Increased

attention to measuring industry trajectories is needed to uncover the industry's role in these outcomes rather than the role of economic restructuring on stability.

Take, for example, Seattle, WA, which has been remade through the tech industry's growth. It evolved from warehousing and coastal industrial employment in the city to a gentrified hub of tech innovation. This evolution has been held responsible for the city's homelessness rates, housing shortages, and weakening PNW character. The tech industry reshaped the South Lake Union neighborhood, in particular. South Lake Union, in the core of Seattle, evolved from the wholesale flower markets and family-owned businesses of the 1980s and '90s into the luxurious tech aesthetics under businesses like Amazon and Microsoft (Broyer 2023), in some ways moving from a diverse service sector to a concentrated tech hub. These aesthetic changes concretize the on-the-ground changes in who commutes there for work, the sheer volume of workers brought into downtown tech campuses, and the erasure of what used to be there. Broyer (2023) argues that the emergence and total reshaping by tech foment change in downstream outcomes because of the ontological distance between the tech industry workers and the history of how the neighborhood operated. In this way, it is not just that the neighborhood changed physically and culturally; the evolution was a stark shift in what work was done.

This paper aims to characterize spatial job markets by their industry trajectories. I undertake this project to render a typology of industrial growth connecting the specific distances between past work and contemporary employment. I use multichannel sequence analysis to show what procession of industries has occurred. This measurement strategy intends to directly compare deindustrialization with other trajectories like the tech boom of SLU, Seattle. In this way, the initial and replacement industries can be compared. The primary questions of this analysis are: (1) What are the in-

dustry composition trends, and how are they distributed in the U.S.? (2) Do distinct pathways that end in the same composition have the same outcomes?

The typology devised in this paper encourages a historicist view of industry impact on outcomes (Rosenfeld and Western 2011, Weil 2014). While it is not a primary focus of this research to speak directly to deindustrialization, as much of that literature has thoroughly explored the changes in American cities (High 2020), the data-driven typology will contribute to the counterfactuals of deindustrialization by assessing what other trajectories occurred in spatial job markets. The concentration of primary industries highlights how areas that did not specialize as thoroughly may be on a different track altogether. The imprinting of specific industries on to space are a dense set of considerations, the typology works to manage the overlapping questions of previous work shaping current environments, the arrangement of that work e.g. a monopolistic industry employing the majority of the labor market, and national changes to industry proportions generally.

2.2 The Primacy of Deindustrialization

Since the 1960s and 70s, American labor markets have experienced deindustrialization in droves (Bluestone and Harrison 1982; Rodrick 2016). At its base, deindustrialization is a decline in manufacturing jobs, declines that are typically associated with Rust Belt cities. Detroit, for example, had a population of 1.8 million in 1950, and today it is just over 630,000 (MacDonald 2014). Deindustrialization has far-reaching consequences beyond the out-migration in a handful of American cities. Deindustrialization eroded the quality of jobs, diminishing labor power and increasing income inequality (Kalleberg 2009, Rosenfeld 2014). Many accounts consider deindustrialization a total economic restructuring of much of the U.S. and many regions worldwide

(see Silver 2003). However, the shape of the decline rests on assumptions that are not clearly conceptualized for a modern understanding of outcomes.

Historically, the decline in manufacturing jobs has not eliminated manufacturing from a local labor market; rather, access was cut off (Waldinger 1999). Through technological change or other changes in the production system, manufacturing has become a smaller share of employment, with less access to job opportunities for people without college degrees (Milkman 1997, Case Deaton 2020). Mah (2012) refers to this decline as the "ruination" where plant closures pervaded but the industry did not totally leave, allowing factory locations to maintain an aura of nostalgia and disappointment for residents in deindustrializing towns. The assumption that deindustrialization carries with it the total elimination of certain types of jobs does not bear out in the data but does aid in the lore accounts of the concept (Emery 2018). This total decline assumption points to an empirical question in the data: How much decline constitutes deindustrialization? What kind of manufacturing market share must be removed for the deleterious effects to form? What is the speed of these changes over time? These questions are scarcely covered in the literature (Kollmeyer 2009). An improvement would be to include the field of industries in a location to give a sense of the relative position of manufacturing in a labor market such that absolute share decline could be considered within the market.

Another assumption from deindustrialization accounts is the weight of geographic spillover. Across different geographies, the addition of bad jobs and the related weakening of wages is assumed despite the variation in the effect by area (Kollmeyer 2018). On the one hand, the impacts of deindustrialization are considered under small places affecting particular neighborhoods; on the other, the importance of manufacturing to entire cities is so evident as to not need to be mentioned (Howell and Kalleberg 2019).

The role of deindustrialization in grand outcomes like income inequality assumes a strong linkage between the individual incomes derived from manufacturing and what we see as unequal today (Savage 2021). This weight is assumed in all locations where it could occur. Industrial composition and the clustering of industries can clarify this slippage. The clustering of manufacturing centers together delineates the penetration of replacement industries in impacted neighborhoods, and the distribution of alternative industries in the same local labor market could highlight how small shares of manufacturing decline could be associated with large-scale outcomes.

Lastly the conceptual framework of deindustrialization is overwhelmed by the procession of industries within a local market. In some accounts, deindustrialization is simply manufacturing employment declines. In contrast, in others, there is a dual labor market process wherein manufacturing is replaced by service work of a particularly low quality (Grusky 2001). The tension between replaced and removed jobs is prescient and highlights the dearth of understanding about what industries remain and what they mean (Mead Wilson 1987). Accounts that describe the weight of primary industries as informative for identity help frame this problem. From this perspective, the replacement work is essential to the sense of self and the possible material changes (Mah 2012). Two deindustrialized towns may be seeing different outcomes today, but the shape of that revitalization effort is more of an open question. On top of this debate is that deindustrialization can be claimed as the natural procession of the wealthiest nations' economic trajectories, adding another layer of complexity to the division (Ritzer 1989).

Despite these critiques, the deindustrialization literature details the pathway for numerous social problems. Deindustrialization is highly predictive of unemployment and not just of the formerly manufacturing workers (McCormack 2009). This connec-

tion is particularly strong in the outcomes of Black workers (Wilson 1997). Deindustrialization also accelerates income inequality in large economies (Kollmeyer 2018). With these strong effects within deindustrializing places, it is vital to make sense of the alternatives for a view of inequality in the U.S.

2.3 Alternative Industrial Trends

I have suggested that alternative trajectories of industry composition are understudied relative to simple deindustrialization. The deficiency of measurement is due in part to the clarity of instruments. What constitutes "service"? And other industry definitions are vague (Korcynzski and Evans 2013). Without a clear definition of industries that are not manufacturing, the alternative trajectories are difficult to specify. For instance, works examining tech sector growth discuss this growth as a general condition of the related income changes rather than a condition of the industry itself. I posit that both things happen at the same time. The growth of an industry with high salaries has consequences for local labor markets, and the characteristics of that specific industry also play a role. A common language of measurement and acknowledgment of industry trajectories is needed to produce a research program on industry composition.

The measurement problem of industrial trends pervades other works and industries. We have seen the replacement hypothesis of deindustrialization that service work (with its lower-quality occupations) infringed on a workforce attuned to manufacturing work. The sliding scale of what constitutes service work undermines the clarity of the process. Some accounts consider the service portion in vague terms, claiming front-facing workers are true service workers (McCammon and Griffin 2000, Korczynski 2009), and others focus on non-tradable services only (Olney Pacitti

2017). The flexibility of service is scarcely examined, analyzing labor market trajectories as a moving target.

There's another problem with the weight assigned to specific industries because they have their own production processes. The face validity of the effects of tech growth specifically is strong. Tech work grows and bears tremendous consequences for income inequality, health and well-being, and the migratory patterns of a local labor market (Alegria 2016, Khadria et al 2018). In this case, the measurement problems are minimized by the clear distinctions about what constitutes tech through usual governmental definitions (Coad and Rao 2011). However, this process of plain tech growth and its consequences have fallen short because the trajectories are not *due to tech*. Rather, the explanations highlight the consequences due to the growth of a high-paying industry, and that any industry that could bring this sort of growth would have similar consequences. Without a comparative view of an industry paths, the comparative cases of local labor markets talk past each other and assume that industry similarities are case specifics.

The areal unit question of industrial trends maps into other industries as well. The growth of the healthcare sector in the United States in terms of employment is clear (BLS 2024b). Tantamount to this research is the areal coverage of healthcare buildings. In these accounts, the coverage size is a continual discussion particularly in rural areas where hospitals become few and far between (Miller & Vasan 2021). This is an essential point to a general model of measuring and analyzing industry compositions because it highlights that in some singular industry accounts, the spillover in space is a vital characteristic of understanding individual outcomes, as are the relative proportion of industries in the location. Saexnian (2000) describes the outgrowth of tech in Silicon Valley through the on-the-ground benefits offered by Silicon Valley.

That is, the construction of the place allowed for easier access between firms, and the job market format was amenable to the explosion of tech. This analysis is near the idea of relative shares and how particular histories of industry shape place-individual dynamics, but it does not yet have the language of industry composition.

The singular shift of industry compositions beyond the deindustrialization trajectory has yet to rise to the station of this one theory. Accounts of healthcare, tech, and education growth have been claimed to profoundly impact many of the outcomes social scientists are interested in (Kelly 1998, Rosenfeld 2021, Poole 2021). Yet, putting these trajectories in comparison with each other is scarcely considered. Past attempts to characterize the geographic distribution of industry changes have come from different fields and have focused on generalizing to the industry composition absent the depiction of industries (Nakamura "Measuring Agglomeration" and Krugman 1991 industry concentration coefficient). These accounts rely on numerical tellings of events that make no sense of the industry changes as is where particular types of industries give way to others or particular types hold up employment in a stale arrangement in a town (Loveridge and Selting 1988).

My reading of the sociological literature suggests that an analysis of industry trends attentive to these issues has not yet materialized because of the position of adjacent analyses. Labor market dualism addresses many of these issues (Hudson 2007, Barbieri and Cutuli 2016, Fauser and Geberl 2023). The industries involved function more like flavor text to these accounts. We miss fundamental connections from industries by aggregating to the place of occupations. The position of industry in the shape of places is one significant omission. The concomitant housing development around specific styles of work is in a mutual relationship with the wage mechanism and the commute patterns of local workers. In dualist accounts, the construction of space

around work related to the work is lost. Take, for example, the dualist accounts of micro-level barriers to job opportunities (Kalleberg 2000, Seo 2021). Human capital, social capital, and job search networks all form barriers to opportunities simultaneously that are conditioned by the format of economic restructuring. Wacquant (2009) rightly describes that low-quality jobs are connected to low-income housing by design and that particular industries reinforce such arrangements to reproduce the capitalist system. In a critique of Kalleberg's book (2011), scholars have pointed out that the layering of industry-specific differences of the type described by Wacquant are absent from the analysis (Kalleberg 2013).

This analysis aims to contribute to the field of industry compositions by examining industry proportions within a location. The analysis aims to be attentive to the specific industry changes, and is translatable across space. The effects of the foundational role of industries is profound to the economic well-being and the personal identity of residents. In this project, I aim to devise a strategy for analyzing industry trends that provide a snapshot of historical change that is attendant to the problems that I have outlined.

2.4 Measuring Industry Trajectories

The growth, decline, and replacement of work is fundamental to sociological study. The burden of industrial change on workers has been a focus. Marx (1849) describes how workers' subsistence demands that their labor power is diminished to continue the accelerated growth of capital. This is the story of deindustrialization in many ways. Workers facing deindustrialization are met with the question of how they can make their production valuable enough for subsistence as the capital looks to find growth in new locales or locally in new industries. The quantification of this phenomenon

is far less prominent. Relative proportions of industries and their influence on the well-being of individuals has been the work of economists and geographers for the most part (Loveridge and Selting 1998). While these analyses are subject to critiques I have raised before, their strategies are instructive.

One line of research in this area is the shift-share studies of regional development. In these works, the relative shares of industries are decomposed to establish how growth rates of particular industries are keeping pace with national industry growth rates for smaller areas and further that this difference in rates is related to economic outcomes (Niemi 1985). These works tend to focus on the general competitiveness of regions and therefore pay little attention to the individual outcomes arising from industry composition changes (Brezina et al 2016). For my project, the strategies for measuring industry share composition in local labor markets is instructive. While a few strategies exist and will be developed further in this dissertation, the typical method is to generate an index of share power (Soreson and Sorenson 2007). This type of index would indicate monopolistic competition or parity of employment among industries in a location. The shortcoming of this strategy is that it is agnostic to the specific industries in the location, which could cause problems like the differences mentioned above in transition after deindustrialization to a sliding scale of service work.

Another line of research is in the location of emerging industries, which focuses on what conditions set the stage for a new type of industry to enter a local labor market and the related questions of that industry's success and longevity in a region. These works tend toward an Economic Sociology perspective, thinking about the actors in local labor markets. Still, the most valuable inclusion for this project is the idea of path interdependence in regional industrial arrangements (Gomar and Harfst 2019).

Multiple calls have been made to assess how local labor market paths are clustered over time and what industries are included in path-dependent economic development (Hassink, Iasken, and Trippl 2019).

My approach aims to contribute to these literatures by identifying the trends of industry composition across the permutations of work arrangements in the U.S. It is attentive to the market concentration, the path interdependence of regional arrangements, and the long-run shifts in local markets. This is a beneficial index creation because of what the methods offer as a tool for understanding economic development. Many of the critiques I have raised could be improved with careful measurement and the construction of theories at the level of the problem. By making typologies of industry composition trends over time, the measurement issue is reduced by allowing data-driven indication of industry composition changes, and the related theories can be grounded to what we can observe in the data.

2.5 Methods and Data

In this paper, I devise a typology of the industry composition trends for all counties in the U.S. from 1975 to 2016. I use multichannel sequence analysis to uncover the primary industries in each county year and then cluster the trends of each county into a typology of trajectories. Next, I check these typologies for spatial dependence and quality of prediction on shaping a local labor market's built environment by evaluating commute times.

The data for this project uses the County Business Patterns of yearly employment by industry from 1975 to 2016. This panel was designed by Eckert and colleagues (2020) to provide full counts of employment, even in small counties, for consistent 2-digit NAICS 2012 industry codes. The panel ended in 2016 due to the nature of

noise introduced by the Census beginning with the 2017 vintage. I keep only the counties that are consistent for the whole panel for a total of 3,075 counties (97.8% of counties in the U.S.) from 1975 to 2016.

Sequence analysis has been a feature of sociology for decades. However it has not to my knowledge been employed for the sequence of industries. It is used here for its main use-cases: devising data-driven typologies and as a starting point for theory construction that accounts for long-run trends. While past work has scrutinized sequence analysis for its discretionary nature, recent contributions have improved this problem by allowing the clustering procedures to be data-driven (Ritschard et al 2023). The basic concept is that a state can change as a trend moves to time point 2. This change comes with some cost, either transitioning to another state or removing the state. It had long been the case that users were deciding the costs and insertion-deletion values that went into state transitions. However, for this project, I use data-driven transition metrics based on the behaviors of the other trends in the data (Gabadhino et al 2011).

Multichannel sequence analysis has become more prominent because it highlights multidimensional status over time (Liao et al 2022). This method provides insights into the long-term enculturation of industry compositions into place. It codifies the role of particular sequences of primary industries rather than focusing on point-in-time industry analyses. I use optimal matching to identify the sequences. Specifically, I use an independence from domain costs and distances (IDCD) formulation, which has gained popularity in multichannel sequence analyses with many domain combinations (Ritschard et al 2023). The IDCD process creates a unique combination for each set of domains. Then, it calculates the cost of switching sequences given what is known in the data to construct a distance matrix. This matrix is then used to identify the

clusters of similar sequences that form the typologies.

To conduct the multichannel sequence analysis, a state must be selected for each county-year. The two trends I am interested in capturing are the primary industry and the concentration of work in the county. The industry data comes from the County Business Patterns data from 1975 to 2016. I use Eckert's CBP weights and imputations for a panel of harmonized codes across time (Eckert et al 2020). The industry is measured as the 2012 NAICS industry. There are 22 2-digit NAICS codes; only twenty codes are represented in this data. The missing codes are unclassifiable and environmental. I select the industry with the highest employment as the "primary" for each county-year.

I construct the Brown and Greenbaum (2017) industry concentration index for each county-year and construct the panel over different concentration levels for concentration. Concentration describes how competitive a market is for employment across various industries. This index derives from the Herfindahl-Hirschman index of industry competitiveness. Historically, subjective brackets have described the competitiveness levels: scores under 1,500 are considered to be low concentration, 1500 to 2500 are moderate concentration, and above 2500 is a high concentration in one industry (Justice Department 2023). The distribution of county-years across the concentration measure are depicted in Figure 1. The majority of county-years have a low concentration of industries.

3,075 counties were selected for this analysis because of their existence and stability across the entire panel (1975 - 2016). In Table 1, I display the assignments for the modal industries and the concentration levels in the sample. I describe these in terms of states and episodes. A state is the years spent with that modal industry, and the episode is the succession of that same state over time. Therefore if we look at

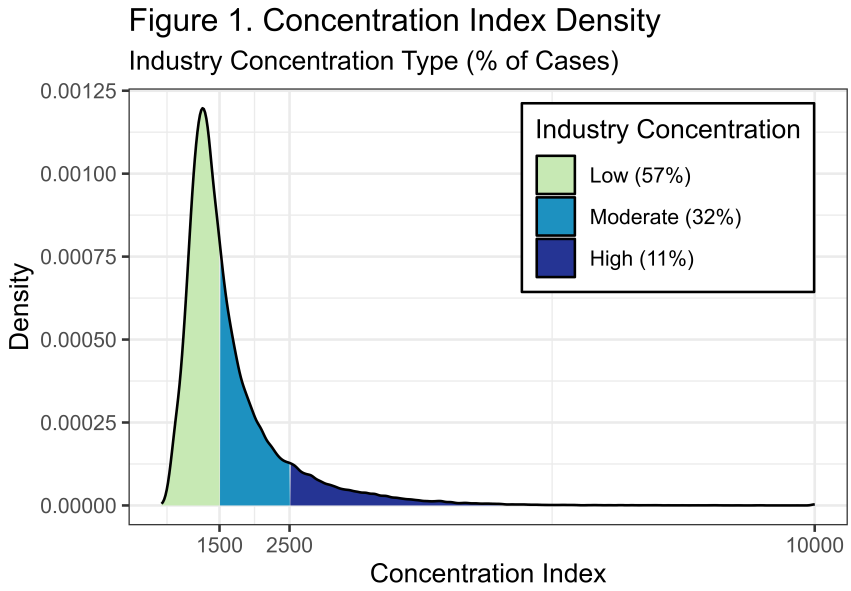

Figure 2.1: HHI Distribution

retail trade as an example, counties tend to stay in that state for 9.67 years, and that state tends to happen in succession for 1.72 times. Table 2 displays the industry concentration time in states and episodes. Throughout Table 1 and Table 2, the standard errors are important, illustrating the variability of industry compositions and the need for cleaner comparative tools.

For this project, each county-year with its combination modal industry and the concentration of industry shares are assessed for the costs of transitioning to a different state of these conditions. The costs are compared for every pair of counties in the data to generate the distance matrix of counties from each other. The distances in that matrix are then used to bin the county trends into groups that have similar sequences and related distances from other industry arrangements. Sequence analysis is sensitive to the selection of costs and insertion-deletion values. In this work, I have selected an optimal matching strategy that considers the preservation of events

Table 1. NAICS Industry State and Episode Summary					
NAICS Industry	Time in State	Time SE	Relative Frequency	Number of Episodes	Episodes SE
Agriculture	0.13	1.24	0.00	0.04	0.34
Mining	1.06	4.67	0.03	0.21	0.82
Utilities	0.15	1.80	0.00	0.04	0.34
Construction	0.62	2.92	0.01	0.20	0.76
Manufacturing	19.79	16.43	0.47	1.46	1.38
Wholesale	0.35	2.31	0.01	0.12	0.61
Retail	9.67	11.85	0.23	1.72	1.87
Transportation	0.23	1.72	0.01	0.07	0.39
Infromation	0.04	0.63	0.00	0.02	0.23
Finance	0.14	1.58	0.00	0.04	0.28
Real Estate	0.01	0.17	0.00	0.00	0.08
Professional Service	0.19	1.92	0.00	0.03	0.26
Management	0.04	0.79	0.00	0.01	0.16
Admin And Support	0.19	1.28	0.00	0.06	0.32
Educational	0.18	1.90	0.00	0.04	0.31
Healthcare	7.41	9.66	0.18	1.19	1.43
Arts And Rec	0.10	0.92	0.00	0.03	0.29
Accomodation	1.65	6.11	0.04	0.35	1.04
Other Service	0.04	0.72	0.00	0.02	0.23
Public Admin	0.00	0.07	0.00	0.00	0.05

Table 2.1: NAICS Industry County-level Episode Summary 1975 - 2016

Table 2. Industry Concentration State and Episode Summary					
Concentration	Time in State	Time SE	Relative Frequency	Number of Episodes	Episodes SE
Low	24.02	15.04	0.57	2.11	1.71
Moderate	13.42	11.63	0.32	2.50	2.12
High	4.55	8.84	0.11	0.75	1.30

Table 2.2: HHI Concentration County-level Episode Summary 1975 - 2016

(rather than timing) as the critical factor in the clustering (Aisenbrey Fasang 2017). We are looking to identify the order and distribution of industry compositions. The exact years that changes occur are secondary to the state transitions.

To perform the multichannel sequence analysis, each county-year is assigned a "token" that is a combination of their domains. For example, King County in 2015 is designated "he+lo" for the HEalthcare industry and LOw concentration. I use INDELSLOG to assess insertion and substitution costs based on the frequency of the tokens in each position (Studer and Ritschard 2016). This cost strategy considers the relative rarity of specific tokens and gives them a higher cost. There are 60 total combinations in the data despite 66 combinations being possible. The missing cases are the mining industry and unclassifiable industry at each level of concentration and these are removed for simplification of the token structure. The typologies are created using the cost strategy output and the PAM clustering algorithm (Le Roux et al 2023).

After producing the typologies, I assess them for a few qualities. First, I will describe the summary statistics of key county-level characteristics. I deep read the clustering outcomes to connect the typologies to the real world. Next, I assess their spatial distribution and examine if the typologies are clustering in geographic space and if the

typologies are not just reproducing other county-level characteristics. Lastly, I determine if the typologies are associated with differences in the work environment. The typologies I have made are devised to become a tool that captures historical industry trajectories and the related processes that we can connect to industry transitions. They intend to shed light on what structural inequalities have been concretized under particular industry arrangements over time.

2.6 Results

In Figure 2, I illustrate the sequence index plots based on the clustering process of the sequence analysis for each of the domains. While I have displayed each domain separately, the typologies are based on their combination. The IDCD strategy combined the domains of modal industries and industry concentration. The cluster processes use the PAM method of clustering (Le Roux et al 2023). The cluster diagnostics point to 6 clusters as the optimal amount with an R-squared of 0.38; the diagnostic plot is presented in the Appendix Figure A1. In Figure 2, each horizontal line represents one county, and the colors represent the sequence state in each year. Each cluster represents a particular type of trajectory, and since they are categories of trends, they are presented in no particular order. The labels on the right hand side of the graphs describe the biggest industry chunk within a typology. Cluster descriptive statistics are presented in Table 3, averaging the county characteristics for the 2022 5-year ACS.

Table 3 describes the average qualities of the counties in each cluster. I have also included a few locations the clustering method describes as representative of the trend. Representativeness was measured by how little distance that county was from the other counties in that cluster. While the counties selected by the cluster are not all household names, a deep reading of the exact areas clustered clarifies the

Figure 2. Sequence Index of Clusters

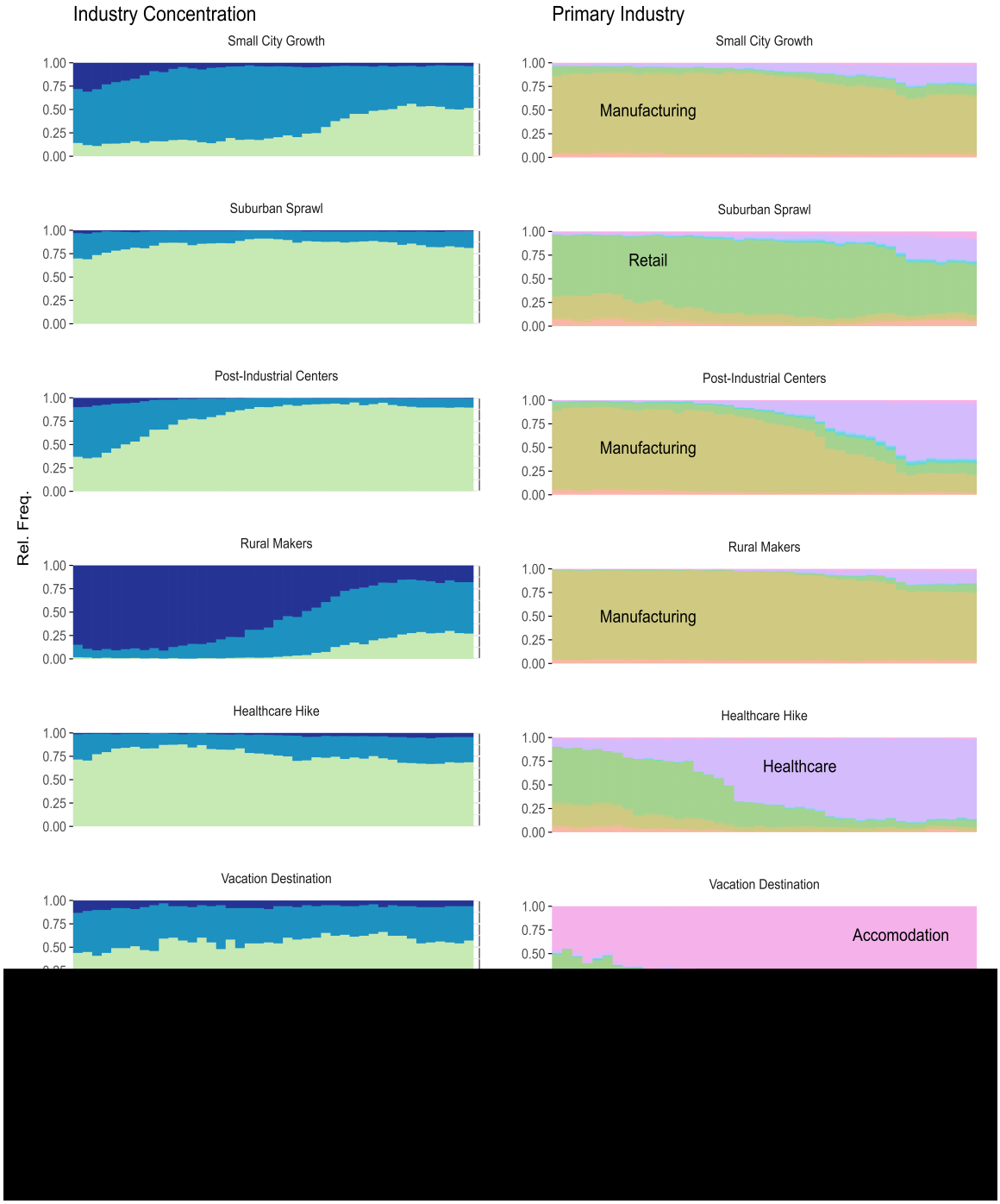

Figure 2.2: Multichannel Domain Indexes

typologies. The titles are shorthands that I devised after assessing the characteristics of the clusters, the literature, and representative counties. The idea is that they point to the trajectory and areal unit on average.

"Small City Growth" describes small population cities undergoing deindustrialization with a move toward parity in industry concentration. This includes many small cities, with just one county out of the bunch with a population of over 45,000. "Suburban Sprawl" describes retail spaces and low concentration for the length of the panel. Suburban Sprawl denotes the adjacency to many large cities without containing them. An example would be the Broward County area of Miami metropolitan, which does not include Miami. The third cluster is "Post-Industrial Centers". This includes many of the largest cities in the U.S. in principle: New York City, Chicago, and Seattle, and depicts the transformation from manufacturing centers to service work, the "ideal type" of deindustrialization theories.

"Rural Makers" describes rural mainly locations that are strongly concentrated in manufacturing throughout the length of the panel. This type is often assessed for pathways to increasing stability and resilience against global industry changes and climate-specific issues (Mueller 2021). "Healthcare Hike" are the trajectories that have always been low concentration but primarily employ healthcare workers more recently. The Bureau of Labor Statistics predicts that healthcare employment will continue to outpace all other occupations in growth for the next ten years and these are the counties where that is already occurring (CITE - BLS 2024b). The last type is "Vacation Destination," which describes many of the biggest tourism locations: Las Vegas, Disney parks, and beach towns.

The geographic distribution of the typologies was tested. I test if metropolitan status can differentiate the sequence typologies. (Gabadinho et al 2011). Metropoli-

Table 3. Typology Summary Statistics

ACS (2017-2022) Estimates Averaged Across Counties within Type

Typology	Number of Counties	Percentage of US Pop	Population	Percent Black	Racial Dissimiliarity	Annual Income	Monthly Housing Costs	Gini Coefficient	Algorithmic Exemplary County
Small City Growth	762	9.8	41,848	10.81	0.50	31,792.00	811.52	0.44	Orangeburg, SC
Suburban Sprawl	597	25.6	138,659	6.23	0.50	34,751.09	1,015.57	0.44	Mohave, AZ
Post-Industrial Centers	669	38.0	185,384	9.09	0.46	34,284.59	987.43	0.45	Wyandotte, KS
Rural Makers	448	3.8	30,018	13.16	0.44	29,826.57	726.50	0.45	Marion, AL
Healthcare Hike	545	19.7	117,318	6.69	0.55	32,963.12	849.37	0.45	Nassau, NY
Vacation Destinations	97	3.1	103,374	5.18	0.49	35,686.12	1,130.12	0.46	Horry, SC

Table 2.3: Summary Statistics by Typology

Table 4. Join-Count Spatial Dependence Results			
Typology	Join Count Test Statistic	Spatial Clustering P Value	Isolation P Value
Small City Growth	93.95	0.159	0.848
Suburban Areas	62.09	0.059	0.945
Metro Centers	75.40	0.157	0.841
Rural Makers	37.20	**0.001**	0.999
Healthcare Hike	53.14	**0.028**	0.976
Vacation Destinations	1.89	0.239	0.746

Table 2.4: Typologies Join-Count Results

tan status is defined by the Census as no-metro, having less than 10,000 people; micropolitan, having between 10,000 and 50,000 people; and metropolitan, having at least 50,000 people. The test shows a statistically significant ($p = 0.001$) association between the metro status and the typologies. This discrepancy illustrates that the typologies partially capture the particularities of rural, suburban, and urban locales. The pseudo R-squared of this discrepancy analysis is a meager 0.005, suggesting that this capture is negligible. Therefore, the notion that metropolitan status drives our typologies is lacking.

The spatial autocorrelation of the typologies is assessed using join-count statistics. Join-count methods examine the relationship between categorical variables and their spatial clustering (Lowell 1997). These statistics measure whether the likelihood of neighboring counties having the same typologies is greater or less than we would expect under random chance. I ran two separate tests: one for the greater-than-random outlook which would suggest clustering, and another for the less-than-random occur-

rence which would suggest isolation. In Table 4, the test results from the spatial clustering and isolation tests are displayed. Rural Makers and Healthcare Hike counties are spatially clustered according to this test. No typologies are isolated according to the complementary isolation test. The total geographic distribution of the counties is displayed in Figure 3. The findings of Table 4 materialize on this map—particular clustering of similar industrial compositions within states and regions.

The distance of particular county-level trends can be calculated to understand how different two cases are in terms of their individual sequences. One of my initial questions asked whether counties with similar endpoints and different pathways are leading to similar outcomes. In other words, does the trend have an imprinting association with outcomes or are point-in-time estimates handling industry composition effects sufficiently? I have suspected that industry compositions are historically impacting the built environment in numerous ways related to stratification outcomes, which I explore more thoroughly in the rest of the dissertation. To test the environmental connection, I devised a regression to capture the differences between trajectories that end in the same place.

I subset the data to just those counties that ended on the most common token in 2016 (healthcare, low concentration). Then, I estimate the commute time for workers living in that county. The idea is that regardless of the current composition, past trajectories have historically shaped the local labor markets' environment around different formats of work. In this way, I expect that commute times will be significantly different based on the typologies of industry trends I have devised. The dataset of ending on he+lo is just 827 counties, or about a quarter of the counties in the U.S. The outcome is the commute time in minutes per employed person in the county and is derived from the 5-year ACS for 2012-2016. I have also included covariates:

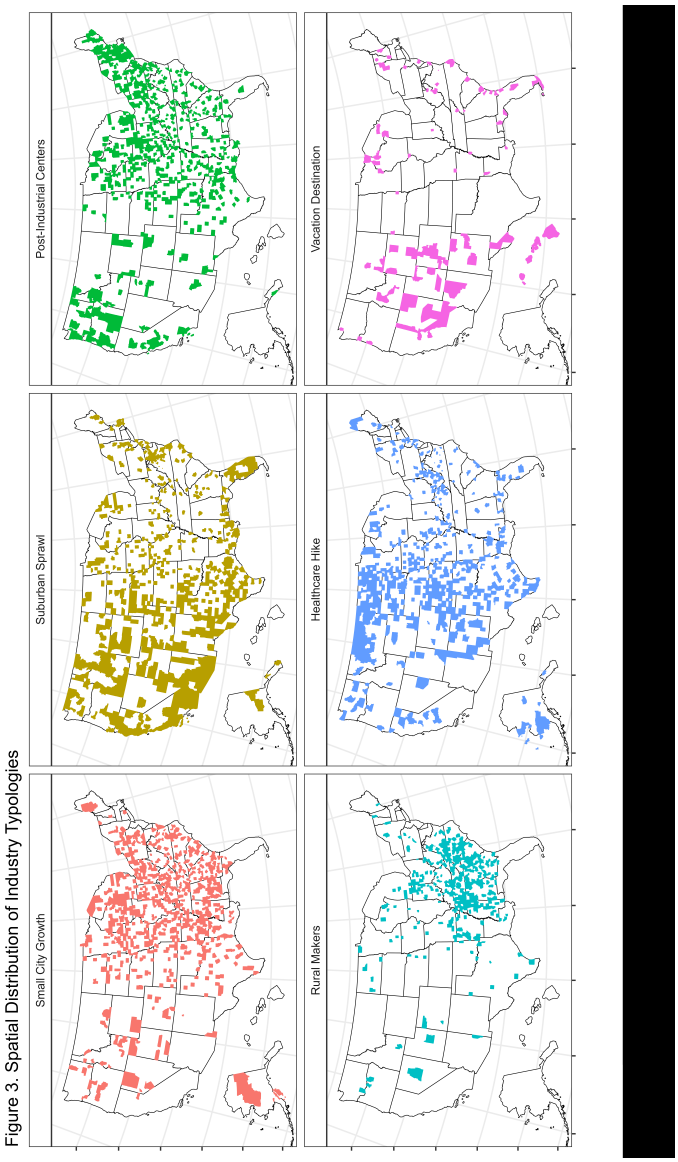

Figure 2.3: Spatial Distribution of Typology

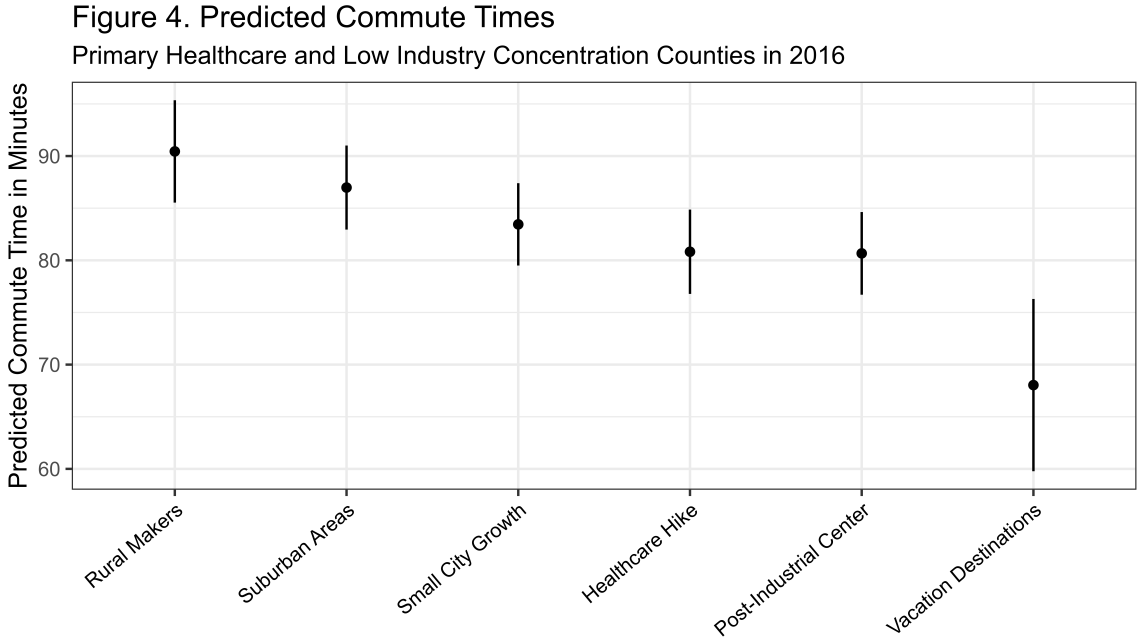

Figure 2.4: Commute Estimates by Typology

population, housing costs, percent Black, median income, and Gini coefficient, to capture some of the work-related social conditions that can influence commute times (Mitra Saphores 2019). The full OLS results are presented in Appendix Table A.1. The predicted commute times by typologies, holding the other variables in the model constant, are presented in Figure 4.

It is clear that there is variation in the commute times based on the typologies, lending some evidence to the idea that the pathways of industry trends are shaping how systems of production are housed in counties. Further, I have included Table 5, the list of pairwise hypothesis tests of predicted outcomes and found that for the majority of the typology pairs, the difference holds statistically significant (Esarey & Sumner 2017).

Table 5. Pairwise Prediction Comparison

Differences in Adjusted Predictions

Typologies Compared	Estimated Contrast	low CI	high CI	p. value
Metro Centers-Rural Makers	−9.78	−15.18	−4.38	0.000
Suburban Areas-Vacation Destinations	18.94	10.14	27.75	0.000
Rural Makers-Vacation Destinations	22.41	13.06	31.76	0.000
Small City Growth-Vacation Destinations	15.41	6.55	24.28	0.001
Healthcare Hike-Rural Makers	−9.62	−15.17	−4.07	0.001
Metro Centers-Vacation Destinations	12.63	3.88	21.38	0.005
Healthcare Hike-Vacation Destinations	12.79	3.88	21.70	0.005
Metro Centers-Suburban Areas	−6.31	−10.91	−1.71	0.007
Small City Growth-Rural Makers	−6.99	−12.37	−1.62	0.011
Healthcare Hike-Suburban Areas	−6.16	−11.06	−1.25	0.014
Small City Growth-Suburban Areas	−3.53	−8.30	1.24	0.147
Suburban Areas-Rural Makers	−3.47	−9.09	2.16	0.227
Small City Growth-Metro Centers	2.78	−1.78	7.35	0.231
Small City Growth-Healthcare Hike	2.63	−2.14	7.39	0.280
Metro Centers-Healthcare Hike	−0.16	−4.82	4.50	0.947

Table 2.5: Typologies Pairwise

2.7 Discussion

The multichannel sequence analysis uncovered 6 trajectories of county-level industrial trajectories. My goal with this construction was to provide a measurement tool that can improve some of the shortcomings in the industrial trends literature—namely, questions of alternative trajectories beyond deindustrialization and a measurement strategy incorporating industry-specific transitions and prevalence. The results indicate that the domains I used, industry concentration and primary industry, evolve in tandem over the panel. The post-typology analysis illustrates many of the benefits of these typologies.

The geographic distribution of the typologies highlights one of their key benefits. The industrial regimes of some regional connections are not necessarily isolated to that region, nor are they conditional on size. My typology uncovers clustered trajectories even across metropolitan types, suggesting some applicability of trend-specific expectations across population size and identifying where spillovers of industry work across geographic borders occurs. This suggests some spillover or at least some similarly situated trajectories for neighboring regions.

The inclusion of industry concentration points was revelatory. The comparison of rural makers, small city growth, and post-industrial centers points to the value of inclusion. Looking at just the right hand side of Figure 2, these typologies are capturing the same process, a movement from manufacturing to a mix of other industries. However, the weight of highly concentrated industrial compositions distinguishes the groups. In the literature, scholars tend to use this type of distinction as a marker of resilience (Brown and Greenbaum 2017). The diversity of opportunity is an important guard against many problems workers face: layoffs, weak job markets, limited mobility (Christopherson et al 2010). I explore these exact themes later in Chapter

4.

Part of my motivation for this work is the role of historicism in stratification research (Savage 2021). In these accounts, the path dependence of categories and distinctions is a critical part of our evaluation of outcomes. Environments can take on elements of their foundation that carry through for decades on (Stinchcombe 1965). I have suggested one pathway that industry composition trends can be tracked through the built environment of local labor markets. The built environment is a lagged indicator of work done in a local labor market: what housing was available, how the roads were constructed, the existence of bus routes where one lives and works (Bunten et al. 2024). These environmental properties are intricately tied not just to the particular work that any one person does, but the total distribution of that work in space and in prevalence of that space. I investigated one possible view of this connection through the inclusion of a linear regression of commute times by the typologies. I found that the typology had a few distinct realizations of commute times providing some cursory evidence to this imprinting idea. This is a valuable first look because it illustrates what these typologies are aiming to do. They capture the pathways to current outcomes by showing how evolution of labor markets arrange places.

I anticipated that the evolution in the shares of industries may create lock-in for the built environment. The predicted commute times showed some indication of the durability of industry compositions on the environment. This is a valuable insight because it indicates path dependence due to work arrangements. While further work is necessary to understand the degree to which these trajectories shape the environment, the results show the potential for lock-in and related consequences. Take for instance a small town like Dalton, GA looking to diversify. The long term consequences of

opening new types of industry may reshape their landscape for many decades to come locking-in housing arrangements and infrastructure that may not persist. In Dalton, the empty warehouses and carpet manufacturing worker infrastructure are still in place decades on. While no one anticipates the collapse of an industry, the spatial cost of such facilities should be a consideration for stakeholders looking to diversify their economies.

The sequence analysis identifies salient trajectories that have been noted in the literature. Both Post-Industrial Centers and Small City Growth are the subjects of the deindustrialization literature and given the size and scope of this literature, the sequence analysis identifying these cases separately indicates that the clustering was accurate to what we know in the literature, that there is a large change in manufacturing to service work in large cities, and a similar situation rose in smaller cities with key differences (Taft 2018). Namely the smaller cities did not necessarily get rid of a manufacturing specialization as easily. The place of Suburban Sprawl and Rural Makers point to a stagnation in some of these less populated areas; a stagnation that policy makers have been trying to rectify for years (Barberi 2008). The most surprising trajectories were Healthcare Hike and Vacation Destinations which comparatively have much fewer works in Sociology about their relationship to structural inequalities (Urry 1995). These typologies are a valuable starting point to gaining insight into how the differences in the evolution of local labor markets shapes individual outcomes. Now that these are available future work can tease out how differences between them create differences in stratification.

This paper generated a typology of industry trajectories at the county level, and while these trajectories are applicable to many individual outcomes, the paper has some shortcomings. First, the typology is not designed to capture the differences in

population size or land mass. This shortcoming is emphasized by the discrepancy analysis of metro areas which could distinguish the typologies although weakly. An inclusion of an additional domain for a scoping-like population size may increase the number of trajectories, although parsimony is at the discretion of the sequence analysis user (Ritschard et al 2023). Second, the frequency of manufacturing was even larger than anticipated and future work could further break down the types of manufacturing that was done in these trajectories because it could be the case that "manufacturing" falls into the same problems as "service". Lastly the frequency of low concentration counties suggests that a more specific measure of parity could be valuable to a future typology. In that analysis perhaps a dualist approach could be integrated to say what is the parity like across different levels of education to get at a question of monopolistic industry arrangements for whom.

In this paper I set out to devise a typology of industry trajectories that was attendant to problems of alternatives to deindustrialization, the concentration into one primary industry and the specific transitions from one industry to the next. My sequence analysis uncovered these trajectories in a data-driven and literature-backed way. This tool will contribute to a more robust examination of the industry trajectories in future work both as a blueprint for how it is done and as a usable typology for county-level comparisons. The related tests show that the typology holds value in measuring and understanding the spatial dependence of industry both as it pertains to the built environment and the adjacency of similar areas. In the following chapters I connect the typology to outcomes and assess the domains of the typology in light of these indications from the typology.

Chapter 3

POOR WORK HISTORY: THE TRAJECTORIES OF LOCAL LABOR MARKETS AND SERVICE SECTOR WAGES

In this chapter, I examine the role of industry trajectories in the wages of service sector workers. Service sector wages are typically low and tied to location (Kerfoot and Korcynski 2005; Carre and Tilly 2017). While cost-of-living adjustments capture much of the spatial variation in these wages, workers in the same occupation industry and similar cost-of-living areas may have significant differences in pay (Grimes, Prime and Walker 2019). I suggest that industry trajectories are an explanation for service sector wage attainment. In transitioning to a broad service sector economy in the U.S., some places were already steeped in service work. The hospitableness of such places to the transition promotes higher wages net of local economic factors. To assess my expectation, I apply the typology I constructed in the last chapter to show variation by these trajectories in service sector wages. I hypothesize that in places where service work was historically central, the wages of service workers will be higher as the areas were primed for benefits from agglomeration and diversification. The analysis reveals that industry trajectories play only a small role in service sector wages across the U.S.

3.1 Introduction

Service sector workers are the key actors in the lore of the national shift to service work. In deindustrialization accounts, there is a hard pivot to service work, and workers' wages are undercut by the need to work in the emerging service industry.

Wages in these Rust Belt locations weakened partly because of the loss of stable jobs for unskilled workers and partly because the replacement was distinct from the industries in place before. This paper focuses on this distance between past work and current industry compositions as a player in the wage differences of service workers across space.

Compare Rust Belt cases with suburbanizing metros like the surrounding areas of Minneapolis, which significantly increased retail spaces. Shopping malls, like the Mall of America, grew, bringing numerous service sector jobs. The difference between the Minneapolis metro and Rust Belt cities is that the pivot to service was much less pronounced. The housing types, access to consumer superstores, and the infrastructure of work in the Minneapolis metro and areas like it were constructed around these considerations of service workers rather than the significant pivot exemplified by the empty factories of the Rust Belt (Marinic 2017). I develop the hospitableness to service as a mechanism in wages. The industry trajectories shape the local labor market, allowing agglomerations and industry concentration to function as determinants of wages.

To understand the overlap of agglomeration and concentration on service sector wages, it is vital to understand what agglomeration does for workers. Agglomeration occurs when firms in the same or adjacent industries link up in one location, and this process is beneficial to those firms and the industry flourishing in that area (Rigby and Brown 2015). The collocation of service industries should also improve wages for the workers (Asheim et al 2011, Kolko 2010). Agglomeration is beneficial because it cuts costs for firms by lowering logistical costs (Melicani and Sevona 2015). Agglomeration can improve wages by the competition in the market for that work, quality workers move to where they are rewarded, and workers have more opportunities in the adjacent industries where their skills can translate. To digress to thinking of trajectories, the

transition to service work is more likely to return wage premiums for service workers in places where service work is ongoing (Gottdeiner et al 2019). The contribution of this paper is to examine that possibility and compare it to the less clear alternative trajectories where there are differing levels of concentration or no history of service work as primary employment in the area.

I take a relational inequalities approach to understand how industry trajectories are associated with service workers' wages. This framework is valuable because it expands on human capital accounts of wages and allows for a discussion of wage-setting. In this framework, the determinants of wage include, in addition to standard human capital accounts, the power of employers in a labor market (Rosenfeld 2021). I developed in Chapter 2, the concentration of industries as a form of power. Industries can shape the built environment and determine wages across firms. Wage-setting can flow from industry-specific norms, blurring the geographical distinctions we have come to expect in wage attainment. In this way, cost-of-living adjustments can take a backseat to industry standards. The influence of these norms on wage attainment is contingent on the composition of industries in that labor market (Soreson and Soreson 2007).

For example, there have been recent changes in land use in Southern California (Chapple 2017). In the exurbs of Los Angeles, local jurisdictions sought to maximize the revenue from their unused land and converted much of this space for commercial use (Polanyi 1944). In these places, the wages tended to decline due to commercializing available land. Policymakers brought in low-wage service work jobs to rural towns. These large conversion projects popped up national franchises and quickly shifted the industry composition to a new concentration in service. As these new jobs popped up, the service industry wage-setters were in an advantageous position. They could of-

fer industry-standard low wages alongside our cost-of-living expectations about rural areas.

Moreover, these new, low-wage jobs displaced some geographically isolated professional jobs (i.e., small law firms and independent dentist offices). Integrating the new service work regime into towns meant large-scale transformations of space for these firms and related growth in housing. This case study points to the mechanisms in this paper. Wages are beholden to industry compositions where power is exercised by considering what work has previously existed as new industries emerge. Service work wages are geographically distributed, and the allocation of wages is related to the different activation energy of industry transitions across space.

In this paper, I aim to draw a throughline for the spatial distribution of service sector wages by connecting the typology from Chapter 2 to wage attainment. I am interested in how industry trajectories prime a local labor market for service worker outcomes. I suspect that transitions to service work, in part, drive service wages. Places where service sector work was already a primary industry allow for beneficial agglomeration processes that promote higher wages. Places that have not historically had service work as a primary employer have an increased activation cost, yielding low-wage service work. The typology I apply in this paper examines these transitions and how they relate to the spatial distribution of wages. I use a mixed effects model to estimate wages for service workers using ACS data (2018-2022). I find only small differences across the typology and discuss these results in light of the concentration of industries and occupational differences in service work.

3.2 Literature Review

Industry trajectories shape numerous individual outcomes because of their direct role in where people work and constraints on where people live. Take, for example, Randolph County, North Carolina (Nerkar 2024). Toyota has recently opened a battery factory there to keep up with the demand for electric vehicles. The county has traditionally done other forms of manufacturing, such as textiles and furniture, which was reflected in the relatively cheap housing compared to cities like Charlotte and Richmond. The battery factory has been considered more of a rebrand than a pivot as manufacturing employment becomes more tech-based and requires more education. Still, ultimately, it is a commodity produced in a factory. The disused textile mills have been converted to housing for many highly-paid workers working at the battery factory. These changes have pulled up the average salary in the county and increased in-migration while at the same time increasing housing costs. The case of Randolph County illustrates what a soft pivot may look like. Once dominated by a particular industry, a place can more readily convert to adjacent primary forms of work, and this shift is associated with wages.

In a relational inequalities framework, distinctions become written into institutions to reproduce inequalities. These distinctions are often clandestine, returning inequalities from neutral policy (Tomaskovic-Devey and Avent-Holt 2019). One such neutral policy is the emergence of a new industry like the battery factory. This emergence increases inequality for residents by driving up housing costs and drawing in a new group of highly-paid workers. The shift to this new factory as a large employer, while weaker than changes we expect in traditional deindustrialization, brings changes for county workers whether they work in the battery factory or not. Therefore, the past work forms the foundation for relative deprivation in an evolving industrial com-

position (Walker and Smith 2001). The distinction between those who work for the well-paying battery factory and those in other industries in Randolph is instructive because the returns on a high-school education are not going as far under this new industrial composition. I expand this reasoning to the variety of industry trajectories in the U.S. The evolution of industrial trajectories is vital to wage differentials because it reorganizes what is valued in the local labor market.

I expect wage differences to be evolution-dependent. That is, the long-run changes in the concentration and particular work conducted play a role in wage differences (Savage 2021). An alternative view might be that the role of industry composition can be independent of industry specifics. The power in the market is sufficient to understand how wages vary related to local labor market differences. As employment shares tend toward monopoly power for one industry, we can expect worse worker outcomes regarding wages, employment tenure, and work quality (Sorenson and Sorenson 2007). Market competition should encourage better wages to attract quality workers all else being equal. In this way, places with highly concentrated labor markets can extract rent from their employees by paying less as the only game in town (Sorenson 2000).

The evolution of industries in a market is shaped by seeding conditions. Like in the case of Randolph County, the battery factory represents a qualitative change in what type of worker is rewarded in the labor market as the market changes. A service worker is expected to have a vastly different skill set than someone with the same education who has worked for years in the manufacturing plant (Milkman 1997). This distance is particularly pronounced for front-facing service workers from other sectors (Milkman 1997, Korczynski 2013). One of the benefits of a labor market diversifying into related industries is that there is knowledge and skill overlap with these emerging industries.

The workforce is more closely attuned to the change regardless of the concentration into a few particular industries. In this way, the specific industry transitions highlight a change in what is rewarded in the market and how service work may accrue benefits in the shift to service nationally.

Another way to think about the wages related to industrial trajectories is through agglomeration economies. In these works, the collocation of related production or similar industries can create cost savings across various firm costs, including job search costs and buyer-supplier relationships. Under this view, the typology of trajectories I apply in this project are renderings of past agglomeration processes. The shift in the Healthcare Hike labor market is an example of how healthcare buildings expand into different neighborhoods, like in Pittsburgh, where coalitions of universities and nonprofit hospitals were able to repurpose old buildings to expand the industry (Simpson 2015). Pittsburgh is uniquely positioned to expand into healthcare because of its past concentrated work in manufacturing. Some of the repurposed healthcare buildings were apartments constructed to house manufacturing workers. This points to a fresh linkage in the agglomeration framework, the long-run evolution as an insight into where agglomeration can succeed. I undertake an examination that moves beyond the idea that service work wages will be higher where a place has traditionally done service work to ask what the distribution is like where service work has emerged from different environments. Will the agglomeration effects we expect for wages in the diversifying industrial compositions all over the United States vary by the seeding conditions of their trajectories?

In the previous chapter, I constructed a typology of six industry trajectories. The typology was designed to capture the simultaneity of industry concentration and industry characteristics over time. Under the relational inequalities approach, these

two domains should play a vital role in wage attainment. The relational inequalities model of wages includes labor market differences as a key consideration of wage attainment. These differences are defined for this project as the relative proportions of industries in the labor market and the historical trajectory of that labor market's industry composition. I expect these domains to relate to wages in a few ways.

First, I extend the notion from past accounts of monopolistic competition's effect on wages (Sorenson and Sorenson 2007). Highly concentrated areas tend toward lower wages because of a lack of competition in the market (Brown and Greenbaum 2017). The highly concentrated areas may also engender more path dependence in the built environment and employment norms. Therefore, these trajectories with high concentrations, like the designation "Rural Makers," should have the problems related to the "hard pivot" discussed before. The wages will likely be lower than in other counties on average.

Second, the specific industries should allow agglomeration processes to increase wages. I expect that wages will be higher where the relationships between employers and the workforce have settled around service work. The wages of service sector workers should increase because of the benefits of nearby service work, the quality of employers' job searches, and the shaping of the market around that type of work. Suburban Sprawl will be a prime candidate to illustrate the industry-specific benefits of service worker wages.

The simultaneity of these two processes should be exemplified in the Post-Industrial Center trajectory. Past work examining deindustrialization processes has pointed out that workers enduring this decline are the most deeply impacted. Wages should be lowest in these places. While deindustrialization is some decades past, the hard pivot has sparsely recovered for many places. However, Pittsburgh may be a counterexam-

ple where, after deindustrialization, diversification took place, and other industries could flourish.

Lastly, occupational differences should render distinct outcomes under the relational inequalities approach. I examine this idea through what kinds of services are provided to customers in person or not. I suspect that interacting with the public will be related to lower wages in general (Kerfoot and Korzynski 2005). Many of these soft skills have been systematically devalued throughout the wage attainment landscape, and a full consideration of the relational inequalities approach requires this testing.

3.3 Methods and Data

This work aims to capture the extent to which industry trajectories are currently shaping the wages of service workers. The area unit for this analysis is the county level, which uses the historical industry trend typologies created in Chapter 2. These typologies are applied to explain the differences in the wages of service workers. The service worker wage data comes from the 5-year ACS (2018-2022). I selected service workers for my sample based on a few characteristics. First, the wages are earned by an employee only, rather than self-employed workers or income earned through other ways. Second, the workers are in the service sector as defined by the NAICS, which establishes broad umbrellas for the goods-producing versus services industries. Service industries include wholesale trade, retail trade, transportation, information, finance, professional services, education, health, leisure, and services outside of public administration (religious services, repair, laundry). This strategy intends to capture the maximum number of service sector employees examined in detail in the analysis.

To examine the difference between workers who work directly for the public and those who work with the public, I used the O*NET database (O*NET 2024). This

tool links specific tasks on a job to occupations based on OCC codes in the ACS. I have used their "work with the public" module to identify the front-facing workers. O*NET assigns scores 0-100 for the importance of each task to a job, and I have selected only those occupations where it is at least 50 importance points. This strategy differentiates 350 front-facing occupations from the total 523.

The focal relationship in this project is the historical industry trends and the wages of service workers. The historical trends data come from the typologies created in Chapter 1. The typologies were derived from two key domains: industrial concentration and primary industry. Industrial concentration describes the competitiveness between industries within a local job market, and primary industry describes the industry with the highest employment in that county year. The panel covers 1975-2018 and identifies six trends through a clustering strategy.

In Table 1, I present the summary statistics separated by typology. Front-facing workers are the most common type of service worker, and women are more likely to hold these jobs. The racial distribution is largely similar across typologies, except Vacation Destinations. Finally, the wage distribution appears to be flat across typologies at the mean point estimate However, there are large 95% intervals about the wage estimates.

The mixed effects model used for the analysis estimates the log wages of service workers in the U.S. with characteristics of the worker and characteristics of their place of work. The focal relationship is the historical trajectory typologies. While the deindustrialization type covers the majority of the population, the distribution of service workers is even wider across typologies. The model controls for a few characteristics typically associated with wage outcomes under the assumptions of relational inequalities theory. First, individual characteristics of service workers are measured

Table 1. Service Worker Summary Statistics

Characteristic	**Healthcare Hike**, N = 1,144,316[1]	**Metro Centers**, N = 3,917,657[1]	**Rural Makers**, N = 336,098[1]	**Small City Growth**, N = 1,422,765[1]	**Suburban Areas**, N = 2,209,088[1]	**Vacation Destinations**, N = 199,603[1]
Front Facing	708,130 (62%)	2,438,169 (62%)	211,401 (63%)	882,637 (62%)	1,363,943 (62%)	121,424 (61%)
Wages	37,394 (17,536, 64,855)	38,913 (18,376, 67,988)	37,410 (18,705, 61,612)	37,832 (18,371, 64,300)	39,660 (19,456, 68,893)	40,000 (20,000, 71,388)
HS Degree	1,082,569 (95%)	3,690,160 (94%)	311,610 (93%)	1,330,722 (94%)	2,080,132 (94%)	191,341 (96%)
Age	39 (27, 53)	40 (28, 53)	41 (29, 53)	40 (28, 53)	40 (28, 53)	41 (29, 54)
Racial Dissimilarity	0.36 (0.30, 0.41)	0.36 (0.32, 0.43)	0.35 (0.32, 0.39)	0.35 (0.32, 0.42)	0.33 (0.29, 0.39)	0.43 (0.39, 0.43)
Sex						
Men	510,309 (45%)	1,743,020 (44%)	148,006 (44%)	617,842 (43%)	1,009,452 (46%)	91,351 (46%)
Women	634,007 (55%)	2,174,637 (56%)	188,092 (56%)	804,923 (57%)	1,199,636 (54%)	108,252 (54%)
Race and Ethnicity						
AAPI	38,200 (3.3%)	128,470 (3.3%)	5,484 (1.6%)	34,023 (2.4%)	76,104 (3.4%)	27,480 (14%)
Black	152,015 (13%)	330,145 (8.4%)	44,805 (13%)	138,296 (9.7%)	221,349 (10%)	29,782 (15%)
Latino	85,534 (7.5%)	355,198 (9.1%)	27,669 (8.2%)	108,562 (7.6%)	316,595 (14%)	21,300 (11%)
Other Categories	38,542 (3.4%)	135,078 (3.4%)	8,942 (2.7%)	42,361 (3.0%)	90,083 (4.1%)	27,799 (14%)
White	830,025 (73%)	2,968,766 (76%)	249,198 (74%)	1,099,523 (77%)	1,504,957 (68%)	93,242 (47%)
Metro						
Metropolitan	1,040,159 (NA%)	3,670,569 (NA%)	225,324 (NA%)	1,173,382 (NA%)	2,050,476 (NA%)	133,604 (NA%)
Micropolitan	90,756 (7.9%)	243,014 (6.2%)	77,209 (23%)	222,364 (16%)	150,944 (6.8%)	56,826 (28%)
no metro	13,401 (1.2%)	4,074 (0.1%)	33,565 (10.0%)	27,019 (1.9%)	7,668 (0.3%)	9,173 (4.6%)

[1] n (%); Median (IQR)

as education in years, age, sex, race and ethnicity. Second, the characteristics of the place of work, which I measure using racial segregation of the county measured as a Black-White dissimilarity index (Reardon and O'Sullivan 2004) and metropolitan status according to the Census. I have also included random intercepts for each state to capture local policies influencing the observed wage distribution.

The model was fit using a Bayesian OLS regression strategy (Burkner 2017). The priors are weakly informative, and I consider the log-wages to be a normal distribution. The Bayesian model was used for its properties in fitting hierarchical linear models (McGlothlin and Viele 2018). The results are displayed using draws from the posterior distribution and 95% credibility intervals (McElreath 2018). Since the data come from the ACS, the unit weights generated by the ACS are applied during the regression. The best-fit model was selected using WAIC.

3.4 Results

The fixed effects from the focal mixed model are presented in Table 2. Only the selected model results are reported in the article. The fixed effects illustrate many of the characteristics of wage attainment in the U.S. The table includes only the numeric covariates and categorical variables, which are divided into two categories. The variables are all scaled. Therefore the model predicts that for every additional standard deviation of education, a service worker earns .4 more log wages or about a 50% increase in income. The model predicts a 30% wage decrease for women relative to men. And the model expects a relatively small wage increase as residential segregation increases.

The mixed effects model included random intercepts for states to adjust for differences in state-level policy related to the wages of service workers. The distribution

Table 2. Fixed Effects Model Results

	Estimate	Est.Error	Q2.5	Q97.5
Education in Years	0.401	0.000	0.401	0.402
Female	−0.365	0.001	−0.366	−0.364
Age	0.333	0.000	0.332	0.333
Place of Work Racial Dissimilarity	0.011	0.001	0.010	0.012

Model includes: Fixed effects for Race, Metro Status, Front-Facing Occupation, and Trajectory Type.

of these state-specific intercepts is presented in Figure 1. Most states are tightly clustered around little to negligible effects on log wages.

The focal relationship of this project is the role of industry trajectories in the attainment of wages. I have predicted the wages across each trajectory devised in Chapter 2. These predictions based on draws from the posterior distribution have been displayed in Figure 2. The draws incorporate the random intercepts of states and the other values at their means. The predictions indicate limited absolute differences between trajectories in dollars.

The fixed effects of working directly with the public at one's workplace were included to address differences in the perceptions of service work. The results illustrate that front-facing employees were associated with lower wages than service workers. The interaction between front-facing status and each trajectory was assessed. The predicted wages are presented in Figure 3. These distributions illustrate that the differences in the cost of front-facing service work are specific. The Front-Facing workers, highlighted in green, earn on average, lower wages than their counterparts. However, this difference is trajectory-specific. There is a slight premium for front-facing work

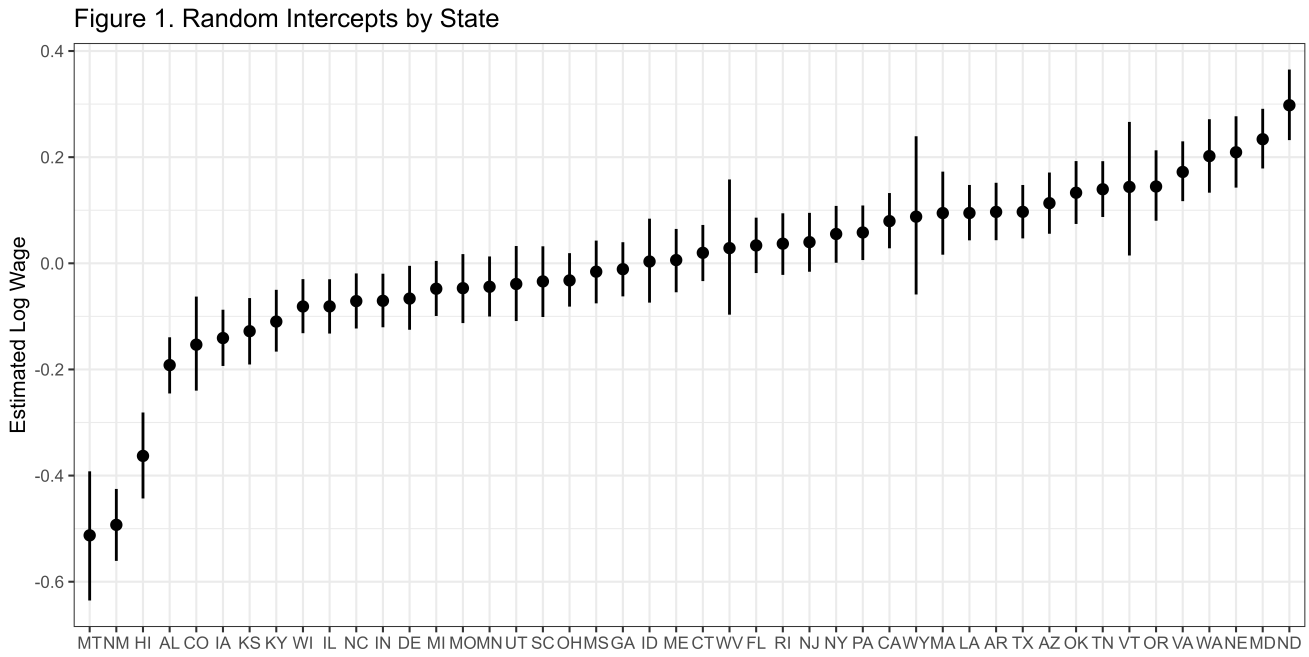

Figure 3.1: Random Intercepts for Each State

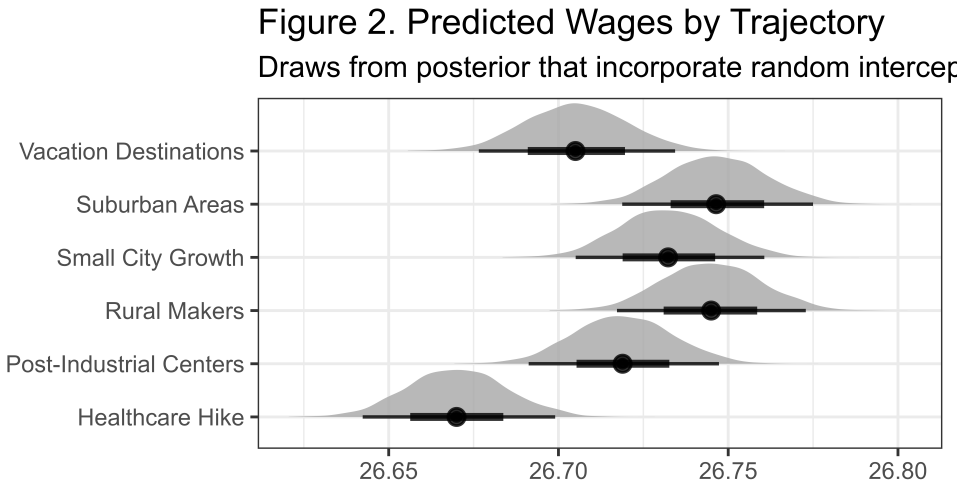

Figure 3.2: Predicted Wages by Trajectory

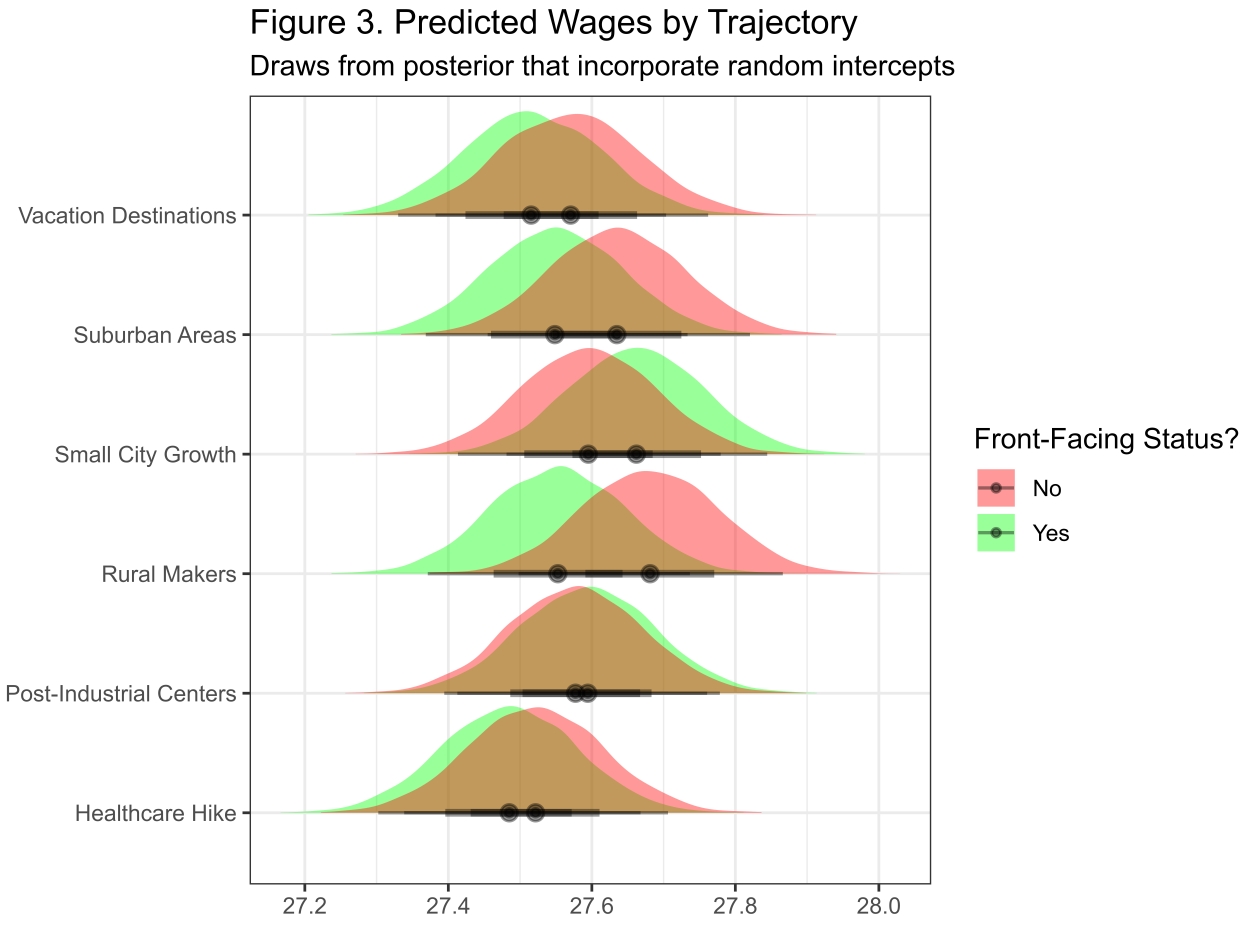

Figure 3.3: Predicted Front-Facing Wages

in Small City arrangements, where concentration is moderate and non-manufacturing work is a recent share of work.

3.5 Discussion

The results indicated that trajectories of work played a small role in the wages of service workers. Across worker characteristics, the difference in the evolution of places of work was not determinative of wages except in some edge contexts. This has impor-

tant implications for how we have historically examined wage attainment spatially. I will take each hypothesis in turn before discussing the wage differences related to industry trajectories.

I hypothesized that, particularly in Rural Maker counties, high industry concentration would be associated with lower wages for service workers. The opposite was found in the analysis, as shown in Figure 2. I suspect that this is due to the role of such service workers, and specialized taskers in the field of manufacturing workers. If we compare Figure 3, the specialization story comes to light. There may be a wage premium due to the niche (Peri and Sparber 2007). In the introduction I highlighted the case of Southern California where land conversion for commerce is increasingly common in rural areas. The service workers in that case were examples holding "bad jobs" we see in the literature (Kalleberg 2013). However the analysis finds that service work may not be so poorly paid in this sample on average. The Southern California story speaks of displacing rural professional services and these results may be capturing those service workers prior to displacement.

The other domain in the typology, industry-specific characteristics, is evidenced in Figure 2. The suburban counties historically encompassed retail employment and low concentration levels, and were among the most high-paid on average for service workers. This illustrates what some of the literature on policy-driven wage increases has pointed to in fight-for-15 drives and the reasonableness of wage increases as local (Kelly 2022). The initial case study of the Minneapolis metro would be another example. The agglomeration of services does appear to be related to higher wages (Weil 2014).

I also anticipated the simultaneity of industry trajectory and industry specifics to play a role. According to the model, post-industrial city centers were not the lowest

in wages. The historical analysis of deindustrializing cities has been connected to increased poverty rates, and I expected that wages were related in kind. Table 1 shows the distribution of wages, and Post-Industrial Metros had some of the highest-end confidence intervals. I suspected that high earners could be pulling these estimates up and producing noise for this effect. Coupled with the increased cost of living, the wages may be locally unmanageable but in absolute terms, higher. Pittsburgh is a prescient case as a post-industrial city that bounced back from many of its deindustrialization problems. Some forty years on, the city could revitalize after a pivot. The service worker's wages may be a factor in this revitalization.

Lastly, occupational differences were expected under the relational inequalities framework. I anticipated the devaluing of front-facing service work would relate to lower wages. This hypothesis was found in four of the six trajectories, at least nominally, in Figure 3. The differences in prediction estimates were not statistically significant save for the case of Rural Makers counties. This is evidence of the continued lack of clarity around how service workers are compensated (Korczynski 2013).

This analysis aimed to understand how industry trajectories relate to service workers' wage attainment. I found evidence of wage attainment differences according to worker status and the trajectory of their place of work; however, this evidence contradicted what I might expect given the current state of the literature. I had anticipated that historically highly concentrated areas might be worse off than others because of the imprinting of disadvantageous work arrangements for workers (Braverman 1998). What I could not capture in this research is how those places were able to pivot to a new economy. In the cases of Pittsburgh and Randolph County, the concentration in particular manufacturing environments was a boon for their future replacements, allowing for structures to adjoin new employment opportunities and housing. Fu-

ture work should consider more direct measurements of housing stock, building uses, and the more traditional measurements of agglomeration to connect service work to long-run trajectories.

This analysis included a few shortcomings that I would like to address. First, the selection of front-facing employees does not entirely address the problem of who a service worker is. A high-powered lawyer may be thrown in with a barista, and this project's wage differences amount to noise. Future work may include constellations of O*NET tasks to highlight occupational differences in a more parsable manner. Next, the chosen controls gloss over essential nuances in the dispensation of wages. The variable selection includes a battery of controls from past works, but does not isolate how trajectories operate fully. Finally, the spatial distribution of wages is considered thinly, focusing on the metro area as the unit of analysis rather than the comparison of similar cases with separate trajectories. Future work may match counties and pay closer attention to the trajectory differences for closer analysis.

In this analysis I hypothesized that differences in wages would be related to the typology. These differences would be actualized through the distance of the transition to service, in other words, a hard pivot would translate to lower wages. Also, these wage differentials would highlight agglomeration processes for service workers. The results do not find evidence for these connections. The results instead indicate the ubiquity of service work and its baggage across space. The proliferation of service work also means a proliferation of homogeneous benefits for workers (Kalleberg 2013). The wages are shown here to be largely the same (differences of about $100 annually).

The broader question is where does that leave the imprinting of industries idea.I suspected that the remnants of industry compositions of previous work would impact the nature and spread of service worker outcomes, however the results show that

this line from industry lock-in to service worker opportunity is negligible. I have spoken of the leftover factories of Dalton, GA as a physical change wrought through industrial path dependence, and extended this notion as a barrier to opportunities. These barriers may be lower than I expected before conducting this research. A physical barrier may constrain worker networks or change their commute, but is this difference significant enough to change wages? In a case like Dalton, it may have been a possibility, however if you take a case like Pittsburgh, the changes in the built environment are likely much more subtle for the creation of a healthcare building for instance. A change in job search networks could be scarcely expected when the core structures of new industries do not impact space.

Another possible pathway for the wage differential for service workers by typology is through the social actors that a "soft" pivot may represent. The results showed that suburban areas were among the highest-paid service workers, albeit only a tiny gain over other places. I had suspected this would result from agglomeration processes and the benefits of collocating similar work. This assumes that agglomeration benefits would reach a worker in terms of wage premiums. Perhaps this is uncharacteristic of today's labor market and wage attainment (Rosenfeld 2021). A view of the service worker as a political voice may be a more robust view of why this modest wage gain is possible (Kelly 2021). In a place like the suburbs of Minneapolis, the service worker has been a member of the industry composition for decades. There may simply be more political will for creating benefits and wage gains for such workers than in alternative trajectories where service work is less prominent or has not had a chance to organize around shared conditions.

In conclusion, the relationship between industry composition trajectories and wages highlighted few differences among service workers. Historically, where one

works and what that place has done plays a role in wage attainment. My study finds that wages can be linked to histories of monopolistic competition and industry popularity, but the wage differentials are small. These findings suggest that more work needs to be done to uncover how the imprinting of work could levy differences in wages.

Chapter 4

NOWHERE BOUND: INDUSTRIAL COMPOSITIONS AS A DETERMINANT OF INTERNAL MIGRATION

In this chapter, I analyze the role of industry compositions on internal migration outcomes in the US over fifteen years (2005 to 2020). During this time, internal migration was declining, and I seek to uncover how local labor market characteristics conditioned this trend. In the analysis, I compare origin and destination characteristics of labor markets as a factor in internal migration. I hypothesize that a co-occurring trend of diversifying industrial compositions was a reason for the decline in internal migration. If the quality of an origin labor market increases through diversification of industries, I expect the "pull" by potential destinations decreases. Surprisingly, diversification is one of the few factors promoting internal migration throughout the time period. I discuss this finding in light of spatial job market matching.

This project is motivated by some of the industry composition changes of the early 90s and its consequences. At that time many small towns and rural areas were looking to diversify their economic output (Carlino and Charjee 2002). A popular policy idea for accomplishing that goal was to open a corrections facility near the town (Potter 2021). Large facilities of this kind often employ several hundred employees, as sustaining an inmate population of upwards of 2,000 people and maintaining the security of the inmates and staff 24 hours a day requires many occupations of workers. Agglomeration was advertised as one of the primary benefits for participating towns.

Custodial vendors, catering services, and law firms could open up in town and help kick-start some economic and population growth in the town. Such towns could theoretically attract more people from the nearby rural areas for stable, relatively well paid work. The agglomeration effects failed to materialize and the population experienced little to no growth. I am undertaking this work to examine the extent to which diversifying towns could become attractive destinations.

4.1 Introduction

Leaving for opportunities elsewhere is woven into the fabric of the American story. Moving to opportunity has reduced poverty and historically offered socioeconomic mobility for the disenfranchised (Chetty et al 2018). Despite these benefits, internal migration in the U.S. has declined for the past forty years (Molloy et al. 2011). The prospect of moving for opportunity is not found in recent estimates (Jia et al 2023). As more workers decide to stay put, what is holding them there? In this paper, I examine the push and pull of labor market characteristics on potential migrants to understand why workers are less likely to move than ever. I conduct this analysis through a novel view of the geographic distribution of industry compositions. I hypothesize that as the labor market locally diversifies, spatial mismatch problems diminish, leading to less migration.

All other things being equal, migrants go to the place where their human capital is most rewarded (Borjas 1992). With a view of internal migration decline, are possible destinations decreasing in rewards? The local labor market may be improving relative to feasible alternatives. Migration may seem less beneficial as the quality of one's local labor market rises. The cost of moving may be too high in the broad context of rising income inequality, wage stagnation, and increasing housing costs proliferating all over

the U.S. (Rosenfeld 2021). Moretti (2013) shows that high-skilled labor is increasingly moving to high-cost places where their human capital is rewarded, yet the relative strength of that wage is weaker than the base salary would suggest. Under these conditions, the perception of the most rewarding place may be a "grass is greener" supposition for American workers.

Local labor markets have been diversifying their industries and opportunities in the United States (Martin and Sunley 2015). Increasingly, economic policies designed to ward against the problems of concentration in one industry have been used for economic growth (Brown Greenbaum 2017). Concentrating on one or a few primary industries leaves local economic well-being beholden to the ebbs and flows of one industry's success. Concentrated industries' offshoring, outsourcing, layoffs, and production disruptions have historically encouraged migration and had far-reaching harmful effects (Milkman 1997, Matthews-Lewis 2014). As local labor markets move away from concentrated industry growth through diversifying opportunities, concentration problems are offset. The question is: Is the attendant migration from concentrated markets also offset?

Internal migration is generally considered to be a positive move for migrants and their destinations alike (Bernard 2023). Recent estimates show that internal migrants tend to have higher socioeconomic status than their stationary counterparts. The ongoing decline in internal migration may indicate the limits of economic mobility throughout the U.S. Other works show that internal migrants tend to move between small metro areas (Molloy et al 2019). These moves are indicators of emerging labor markets and strengthening metro areas. The national decline then means less widescale growth of small metros through the internal migration process.

Internal migration has many historical drivers: economic factors, policy, life course

milestones, and the like (Cebula 2005). However, recent scholarship on the question of internal migration decline has yet to come to a consensus about the explanations of the current decline (Molloy et al. 2011; Basso and Peri 2020; Onley and Thompson 2024). In this work, I compare origin and destination labor market characteristics to provide a possible explanation. Building from the idea that higher quality returns from destination drive migration (Roback 1982). As labor markets homogenize, solving spatial mismatch problems are less common, in turn, decreasing internal migration.

Past work has highlighted three determinants of internal migration in the United States (Molloy et al. 2011). First, the individual characteristics of migrants are examined, and factors like aging populations and home ownership discourage internal migration (Caliendo et al. 2019). Second, the group-specific characteristics of migrants, like retirement migrants. And lastly, economic factors generally and locally. The general economic conditions refer to broad conditions like the Great Recession, in which few people moved. Local economic conditions refer to the wages for particular kinds of human capital in a region. In this work, I closely examine the local economic conditions as part of the story of declining internal migration in the U.S. Dominant industries have historically been a positive factor in encouraging migration for workers in that industry. Industry concentration may pull in migrants who are willing to travel farther for their rewards to human capital. This work looks to uncover how industry dominance encourages or discourages internal migration in U.S. labor markets net of other factors.

This paper assesses the internal migration associated with local labor market characteristics. The focal characteristic of industry composition illustrates how local labor markets contain dominant industries and alternatives. I hypothesize that the increasing diversity of origin labor markets decreases migration by solving the spatial

mismatch issues that have historically promoted migration (Gobillion et al 2007). On the other hand, destination diversity will be associated with increased migration as more potential immigrants align with the available industries. Further, I hypothesize that rising housing costs and stagnating wages will decrease migration (Rosenfeld 2021). I test these hypotheses using the migration patterns between Core-Based-Statistical-Areas (CBSAs) from 2005 to 2020 to track how origin and destination industry compositions are related to migration. Counter to expectation, origin diversity is associated with an increase in migration. The evidence also suggests that destination diversity is related to increased migration. These industrial compositions may be empirical evidence of sorting mechanisms that prop up what little internal migration in the U.S. remains.

4.2 Literature Review

One framework for assessing internal migration decisions is based on weighing the benefits of the origin and the destination while factoring in moving costs and amenities (Roback 1982). The Rosen-Roback framework emphasizes the utility of moving. Moving occurs when the destination amenities must outweigh costs and grant greater benefits than the origin. I begin from this framework to examine how job market characteristics may discourage migration. Workers may be willing to move for opportunities in other labor markets where their skills will be rewarded and they will have better amenities (Borjas 1992).

One drawback of this approach is that "amenities" carry much of the social weight of moving decisions. In this model, remaining in one's "origin" to be closer to family, to have kids stay in the same school system, or to be near particular hospitals or religious buildings are all subsumed under the amenities designation. Even the guiding

paper in much of the internal migration research of the past decade uses this term. Molloy and colleagues (2011) hypothesize that "the distribution of amenities has become more homogeneous across locations, making residence in any particular city less attractive" (p. 186). In my paper, amenities are the quality of the labor market in terms of industry diversity. Places have become less specialized in industry and allow for more staying at origins (Carlino and Chatterhee 2002). In this way, I use the Rosen-Roback framework for this piece of the puzzle of internal migration, acknowledging that there are unobservable amenities for potential migrants.

Changes at the local labor market level like industry booms and declines, recast the calculus of where workers see their skills are rewarded (Rodwin & Sazanami 1989). Randolph County, North Carolina was one such example. The introduction of a new high-tech manufacturing plant redefined what certifications were worth getting, and how far one should live for a manufacturing job. The white-collar professionals moving to Randolph are suddenly willing to live in a small southern town. Emerging STEM majors rethought some of the attractiveness of the big cities to have a job in their field, in their home. The diversifying market encouraged migration. Industry growth has been shown to encourage migration from other labor markets (White Lindstrom 2005). Amazon's community impact statement clearly outlines the expectation that HQ2 will cause migration from all over the U.S. and abroad for job opportunities and related growth in the area through housing markets and associated industries (Nager et al 2019). The burgeoning tech sector in Richmond and the deep roots of tech in many West Coast cities illustrate the agglomeration of people with the growth of particular industries. In these cases, the development of one specific industry plays a prominent role in pulling migrants to destinations.

The counterparts of primary industries play a different role. Labor markets are

said to be resilient to the ebbs and flows of primary industry changes when there is a diversity of opportunity (Moro et al 2021). Mass layoffs in one industry can be more readily absorbed in the local labor market when economic production is diverse (Foote et al 2018). If we consider this connection in migration, increased immobility may be related to diverse offerings in the local space. Potential destinations need to be substantially more amenity-plus to encourage migration.

With the rise in precarious employment and prevalence of job hopping, perhaps diverse labor markets are an amenity that migrants will seek out (Kalleberg 2013). The secondary industries, with their differences in production, wage attainment, and number of employees, carry their own push and pull factors for migrants. The joint relationship between industries adds another layer to migration processes: should one industry decline, the others offset some deleterious effects on workers (Foote et al 2018).

Traditional measures of job market quality like labor force participation, productivity, and benefits coverage miss what it is that people do specifically. Many of these indicators are decoupling from the outcomes: productivity has been decoupled from wage attainment (EPI 2022) and benefits coverage is decoupled from particular occupations (Keisler-Starkey and Bunch 2022). It is with this view that industry compositions become a valuable indicator. Local industries help set the norms of wage attainment and benefits in that area (Werner 2024). Popular workplaces' wages flow from the production center and shape reasonable housing costs (Epstein and Shapiro 2022). Industry compositions may be an indication of the role of labor market quality through their norm-setting arrangements.

4.3 Spatial Matching

I frame this relationship between industry diversity and migration as a case of spatial matching (Gobillion et al 2007). Spatial matching considers the geographic distribution of industries, businesses, and related factors like commuting patterns and infrastructure as having a vital role in workers' employment decisions. Proximity to firms is crucial as job seekers look to optimize their economic position in light of these factors. A mismatch occurs when human capital is not rewarded in the job market (Fox and Piven 1971). The mismatch can cause numerous disparities as people are structurally unable to take advantage of the best opportunities, leading to underemployment, unemployment, and potential migration (Houston 2009). I expose the local labor market changes by measuring industry compositions to trace how spatial mismatch can lead to migration.

Cloward and Piven (1971) suggest that the geographic distribution of work according to industrial systems constrains workforces to deal with changes from the top down. Modernization, technological changes, and industry booms can create maladjusted workforces designed to work under previous industrial conditions. Under these changes to the local production systems, workers must seek locations where their talents are still rewarded. One consideration from the internal migration literature is families and couples. Finding multiple jobs complicates the math for potential migrants. Diverse industry arrangements may attract more groups of people (Molloy et al 2011). Two stable jobs where one may be underemployed may be a strong amenity relative to two people testing a new job market with related unknowns about commutes and housing on top of the cost of moving.

Wacquant (2009) describes low-income housing as a site of confinement for the purposes of production. The workers are paid just enough to live near the workplace

to continue producing for employers. I extend this notion to the relationships between housing, work, and migration described by Roback (1982). The wage and housing cost relationship heavily influences where people are willing to migrate (Molloy et al 2011). Much has been made recently of high-skill, high-wage workers' migration patterns because their destinations are high-cost areas. In absolute terms, these workers follow the theory, going to places that return the best rewards for their capital (Borjas 1992). However, that dollar does not stretch as far in the popular destinations. With the rising housing costs in the 2010s, migration likely decreased as workers recognized the relative deprivation of other locations.

This project connects multiple perspectives to analyze the decline of internal migration in the U.S. The Roback migration decision framework outlines the origin and destination labor market comparisons. My contribution is the examination of migration processes through industry. The concentration of particular industries has encouraged and discouraged migration under certain conditions. I hypothesize that increasing industry diversity in origins will be associated with a decline in migration as it solves spatial mismatch problems, allowing workers to continue to work in the same local market. I test this framework by comparing origin and destination industry composition characteristics to uncover how migration patterns are trending down.

4.4 Methods and Data

The data for this project consists of IRS county-to-county migration records from 2005-2020. Each migration count is based on information from tax returns. These records are preferable when assessing small-area migration in the U.S., as the added noise is minimized relative to CPS or ACS data (Hauer and Byars 2019). For this

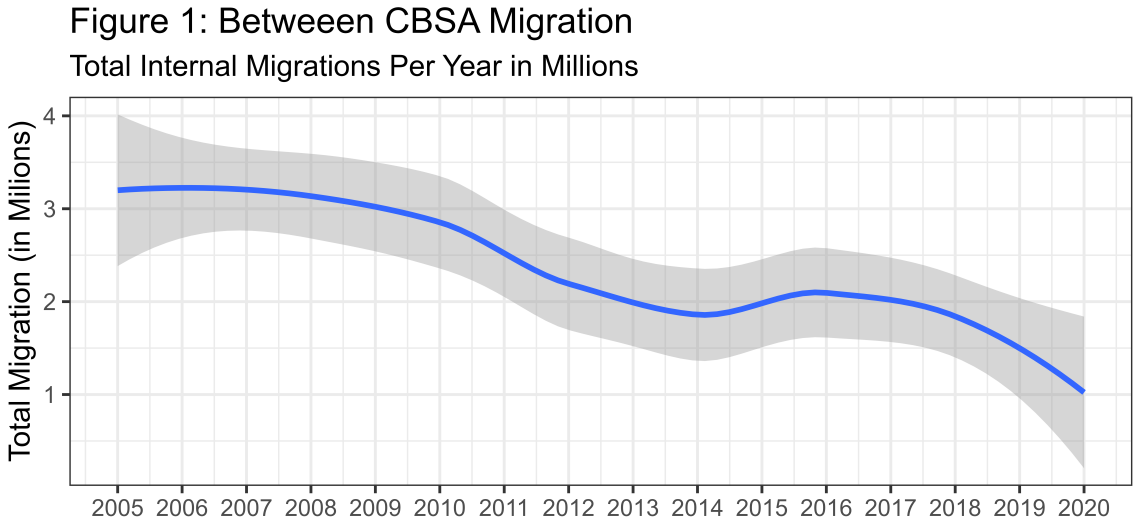

Figure 4.1: Annual Migration 2005 to 2020

project, I have aggregated the county-level data into Census Core-Based Statistical Areas (CBSAs). These are labor market areas associated with an urban core with a population of at least 10,000. CBSAs are either metropolitan or micropolitan areas defined by having greater than 50,000 or less than 50,000 inhabitants respectively. Therefore, these areas are salient labor markets that are not bound by state borders (i.e., Kansas City). They are generally larger than counties, so this strategy increases the number of migrants in each pairwise flow while decreasing the number of pairs. This aggregation strategy will necessarily miss rural locations and micropolitans that are smaller than counties as a source of origin or destination. Out of the 938 CBSAs, 838 are identified in this data. The total counts for internal migration and its decline are displayed in Figure 1. Since the data is based on tax returns, it is biased toward employed people. This data covers the groups I am interested in: workers' migration possibilities related to job markets.

This research compares the origin and destination characteristics of CBSAs to uncover what factors may drive the decline in internal migration. The focal relationship is the industrial diversity in each location. I use the County Business Patterns data, which shows the number of workers, establishments, and annual payroll per 2-digit NAICS industry classification in each county each year. I aggregate these to the CBSA level and construct the industry composition measures for the panel length (2005-2020).

Two industry composition measurements developed by Brown Greenbaum (2017) were considered for this project. "Concentration" is a version of a Herfindahl-Hirschman index (Matsumoto et al 2012). This measure sums the share of employment attributable to one industry squared to indicate how much competition is in the market. Lower numbers mean more competition; higher numbers mean higher concentration in one industry. This concentration measure is traditionally used to illustrate labor markets that have dominant industries. The second measurement is industry diversity. This measure is an entropy index originally developed by Kort (1981). It is the negative sum of the product of employment shares in each industry and the log of those proportions. This value demonstrates more diversity as the number increases. Both of these measurements cover the industry compositions of each CBSA.

Figure 2 plots the kernel density of each industry composition index in the data and the scatter plot of their distributions. These variables are related to one another. The correlation between these variables in the sample is -0.95, illustrating a strong negative association between these variables. This is surprising, given the literature which has used this pair of indicators in regression models (Greenbaum Brown 2017; Tan et al. 2020; Crowley et al. 2021). The reasoning from these works is that there should be an indication of the variety of industries and a separate indicator of the

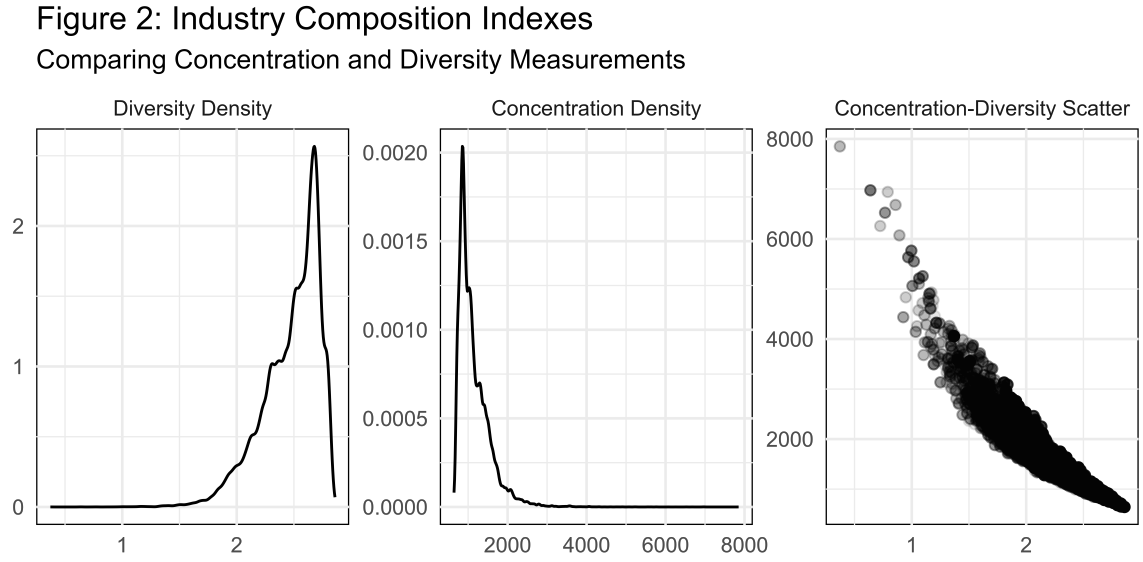

Figure 4.2: Concentration and Diversity Scatterplot

distribution of workers within that variety is all in one place. In my data, these two constructs are sides of the same coin describing the shape of the industrial options for employment. Also, the multicollinearity this correlation introduces may be less of a problem in the county-level constructions that past work has used (Fotheringham and Wong 1991). I have thus far proposed that diversity is the key indicator in migration related to origin and destination processes as it offsets the problems related to industry composition changes. As such, the diversity of industry compositions will be the focal variable considered in the regression analysis. Figure 3 illustrates the growth of industrial diversity in local labor markets with a Loess-smoothed line.

Key to this research are the characteristics of origins and destinations and how they differ in migration processes. Table 1 shows the summary statistics of the CBSAs for economic characteristics related to internal migration (Molloy et al 2011; Onley and Thompson 2024). I distinguish metropolitan CBSAs and micropolitan CBSAs

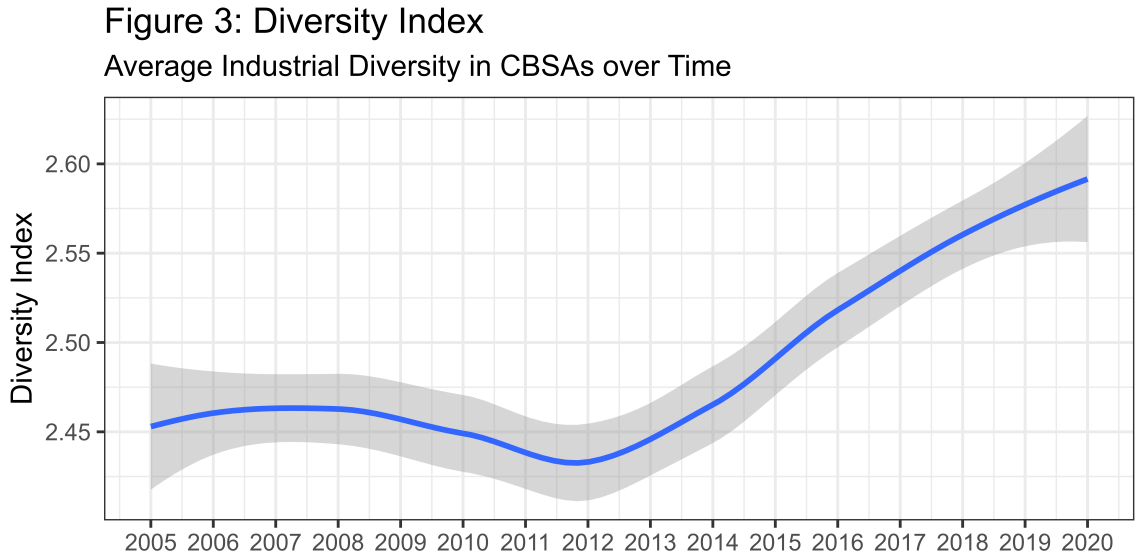

Figure 4.3: CBSA Industrial Diversity 2005 to 2020

to illustrate where these conditions I have highlighted thus far occur. High industrial diversity is largely a Metropolitan characteristic. The housing costs and income are much higher in metros. The median population is an order of magnitude higher than micropolitan areas. One of the drawbacks of the IRS data used for migration is that I cannot measure the age of migrants. I have included the median age of origin and destination to capture some of the age distribution with the aim to measure retiree destinations and college towns. The statistics in Table 1 are averaged over the ten-year panel and all CBSAs in the U.S. Past work points to the value of housing costs versus income as a vital part of comparing origins and destinations (Roback 1982).

4.5 Results

A spatio-temporal negative binomial model was fit to make sense of the internal migration patterns from 2005 through 2020. The model incorporates the spatial

Table 1. Summary Statistics

	Metropolitan	Micropolitan
CBSAs in Sample	320	518
Population	650,955	61,399
Median Age	37	38
Number of Wage Workers	30,176	25,703
Median Monthly Housing Cost	951.80	712.21
Median Annual Income	26,252.02	22,117.89
Concentration	1,022.2	1,561.4
Diversity	2.6	2.2

autocorrelation related to the CBSA units. That is, the migration patterns of internal migrants might be related to other preferences that are not modeled in the data: favorable local policies or proximity to the beach. The spatial dependence structure is treated as a BYM2 (Rue et al 2017). The rationale is that CBSAs are not discrete locations for migrants. One can easily live in one and travel to another for work, especially in tightly clustered areas like those in Philadelphia and work in New York City. As such, the assumption that migrating to a particular destination to work there may not hold. The spatial correlation intends to capture this situation. The model includes the fixed effects for time to control for individual year differences not captured elsewhere in the model.

A random effect is assessed for the spatial-temporal interaction and the spatial dependence structure. This popular strategy captures place-specific year-to-year changes (Blangiardo et al 2013). The idea is that temporal trends likely differ between areal units. Still, these trends are likely to be similar for adjacent areas, with the assumption that they are based on a Gaussian distribution.

The regression model aims to assess the extent to which industry diversity was a factor in migration outcomes from 2005 to 2021. All variables used in the model are scaled. The model was fitted using the INLA package (Rue et al 2017). The priors for all controls are weakly informative and based on the normal distribution. Generic priors were used for the relationships between areal units and the interaction between areal units and time. The areal units were assessed using "BYM2" convolution specifications, and the time units were treated as independent and identically distributed for each year. The BYM2 model is a spatial effects parameterization that includes one component for the spatial autocorrelation and a second for traditional random effects (spatial heterogeneity). The convolution structure is used to avoid

fitting issues related to traditional MCMC methods in spatial Bayesian approaches (Morris et al 2018). The hyperparameters are in Appendix Table A.4, including the negative binomial shape parameter and the random effects' precision. Table 2 reports the results of the regression models for migration of CBSA pairs in the U.S. from 2005 to 2020.

The focal relationship of the model does not show evidence for the origin hypothesis. I expected that increasing origin diversity would be associated with decreased migration. However, the model shows that origin industry diversity is associated with increased migration. For a one standard deviation increase in origin diversity, the model expects a 17% increase in migration, holding the other variables in the model constant. There was evidence for the destination hypothesis: diverse industrial compositions would be associated with increased migration. For a one standard deviation increase in destination industrial diversity, the model expects a 24% increase in migration, holding the other variables constant. To further illustrate these relationships, predicted migration counts were fit across plausible levels of origin and destination diversity with 95% confidence intervals. Figure 5 illustrates increased migration as both origin and destination diversity increase.

The other place-based associations known in the literature hold. As Olney and Thompson (2024) found, increases in origin housing costs were associated with greater migration. For a standard deviation increase in origin housing costs, the model expects a 45% increase in migration, holding other variables at their mean. Destination housing costs were another strong predictor of migration. For a one standard deviation increase in destination monthly housing costs, the model expects a 34% decrease in migration flows to a destination, holding the other variables constant. Wages were relatively weaker predictors of migration. For a standard deviation increase in origin

Table 2. Negative Binomial Regression Results

Model Fixed Effects

	Coefficient	Standard Error	Low CI	High CI	e^Coeffcient
Destination Median Age	-0.03	0.01	-0.05	0.00	0.97
Origin Median Age	-0.02	0.00	-0.02	-0.01	0.98
Destination Median Income	0.23	0.02	0.19	0.26	1.25
Origin Median Income	-0.32	0.01	-0.34	-0.31	0.72
Destination Median Monthly Housing Cost	-0.49	0.02	-0.53	-0.46	0.61
Origin Median Monthly Housing Cost	0.39	0.01	0.37	0.40	1.47
Destination Industry Diversity	0.23	0.01	0.22	0.25	1.26
Origin Industry Diversity	0.14	0.00	0.13	0.15	1.15
Year	-0.01	0.00	-0.01	-0.01	0.99

This model includes fixed effects for the Micropolitan and Metropolitan Origin, Destination Pairs, and Largest Industry.

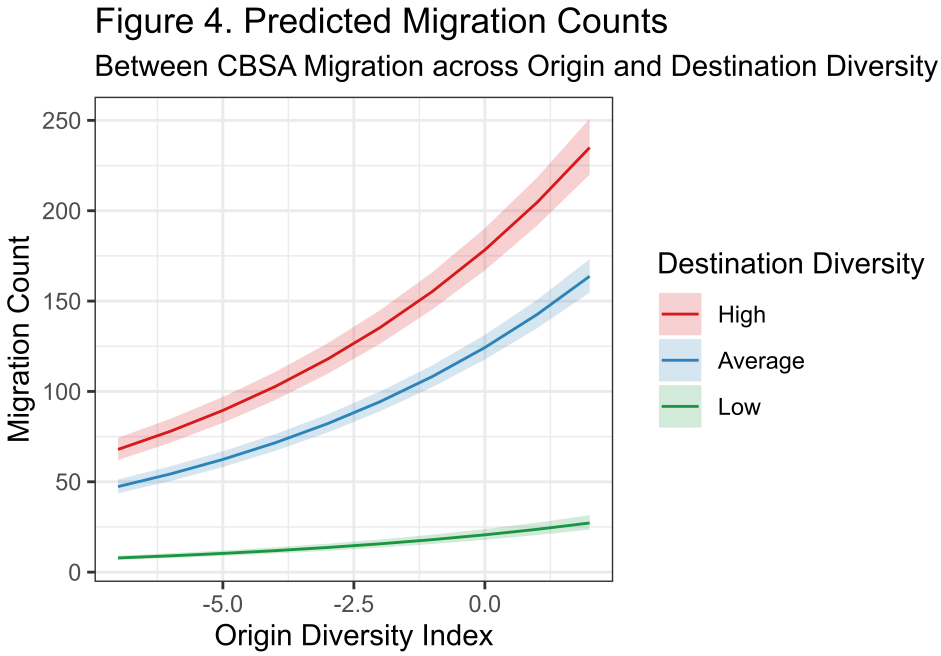

Figure 4.4: Predicted Migration Across Industry Diversity

income, the model expects an 11% decrease in migration, and for a standard deviation increase in destination income, the model expects a 10% increase in migration flows, holding the other variables constant.

The model was assessed for spatial random effects to capture the spillover of local labor market amenities. Figure 4 displays the random effects related to each CBSA. These effects were derived by averaging one thousand draws from the posterior distribution. Commerce centers and capital cities are pulling in more migrants. The effect sizes across the board are minor in light of the fixed effects in the model. Regional differences are not a salient feature of migration between CBSAs.

The literature is clear that internal migration is decreasing throughout the U.S. over the past many years. I assessed time as an interaction with each CBSA and a fixed effect in the model following (Jia et al 2023). To get a clearer picture of

Figure 5. Spatial Random Effects of CBSAs on Migration

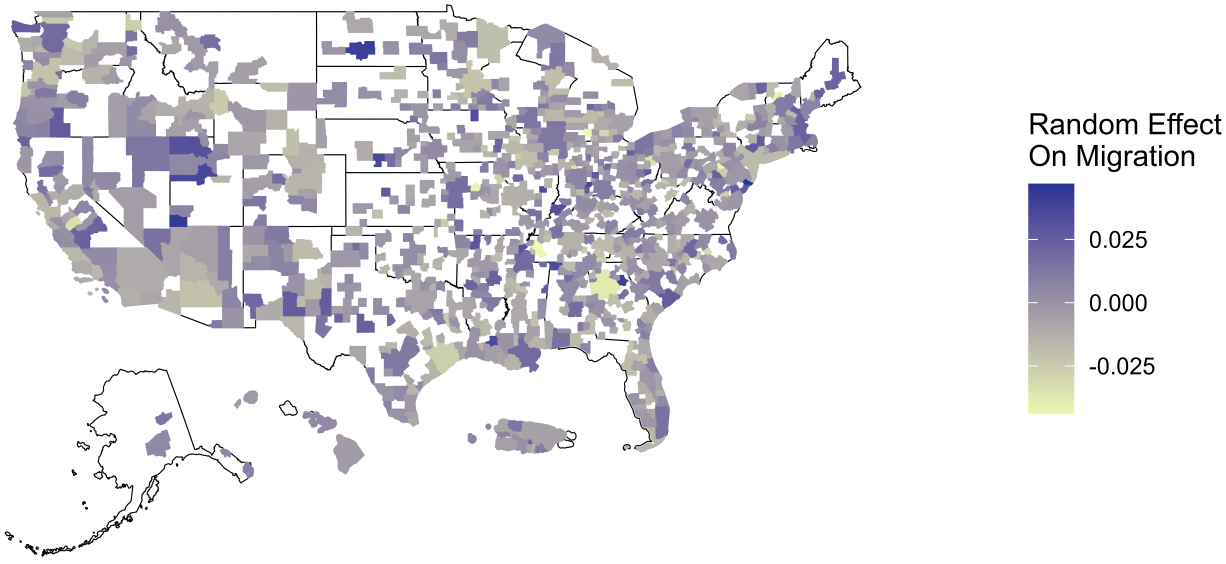

Figure 4.5: CBSA Spatial Dependence

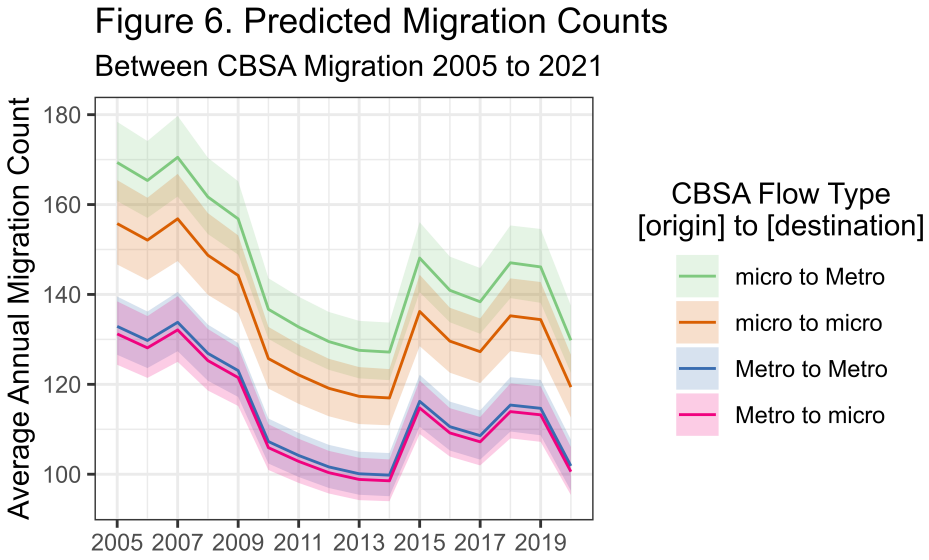

Figure 4.6: CBSA Spatial Dependence

the differences in origins and destinations over time, I fit predicted counts for each type of CBSA pairing Metropolitan and micropolitan. Metropolitans have at least 50,000 residents whereas micropolitans have between 10,000 and 50,000. There is a tendency for migration out of smaller localities (Golding 2014), and Figure 6 affirms this tendency. Despite overall higher counts in Metropolitans, the predicted counts are highest among micropolitan origins.

4.6 Discussion

The findings highlight a few insights about the decline of migration in the United States. First, the diversity of industry compositions in origins and destinations were valuable migration indicators. Origin and destination diversity were on average, associated with increases in migration. While this goes against my hypothesis about origins, it provides evidence for my destination hypothesis. I suspected diversity factored

into potential migrants' decisions as a notion that the "grass is always greener.": the benefits of potential destinations have diminished due to industrial diversity growth. Layered stay factors like stagnating wages and increasing housing costs, the spatial mismatch problems were critical. The results show a different picture–workers sorting between job markets.

Job sorting is typically considered within labor markets; the distribution of human capital is vetted by firms that allocate employment concordant with what their market offers as job applicants. This system is a socially conditioned meritocracy that awards the greatest rewards to the best capital (Rosenfeld 2021). The pool of job applicants is critical to the sorting process and if people are willing to move, the application pool takes on a new tenor (Collins 2015). In my research there is evidence that job markets are increasing in diversity all over the U.S. since the Great Recession and that this increase is associated with positive migration. Moreover the EPI estimates that underemployment decreased from its Great Recession peak to its lowest point in thirty years during the sample period (Jia et al 2023). Also, job hopping has been the name of the game for increasing individual salaries for the Millennial cohort of workers (Tetteh et al 2021). Taking these social items together, the growth of industrial diversity allows workers to seek widely and be rewarded at the cost of migration.

The predicted counts in Figure 5 connect the origin and destination diversity indicators and show how these industrial compositions work in tandem. The figure suggests that migrants from diverse labor markets are more likely to head to diverse labor markets as destinations. This tendency could be a pre-selection into the origin market. Someone with niche skills may require a diverse industrial market to hold a job, and should they need to move, the need for a diverse market remains (Abbot

1988). This cannot be the whole story. Industry diversity is growing, on average, throughout all the CBSAs. Examining the case of origin diversity may highlight this relationship further.

The results showed that origin diversity growth was an indicator of out-migration. I see this finding as the traditional model of workers who are made to be maladjusted by labor market changes. Growing industries in a labor market that are out of alignment with skills made for a declining industry is a signal for a change of scenery. Milkman (1997) describes the workers at GM who accepted severance and left Linden, New Jersey, as a consequence of not only forces in their own industry, technological replacement, but also the growth of the pharmaceutical industry bringing in higher paying workers and increasing local costs. Industrial diversity growth spurred spatial mismatch problems rather than solving them.

If growing industry diversity in CBSAs throughout the U.S. were to solve spatial mismatch problems, offset worker maladjustment, and reduce migration, it would require CBSAs to homogenize their industry compositions. For any one worker's capital to be rewarded in their original labor market, labor markets would, at their conclusion, become uniform across the potential destinations. More work would need to be done to uncover that relationship. Are similar situated, industrially speaking, labor markets seeing migration flows? An analysis of long-term trends may highlight such a condition. However, we may still be in the middle of the trend. Case Deaton (2020) show that within global industries, market power is increasingly concentrated in oligarchies and monopolies. The authors dovetail this monopoly power into reduced wages and decreased opportunities of Americans without college degrees. Working in retail, for instance, brings to mind the big box stores that are increasing in ubiquity, and the monopoly wage structures confine workers to local labor markets as the

alternative destinations are the same wages relative to the housing market in the same firms (Hudson 2007). The monopoly concentration of industry leaders and minimizing competition appears to stymie the ability of job applicants to play a part in the sorting process in these types of jobs, which I suspect spills over into the sorting between labor markets I have analyzed here (Rosenfeld 2021). Future work needs to compare the migration opportunities of workers in these low-wage jobs at the individual level, and keep an eye for the differences across dual markets (Doeringer and Piore 1971).

The ratios of wages and housing costs are among the strongest predictors of internal migration decline in the U.S (Olney and Thompson 2024). These results affirm this view with important caveats. Migration is more common as wages go down at home, and as housing costs go up at the destination, migration is less common on average. These findings align with the traditional internal migration model offered by Roback (1982). Figure 6 and the micro/metro distinction suggest some complications with these results. The movement from micropolitans, which tend to have lower housing costs, has the largest predicted migration counts. A reading of Roback might claim that this is where the amenities of areas come in; the increased cost of housing is justified with more access to destination amenities.

In Table 3, I have subset the data to each micropolitan and metropolitan pair and run the model. I have kept only those covariates germane to this part of the discussion, but the full model was fit. The housing costs and income ratio estimates fluctuate according to each flow type. Some interesting relationships arise from this strategy that complicates the amenities argument. Flows to micropolitans have the opposite signs of the full model, suggesting a few ideas. Destination income is not a statistically significant predictor of migration into micropolitans. Micropolitans tend

Table 3. CBSA Flow Type Regression Results

	micro to micro		micro to Metro		Metro to micro		Metro to Metro	
	Mean	CI	Mean	CI	Mean	CI	Mean	CI
Destination Income	0.00	(-0.09,0.08)	0.16	(0.05,0.26)	-0.03	(-0.1,0.04)	0.26	(0.21,0.31)
Origin Income	-0.01	(-0.07,0.05)	-0.22	(-0.26,-0.17)	0.09	(0.04,0.14)	-0.38	(-0.4,-0.36)
Destination Housing Cost	0.30	(0.23,0.38)	-0.41	(-0.5,-0.33)	0.01	(-0.06,0.07)	-0.61	(-0.66,-0.57)
Origin Housing Cost	-0.09	(-0.15,-0.04)	0.18	(0.15,0.21)	-0.11	(-0.14,-0.07)	0.46	(0.45,0.48)
Destination Diversity	0.14	(0.11,0.17)	0.30	(0.25,0.35)	0.22	(0.19,0.25)	0.33	(0.3,0.36)
Origin Diversity	0.10	(0.08,0.12)	0.06	(0.04,0.07)	0.13	(0.1,0.16)	0.16	(0.15,0.17)
Sample Size	8,491		25,927		23,722		156,385	

to be associated with fewer amenities. Future work should investigate life course migration related to these relationships; it could be the case that these migrants are moving near family or retiring. Destination housing cost strongly predicts migration in the micropolitan-to-micropolitan case, suggesting a hot housing market. Across all four model fits, the diversity relationships remain, lending some credibility to the sorting across space idea.

4.7 Conclusion

Industrial compositions are an understudied yet valuable part of understanding the population process in the U.S. Migration decisions related to the comparison of origins and destinations are colored by the format of production and availability of jobs in both locations. I set out to understand the decline of internal migration in the U.S. by measuring industry diversity. I found the surprising result that industry diversity positively predicts migration. I suspect that this positive result is indicative of labor market sorting. Workers seek markets where their skills are maximized, and diverse

industry compositions increase those chances.

The decline in internal migration derives from other factors. These results affirm some of those determinants from the literature: the increase in housing costs as a discouraging factor for migration and the stagnation of wages as a source of confinement to origin labor markets. According to this data, the diversity of industries has grown over the past ten years. It appears to be propping up the remaining migration flows in the U.S. Since past work finds that flows tend to be between small metros or micro-to-metro, like I have highlighted here, there are a few consequences. First, we might expect if trends continue, that some small metros will decline in population like we see in small towns throughout the U.S. These metros unable to attract internal migrants like diversifying places may lose on the flows that could strengthen the area in terms of economic growth.

There are a few main limitations of this analysis. This paper relies on 2-digit NAICS codes to describe the composition of industries in a CBSA. There is tremendous diversity within each industry. For example, NAICS code 71: Arts, Entertainment, and Recreation contains many differences in terms of systems of production, types of occupations, wage structures, and so on. More granular industry codes would provide a more precise measure of diversity, which is currently biased toward amenable land-use CBSAs. Another shortcoming is that the format by which diversity is assessed does not account for increasing diversity by the closing of one large employer. In many smaller metros, the diversity will appear to grow because a large proportion of jobs in one industry may leave. Future work must consider the different pathways through which a metro diversifies to capture these differences properly.

The model fails to capture individual-level determinants of migration that are considered among the key components of migration today (Molloy et al. 2011). Lim-

itations of the data prevent such an analysis at this scale, and as such I opted for examining flows. Scholars have suggested that aging drives the decline in internal migration that I have examined here. Older adults and "empty-nesters" are more likely to stay in their 3 or 4-bedroom homes for longer than previous generations. Young professionals are less likely to move while strapped with student loan debt and difficult housing markets. These accounts were modeled through the median age but did not bear out in this data.

The modeling presumes that people live and work in the same CBSA. This assumption distinguishes CBSAs too strongly. Living in say, the southern Seattle-Tacoma CBSA and working in the Olympia CBSA is common. A spatial dependence model was assessed to assist in modeling this situation. However, some commute norms are outside my strategy to address this problem. The spatial random effects map in Figure 4 shows a few metro areas where the major city is negatively associated with migration.

In conclusion, the internal migration decline in the U.S. remains a social problem. The benefits of migration, like increased wages, are less accessible today than thirty or even twenty years ago. Moreover, with other demographic concerns like an aging population, the decline in internal migration precipitates a lower ability to care for the older population in small metros. This paper contributes one view of how migration continues to play out today, where industrial composition is part of the decision-making process for potential migrants. This work tells a countervailing story of where people can still get the benefits related to migration, although it may be at the expense of waiting on a tech company to refabricate the town.

Chapter 5
CONCLUSION

In this dissertation, I have set out to uncover the trajectories of industries and connect them to individual outcomes. This line of inquiry began as a simple question: What about the alternative transitions from manufacturing to service work? This spun into how exposure to labor markets shapes individual outcomes in wage attainment and migration. Many long-term trends in the U.S. background these questions. The rise of income inequality, the decline in internal migration, and the diminishing stability of employment are reciprocal with these labor market conditions. The contribution of this dissertation is reframing these as parsable relationships between individuals and the shape of labor markets thrust upon them. The results of these chapters point to general industry trends shaping inequality.

I hoped that by uncovering precise measurements and application of industry compositions comparative experiences of how work and opportunity are mutually reinforcing. The analysis accomplishes this comparison throughout the chapters. The primacy of deindustrialization accounts was contrasted in panel, spatial, and theoretical accounts. By connecting the histories of work and the relative shares of work in space, the stratification attributable to the differences in work was explored.

A sequence analysis was conducted to show that a local labor market's characteristics and alternatives are funneling opportunities. The typology was designed to capture the trends in industrial composition transitions and cluster those trends into meaningful groups. Savage (2021) describes the historicism of inequality as a punc-

turing of our temporal ontology. That the generators of inequality are not so much left behind but forgotten. The typology highlighted several trajectories noted in the literature, namely the deindustrialization of many of America's cities and the depth of manufacturing persistence in rural areas. The forgotten alternatives can now connect stories like the transformation of South Lake Union into a comparative analysis.

The modern figure of industrial trajectory research is the service worker. In some accounts, the service worker is a low-skilled, young Person of Color with few opportunities, and in others, a middle-aged professional doing spreadsheets and filing reports (Kalleberg 2013, Korczynski 2013). The variety of these faces prompted attention to what is happening with these workers and how industry trends have shaped their outcomes. The results find variation about the trajectories of industry compositions. Against the hypotheses, I found that rural areas are seeing relatively high wages in service work, and that post-industrial areas are not falling behind. The Californian exurbs are shown in relief. The small-town professionals illustrate a different tenor of service work than their low-wage, emerging labor market counterparts. These findings highlight the importance of historicist thinking in structural stratification.

The destination and its characteristics are one of the primary drivers of internal migration. In this research, I found that the relationship between origin and destination was related to sorting migrants to relevant locations rather than necessarily discouraging migration through concentration and depressed wages, as one might expect under gravity theories of labor market considerations (Chakrabarti and Sengupta 2016). My analysis reveals stories like Pittsburgh, where diversifying industries can reinvigorate labor markets. However there is still a tension between how diverse compositions come about and what that means for the flows out of a diversifying labor market.

The research findings have valuable implications for how scholars approach structural stratification as it pertains to local labor markets. First, the access to measurement representing the transitions between industry arrangements in local labor markets provides a new tool covering important bases in this area. I have critiqued the deindustrialization literature for a lack of attention to alternative trajectories. The typology provides a neat, data-driven package that can respond to these critiques. For example, Clave and colleagues (2023) examine the path to Disney being the largest single-site employer in the U.S. through a discussion of industry-specific visas and patterns of migration around the site. Uncovering Vacation Destinations reveals the potential for transferability of the findings siloed from other disciplines.

These contributions from this dissertation imply some paths for future researchers. The focal relationship of this project is the role of industry compositions on individual outcomes, and I proposed a few potential pathways for the operation of compositions on individuals. I have suggested the shaping of the built environment as a structural barrier to opportunities, the potential of emerging markets as a positive quality in the investment for moving, the sedimentation of norms around employment wages and benefits related to primary industries, the spillover of wages in other local industries in shaping the housing markets preventing the inhabitants of some jobs, and the imprinting of labor markets as a reproducer of racially segregated housing markets (Farmer 2011, Nair and Webster 2012, Western and Rosenfeld 2011, Wilson 1997). These connections were derived from past research; however, the works cited were focused on other outcomes and may be unsuitable for further exploration of this mechanism. The format by which industries and the compositions of their relations shape individual outcomes requires more targeted work. I have devised a few ideas on how this work can be accomplished.

Throughout the project, the role of industrial compositions on the built environment was a tempting idea. One of the initial connections of the Chapter 2 typologies was the shaping of commute times. Scholars should continue to pull on this thread. The emergence of toll roads in metro areas is one such case where the agglomeration of work has delineated haves and have-nots. The promotion of some systems of production within place over others. How have the collocation of transportation opportunities been tied to the evolution of work?

Norms are an important feature of employment (Gorsuch 2019). Industry-specific norms, too, have shown how premiums gained in one organization can spill over into others. The question is, how do local norms of employment proliferate? Are they tied to market shares or the conditions of the local labor market? Take, for example, the position of a subsidized bus pass in contract negotiations. One can easily imagine how, under a critical mass of regular riders and bus passes in employment, this becomes the norm of a labor market (Lichtenwalter et al 2006). The question is how the compositions shape this and if this critical mass can be tracked to particular industries or employment shares.

Much of Wilson's work (1989, 1996) has been about industry trajectories and their connection to racial inequality. In these accounts, deindustrialization processes have been especially harmful to Black people. The transitions of industries and the related minimizing of job quality is tied to segregation, displacement, poverty, and decreased access in, physical and economic terms, to jobs. Re-approaching these connections with a view of the variation in industry transitions may highlight the most successful trajectories in alleviating racial inequality. Are there trajectories that promote continued access to job opportunities? This reframing allows for actionable comparison cases that have been a critique of Wilson's work in the past (Wilson 1987).

This dissertation also has implications for policy and stakeholders working in small-town economics. I find evidence that some trajectories are spatially dependent, suggesting regions of similar trajectories exist. Additionally, I find that there is spatial dependence in the internal migration of workers throughout the U.S. One can find these dual conditions in my home state of Georgia. Diminishing population size in small towns and rural counties has led to bitter rivalries over scarce opportunities like new hospitals, corrections facilities, and technical colleges. My first policy recommendation would be to invest in the consolidation of small-town competencies and an infrastructure that envisions growth into consolidation. This would require long-term infrastructure planning around the idea that some small towns and counties could eventually join. This strategy is beneficial for a few reasons. First, it pools investment opportunities within similarly situated neighbors. It fosters the kind of strategic planning that allows for state subsidies for more significant infrastructure improvements. It also looks to find resilience in similar circumstances rather than competition.

I set out to understand how imprinting may have a place in our understanding of stratification. That is, the previously undertaken work could form a constraint of future types of work. One way that I thought this may occur is through the types of housing that are created with potential residents in mind i.e. an apartment complex designed for young professionals has a clear tie between the type of work near the complex. However, should the types of jobs that these young professionals have decline, the complex will still be there and may not be a sound investment. In light of this condition, I recommend less aspirational housing development. The snowballing type of growth is simply not found when one assesses broadly the trajectories of all counties in the U.S. Resilience of housing design should reflect the possibility of

decline in light of other factors (Charles et al 2019).

Lastly, I examined how the possibility of a joint relationship between agglomeration processes and the repurposing of structures could impact wages. While I did not find a strong effect on the wages of service workers, there are numerous cases where revitalizing reflects what is already a brick-and-mortar building. The cases of Randolph County, NC and Pittsburgh, PA are examples of how diversifying possibilities can grow from what already exists. While many small towns have been looking to invest in their commercial corridors (Richardson and Loh 2024), one recommendation would be to revisit what infrastructure and buildings have stood the test of time and could be converted to new purposes.

In this dissertation, I have shown that industrial compositions shape stratification throughout the U.S. in contemporary contexts by historical means. My measurement strategy created pathways to new analyses of fundamental outcomes of wage attainment and migration. I hope this document will serve as an opportunity for more pathways between what work is done and how it shapes our trajectories.

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Appendix A

ADDITIONAL FIGURES AND TABLES

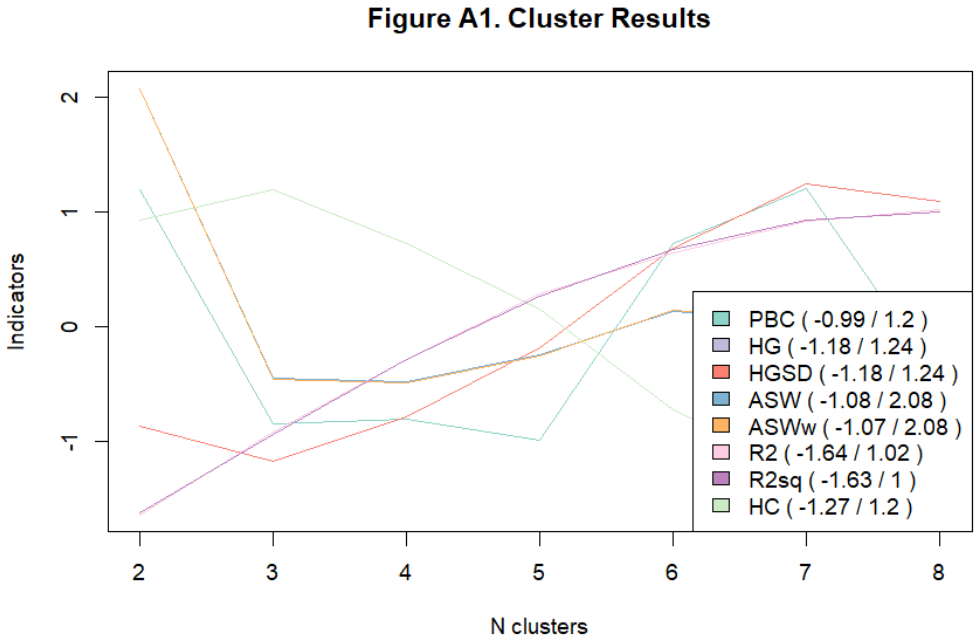

Figure A.1: Typology Cluster Diagnostics