

RESEARCH BRIEF

# The Faltering Escalator of Urban Opportunity

DAVID AUTOR

FORD PROFESSOR OF ECONOMICS

DIRECTOR, NATIONAL BUREAU OF ECONOMIC RESEARCH,  
LABOR STUDIES PROGRAM

CO-CHAIR, MIT TASK FORCE ON THE WORK OF THE FUTURE



# The Faltering Escalator of Urban Opportunity\*

David Autor

\*dautor@mit.edu: 50 Memorial Drive, Morris and Sophie Chang Bldg., E52-438, Cambridge, MA 02142. I am grateful to Brandon Enriquez for exceptional research assistance and intellectual input throughout this project, and to Melissa Kearney, Rebecca Jackson, and Elisabeth Reynolds for comments that improved the paper. I acknowledge research support from Accenture LLP, IBM Global Universities, the MIT Task Force on Work of the Future, Schmidt Futures, and the Smith Richardson Foundation.

## Introduction

For much of modern U.S. history, workers were drawn to cities by opportunities for the more enriching work offered there and the higher pay that came with it. As the eminent urban economist Edward L. Glaeser observed, "...cities have been an escape route for the underemployed residents of rural areas, such as the African-Americans who fled north during the Great Migration" (Glaeser, 2020). However, an important aspect of this opportunity escalator has broken down in recent decades. The migration of less-educated and lower-income individuals and families toward high-wage cities has reversed course (Ganong and Shoag, 2017): Since 1980, college-educated workers have been steadily moving into affluent cities while non-college workers have been moving out. (In this research brief, 'college' refers to workers with a four-year college degree; 'non-college' refers to workers with less than a four-year college degree, e.g., associate degrees, high school diploma, or less than high school.)

This historic reversal is little studied yet undeniably important.<sup>1</sup> If non-college workers are steering clear of thriving high-wage cities despite the escalator of economic opportunity these cities offer, then policymakers should work to redress the economic, social, and informational barriers that inhibit these beneficial moves. Alternatively, if non-college workers are fleeing cities because the urban opportunity escalator is faltering, then policymakers need to understand what has changed and shift policy toward either restoring urban opportunity or redirecting workers elsewhere.

This research brief explores how the structure of opportunity offered by urban and non-urban labor markets to college and non-college workers has changed since 1980.<sup>2</sup> At the

core of understanding why non-college workers are no longer flocking to the cities is the question of *push* versus *pull*. Are economic forces pushing non-college workers out of thriving cities that otherwise offer strong labor market opportunities, or are the opportunities offered by these places eroding—meaning that their pull is weakening? Or, are both forces interacting? How should policy respond to these changing dynamics, if at all?

The most widely accepted explanation of why non-college workers are steering clear of thriving, high-wage cities is that steep and rising housing costs are pushing them away (Glaeser, Gyourko, and Saks, 2005; Ganong and Shoag, 2017; Hoxie, Shoag, and Veuger, 2019). This explanation is surely correct but, as shown below, it is incomplete: The economic pull of urban labor markets for non-college workers—seen most immediately in the urban non-college wage premium—has weakened or disappeared.

From where did this urban pull arise? It is a well-established fact that urban workers earn more than observably similar non-urban workers (Glaeser and Maré, 2001; Moretti, 2004; Glaeser and Resseger, 2010). Given that land prices are intrinsically higher in cities, it seems only logical that urban wages must compensate workers for the elevated cost of city living. For this to be economically sensible, however, urban workers must be proportionately more productive to cover their higher costs—otherwise, firms would locate elsewhere. Much evidence suggests that workers are more productive in cities (Glaeser and Gottlieb, 2009; Hsieh and Moretti, 2019), and it is not hard to see why: Highly educated and specialized workers cluster in cities, and invention and innovation thrive in these places (Glaeser, 2011).<sup>3</sup> High urban wages have not, however, historically been limited to highly educated workers. Non-college workers—meaning workers with less than a four-year college degree—have also tended to earn more in cities.

But these favorable circumstances began eroding several decades ago. In the United States, as in most industrialized countries, employment has become increasingly concentrated in high-education, high-wage occupations and in low-education, low-wage occupations, at the expense of traditionally middle-skill career jobs (Autor, Katz, and Kearney, 2006; Autor, Katz, and Kearney, 2008; Goos and Manning, 2007; Autor, 2013; Michaels, Natraj, and Van Reenen, 2013; Goos, Manning, and Salomons, 2014). Economists refer to this phenomenon as employment polarization. While its causes are multifarious, they are in part rooted in both automation and computerization, which have taken over many routine production and office tasks, and in globalization, which has substantially reduced labor-intensive manufacturing work in high-wage countries.<sup>4</sup> As polarization has advanced, non-college workers have been shunted out of blue-collar production jobs and white-collar

office and administrative jobs into services, such as food service, cleaning, security, transportation, maintenance, and low-paid care work.

These trends are widely recognized. What is much less widely known is that the polarization of work has been overwhelmingly concentrated in cities.<sup>5</sup> In the initial decades following WWII, U.S. cities offered a distinctive skills and earnings escalator to less-educated workers. A likely reason why is that, in these decades, adults without college degrees performed higher-skilled, more specialized jobs in cities than their non-urban counterparts. Laboring in urban factories and offices, they staffed middle-skill, medium-paying production, clerical, and administrative roles, where they worked in close collaboration with highly educated professionals (e.g., engineers, executives, attorneys, actuaries, etc.). These collaborative working relationships often demanded specific skills and shared expertise, and likely contributed to the higher wages (and higher productivity) of urban non-college workers. Such jobs were comparatively scarce in suburbs and rural areas, far away from the office towers and (at one time) bustling urban production centers.<sup>6</sup> Urban labor markets accordingly provided an escalator of opportunity and upward mobility for immigrants, minorities, and workers who were less affluent and less educated.

In the decades since 1980, however, this distinctive feature of urban labor markets has diminished. As rising automation and international trade have encroached on employment in urban production, administrative support, and clerical work, the non-college urban occupational skill gradient has diminished and ultimately disappeared. While urban residents are on average substantially more educated—and their jobs are vastly more skill-intensive—than four decades ago, non-college workers in U.S. cities perform substantially less specialized and more skill-intensive work than they did decades earlier. Polarization thus reflects an unwinding of the distinctive structure of work for non-college adults in dense cities and metro areas relative to suburban and rural areas. And, as this distinctive occupational structure has receded, so has the formerly robust urban wage premium paid to non-college workers.

This reality is depicted in Figure 1, which plots percentage changes in inflation-adjusted hourly wages in urban versus non-urban labor markets between 1980 and 2015 for workers grouped by education level: less than high school; high school graduate; some college, less than a four-year degree; four-year college graduate; and post-college education. Among the two highest education groups—workers with a four-year college degree or post-college education—real wages rose by 5 to 6 percent more in urban and non-urban labor markets during this 35-year period. For workers without a college degree, however, the opposite occurred: Relative to similarly educated workers in non-urban labor markets,

real urban wages fell by 3 percentage points among workers with some college; by 7 percentage points among workers with a high school diploma; and by fully 13 percentage points among workers with less than high school. While urban labor markets remain vibrant for college graduates, even in the most-educated U.S. cities, less than half of working-age adults have a college degree (Autor, 2019).

As documented below, this deterioration in the urban wage advantage among non-college workers has been even more pronounced for Blacks and Hispanics than for whites, and, distressingly, most pronounced for Black males. Although urban college graduates have generally fared well during this same time interval, Black college-educated men have done less well. Relative to their non-urban counterparts, they have experienced a higher degree of occupational polarization and a deterioration in their urban earnings premium. While this research brief does not identify why these trends have been especially adverse among Black men, these findings are consistent with a panoply of evidence that Black men are faring poorly in U.S. cities. Thus, for the majority of U.S. workers—but especially for minorities—cities no longer appear to offer the escalator of skills acquisition and high earnings that they provided in earlier decades.

**Figure 1: Percentage Changes in Real Wage Levels (Not Adjusting for Local Cost of Living) in Urban vs. Non-Urban Labor Markets by Detailed Educational Level, 1980–2015**

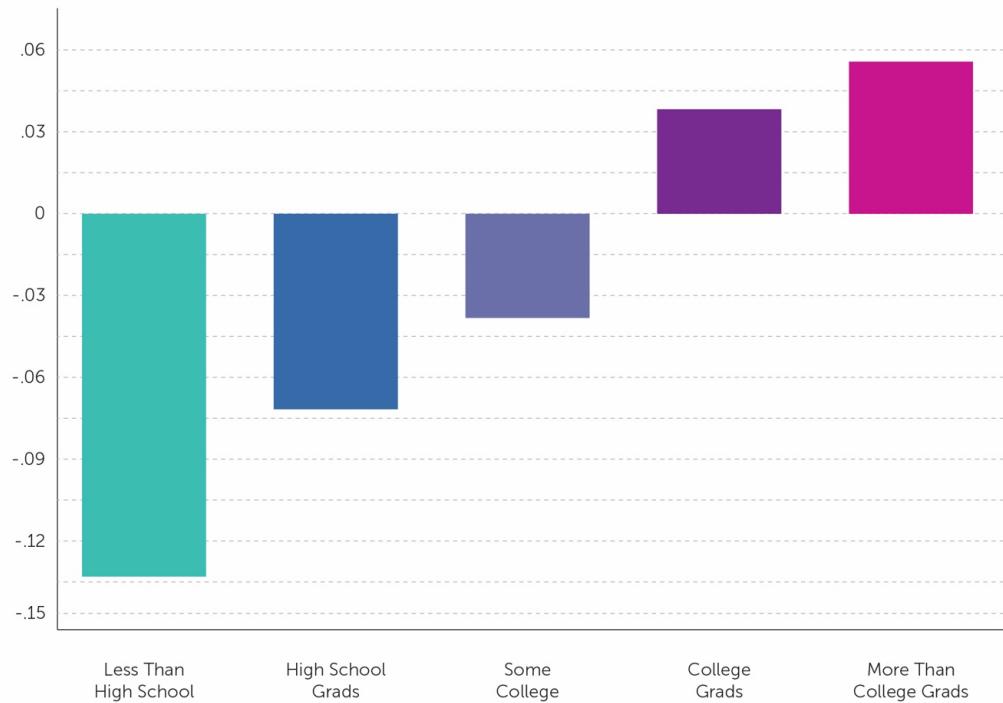


Figure is constructed using U.S. Census of Population data for 1980 and pooled American Community Survey (ACS) data for years 2014 through 2016. Each bar represents the contrast between the change in mean log wages between 1980 and 2015 among the indicated education group residing in the top quartile of most-urban labor markets versus the bottom quartile of least-urban labor markets.

How should policy respond? Because the underlying economic forces that drive these trends appear to be pervasive and longstanding, there is no single policy remedy that can correct them. But, this does not mean that policy cannot help. There are at least two arenas where policy can constructively focus, one on places and the other on people. First, a place-based policy would seek to restore some of the lost earnings power of non-college workers laboring in cities. One feasible and impactful way to accomplish this goal is by setting appropriately calibrated city-specific minimum wages. While almost all economists agree that raising the minimum wage too aggressively risks curtailing employment, the U.S. federal minimum wage is lower at present than four decades earlier (Congressional

Budget Office, 2019). And, the best available evidence finds that federal and state minimum wage laws enacted over the last several decades have substantially boosted earnings in low-paid jobs without reducing employment (Cengiz et al., 2019; Dube and Lindner, 2020).<sup>7</sup> It is therefore likely that there is headroom in many U.S. cities to improve earnings of low-paid urban workers at little cost to their employability. To be clear, boosting wages through minimum wage hikes is not a free lunch: Minimum wage increases are passed on to consumers in the form of higher prices, and sharp hikes may tend to put low-productivity employers out of business (Aaronson, 2001; Dustmann et al., 2020). Policymakers should consider these tradeoffs when calibrating minimum wage levels.

Second, a people-based policy could make a substantial difference over the long run in assisting families to choose neighborhoods with good earnings opportunities relative to living costs. The celebrated Moving to Opportunity (MTO) experiment, launched in the mid-1990s, demonstrated that moving families from high-poverty public housing projects to low-poverty neighborhoods had substantial, positive long-term benefits for the educational attainment, earnings, and well-being of household members (Ludwig et al., 2013; Chetty, Hendren, and Katz, 2016; Chetty and Hendren, 2018). Recent policy experiments have built on these findings by assisting recipients of subsidized housing vouchers in selecting low-poverty neighborhoods in which children have historically thrived (Bergman et al., 2019). Bearing in mind the diminishing earnings opportunities facing non-college workers in U.S. cities, policymakers might consider fostering moves to neighborhoods that are not only *less impoverished* but also *less urban* than might have seemed warranted some decades earlier.<sup>8</sup>

As discussed in the concluding section of this research brief, the current COVID-19 crisis appears likely to exacerbate these adverse trends by reducing demand for non-college workers in the urban hospitality sector (i.e., air travel, ground transportation, hotels, and restaurants) and in urban business services (i.e., cleaning, security, maintenance, repair, and construction). While this trend reversal may spur a *depolarization* of urban employment, this would not, ironically, augur good news for urban non-college workers. Reducing demand for non-college workers in low-paying urban jobs will not, unfortunately, restore demand for these same workers in medium-paying urban jobs.

Although policy cannot turn back the tide of urban polarization, it can improve the quality of urban non-college jobs on the margin, while simultaneously encouraging adults to seek work outside of those urban labor markets where the quality of jobs has not kept pace with the cost of living.

## Occupations, Wages, and Cities

### THE BIG PICTURE

**Figure 2: Changes in Occupational Employment Shares among Working-Age Adults, 1980–2015**

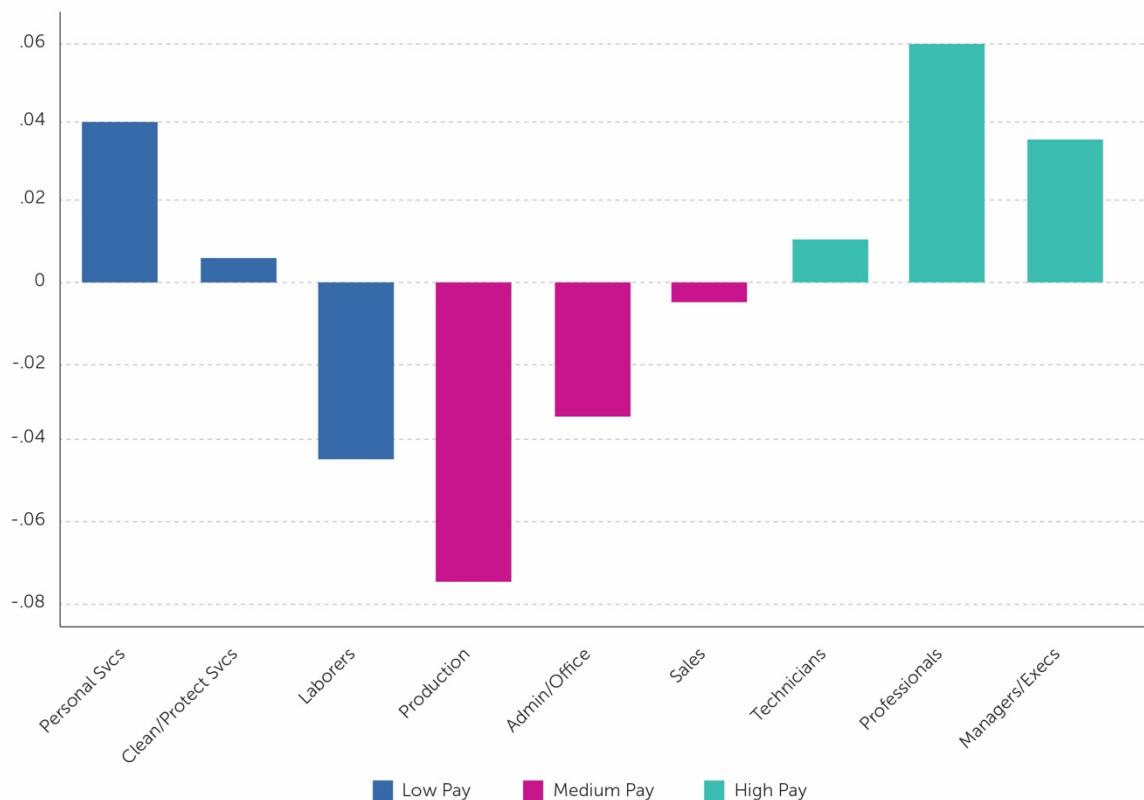


Figure is constructed using U.S. Census of Population data for 1980, 1990, and 2000, and pooled American Community Survey (ACS) data for years 2014 through 2016, sourced from IPUMS (Ruggles et al., 2018). Sample includes working-age adults ages 16–64 excluding those in the military. Occupational classifications are harmonized across decades using the classification scheme developed by Dorn (2009).

Before exploring the changing geography of work, it is useful to review the picture of aggregate occupational change for the United States. Figure 2 plots the widely discussed polarization of the occupational structure of the U.S. labor market between 1980 and 2015.<sup>9</sup> The nine exhaustive and mutually exclusive occupational categories depicted in this figure are ordered from lowest to highest by mean wage level. The ‘barbell’ shape of this figure reflects the secular bifurcation of the occupational structure in the United States

(mirroring many other industrial economies) into high-education, high-wage professional, managerial, and technical occupations, on the one hand, and non-credentialed and typically low-paid service and laborer occupations, on the other hand (Autor, Katz, and Kearney, 2006; Goos and Manning, 2007; Goos, Manning, and Salomons, 2014; Autor, 2015; Alabdulkareem et al., 2018; Acemoglu and Restrepo, 2020).<sup>10</sup>

Figure 3 brings these patterns into sharper focus by aggregating the nine occupational categories into three broad clusters: manual and service occupations ('low pay'); production, office, and sales occupations ('medium pay'); and professional, technical, and managerial occupations ('high pay'). At the start of this interval (in 1980), U.S. employment was roughly evenly divided among these three categories: 33 percent of workers were in low-pay occupations, 38 percent were in medium-paying occupations, and 30 percent were in high-pay occupations. The first panel of Figure 3 shows that over the subsequent 35 years, middle-skill employment fell steeply—by 11 percentage points. This trend might be concerning were it not the case that almost the entirety of this fall was offset by rising employment in high-wage, high-skill occupations. In fact, the share of workers employed in typically low-paying occupations barely budged. Thus, in aggregate, occupational polarization appears to be a case of the middle class joining the upper class, which should not be a concern for policy.

The next two panels of Figure 3 temper this conclusion. Among non-college workers—those with less than a four-year degree—the picture is radically different. In 1980, employment of non-college workers was roughly split between low- and medium-paying occupations, with 39 percent in the former category, 43 percent in the latter, and the remaining 18 percent in high-paying occupations. Over the ensuing decades, the share of non-college employment in medium-paying occupations fell by more than 10 percentage points, with two-thirds of this fall reflecting the movement of non-college workers out of medium-paying occupations and into traditionally low-paying occupations.

**Figure 3: Changes in Occupational Employment Shares among Working-Age Adults, Overall and by Educational Attainment, 1980–2015**

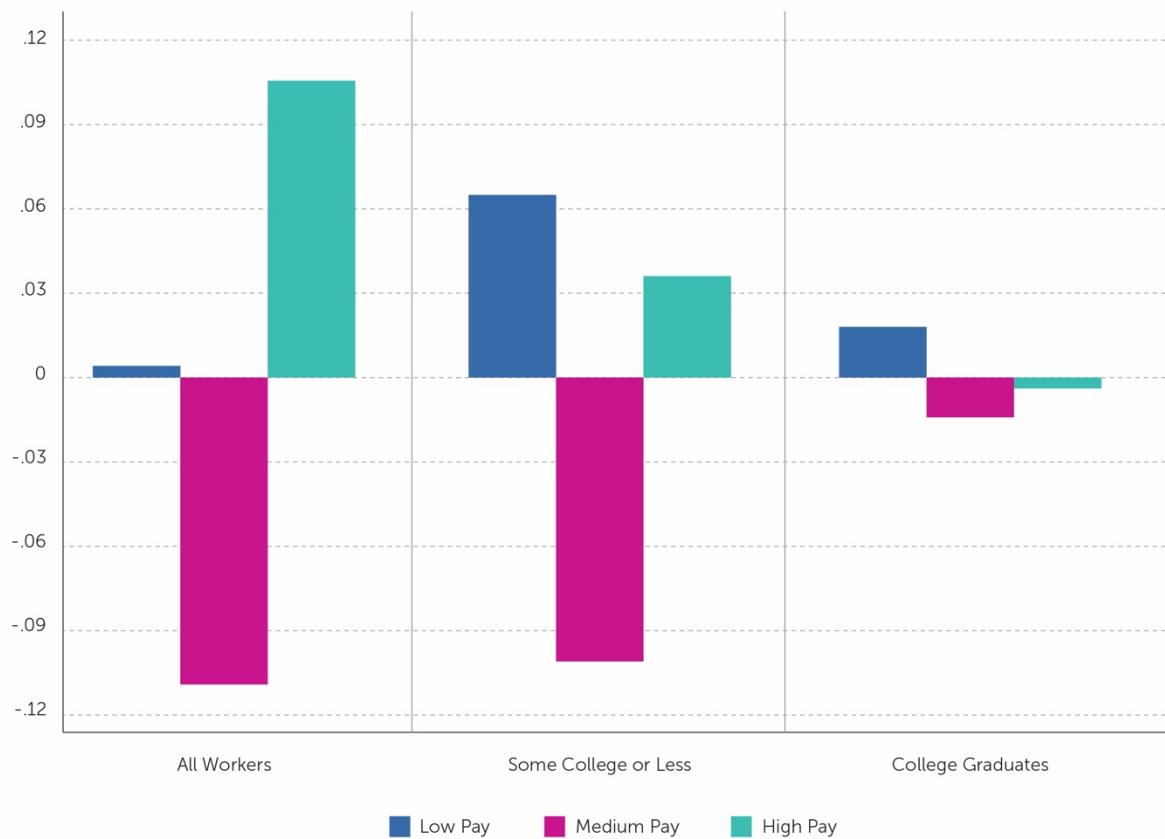


Figure is constructed using U.S. Census of Population data for 1980, 1990, and 2000, and pooled American Community Survey (ACS) data for years 2014 through 2016, sourced from IPUMS (Ruggles et al., 2018). Sample includes working-age adults ages 16–64 excluding those in the military. Occupational classifications are harmonized across decades using the classification scheme developed by Dorn (2009).

In short, the quality of jobs that non-college workers perform in cities has deteriorated sharply as the medium-pay stratum of occupations has eroded. In the same time interval, there has been a vast increase in the fraction of urban workers who hold college and post-college degrees<sup>11</sup>, with no obvious dilution in the quality of jobs that they occupy.

With these aggregate facts in mind, I turn to the geography of occupational polarization.

### URBAN POLARIZATION

The structure of work differs across places: Locations often specialize in particular industries and services, such as manufacturing, education, entertainment, or healthcare. As

noted above, a key predictor of the structure of economic activity is population density—specifically, whether a place is a city, a metropolitan area, a suburb, or a rural area. Some work intrinsically occurs in low-density areas, such as agriculture. Conversely, U.S. manufacturing was concentrated in large cities at the start of the twentieth century, and it slowly migrated toward less dense areas as transportation networks improved (Glaeser, 2011). Knowledge-intensive industries tend to locate in dense cities, where educated workers are most prevalent (Glaeser and Maré, 2001; Moretti, 2004; Berry and Glaeser, 2005).

These features of economic geography are well known, but how do they connect to the notion that cities provide a gateway of opportunity? Figure 4 offers the rudiments of an answer. This figure sketches the striking relationship between population density and occupational structure—that is, the type of work that people do—across 722 local labor markets (so-called Commuting Zones, or CZs) that collectively comprise the contiguous United States. Each panel reports the share of employment among working-age adults in 1980, 1990, 2000, and 2015 in one of the three broad occupational categories discussed above: low-pay service, transportation, laborer, and construction occupations; medium-pay clerical, administrative support, sales, and production occupations; and high-pay professional, technical, and managerial occupations.<sup>12</sup> CZs are arranged from most rural to most urban along the x-axis of this figure.<sup>13</sup> Each plotted point in the bin-scatter represents approximately 2.5 percent of the working-age population.

Figure 4 makes three key points. First, cities are much more intensive in high-pay, educationally demanding work than are non-urban labor markets, and this pattern became substantially more pronounced in recent decades. In 1980, the fraction of workers employed in high-paying occupations was approximately 10 percentage points higher in the most-urban versus least-urban labor markets; by 2015, this differential had risen to more than 15 percentage points.<sup>14</sup> Second, urban labor markets are substantially less intensive in low-paid work than are non-urban labor markets. In each decade, the share of workers employed in low-paid service, transportation, laborer, and construction occupations was 10 to 15 percentage points lower in the most-urban versus least-urban labor markets. Third, and perhaps most strikingly, the middle panel of the figure reveals what is both historically distinctive and rapidly changing about urban labor markets: the prevalence of medium-pay clerical, administrative support, sales, and production occupations. In 1980, urban labor markets had a substantially larger share of medium-paying occupations than did suburban and rural CZs, with an urban-rural gap of about 10 percentage points.<sup>15</sup> In the ensuing decades, this differential eroded and eventually

reversed sign—from positive to negative. While middle-skill work was overrepresented in cities and metro areas in 1980, it was underrepresented in these same locales 35 years later (and less prevalent everywhere in absolute terms).

**Figure 4: Occupational Employment Shares among Working-Age Adults by Commuting Zone Population Density, 1980–2015: Level Relative to 1980 Mean**

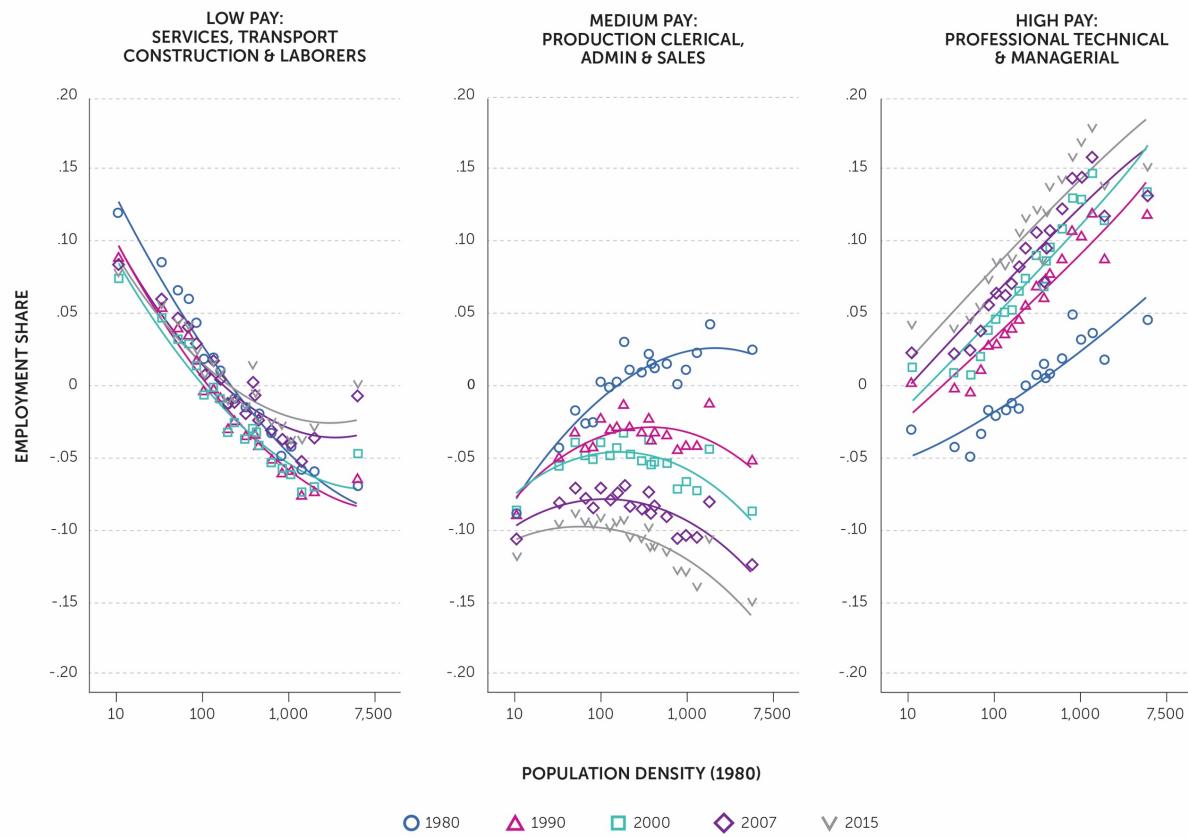


Figure is constructed using U.S. Census of Population data for 1980, 1990, and 2000, and pooled American Community Survey (ACS) data for years 2014, 2015, and 2016 (to create a 2015 average), sourced from IPUMS (Ruggles et al., 2018). Occupational classifications are harmonized across decades using the classification scheme developed by Dorn (2009) and distilled to the level of 722 consistent local labor markets (or, Commuting Zones) following the procedures in Autor and Dorn (2013). Each plotted point represents approximately 5 percent of the working-age population in the relevant year.

Still, one may legitimately ask: What's the worry? Figure 4 shows that high-paying urban occupations expanded as medium-paying urban occupations contracted, which does not look like bad news. Figure 3 above showed that, in aggregate, the overall shift toward

high-wage occupations masks the diverging paths of college and non-college workers, with college-educated workers shifting upward and non-college workers shifting downward.<sup>16</sup> Figure 5 shows that this aggregate phenomenon is overwhelmingly concentrated in urban labor markets. In 1980, non-college workers in the most-urban labor markets were approximately 15 percentage points more likely to work in medium-paying occupations—and 15 percentage points less likely to work in low-paying occupations—than were non-college workers in the least-urban labor markets. But, this urban occupational differential attenuated and then inverted over the next 35 years. As of 2015, nothing remained of the robust middle of non-college production, office, clerical, and administrative jobs that was a standout feature of urban labor markets less than four decades earlier.<sup>17</sup> In fact, the low-pay employment share among non-college workers was several points higher in the most-urban relative to the least-urban labor markets, and the medium-pay employment share was several points lower. (There was almost no change in the high-pay employment share among non-college workers). Thus, Figures 4 and 5 make clear that the polarization of U.S. employment into high-wage professions and low-wage services is driven by urban labor markets, and that within urban labor markets, the growth of employment in low-wage occupations is driven by non-college workers.<sup>18</sup>

**Figure 5: Occupational Employment Shares among Workers with and without Four-Year College Degree by Commuting Zone Population Density, 1980–2015: Level Relative to 1980 Mean**

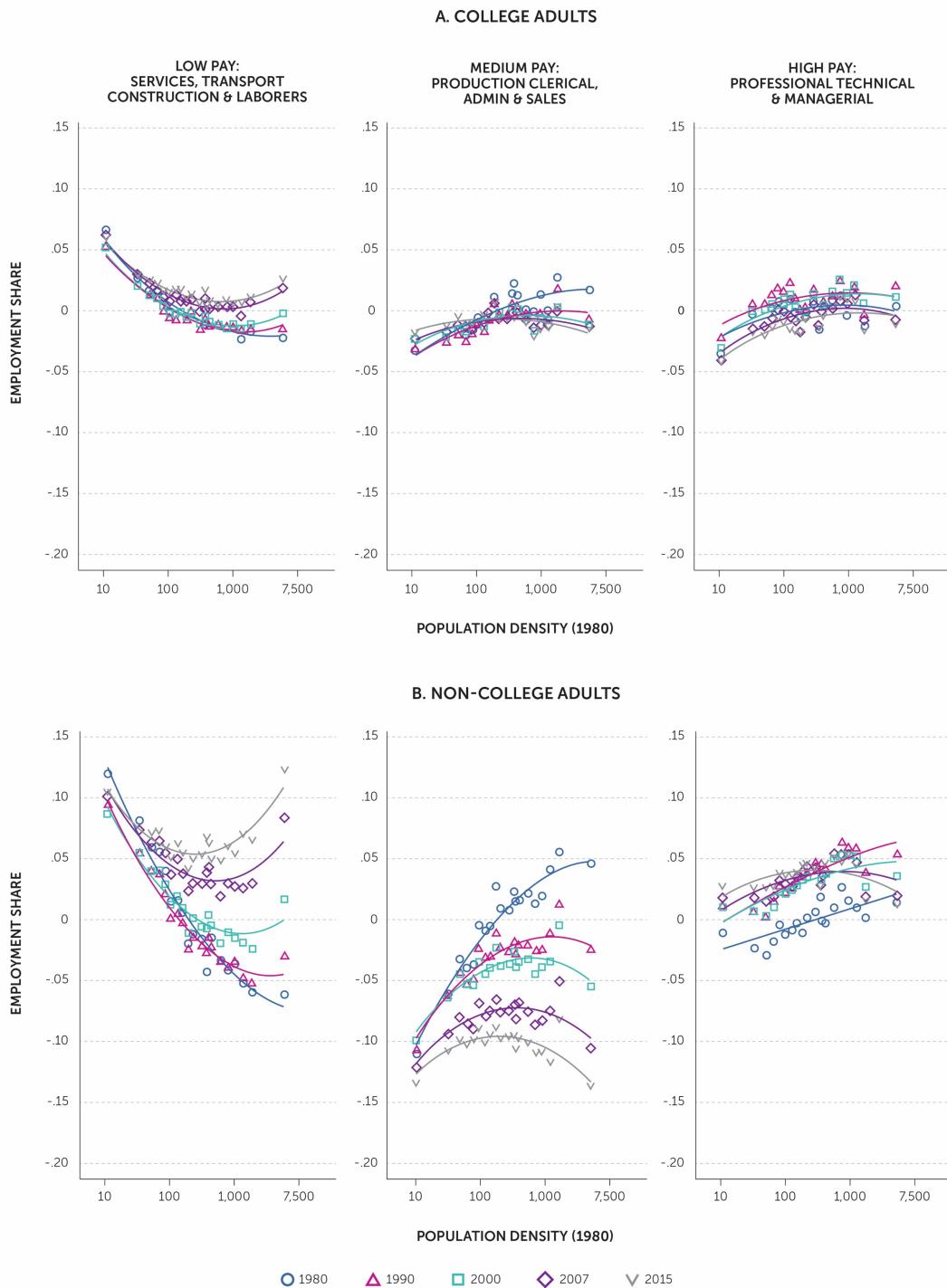


Figure is constructed using U.S. Census of Population data for 1980, 1990, and 2000, and pooled American Community Survey (ACS) data for years 2014, 2015, and 2016 (to create a 2015 average), sourced from IPUMS (Ruggles et al., 2018). Occupational classifications are harmonized across decades using the classification scheme developed by Dorn (2009) and distilled to the level of consistent local labor markets (AKA, Commuting Zones) following the procedures in Autor and Dorn (2013). Each plotted point represents approximately 5 percent of the working-age population in the relevant year.

### THE DISTRESSING RACIAL AND ETHNIC DIMENSION OF POLARIZATION

The urban U.S. workforce is disproportionately college educated, foreign born, and female, and it has become more so in recent decades (Costa and Kahn, 2000; Glaeser and Maré, 2001; Florida, 2002; Moretti, 2013; Diamond, 2016; Autor, 2019). Could it be that the sharp shifts in urban occupational structure documented above are driven by these demographic changes or, alternatively, are concentrated among a subset of urban workers (e.g., minorities, women, adults who have not completed high school)? Figure 6 explores this possibility by plotting changes in occupational structure between 1980 and 2015 in the most-urban versus least-urban labor markets among subgroups of workers defined by education, gender, and race/ethnicity.<sup>19</sup> This figure makes clear that polarization is pervasive across race and gender groups. The left-hand panel shows that among non-college white, Black, and Hispanic men and women, urban employment in medium-paying occupations fell by 7 to 15 percentage points between 1980 and 2015, with a corresponding increase in employment in low-paying occupations and almost no change in employment in high-paying occupations. Conversely, the right-hand panel shows that, among college-educated workers, urban occupational polarization was small overall, and that the majority of employment declines in medium-paying occupations were absorbed by employment gains in high-paying occupations.

Nevertheless, the demographic contours of occupational polarization were much more pronounced among non-white workers: Polarization among both non-college and college workers was most pronounced among Hispanics; less pronounced, but still substantial among Blacks; and substantially more moderate among whites. (In Autor (2019), I document that polarization is also more concentrated among foreign-born than native-born workers, which is consistent with the greater degree of polarization among urban Hispanics than urban whites.) Most disconcerting is the experience of Black male college graduates. Their employment share in medium-paying occupations fell by seven percentage points, and their share in low-paying occupations rose by almost five percentage points. Thus, despite high levels of educational attainment, they exhibited

downward occupational mobility in urban versus non-urban labor markets. This stark finding is consistent with Derenoncourt (2019), who shows that upward mobility deteriorated among urban Black residents following the Great Migration, and with Chetty et al. (2020), who document the exceptionally poor labor market outcomes of Black men raised in poor urban U.S. neighborhoods.

**Figure 6: Change in Occupational Employment Shares in Urban vs. Non-Urban Labor Markets by Education, Gender, and Race/Ethnicity, 1980–2015**

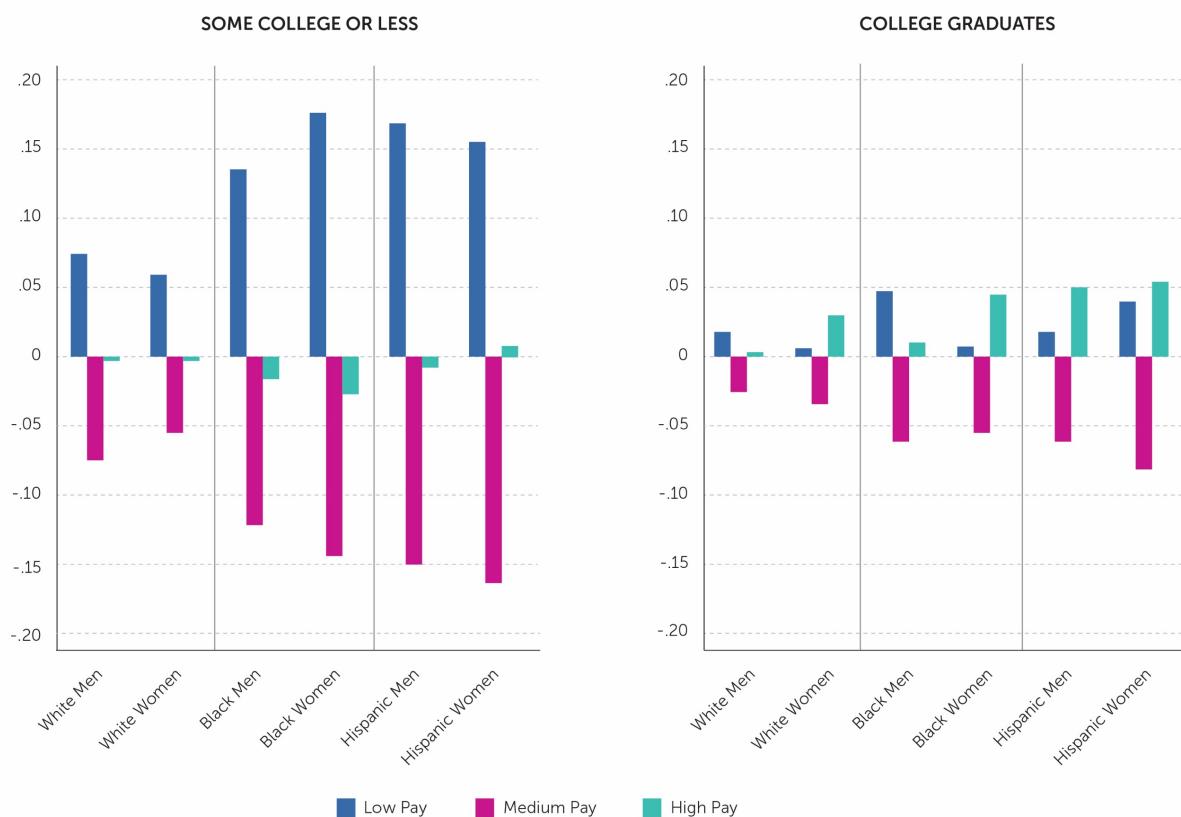


Figure is constructed using U.S. Census of Population data for 1980 and pooled American Community Survey (ACS) data for years 2014, 2015, and 2016 (to create a 2015 average). Each bar represents the contrast between the change in occupational employment shares (in percentage points) between 1980 and 2015 among the indicated demographic group residing in the top quartile of most-urban labor markets versus the bottom quartile of least-urban labor markets.

In summary, the aggregate polarization of the U.S. occupational structure is disproportionately urban, concentrated among workers with some college or lower education levels. Among non-college workers, it is especially acute among Hispanic and Black workers. It does not appear to have a distinctive gender component, but urban,

Black, male college graduates are distinctive among college-educated workers in experiencing polarization with almost no accompanying *upward* occupational movement; whereas urban, Black, female college graduates are distinctive in experiencing polarization with no accompanying *downward* occupational movement.<sup>20</sup>

## 2. The Fading Urban Wage Premium for Non-College Workers

One can be too sentimental about changes in occupational structure. If automation and globalization are spurring urban workers to switch from blue-collar production and white-collar office jobs toward in-person service jobs, perhaps this is progress. Arguably, what matters most is not whether workers are keeping their ‘old’ jobs but rather whether their ‘new’ jobs are as good as the old ones. And, the simplest way to make that comparison is via wage levels. As highlighted in the Introduction, both college and non-college workers have historically earned more in cities, and this has been especially true for non-college workers who work in factories and offices alongside professionals, technical workers, and managers (Moretti, 2004; Moretti, 2012). Thus, the relevant question is whether urban non-college workers have maintained that urban wage advantage as they have transitioned from medium-paying to traditionally lower-paying occupations.

The short answer to this question is no. Figure 7 provides a more detailed answer by plotting inflation-adjusted average hourly wages among college and non-college workers across the full spectrum of urban, metropolitan, suburban, and rural labor markets in the years 1980, 1990, 2000, and 2015. As in Figures 4 and 5, local labor markets in Figure 2 are ordered from least to most urban. Wage levels of college and non-college workers are plotted on a logarithmic scale, so that an increment of 0.10 to the level of the wage corresponds to roughly a 10 percent increase. Although wages in this figure are adjusted for inflation between 1980 and 2015, they do not account for differences in living costs between urban and non-urban areas or between fast- and slow-growing cities. These regional differences are an important part of the story, and I turn to them in the next section.

This figure contains three key results. First, the wages of college graduates are substantially higher in urban rather than non-urban labor markets. In 1980, college graduates in the most-urban quartile of labor markets earned approximately 40 percent more per household than college graduates in the least-urban labor markets. This urban-rural wage differential rose substantially over subsequent decades and reached approximately 55 percent by 2015. Second, the wages of non-college workers are also higher in urban rather than non-urban labor markets. In 1980, average hourly wages of

non-college workers in the most-urban labor markets were approximately 35 percent higher than those of non-college workers in the least-urban labor markets, and this gap grew by another 15 percentage points between 1980 and 1990. But, third, unlike for college-educated workers, the urban wage differential among non-college workers substantially collapsed thereafter, plummeting from roughly 50 percentage points in 1990 to 40 percentage points in 2000 to a mere 25 percentage points in 2015—a cumulative drop of one-half.<sup>21</sup> Thus, the urban wage differentials for college and non-college workers moved in opposing directions after 1990, with this premium rising for workers with a college degree and declining dramatically for those without one. This non-college urban wage premium has ebbed as the distinctive structure of non-college urban jobs—specifically, the overrepresentation of blue-collar production and white-collar office and administrative jobs—has receded.

**Figure 7: Real Log Hourly Wages of College Graduate and Non-College Graduate Workers by Commuting Zone, 1980–2015**

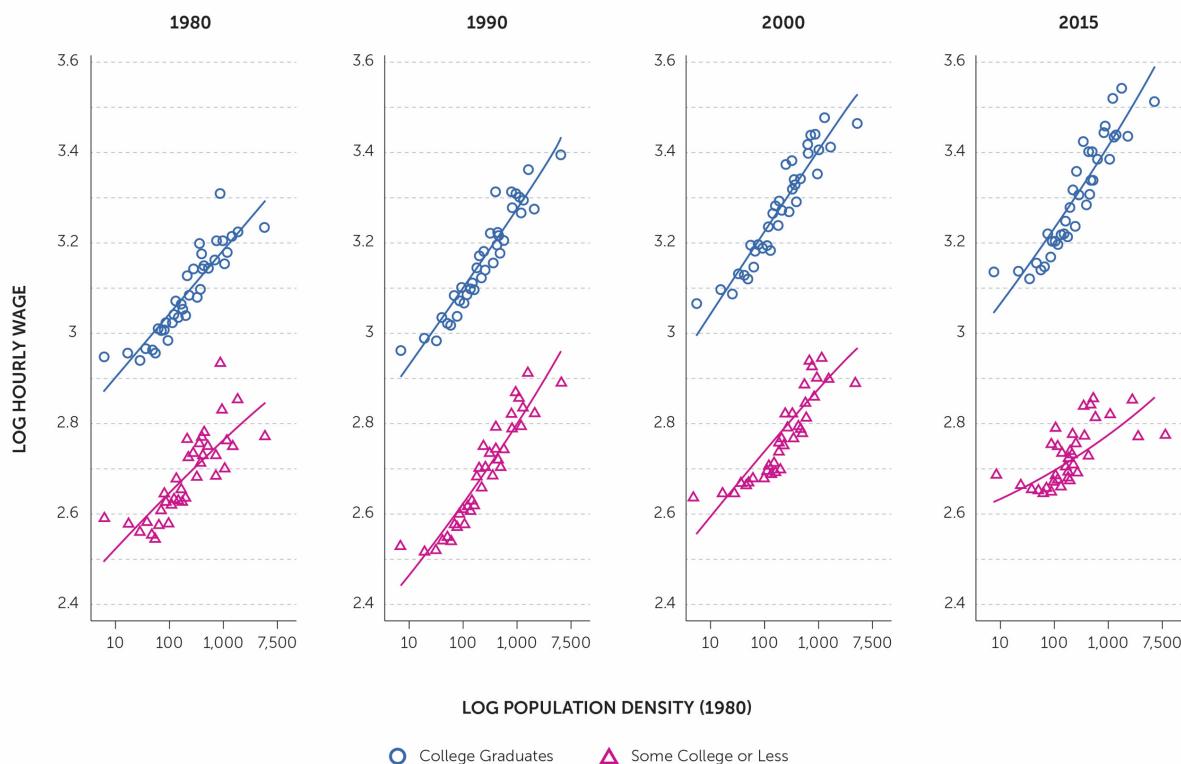


Figure plots real mean log hourly earnings among college graduates and workers with some college or lower education in 1980, 1990, 2000, and 2015. Wages are normalized to real 2015 levels using the Personal Consumption Expenditure deflator. Each plotted point represents

approximately 2.5 percent of the working-age population in the relevant year. Source: U.S. Census of Population data for 1980, 1990, and 2000 and pooled American Community Survey (ACS) data for years 2006 through 2008 and 2014 through 2016, sourced from IPUMS (Ruggles et al., 2018).

Following the format of the evidence on urban occupational polarization above, Figure 8 explores how these urban wage differentials have played out across demographic groups defined by gender, race, and ethnicity. To make this comparison, the figure contrasts changes in real wages between 1980 and 2015 in the most-urban (top density quartile) versus least-urban (bottom density quartile) labor markets. The findings in Figure 8 affirm the dispiriting picture conveyed by Figure 7. Among non-college whites of both sexes, there was a very slight decline in the urban wage premium. Among non-whites, however, falls were pronounced. This premium dropped by 5 to 7 percentage points among non-college Hispanics and by 12 to 16 percentage points among non-college Blacks.

Among college-educated workers, gains were generally positive, but the racial and ethnic dimension was again less favorable. Gains were larger for whites of both sexes than for Blacks and Hispanics of either sex. And, consistent with the adverse occupational shifts plotted above, urban Black college-educated men saw their wages fall relative to their non-urban counterparts—a distressing result that deserves far deeper exploration than this research brief can offer.

In interpreting this evidence, it deserves emphasizing that Figure 8 reports changes in urban *relative* to non-urban wage changes by demographic group. Thus, the steep decline in the non-college wage premium could reflect a fall in urban wages among non-college workers, a rise in non-urban wages among non-college workers, or a combination of the two. As may be seen from a close study of Figure 7, both factors are operative: Urban non-college wages fell between 1980 and 2015 (particularly after 2000) while non-urban non-college wages rose. Though not visible in this figure, this pattern also holds across race and gender groups: The falling urban premium for non-college Blacks and Hispanics reflects weak or negative wage growth among urban minority workers and reasonably strong wage growth among non-urban minority workers. The combination of these two forces means that the urban wage premium has collapsed for non-college Blacks and Hispanics.

**Figure 8: Percentage Changes in Real Wage Levels (Not Adjusting for Local Cost of Living) in Urban vs. Non-Urban Labor Markets by Education, Gender, and Race/Ethnicity, 1980–2015**

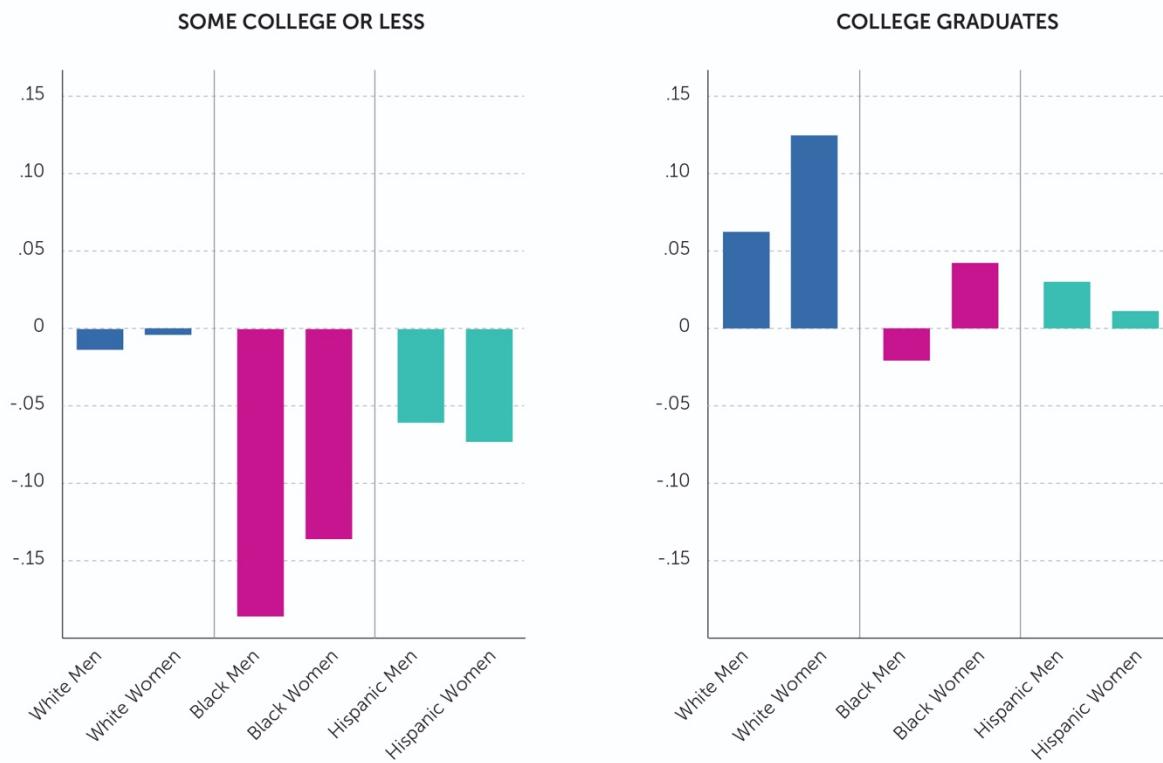


Figure is constructed using U.S. Census of Population data for 1980 and pooled American Community Survey (ACS) data for years 2014, 2015, and 2016 (to create a 2015 average). Each bar represents the contrast between the change in mean log wages between 1980 and 2015 for the indicated demographic group residing in the top quartile of most-urban labor markets versus the bottom quartile of least-urban labor markets.

**Figure 9: Change in Wages and Employment Shares in High- vs. Low-Paying Occupations in Urban vs. Non-Urban Labor Markets by Demographic Group, 1980–2015**

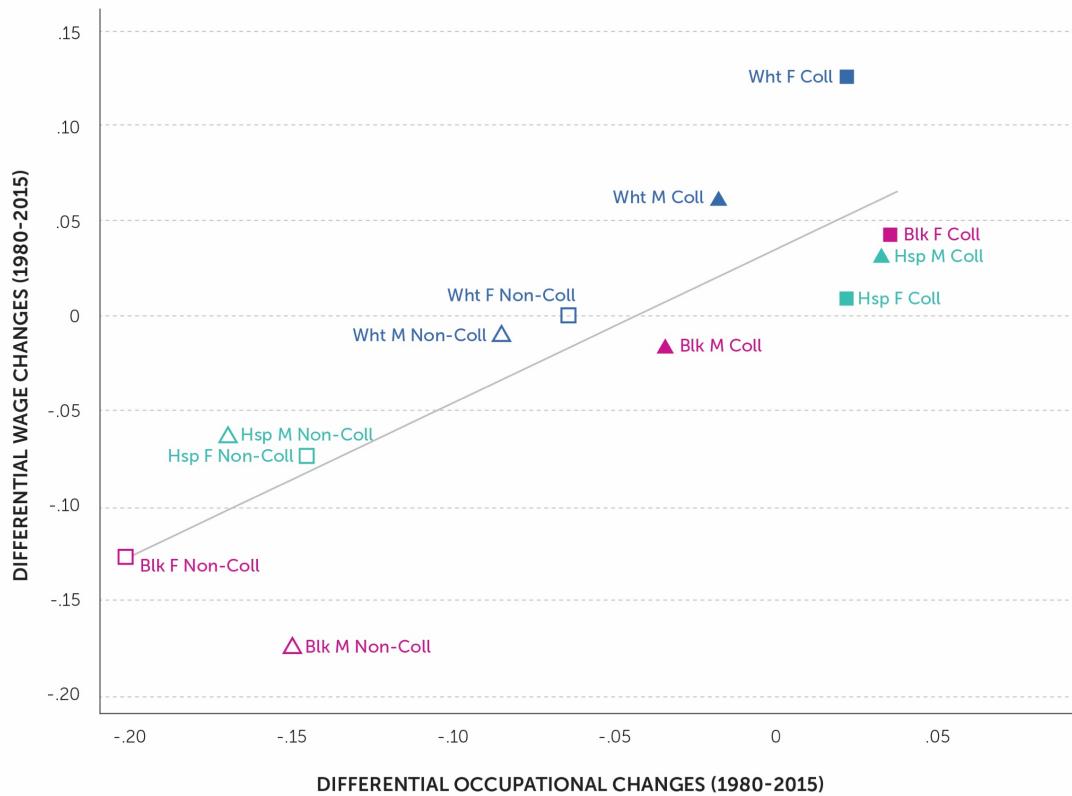


Figure presents a scatter plot of the relationship between the change in the urban vs. non-urban occupational employment shares of each indicated demographic group on the x-axis (from Figure 6) and the change in the urban vs. non-urban wage gap for that demographic group on the y-axis (from Figure 8). The change in the occupational share for a demographic group is equal to the change in its share in high-wage occupations minus the change in its share in low-wage occupations. (See endnote 22 for further explanation.) Plotted line corresponds to an unweighted OLS regression fit of figure data points. Rubric: Wht, Blk, and Hsp refer to white, Black, and Hispanic; F and M refer to female and male; and Coll and Non-Coll refer to workers with and without college degrees.

The striking correspondence between changes in occupation and wage structures in urban versus non-urban labor markets invites the question of whether these are two halves of a whole. That is, did urban occupational polarization cause the non-college urban wage premium to fall? This is a challenging question to answer because these data are correlational in nature. In a hypothetical case where polarization was randomly ‘assigned’ to one city, but not to another, we could directly assess how changes in occupational structure affect wage levels overall and among demographic groups.

Lacking such an experiment, Figure 9 offers initial evidence that strongly suggests a connection. This figure presents a scatter plot of changes in urban versus rural wages between 1980 and 2015 among the twelve detailed demographic groups discussed above (college/non-college by male/female by white/Black/Hispanic) against the contemporaneous change in their occupational employment shares in urban versus non-urban labor markets.<sup>22</sup>

What is unambiguous from this simple plot is that the education, gender, and racial/ethnic groups that saw the largest downward movement in urban versus non-urban occupational employment shares saw the largest declines in urban versus non-urban wages. Similarly, the demographic groups that saw the largest upward movements in occupational employment shares saw the largest wage gains. To be clear, this figure does not constitute proof of cause and effect. What it makes almost indisputable, however, is that these two phenomena share common economic origins.

### **3. Accounting for the Rising Cost of Urban Living**

I began this essay by emphasizing the distinction between *push* and *pull* factors—costs and benefits—that affect the draw of urban labor markets for workers overall and by educational group. The evidence above makes clear that the pull of (formerly) high-wage, urban labor markets for non-college workers has declined as the ‘quality’ of jobs available to non-college workers—measured either by formal skill demands or conventional pay rankings—and real wage levels have eroded. Although U.S. cities today are vastly more skill-intensive than they were thirty or forty years ago, urban non-college workers perform substantially less skilled work than decades earlier, and the once robust non-college, urban wage premium has nearly halved. Absent any change in the push side of the urban labor market ledger, non-college workers would have ample reason to reconsider the conventional wisdom that thriving U.S. cities offer a bastion of opportunity to all-comers. Nevertheless, the push aspect of urban labor markets is likely quite important, as discussed in Ganong and Shoag (2017), Hoxie, Shoag, and Veuger (2019), and Glaeser (2020).

This final section of the research brief stands these push and pull factors alongside one another. To operationalize the push side of the ledger, I turn to Consumer Price Index data compiled by the U.S. Bureau of Labor Statistics.<sup>23</sup> For expositional purposes, I focus on eight urban metropolitan areas, two each in the Northeast, Midwest, South, and West. Within each of these four regions, I include one thriving ‘superstar’ city (New York, Chicago, Houston, or San Francisco) and a second city that is arguably less prominent (Philadelphia, Detroit, Atlanta, or Denver). These data enable comparisons of changes in real wage levels by city and education group accounting for changes in city-specific price levels.

Before turning to wage comparisons, Figure 10 plots the patterns of occupational polarization by city and education group. In all eight cities, polarization is much greater among non-college than college workers. Moreover, polarization appears especially pronounced among non-college workers in the ‘superstar cities’ of New York, San Francisco, and Chicago. Thus, the evolution of occupational structure within these major metropolitan areas is consistent with the patterns above.

**Figure 10: Change in Occupational Employment Shares among College and Non-College Workers in Eight Major Metropolitan Areas, 1980–2015**

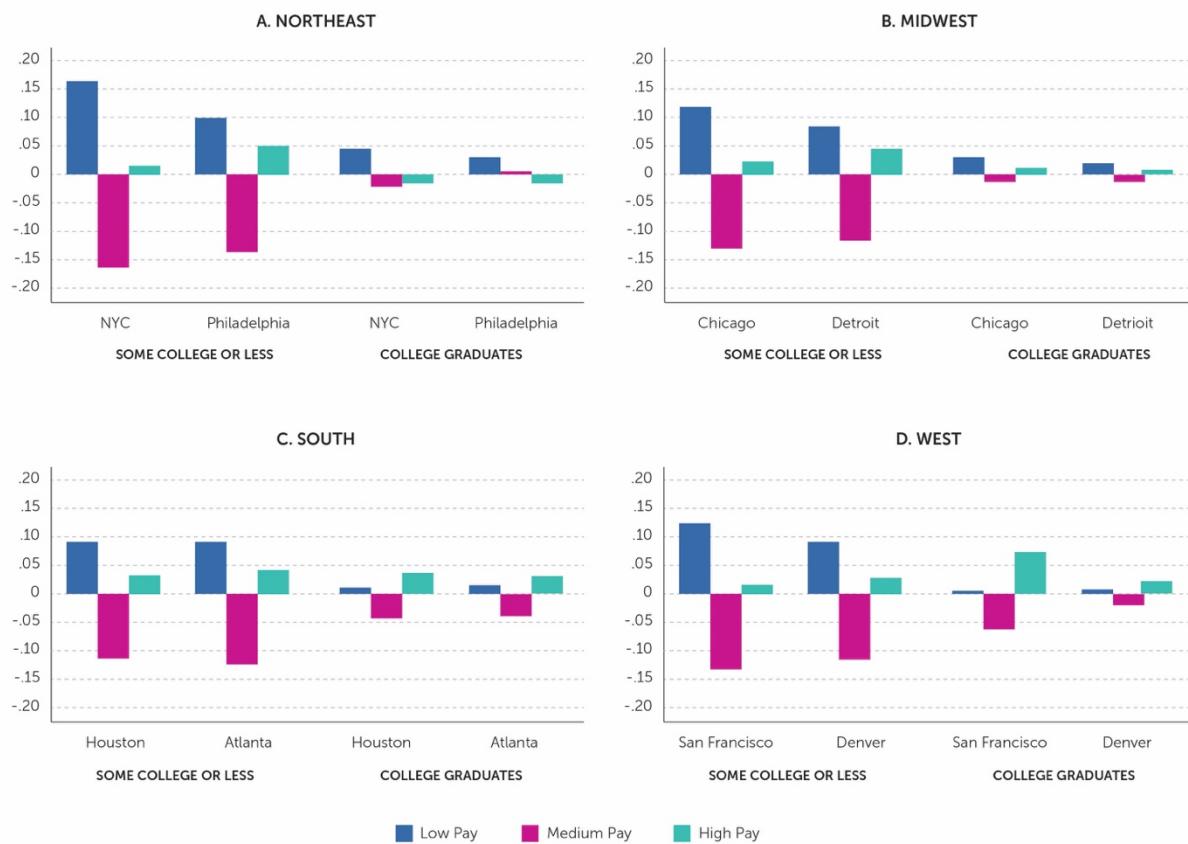


Figure presents changes in occupational employment shares in low-, medium-, and high-paying occupations in eight Current Price Index (CPI) metropolitan areas. These areas are harmonized to U.S. Commuting Zones using data on the county composition of CPI metropolitan areas reported in U.S. Bureau of Labor Statistics (2018).

Figure 11 plots real wage changes among college and non-college workers by city between 1980 and 2015 using both national and city-specific price indexes. The message of this figure is clear: Accounting for rising price levels in major metropolitan areas exacerbates the pervasive pattern of eroding real wages among non-college, urban workers shown above. Indeed, in New York City, San Francisco, and Denver, accounting for city-specific prices flips the modest real wage growth of non-college workers between 1980 and 2015 from positive to negative. Accounting for regional price levels, the real wages of non-college workers fall in six of the eight cities in this period. Only in the southern cities of Houston and Atlanta do non-college wages make any net progress in these three-and-a-half decades. Notably, college-educated workers are not immune from these same forces.

Steeply rising prices in the booming cities of New York, San Francisco, and Denver also clawed back some of the wage gains made by college workers in these cities during these decades.<sup>24</sup> But, wage growth among college graduates was sufficiently robust that net wage gains remained strongly positive.

A key driver of the rising cost of living in thriving cities is the steeply increasing costs of housing—especially in geographically constrained cities like New York and San Francisco. Low-income households spend a substantially larger share of their budgets on housing than do high-income households, reflecting the fact that housing is a necessity like food or clothing.<sup>25</sup> The city-specific price indexes developed by the U.S. Bureau of Labor Statistics and applied in Figure 11 do not, however, account for differences in how low- and high-income households allocate their budgets across goods categories. If it were feasible to make this adjustment, the real wage picture for non-college workers would surely look even less favorable than shown in Figure 11. In short, accounting for the rising real cost of city living further clouds the already dark wage picture for urban non-college workers (Hoxie, Shoag, and Veuger, 2019).

**Figure 11: Change in Wage Levels among College and Non-College Workers in Eight Major Metropolitan Areas, 1980–2015, Using National and City-Specific Price Indexes**

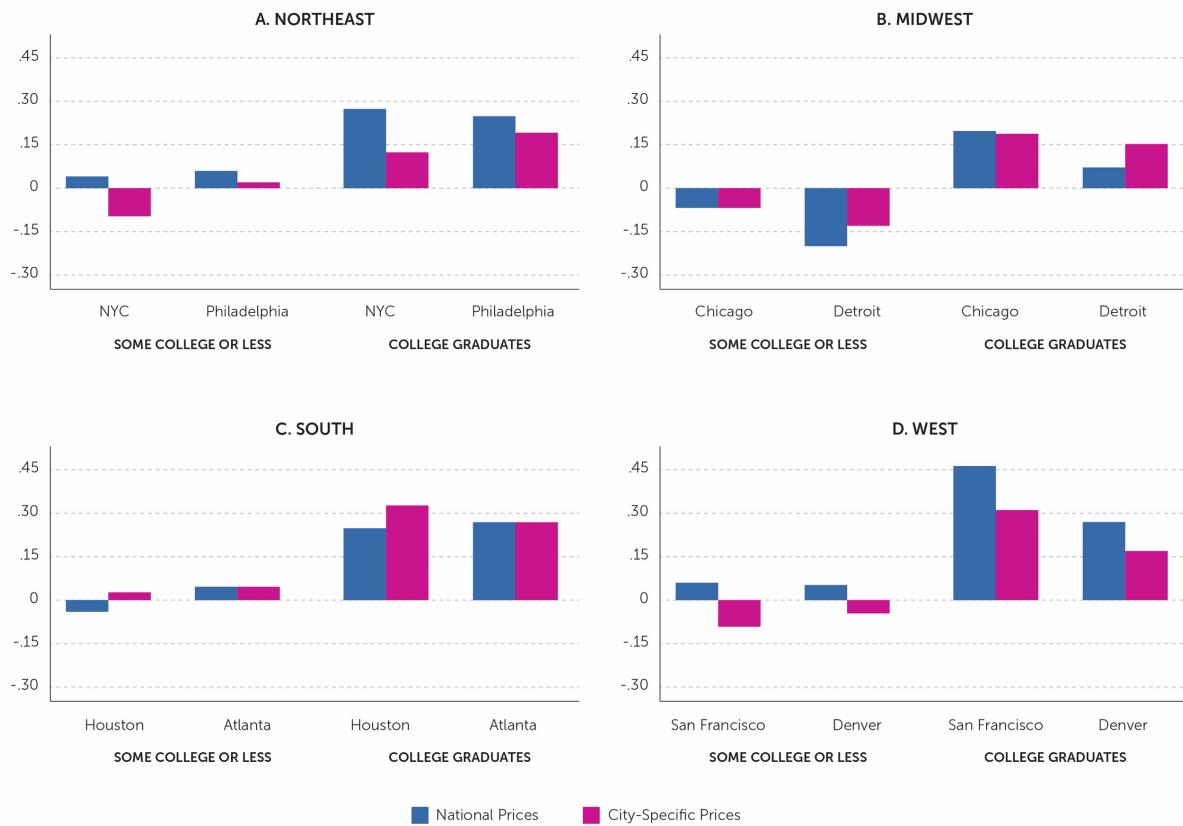


Figure presents changes in real wage levels deflated using the U.S. Personal Consumption Expenditure deflator for national prices and the Current Price Index series for corresponding metropolitan areas.

## 4. Conclusions

The findings in this research brief should be understood in light of both conventional economic wisdom and popular understanding. Both point to affluent, dynamic cities as bastions of labor market opportunity, and they lament the fact that non-college workers are no longer migrating to high-wage U.S. cities (Moretti, 2015; Ganong and Shoag, 2017; Austin, Glaeser, and Summers, 2018). The evidence here suggests that these changing migration patterns reflect the diminishing allure of urban labor markets for workers without advanced degrees. While cities remain vibrant for workers with college degrees, the urban skills and earnings escalator for non-college workers has lost its ability to lift workers up the income ladder. Measured by occupational structures and real wage levels, urban opportunities for non-college workers have deteriorated swiftly and pervasively relative to non-urban labor markets. The declining urban occupational and wage advantage is broadly evident across non-college workers. It is particularly severe among Black and Hispanic workers, and even more so among Black men. Although, in Edward L. Glaeser's phrase quoted above, cities had historically served as "an escape route for the underemployed residents of rural areas" (Glaeser, 2020), there is limited reason to believe that this is still the case.

The data and findings above do not, however, extend to the present, and specifically the ongoing COVID-19 crisis. Although it is premature to make confident forecasts, this crisis appears likely to ultimately exacerbate the challenges afflicting non-college workers in U.S. cities. The primary engine of job growth, albeit not wage growth, among urban non-college workers over the last several decades has been rising employment in personal services (i.e., food service, cleaning, security, entertainment, recreation, health aides, transportation, maintenance, construction, and repair).<sup>26</sup> The COVID-19 crisis may change this trajectory. It seems probable that employers will learn two durable lessons from the swift, disruptive, and yet surprisingly successful movement of knowledge work from in-person to online: The first is that online meetings are almost as good as—and much cheaper than—time-consuming, resource-intensive business trips; the second is that virtual workplaces can provide a productive, cost-effective alternative to expensive urban offices for a meaningful subset of workers.

If these lessons take root, they will shift norms around business travel and remote work, with profound consequences for the structure of urban labor demand. Already, U.S. employers surveyed during the current pandemic project that the share of working days delivered from home will triple after the pandemic has passed (Altig et al., 2020). Most significantly, the demand for non-college workers in the urban hospitality sector (i.e., air travel, ground

transportation, hotels, and restaurants) and in urban business services (i.e., cleaning, security, maintenance, repair, and construction) will not likely recover to its previous trajectory. While this trend reversal may spur a *depolarization* of urban employment, this would not, ironically, augur good news for urban non-college workers. Unfortunately, reducing demand for non-college workers in low-paying urban jobs will not *restore* demand for these same workers in medium-paying urban jobs.

Looking ahead, there are some reasons for tempered optimism. The slowing inflow of non-college workers into urban labor markets highlights one mechanism by which deteriorating conditions may be partly self-correcting. A shrinking pool of non-college workers in major U.S. cities will eventually induce employers to compete more vigorously to attract them. This should (slowly) improve wage levels. Simultaneously, the disproportionate aging of the suburban and rural U.S. population during the last four decades (Autor and Fournier, 2019) means that there will be rapidly rising demand for many labor-intensive services in suburbs and rural areas, including in-person care, transportation, repair, and other services for the elderly. These secular demographic changes may generate new employment opportunities for non-college workers outside of major cities and could further reduce the long-standing urban non-college wage gradient. Policy can abet this process on two levels. Though policy cannot readily reverse the longstanding economic forces driving urban polarization, it can serve to improve the quality of urban non-college jobs with carefully calibrated minimum wage policies. Simultaneously, policy can assist workers to seek jobs outside of those urban labor markets where the quality of jobs has not kept pace with the cost of living.

## Appendix

**Figure A1: Change in Occupational Employment Shares in Urban vs. Non-Urban Labor Markets by Detailed Education Level, 1980–2015**

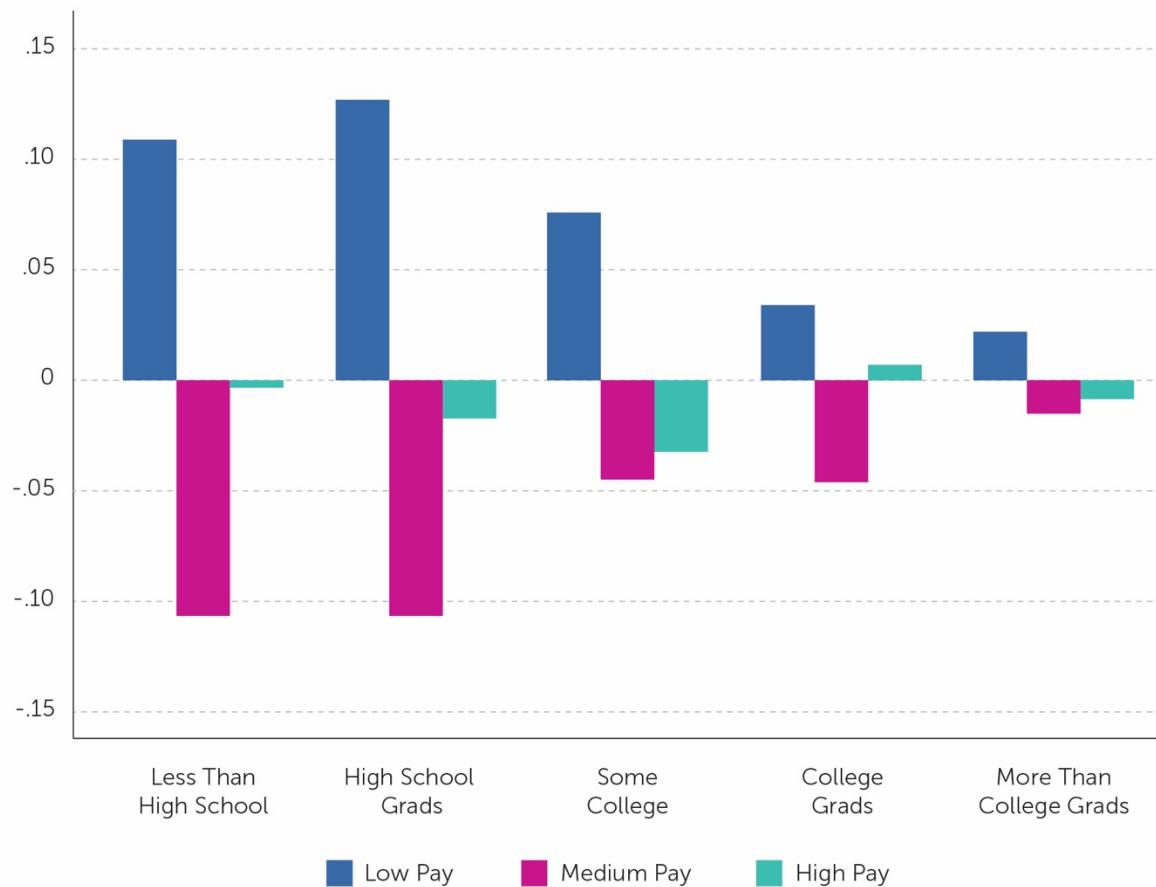


Figure is constructed using U.S. Census of Population data for 1980 and pooled American Community Survey (ACS) data for years 2014 through 2016. Each bar represents the contrast between the change in occupational employment shares (in percentage points) between 1980 and 2015 among the indicated educational group residing in the top quartile of most-urban labor markets versus the bottom quartile of least-urban labor markets.

## References

- Aaronson, Daniel (2001). "Price Pass-Through and the Minimum Wage." *The Review of Economics and Statistics* 83.1, pp. 158–169.
- Acemoglu, Daron and Pascual Restrepo (2020). "Robots and Jobs: Evidence from US Labor Markets." *Journal of Political Economy* 128.6, pp. 2188–2244.
- Akerman, Anders, Ingvil Gaarder, and Magne Mogstad (2015). "The Skill Complementarity of Broadband Internet." *Quarterly Journal of Economics* 130.4, pp. 1781–1824.
- Alabdulkareem, Ahmad, Morgan Frank, Lijun Sun, Bedoor AlShebli, César Hidalgo, and Iyad Rahwan (2018). "Unpacking the Polarization of Workplace Skills." *Science Advances* 4.7, eaao6030.
- Altig, David, Jose Maria Barrero, Nick Bloom, Steven J. Davis, Brent Meyer, Emil Mihaylov, and Nick Parker (2020). "Firms Expect Working from Home to Triple." Federal Reserve Bank of Atlanta Macroblog (blog), May 28.  
<https://www.frbatlanta.org/blogs/macroblog/2020/05/28/firms-expect-working-from-home-to-triple>
- Austin, Benjamin, Edward Glaeser, and Lawrence Summers (Spring 2018). "Jobs for the Heartland: Place-Based Policies in 21st-Century America." *Brookings Papers on Economic Activity*, pp. 151–255.
- Autor, David H. (Jan. 2013). "The 'Task Approach' to Labor Markets: An Overview." *Journal for Labour Market Research* 46.3, pp. 185–199.
- \_\_\_\_ (Aug. 2015). "Why Are There Still So Many Jobs? The History and Future of Workplace Automation." *Journal of Economic Perspectives* 29.3, pp. 3–30.
- \_\_\_\_ (May 2019). "Work of the Past, Work of the Future." *AEA Papers and Proceedings* 109, pp. 1–32.
- Autor, David H. and David Dorn (Aug. 2013). "The Growth of Low-Skill Service Jobs and the Polarization of the U.S. Labor Market." *American Economic Review* 103.5, pp. 1553–1597.
- Autor, David and Juliette Fournier (Jan. 2019). "No Country for Young Men: The Inversion of the Rural-Urban Age Gradient." MIT Working Paper.
- Autor, David H., David Dorn, and Gordon H. Hanson (Aug. 2016). "The China Shock: Learning from Labor-Market Adjustment to Large Changes in Trade." *Annual Review of Economics* 8.1, pp. 205–240.
- Autor, David H., Lawrence F. Katz, and Melissa S. Kearney (May 2006). "The Polarization of the U.S. Labor Market." *American Economic Review Papers and Proceedings* 96.2, pp. 189–194.
- \_\_\_\_ (May 2008). "Trends in U.S. Wage Inequality: Revising the Revisionists." *Review of*

- Economics and Statistics* 90.2, pp. 300–323.
- Baum-Snow, Nathaniel, Matthew Freedman, and Ronni Pavan (Oct. 2018). "Why Has Urban Inequality Increased?" *American Economic Journal: Applied Economics* 10.4, pp. 1–42.
- Bergman, Peter, Raj Chetty, Stefanie DeLuca, Nathaniel Hendren, Lawrence F. Katz, and Christopher Palmer (Aug. 2019). "Creating Moves to Opportunity: Experimental Evidence on Barriers to Neighborhood Choice." NBER Working Paper No. 26164.
- Berry, Christopher R. and Edward L. Glaeser (2005). "The Divergence of Human Capital Levels Across Cities." *Papers in Regional Science* 84.3, pp. 407–444.
- Cengiz, Doruk, Arindrajit Dube, Attila Lindner, and Ben Zipperer (Aug. 2019). "The Effect of Minimum Wages on Low-Wage Jobs." *The Quarterly Journal of Economics* 134.3, pp. 1405–1454.
- Chetty, Raj and Nathaniel Hendren (July 2018). "The Impacts of Neighborhoods on Intergenerational Mobility I: Childhood Exposure Effects." *The Quarterly Journal of Economics* 133.3, pp. 1107–1162.
- Chetty, Raj, Nathaniel Hendren, Maggie R. Jones, and Sonya R. Porter (May 2020). "Race and Economic Opportunity in the United States: An Intergenerational Perspective." *The Quarterly Journal of Economics* 135.2, pp. 711–783.
- Chetty, Raj, Nathaniel Hendren, and Lawrence F. Katz (April 2016). "The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment." *American Economic Review* 106.4, pp. 855–902.
- Congressional Budget Office, Congress of the United States (July 2019). "The Effects on Employment and Family Income of Increasing the Federal Minimum Wage." Publication No. 55410.
- Costa, Dora L. and Matthew E. Kahn (Nov. 2000). "Power Couples: Changes in the Locational Choice of the College Educated, 1940–1990." *The Quarterly Journal of Economics* 115.4, pp. 1287–1315.
- Derenoncourt, Ellora (Jan. 2019). "Can You Move to Opportunity? Evidence from the Great Migration." Princeton University Working Paper.
- Diamond, Rebecca (March 2016). "The Determinants and Welfare Implications of US Workers' Diverging Location Choices by Skill: 1980–2000." *American Economic Review* 106.3, pp. 479–524.
- Dorn, David (2009). "Essays on Inequality, Spatial Interaction, and the Demand for Skills." PhD thesis. University of St. Gallen. url: [https://www.ddorn.net/data/Dorn\\_Thesis\\_Appendix.pdf](https://www.ddorn.net/data/Dorn_Thesis_Appendix.pdf)
- Dube, Arindrajit and Attila Lindner (2020). "City Limits: What Do Local-Area Minimum Wages Do?" *Journal of Economic Perspectives* forthcoming.

- Dustmann, Christian, Attila Lindner, Uta Schönberg, Matthias Umkehrer, and Philipp vom Berge (2020). "Reallocation Effects of the Minimum Wage." *CReAM Discussion Paper* (CDP 07/20), p. 60.
- Florida, Richard L. (2002). *The Rise of the Creative Class*. New York: Basic Books.
- Ganong, Peter and Daniel Shoag (Oct. 2017). "Why Has Regional Income Convergence in the U.S. Declined?" *Journal of Urban Economics* 102, pp. 76–90.
- Glaeser, Edward (2011). *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier*. New York: Penguin Books.
- Glaeser, Edward L. (March 2020). *Urbanization and Its Discontents*. NBER Working Paper 26839.
- Glaeser, Edward L. and Joshua D. Gottlieb (Dec. 2009). "The Wealth of Cities: Agglomeration Economies and Spatial Equilibrium in the United States." *Journal of Economic Literature* 47.4, pp. 983–1028.
- Glaeser, Edward L., Joseph Gyourko, and Raven E. Saks (2005). "Why Have Housing Prices Gone Up?" *American Economic Review* 95.2, pp. 329–333.
- Glaeser, Edward L. and David C. Maré (2001). "Cities and Skills." *Journal of Labor Economics* 19.2, pp. 316–342.
- Glaeser, Edward L. and Matthew G. Resseger (Feb. 2010). "The Complementarity Between Cities and Skills." *Journal of Regional Science* 50.1, pp. 221–244.
- Goos, Maarten and Alan Manning (Feb. 2007). "Lousy and Lovely Jobs: The Rising Polarization of Work in Britain." *Review of Economics and Statistics* 89.1, pp. 118–133.
- Goos, Maarten, Alan Manning, and Anna Salomons (Aug. 2014). "Explaining Job Polarization: Routine-Biased Technological Change and Offshoring." *American Economic Review* 104.8, pp. 2509–2526.
- Hoxie, Philip, Daniel Shoag, and Stan Veugel (Dec. 2019). "Moving to Density: Half a Century of Housing Costs and Wage Premia from Queens to King Salmon." AEI Economics Working Paper No. 2019-24.
- Hsieh, Chang-Tai and Enrico Moretti (April 2019). "Housing Constraints and Spatial Misallocation." *American Economic Journal: Macroeconomics* 11.2, pp. 1–39.
- Ludwig, Jens, Greg J. Duncan, Lisa A. Gennetian, Lawrence F. Katz, Ronald C. Kessler, Jeffrey R. Kling, and Lisa Sanbonmatsu (May 2013). "Long-Term Neighborhood Effects on Low-Income Families: Evidence from Moving to Opportunity." *American Economic Review* 103.3, pp. 226–231.
- Mazzolari, Francesca and Giuseppe Ragusa (2013). "Spillovers from High-Skill Consumption to Low-Skill Labor Markets." *Review of Economics and Statistics* 95.1, pp. 74–

86.

Michaels, Guy, Ashwini Natraj, and John Van Reenen (April 2013). "Has ICT Polarized Skill Demand? Evidence from Eleven Countries over 25 Years." *Review of Economics and Statistics* 96.1. pp. 60–77.

Moretti, Enrico (2004). "Estimating the Social Return to Higher Education: Evidence from Longitudinal and Repeated Cross-Sectional Data." *Journal of Econometrics* 121.1, pp. 175–212.

\_\_\_\_ (2012). *The New Geography of Jobs*. Boston: Houghton Mifflin Harcourt.

\_\_\_\_ (2013). "Real Wage Inequality." *American Economic Journal: Applied Economics* 5.1, pp. 65–103.

\_\_\_\_ (2015). "Are Cities the New Growth Escalator?" *The Urban Imperative: Towards Competitive Cities*. Ed. by Edward L. Glaeser and Abha Joshi-Ghani. New Delhi, India: Oxford University Press, pp. 116–148.

Ruggles, Steven, Sarah Flood, Ronald Goeken, Josiah Grover, Erin Meyer, Jose Pacas, and Matthew Sobek (2018). *IPUMS USA: Version 8.0*.

U.S. Bureau of Labor Statistics (2018). "Chapter 17. The Consumer Price Index." *BLS Handbook of Methods*. Washington, D.C.: U.S. Bureau of Labor Statistics: Office of Publications & Special Studies. url: <https://www.bls.gov/opub/hom/>.

## ENDNOTES

<sup>1</sup> Two important exceptions to this generalization are the insightful papers by Ganong and Shoag (2017) and Hoxie, Shoag, and Veuger (2019).

<sup>2</sup> Building on work reported in David Autor (2019), this research brief adds a race, ethnicity, and gender dimension to the analysis that was absent from earlier work and, additionally, considers the role of local living costs in affecting real wage levels.

<sup>3</sup> An extensive economic literature, reviewed by Glaeser and Gottlieb (2009), studies the forces that potentially make workers more productive in cities.

<sup>4</sup> On the role of automation and trade in reducing employment in production, administrative, and clerical work, see Autor (2015) and Autor, Dorn, and Hanson (2016).

<sup>5</sup> It has long been understood that cities and skills are deeply entwined (Glaeser and Maré, 2001; Florida, 2002). And, to be sure, I am not the first to study differential polarization across places (cf. Autor, 2013; Mazzolini and Ragusa, 2013; Akerman, Gaarder, and Mogstad, 2015). The goal of this research brief is to demonstrate the centrality of geography to both the prevalence of middle-skill jobs in earlier decades and their steep decline in recent decades.

<sup>6</sup> Of course, non-college workers in both urban and non-urban labor markets performed traditionally low-education, low-wage manual labor, transportation, construction, and in-person

service jobs. Distinctively, many non-college workers in urban labor markets held middle-skill jobs.

<sup>7</sup> Cengiz et al. (2019) find that binding minimum wages do tend to reduce employment in traded industries, such as manufacturing, which is logical since these sectors face direct overseas competition. However, most low-wage urban jobs are in non-tradable services (e.g., food service, cleaning, security, personal care, construction, transportation, maintenance, and repair), where the possibility of import substitution is not relevant.

<sup>8</sup> An influential literature identifies neighborhoods that foster positive adult outcomes relative to family circumstances among children who grow up in these locations (Chetty and Hendren, 2018; Chetty et al., 2020). This body of work does not directly consider contemporaneous earnings of adults working in those locations, nor does it explore how working conditions in these locations have evolved in the intervening years between child-rearing of now-adult children and the present.

<sup>9</sup> This figure, and those that follow, is constructed using U.S. Census of Population data for 1980, 1990, and 2000, and pooled American Community Survey (ACS) data for years 2014 through 2016, sourced from IPUMS (Ruggles et al., 2018). Samples include working-age adults ages 16–64 excluding those in the military. Occupational classifications are harmonized across decades using the classification scheme developed by Dorn (2009).

<sup>10</sup> Plotted bars correspond to the proportional change in the share of employment in each category; smaller categories can have large growth rates without accounting for a large change in employment and vice versa for larger categories.

<sup>11</sup> Between 1980 and 2015, the share of working-age adults with a college degree rose from less than 30 to more than 40 percent in the densest CZs. In the least urban CZs, this increase was on the order of 5 percentage points (Autor, 2019).

<sup>12</sup> In each panel, I subtract the overall working-age mean share of employment in the relevant occupational category in 1980, so the plotted points correspond to the CZ's share of employment in the occupational cluster relative to the aggregate mean share in that cluster in 1980.

<sup>13</sup> I measure the rural-urban continuum by arraying CZs according to population density, meaning adults per land area. I apply a log scale so that unit increments denote proportional increases. I use each CZ's population density in 1980 as the x-axis variable for all decades so that CZs are consistently ranked over time. This choice is innocuous, however, since the ranking of CZs by population density is highly stable across decades.

<sup>14</sup> Alabdulkareem et al. (2018) document that small U.S. cities are substantially less specialized in hard-to-automate professional, managerial, and technical occupations than are larger cities and thus face greater potential impacts from automation.

<sup>15</sup> In Autor (2019), I document that this pattern was even more pronounced in the 1970s. My focus on this research brief is on 1980 forward because it is more relevant to current policy.

<sup>16</sup> It may seem counterintuitive that the overall low-pay share of employment is more or less constant even while the low-pay share among non-college workers is rising. The resolution is that college workers are much less likely than non-college workers to work in low-skill occupations at all times, and the fraction of college versus non-college workers is rising.

<sup>17</sup> To be clear, medium-paying jobs remain, but they are no longer overrepresented in cities.

<sup>18</sup> There was almost no change in the allocation of college degree-holders among low-, medium-, and high-paying occupations, either over time or across geographies (see panel A of Figure 5).

<sup>19</sup> Formally, I contrast changes in occupational structure between labor markets with the highest versus lowest quartile of population density. Quartiles are constructed by ranking CZs by their 1980 population density, then dividing CZs into four density quartiles, each containing approximately one-fourth of the 1980 working-age population.

<sup>20</sup> As a further check on these conclusions, Figure A1 in the Appendix reports analogous polarization plots, contrasting urban versus non-urban labor markets, for workers subdivided into five detailed education categories: less than high school; high school graduate, no college; some college; four-year degree; post-college education. While urban occupational polarization is detectable among all education groups, it is concentrated among the least educated. Among workers with high school or lower education levels, there is over a 10 percentage point fall in middle-skill employment accompanied by over an 11 point rise in low-skill employment. Among workers with some college, the decline in the middle is on the order of 5 points, and the rise in the lower tail is approximately 7 points. Among workers with college or post-college education, the decline in middle-skill employment and the rise in low-skill employment are both 4 or fewer points.

<sup>21</sup> The declining non-college urban wage premium was first reported by Baum-Snow, Freedman, and Pavan (2018) in their study of the causes of rising urban wage inequality between 1980 and 2007.

<sup>22</sup> Specifically, the occupational employment share variable for a demographic group is the urban-rural relative change in its share in high-paying occupations minus the urban-rural relative change in its share in low-paying occupations. Thus, a demographic group that lost 10 points in medium-paying occupations, gained 3 points in high-paying occupation, and gained 7 points in low-paying occupations would receive an occupational change value of  $-4 = 3 - 7$ .

<sup>23</sup> BLS has calculated consistent price index data for multiple decades for approximately two-dozen major metropolitan areas.

<sup>24</sup> An active economics literature debates whether after accounting for improving urban amenities, changes in inflation-adjusted wage levels in high-wage U.S. cities under- or over-state real earnings growth among college-educated residents of these cities in this time period (see Moretti, 2013 and Diamond, 2016). There is no debate in this literature, however, that real wage growth among non-college workers in these same locations is reduced by rising living costs.

<sup>25</sup> Ganong and Shoag (2017) estimate that the lowest-income households in a typical city spend approximately 32 percent of income on housing versus 15 percent among the highest-income households.

<sup>26</sup> This is visible in panel B of Figure 5, which shows that the growth of non-college employment in low-paying occupations has been disproportionate in the densest urban areas. In these cities, non-college employment in low-paying occupations has gone from being substantially less prevalent than average in 1980 to substantially more prevalent than average in 2015.