

Understanding Gentrification's Causes

What do three centuries of Philadelphia history tell us about today's changing neighborhoods?

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Recent gentrification in central city U.S. neighborhoods has generated controversy and increased interest from policymakers, researchers, and the public regarding the consequences of neighborhood change. In gentrifying areas, some residents raise concerns about rising rents and changing demographics, while others may welcome the increased property values and new neighborhood amenities that accompany gentrification. In response, policymakers have acted to both stem and accelerate the pace of neighborhood change. But while press accounts and studies of gentrification's effects have stirred public interest, less attention has been focused on its causes. Although much remains to be learned, our understanding of what triggers neighborhood transformation is improving.

History shows that neighborhoods decline and rebound more frequently than is generally realized. It also suggests that past transformations and the current wave of gentrification stem from shifts in four fundamental factors: amenities, productivity, access, and prices. Over long spans of time, changes in people's tastes, in what and how businesses produce, and in transportation technology have interacted with changes in certain key characteristics of neighborhoods to generate changes in the socioeconomic structure of our cities. Recognizing these influences may help decision-makers anticipate shifts in the socioeconomic status of residential areas and respond with more effective policies. In this article, I trace how these factors have reshaped neighborhoods and even entire metropolitan areas by looking back in time at America's original big city, Philadelphia.

Recent and historical neighborhood change

Since 2000, a growing number of downtown neighborhoods across the U.S. have gentrified.¹ The term gentrification has many meanings. In this article, I use it to refer to increased investment and an influx of residents of higher socioeconomic status into a lower socioeconomic status neighborhood. The increased socioeconomic status of U.S. downtowns today is a reversal of the

trend in the early to mid-20th century, during which white, higher-income households left central neighborhoods for the suburbs. Gentrification today is also happening more broadly and more quickly compared with the gentrification of isolated cities and neighborhoods that occurred in the 1970s and 1980s, a period of overall central city decline.²

Despite these distinctions, recent gentrification resembles earlier periods of rapid neighborhood change in at least two ways. One, history shows changes in neighborhood status are quite common. The likelihood that the relative status of a neighborhood will decline or rebound hasn't increased over several decades. And two, neighborhoods tend to move back toward the average over time: High-status neighborhoods decline, while low-status neighborhoods improve.

To observe the first phenomenon, we need a way to measure neighborhood status. Note that the idea is to determine an area's relative status among other areas in the same metro area. In this way, we can see how often a community moves up and down in the ranking order over time. To show this, I summarize data from decennial U.S. censuses and the American Community Survey to describe how neighborhoods have changed over 10-year periods. For each decade, I measure a neighborhood's status as the percentile rank of its average household income compared with all other neighborhoods in that metropolitan area.³ A neighborhood's percentile rank is always between 0 and 1. For example, in the Philadelphia metropolitan area, a portion of Gladwyne had a measured percentile rank of 0.998 in 2010, meaning that Gladwyne's average household income was higher than in 99.8 percent of Philadelphia metropolitan area neighborhoods. Now I can measure the change in a neighborhood's status by computing the change in its percentile rank in each decade.

But remember that we want to know the likelihood of neighborhood status changes for the whole metro area. For that, I need to compute the average absolute value of change in neighborhood percentile rank that takes into account both

neighborhood decline and improvement. Otherwise, if I were to use positive and negative changes, the average would always be zero, since one neighborhood's gain relative to other neighborhoods in the metropolitan area must mean another neighborhood's decline. For both the Philadelphia metropolitan area and the average across U.S. metropolitan areas in recent decades, neighborhood change did not become more likely (Figure 1).

The historical precedent of striking neighborhood change is more evident when we examine longer time horizons. Using long-run data from a smaller number of metropolitan areas, over the 60 years between 1950 and 2010, the average U.S. neighborhood moved a full quartile, or 25 percentile points (Figure 2).⁴

Now let's examine the second feature shared by recent and historical neighborhood change: mean reversion—that is, the tendency for above-average neighborhoods to decline and for below-average neighborhoods to improve. Though some neighborhoods stay rich or poor, it's relatively common for neighborhoods to go in and out of fashion. For example, Society Hill, a neighborhood dating to the 1680s bordering Philadelphia's Old City historic district, experienced decline

FIGURE 1
Consistent Likelihood of Change in Neighborhood Status

Average absolute change in percentile rank within metropolitan areas over recent 10-year periods, percentile points.

	All U.S. metros	Philadelphia metro
1980s	0.09	0.07
1990s	0.09	0.06
2000s	0.09	0.07

Sources: Census Bureau and author's calculations.

Note: The U.S. average is computed across 378 metropolitan areas totaling about 260 million people in 2010.

between 1880 and 1950, followed by a dramatic reversal in the 1960s in the midst of urban renewal programs (Figure 3).⁵ About five miles northwest of Society Hill, the city's Strawberry Mansion neighborhood had initially been wealthy in the 19th century but experienced a prolonged decline in the 20th century that persists today.

Neighborhoods' continual reversion toward the average status becomes visible when we track the change in neighborhoods' percentile rank over the course

FIGURE 2
Large Shifts More Evident Over Longer Periods

Average absolute change in percentile rank within metropolitan areas over 60-year periods, percentile points.

	All U.S. metros	10 U.S. metros	Philadelphia metro
1930–1990	0.27	0.27	N/A
1940–2000	0.28	0.29	0.26
1950–2010	0.25	0.25	0.30

Sources: Census Bureau and author's calculations.

Note: The 10 U.S. metro average holds fixed the sample of metro areas determined by the data available in 1930. Philadelphia neighborhood data are not available for 1930.

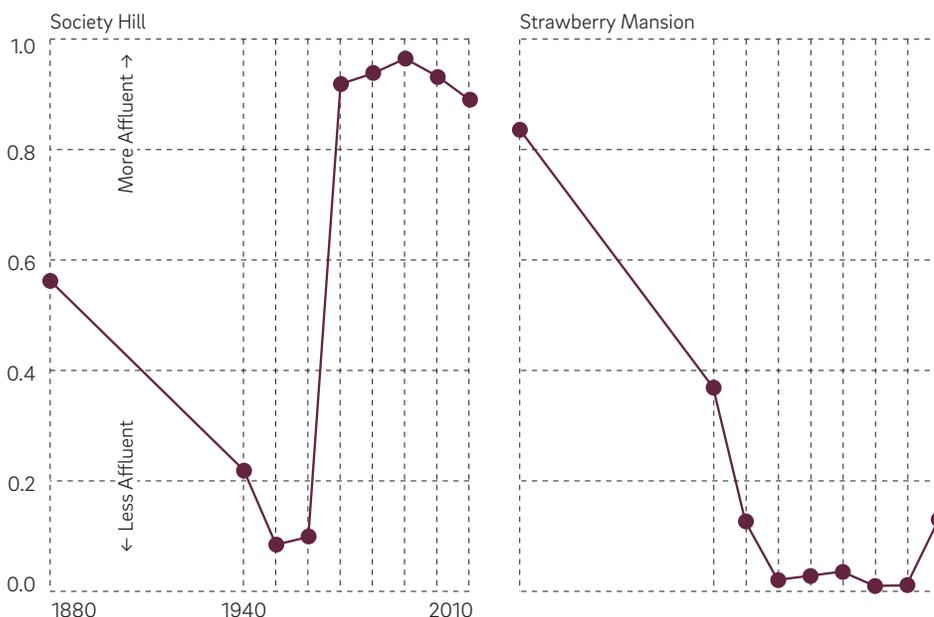
of a century. Figure 4 summarizes how much neighborhoods with different initial statuses changed over 10-year intervals. Each point represents a neighborhood's rank in an initial year (horizontal axis) and 10 years later (vertical axis). On average, as shown by the dark solid line, the bottom-ranked neighborhood (0.0 on the horizontal axis) increased in status to the 10th percentile 10 years later (0.1 on the vertical axis). In contrast, a neighborhood initially at the median status (0.5) experienced, on average, no change in status. Overall, neighborhoods ranked below the 50th percentile at the start of a 10-year period tended to increase in rank over the 10 years, while neighborhoods that started out above the 50th percentile tended to decline.⁶

The segmented pink line traces the evolution of Society Hill's relative status between 1940 and 2010: For instance, the point labeled 1950 shows its rank in 1950 compared with its rank in 1940. Society Hill's reversal in the 1960s is clearly visible. While such dramatic transitions are relatively rare, they contribute to the overall pattern of neighborhood mean reversion.

Overall, these historical patterns—both the frequency of dramatic neighborhood change and the tendency for neighborhoods to mean revert—echo previous research, including Stuart Rosenthal's analysis of Philadelphia neighborhoods between 1900 and 2000. So why isn't the commonplace nature of neighborhood change more widely appreciated among households and policymakers? Rosenthal

FIGURE 3
Neighborhoods Go In and Out of Fashion

Neighborhood income status for census tracts 10.01 in Society Hill and 151.01 in Strawberry Mansion, 1880–2010.



Sources: Census Bureau and author's calculations.

notes that “possibly this is because most families remain in their homes (and neighborhoods) far less than ten years, a horizon too brief for the change in neighborhood economic status to be readily apparent.”⁷ Intriguingly, the commonplace nature of dramatic neighborhood change hints that recent gentrification and historical neighborhood change may share common causes.

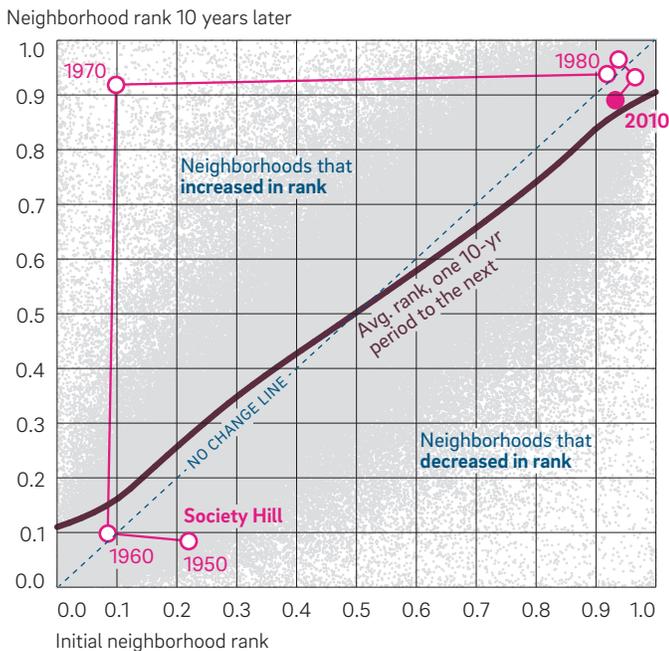
What causes neighborhood change?

Given how often neighborhoods change, we have to wonder: Why do they change? One starting point is to categorize neighborhood features that may affect the socioeconomic status of its households and the types of activities found there into four types: amenities, productivity, access, and prices. Then we can understand changes in neighborhood status via changes in one or more of these four factors.

First, an amenity is a feature of a neighborhood that some household is willing to pay for in order to enjoy—for example, a good school, a view of the ocean, or a wide variety of restaurants all increase the amenity value of a neighborhood. Households’ demand for a neighborhood amenity may depend in part on economywide factors. For example, the entry of the millennial generation into their 20s—larger in size and more highly educated than the baby boom generation—is thought by some to have contributed to the recent revitalization of dense urban neighborhoods.⁸

Second, workers may be more productive in certain neighborhoods compared with others. For example, a deep seaport may

FIGURE 4
Lower-Ranked Areas Tend to Rise and Vice Versa
Mean reversion in neighborhood income status, 1910–2010.



Sources: Census Bureau and author’s calculations.

Note: The pink segmented line shows status changes over time for census tract 10.01 in Society Hill.

increase the productivity of the local transportation sector in coastal neighborhoods. At one time, waterfalls provided power for early manufacturing. Likewise, a high density of customers may enable a provider of business services to economize on transportation costs and thus increase productivity. Over time, the kinds of products and services produced in Philadelphia have depended on the city’s comparative advantage at the time, and the location of their production has depended on the comparative advantages of its neighborhoods.

Third, households and businesses do not just consume and produce in their own neighborhoods; they require access to products and customers located elsewhere. Successive improvements in transportation technology, from horses to electricity to internal combustion, have changed the relative accessibility of central versus outlying neighborhoods. In addition, investments in transportation infrastructure such as rails, highways, and mass transit have favored certain neighborhoods over others.

Finally, if all else is equal, households choose houses with lower prices. While economists believe that the prices of land and houses generally reflect the attributes of the house or the neighborhood, there may be factors that temporarily create attractive pricing conditions in certain locations. One key example of this mechanism stems from the durability of houses. High-income households tend to choose neighborhoods with newer housing. Because houses last a long time, the location of these neighborhoods varies over a city’s history. Because cities grow outward from their centers, new houses are typically built in outlying areas. As houses reach the end of their useful life, their deterioration attracts redevelopment. Echoing earlier work by Neil Smith, the article by Jan Brueckner and Rosenthal highlights the timing of the replacement of old homes as an important factor in determining when and which neighborhoods are likely to gentrify.

Changes in even one of these four factors can be enough to transform a neighborhood. These changes may be driven by broader changes in the economy that affect neighborhoods differently according to their initial endowments. For example, generally rising incomes may shift demand toward larger houses or restaurant variety, favoring certain neighborhoods with abundant supplies. Or a change favoring home ownership over renting, perhaps stemming from demographic shifts or policy changes, might tilt demand away from city apartment lifestyles. New technologies might favor producers in new locations (manufacturers near waterfalls) versus old ones (traders near ports). Alternatively, the stock of neighborhood assets may change over time, as with the deterministic aging of structures or neighborhood-specific investments in local infrastructure or place-targeted policies.

A final consideration in examining how these four factors trigger neighborhood change is that shifts in one or more of them might set in motion either a “virtuous” or a “vicious” cycle that reinforces and amplifies the initial factor. For example, a small initial improvement in neighborhood amenity value—say, the opening of a supermarket—may attract more residents, encouraging new restaurants to open, further improving neighborhood amenities, and attracting residents of higher means. On the flip side, a deteriorating house may lower the value of nearby

houses, causing residents to flee, further lowering demand for housing in the neighborhood, and causing its amenities to decline. One implication of such endogenous, or internally generated, reinforcement is that the initial shift in an underlying factor need not be large to dramatically change a neighborhood.

Evidence on the Causes from Philadelphia's History

The history of Philadelphia illustrates how evolving technologies, tastes, and fixed neighborhood factors have shaped changes in neighborhood status and the internal structure of the overall city and metropolitan area by affecting the four key factors of amenities, productivity, access, and prices.

In Philadelphia's early history, productivity and access played major roles in shaping neighborhoods. Around 1750, Philadelphia emerged as an important trading center and the largest city in British North America.⁹ In his contribution to *Philadelphia: A 300-Year History*, Theodore Thayer notes that given the importance of trade, early industrial activity had concentrated near the banks of the Delaware River and in the vicinity of the shipyards. Shipbuilding and related activities, such as blacksmith shops and foundries, were joined by tanneries, distilleries, breweries, carriage shops, and other industries that often relied on imported inputs.¹⁰

In that era, Philadelphia was also America's financial capital. Banks were clustered on lower Chestnut Street, just blocks from the trade that had attracted capital and had inspired many local financial innovations such as marine insurance.¹¹ As transportation options were limited, almost all Philadelphia residents and workers lived within three or four blocks of the Delaware River.¹² That's not to say that amenities did not matter—the very affluent, such as William Penn's early patrons, sometimes had bucolic estates far outside the city limits. But in the burgeoning city, even the rich lived near the Delaware, though they often chose larger plots overlooking the river.¹³ Overall, the spatial structure of 18th century Philadelphia was largely determined by the importance of the port for trade, which led to the concentration of industry along the Delaware River, and the high cost of travel, which led to the concentration of workers, even high-status ones, within a few blocks.

In the 19th century, several trends affecting neighborhood productivity, amenity, and access intersected to dramatically alter the spatial structure of the city (Figure 5). One, the city's economic lifeblood shifted from trade and finance to manufacturing. Two, the size and complexity of manufacturing establishments increased. Three, faster modes of transportation were developed. A brief look at the city's economic and social history shows how these trends interacted to transform neighborhoods.

By the 1820s, Philadelphia's early advantages in trade, commerce, and finance had lapsed in favor of New York.¹⁴ However, new entrepreneurs and investments soon made Philadelphia a manufacturing hub, which fueled Philadelphia's growth for nearly a century more. In terms of the spatial structure of the city, these shifts meant that employment shifted west from the Delaware waterfront toward Broad Street.¹⁵ Some manufacturers,

particularly of textiles, were attracted to Manayunk in order to take advantage of waterpower on the Schuylkill River. The growing size of factories and mills also pushed apart work and residence. According to one analysis, the share of Philadelphia's manufacturing workforce employed at small firms—defined as those with fewer than 26 employees—fell from over 40 percent to less than 20 percent between 1850 and 1880.¹⁶

This growing separation between work and home was reinforced by faster modes of transportation such as the omnibus and the streetcar. Artisans and skilled workers took advantage of new technologies such as the horse-drawn streetcar, introduced to Philadelphia in 1858, to live in the more amenable “streetcar suburbs” of West Philadelphia, Germantown, and Chestnut Hill. As an example of neighborhood transformation during the 19th century, between 1850 and 1860, in the northwest Philadelphia district encompassing Germantown, the proportion of households in the middle class increased from 13 percent to 27 percent, while the proportion of unskilled households decreased from 38 percent to 25 percent.¹⁷ In 1882, the opening of Broad Street Station allowed commuters from the affluent Main Line access to Center City, and commutes by high-status workers lengthened between 1850 and 1880.¹⁸ By moving to these early suburbs, higher-income residents could escape the disamenities of 19th century urban life, including periodic epidemics of influenza and yellow fever.¹⁹

By 1880, the highest-status neighborhoods had already shifted several kilometers away from downtown, as can be seen in Figure 6. Each line plotted provides a snapshot of relative neighborhood income at different distances from City Hall in six census years between 1880 and 2010.²⁰ As a group, the six snapshots illustrate the long-term status shift in favor of suburban neighborhoods as well as the small but notable shift after the turn of the 21st century back toward the central city. The decentralization of income and status that was perceptible by the late 19th century was of course a preview of the more dramatic suburbanization to come in the 20th century.

In the 20th century, amenities, productivity, and access all played major roles in shaping neighborhood status. Central Philadelphia's status declined markedly as high-income and middle-income households, usually white, left the city. Several factors contributed to these changes.

One, advances in transportation technology and infrastructure further decoupled the location of work and home. Car ownership became commonplace, and public investment in the Interstate Highway System further decreased commuting costs, increasing the access advantages of the suburbs. Nathaniel Baum-Snow has found that highways caused central city populations in the U.S. to decline by 25 percent between 1950 and 1990. Two, rising incomes also increased demand for amenities and space, again favoring suburban locations that could offer these features. Three, the de-urbanization of manufacturing employment, historically centered in the city, also eroded the position of central Philadelphia. Four, social and racial problems mounted in the city. Leah Boustan has found that the influx of African Americans into Northern cities such as Philadelphia prompted “white flight” to the suburbs. As Philadelphia was a longtime magnet for African American migrants, this

FIGURE 5

Westward Shift in 19th Century, Renewal in 20th

In the mid-19th century, commerce remained concentrated closer to the Delaware River, and covered wagons remained in use alongside trolleys, as seen in the photograph taken in 1870 of Walnut Street, looking west from Fourth Street (1). The importance of trade to Philadelphia's economy was still keeping activity near the port, which is also seen in the merchant signs for coal shipping, insurance, and rail. But by the late 19th century, activity had shifted several blocks west, and electric streetcars had become popular, as visible in the 1894 photograph of 12th and Market Streets (2). More than 70 years later, the Delaware waterfront experienced a resurgence as high-rises sprouted on the eastern edge of Society Hill, a neighborhood that dates from colonial times (3).

Photos: Photo 1 courtesy of Free Library of Philadelphia, Print and Picture Collection; photos 2 and 3 courtesy of PhillyHistory.org, a project of the Philadelphia Department of Records.

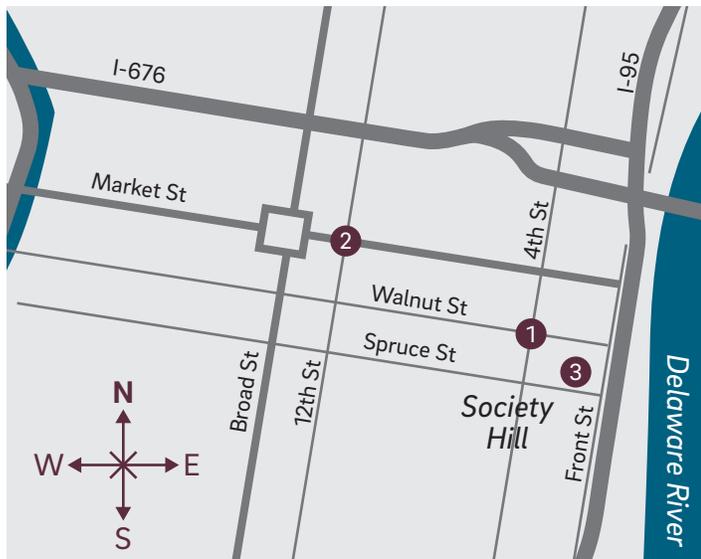


FIGURE 6

Late 19th Century a Precursor to the Mid-20th Century

Neighborhood income status by percentile ranks of census tracts in Philadelphia, by distance to city center for select years between 1880 and 2010.



Sources: Census data and author's calculations.

white flight may have played a large role in Philadelphia's evolution over the 20th century. One study found that riots in the 1960s drove down urban employment, incomes, and housing values, and by that study's classification, Philadelphia had several severe riots.²¹ Some of the urban renewal policies of the 1960s may also have eroded the amenity value of central Philadelphia.²² And poor public finance and city services have been identified as contributing to the erosion of quality of life in the city.²³

In the 1990s, incomes and population in central Philadelphia stopped declining, as they did in other big U.S. cities, and the population of higher-income households in Center City rebounded (Figure 6). Interestingly, the average improvement in percentile rank for a central Philadelphia neighborhood is similar in magnitude to the average absolute change in neighborhood status over the last several decades reported in Figure 1.

As in earlier periods, changes in amenity, productivity, and access values of downtown neighborhoods have contributed to the recent turnaround. One, aggregate shifts in employment toward education and health services have increased the comparative advantage of downtown neighborhoods. Because many of these institutions were located downtown historically, employment downtown has benefitted as these industries have grown, making nearby neighborhoods more attractive to these workers. Across all U.S. cities, similar shifts in the U.S. production structure since 1980 have tended to favor downtown neighborhoods.²⁴

Two, rising incomes overall and perhaps shifts in preferences among millennials have also attracted more highly educated households back to downtowns. Today's high-income and college-educated households appear to value urban consumption amenities—restaurants, theaters, etc.—more than these types of households did in earlier periods.²⁵ Higher incomes also raise the opportunity cost of commuting—in other words, an hour spent in traffic represents a greater loss of gainful productivity for a higher-wage commuter than it does for a lower-wage one. This cost may be another mechanism driving increased demand for

downtown living.²⁶

Three, urban amenities have also improved. One study suggests that the decline in central city crime played a role in recent gentrification.²⁷ Relative access values have changed, too: Reduced investment in new transportation infrastructure in recent decades has meant that, in the face of a growing population and increased congestion, the access advantages that suburban locations once provided has eroded. One theory holds that high-income households may have returned to downtown neighborhoods because the tradeoff between access and space has now become more favorable in downtown neighborhoods.²⁸

Finally, as the housing stock and other structures in certain neighborhoods aged, property prices there declined enough to make these areas attractive for redevelopment.²⁹ Policies such as the City of Philadelphia's property tax abatement have reinforced these pricing advantages. As a result, vacant lots and the old housing stock have been replaced with new, higher-priced apartments and condos.

Looking back across the centuries has made it plain that the four factors have not been equally important in driving ups and downs in the city's neighborhoods. Over Philadelphia's history and right up to today, access—whether by foot, horse, rail, or car—has consistently been an important factor shaping neighborhood dynamics. In contrast, productive factors such as waterpower have faded in importance compared with amenable characteristics such as bicycle paths and restaurants. Policy and the aging of the city's housing stock have also been important for understanding recent neighborhood change.

The Future

What does Philadelphia's future hold? The current geography of the metropolitan area is characterized by a downtown with a concentration of business services, high-income households, and a high quality of life; a transportation network centered on downtown; and relatively high home prices in downtown neighborhoods. But the region is also characterized by affluent neighborhoods in suburban locations and many high-productivity

service industries, such as pharmaceuticals and finance, located outside the city.

In the future, many factors might reshape this economic geography. Policy such as wage and business tax rates, particularly in the city of Philadelphia, will affect whether central areas will attract more high-paying jobs to follow the recent inflow of higher-income households. Automated transportation technologies such as self-driving cars and deliveries via drones may reduce the cost of commuting, turning the tide back toward more decentralization. But these technologies may also affect where different types of households choose to live in our region by, for instance, changing how people shop, reducing the need for parking, and changing leisure choices. The current revival of Center City could face other setbacks as well. The next generational wave of young adults may not value urban amenities so highly. Or the region's comparative advantage in "eds and meds" may fade in response to changes in policy or larger shifts in the structure of the economy.

The history of Philadelphia over three centuries reminds us that neighborhood change is constant and, to some extent, unavoidable. Intriguingly, some neighborhood development may be spontaneous, occurring without apparent external cause. Economists typically call these random, outside events exogenous shocks, but the authors of one novel study just call them "surprises." William Easterly and his coauthors track the ups and downs of a single New York City block over nearly 400 years and conclude that wider events that no one foresaw or likely could have influenced repeatedly swept into and out of the

block at random intervals, interacting with existing conditions there to unexpectedly alter its fortunes.

The Dutch did not expect New York to thrive when they gave the Greene Street block to slaves and then gave up New York altogether in favor of Suriname (Surprise 1). The affluent residents of the block in 1830–1850 did not expect brothels (Surprise 2). The brothel owners, workers, and customers in 1880 were likely surprised to see a thriving garment industry take over the block (Surprise 3). The garment industry did not expect the severe downturn after 1910 (Surprise 4). The urban planners in the 1940s and 1950s did not anticipate the block would explode in value again, first with art galleries (Surprise 5), and then with today's luxury retail stores and residences (Surprise 6). The block's story ends in the present at a high point in real estate value, but the history reminds us that the next surprise could be negative.

These researchers note that the essentially "leaderless" nature of development forces may argue against policies designed to support specific neighborhoods—often called place-based policies—in favor of social support aimed at individuals. But they also note that their study wasn't able to factor in the urban planning and policies such as good schools or modern infrastructure that can underpin the long-run growth of a city or region. Regardless of the nature and sources of these shocks, the common thread is the economic mechanisms through which these shocks transform neighborhoods: amenities, access, productivity, and prices. 

Notes

1 See the articles by Nate Baum-Snow and Daniel Hartley, Victor Couture and Jessie Handbury, and my article with Jackelyn Hwang.

2 There is substantial debate about whether gentrification leads to displacement, in which rising rents and taxes from increased investment could price lower-income residents out of their neighborhood. There are several challenges in determining whether displacement is occurring. For example, low-status neighborhoods have high rates of both in- and out-migration. When such neighborhoods gentrify, it is difficult to distinguish out-migrants who are displaced by higher-income in-migrants from out-migrants who would have left the neighborhood anyway, even without gentrification. Lance Freeman and Frank Braconi, Terra McKinnish and her coauthors, and Lei Ding and his coauthors discuss these issues in their articles.

3 I use consistent-boundary census tracts to define neighborhoods. Historical data are adjusted so that they reflect 2010 census tract boundaries. Alternative ways of measuring relative neighborhood status, including income, housing prices, and educational attainment yield similar rankings. Some later figures use average housing prices or average educational attainment to rank neighborhoods in early census years when income was not reported. For more details on these data and comparisons, see my paper with Sanghoon Lee.

4 While patterns of household sorting by income or status have undergone significant churn over time, the pattern of population density within cities has remained remarkably persistent, as documented recently in an *Economic Insights* article by Jeff Brinkman.

5 The American Planning Association summarizes Society Hill's evolution in its Great Places in America series, <https://www.planning.org/greatplaces/neighborhoods/2008/societyhill.htm>.

6 Some readers might object that the mean reversion in percentile ranks might be mechanically driven. That is, since percentile ranks are between 0 and 1, any change in the bottom-ranked neighborhood can only be up, and vice versa for the top-ranked neighborhood. For example, suppose the highest-status neighborhood experiences a large increase in income and the lowest-status neighborhood experiences a large decrease in income. Despite the divergence in incomes in this example, the percentile rankings would indicate no change in the relative status of the neighborhoods. Yet, interestingly, mean reversion emerges even when using the change in average household income as the measure of neighborhood change: Neighborhoods with higher initial incomes tend to decline more in average household income over the subsequent 10 years. This suggests that the use of percentile rankings to measure mean reversion is not driving these findings.

- 7** See p. 818 of Rosenthal's article.
- 8** See the paper by Dowell Myers.
- 9** The article by Joseph Gyourko discusses each phase of Philadelphia's growth.
- 10** See p. 75.
- 11** See the book by Robert E. Wright.
- 12** See the contribution on p. 14 by Mary Maples Dunn and Richard S. Dunn to *Philadelphia: A 300-Year History*.
- 13** See p. 34 of Edwin Bronner's chapter in *Philadelphia: A 300-Year History*.
- 14** Among other reasons, New York's superior natural harbor and the opening of the Erie Canal; the Napoleonic Wars which disrupted trade with continental Europe, an important market for Philadelphia; tighter links between New York and London; and the eventual lapse in the charter of the Second Bank of the United States are all cited as contributing to Philadelphia's decline (both Gyourko's article and Wright's book have more on these factors).
- 15** According to Alan Gin and Jon Sonstelie, by 1880, 45 percent of adult males worked within 1 mile of Broad and Market Streets.
- 16** See the analysis of the U.S. census of manufactures by Theodore Hershberg and his coauthors.
- 17** Kenneth Jackson's book documents this neighborhood transformation.
- 18** Hershberg and his coauthors document the growing commute times.
- 19** See the working paper by Patricia Beeson and Werner Troesken.
- 20** The year 1880 was the first for which neighborhood-level census information is available about residents' occupations and educational attainment.
- 21** See the work by William Collins and Robert Margo.
- 22** See the paper by William Collins and Katharine Shester.
- 23** Articles by Joseph Gyourko and Robert Inman highlight these factors.
- 24** See Baum-Snow and Hartley's 2016 work.
- 25** See Victor Couture and Jessie Handbury's paper.
- 26** See the paper by Lena Edlund and her coauthors.
- 27** See the work by Ingrid Ellen and her coauthors.
- 28** As Stephen LeRoy and Jon Sonstelie have theorized.
- 29** See the article by Brueckner and Rosenthal.

References

- Baum-Snow, Nathaniel, and Daniel Hartley. "Accounting for Central Neighborhood Change, 1980–2000," Federal Reserve Bank of Chicago Working Paper 2016–19 (2016).
- Beeson, Patricia E., and Werner Troesken. "When Bioterrorism Was No Big Deal," National Bureau of Economic Research Working Paper 12636 (October 2006).
- Boustan, Leah Platt. "Was Postwar Suburbanization 'White Flight'? Evidence from the Black Migration," *Quarterly Journal of Economics*, 125:1 (2010), pp. 417–443.
- Brinkman, Jeffrey. "Making Sense of Urban Patterns," Federal Reserve Bank of Philadelphia *Economic Insights* (First Quarter 2017).
- Bronner, Edwin B. "Village into Town, 1701–1746," in *Philadelphia: A 300-Year History*, Russell F. Weigley, ed. New York: W.W. Norton & Company (1982).
- Brueckner, Jan K., and Stuart S. Rosenthal. "Gentrification and Neighborhood Housing Cycles: Will America's Future Downtowns Be Rich?" *Review of Economics and Statistics*, 91:4 (November 2009), pp. 725–743.
- Collins, William J., and Robert A. Margo. "The Labor Market Effects of the 1960s Riots," *Brookings–Wharton Papers on Urban Affairs* (2004), pp. 1–46.
- Collins, William J., and Katharine L. Shester. "Slum Clearance and Urban Renewal in the United States," *American Economic Journal: Applied Economics*, 5:1 (2013) pp. 239–273.
- Couture, Victor, and Jessie Handbury. "Urban Revival in America, 2000 to 2010," working paper (2016).
- Ding, Lei, Jackelyn Hwang, and Eileen Divringi. "Gentrification and Residential Mobility in Philadelphia," *Regional Science and Urban Economics*, 61 (November 2016) pp. 38–51.

- Dunn, Mary Maples, and Richard S. Dunn. "The Founding, 1681–1701," in *Philadelphia: A 300-Year History*, Russell F. Weigley, ed. New York: W.W. Norton & Company (1982).
- Easterly, William, Laura Freschi, and Steven Pennings. "A Long History of a Short Block: Four Centuries of Development Surprises on a Single Stretch of a New York City Street," Development Research Institute Working Paper 97 (June 2016).
- Edlund, Lena, Cecilia Machado, and Maria Micaela Sviatchi. "Bright Minds, Big Rent: Gentrification and the Rising Returns to Skill," National Bureau of Economic Research Working Paper 21729 (2015).
- Ellen, Ingrid G., Keren Mertens Horn, and Davin Reed. "Has Falling Crime Invited Gentrification?" U.S. Census Bureau Center for Economic Studies Working Paper 17–27 (2017).
- Freeman, Lance, and Frank Braconi. "Gentrification and Displacement: New York City in the 1990s," *Journal of the American Planning Association*, 70:1 (2007), pp. 39–52.
- Hwang, Jackelyn, and Jeffrey Lin. "What Have We Learned About the Causes of Recent Gentrification?" *Cityscape: A Journal of Policy Development and Research*, 18:3 (November 2016) pp. 9–26.
- Gin, Alan, and Jon Sonstelie. "The Streetcar and Residential Location in Nineteenth Century Philadelphia," *Journal of Urban Economics*, 32 (1992) pp. 92–107.
- Gyourko, Joseph. "Looking Back to Look Forward: Learning from Philadelphia's 350 Years of Urban Development," Brookings-Wharton Papers on Urban Affairs, Gary Burtless and Janet Rothenberg Pack, eds. (2005).
- Hershberg, Theodore, Dale Light, Jr., Harold E. Cox, and Richard R. Greenfield. "The 'Journey-to-Work': An Empirical Investigation of Work, Residence, and Transportation, Philadelphia, 1850 and 1880," in *Philadelphia: Work, Space, Family, and Group Experience in the Nineteenth Century*, Theodore Hershberg, ed. New York: Oxford University Press (1981).
- Inman, Robert. "How to Have a Fiscal Crisis: Lessons from Philadelphia," *American Economic Review*, 85:2 (1995) pp. 378–383.
- Jackson, Kenneth T. *Crabgrass Frontier: The Suburbanization of the United States*, New York: Oxford University Press (1985).
- Lee, Sanghoon, and Jeffrey Lin. "Natural Amenities, Neighborhood Dynamics, and Persistence in the Spatial Distribution of Income," *Review of Economic Studies*, forthcoming (2017) <https://doi.org/10.1093/restud/rdx018>.
- LeRoy, Stephen F., and Jon Sonstelie. "Paradise Lost and Regained: Transportation Innovation, Income, and Residential Location," *Journal of Urban Economics*, 13 (1983) pp. 67–89.
- McKinnish, Terra, Randall Walsh, and T. Kirk White. "Who Gentrifies Low Income Neighborhoods?" *Journal of Urban Economics*, 67:2 (2010) pp. 180–193.
- Rosenthal, Stuart S. "Old Homes, Externalities, and Poor Neighborhoods: A Model of Urban Decline and Renewal," *Journal of Urban Economics*, 63:3 (2008) pp. 816–840.
- Smith, Neil. "Toward a Theory of Gentrification: A Back to the City Movement by Capital, Not People," *Journal of the American Planning Association*, 45:4 (October 1979), pp. 538–548.
- Thayer, Theodore. "Town Into City, 1746–1765," in *Philadelphia: A 300-Year History*, Russell F. Weigley, ed. New York: W.W. Norton & Company (1982).
- Wright, Robert E. *The First Wall Street: Chestnut Street, Philadelphia, and the Birth of American Finance*. Chicago: University of Chicago Press (2005).