

The Puzzling Persistence of Place

BY JEFFREY LIN

It's common for neighborhoods, cities, and regions to experience changes in fortune over time. Yet, many places exhibit intriguing persistence in their relative economic development. From ancient Japan to Roman and medieval Europe to the pre-Columbian Americas, age-old development patterns are strongly correlated with present-day geographic distributions of population and income. Such extreme spatial persistence may be relevant for urban policy today. Why haven't these urban patterns changed over decades, centuries, or even millennia? Is such persistence desirable? And what does persistence imply about the prospects for "place-making" policies aimed at generating development in or attracting it to particular locations?

Remarkable long-run persistence in the relative sizes and incomes of regions appears to be common. For example, in Latin America, the distribution of population before European exploration and conquest began in 1492 is strongly correlated with present-day distributions of population and income.¹ Similarly, the spatial distribution of economic activity in Europe today is strongly correlated with the location of trading routes and commercial centers in the 14th and 15th centuries.² As I will discuss, other studies have found similar persistence over centuries or even millennia in the U.S., Britain, Japan, and Africa.

By investigating such examples of persistence, economists have begun to understand and disentangle the various reasons why certain development patterns persist. And by comparing these examples with instances in which historical patterns didn't hold, we are beginning to understand the implications of spatial persistence, including whether it tends to be beneficial. Examining the factors behind persistence also allows us to better understand where place-making — also called place-based — policies are more likely to succeed in creating lasting improvements in the prosper-

ity of neighborhoods, cities, and regions. In this article, I explain how economists think about these factors, describe some real-world evidence, and discuss the implications for today's urban policy.

WHY PERSISTENCE? SOME THEORY

What factors could account for the remarkable long-run persistence of place? Such persistence is even more puzzling given economists' view that, over the very long run, households and businesses are mobile, meaning they are free to change location.³ What, then, might persuade so many families and firms to continue to choose the same place generation after generation? Economists have identified three kinds of factors — natural geography; human geography, or *agglomeration economies*; and the human geography of the past, or *sunk* factors.

Natural geographic advantages. First, natural features such as coastal harbors, defensible hills, and navigable rivers might have persistent value that attracts households and firms year after year. The value of such features may persist over centuries, resulting in persistent development patterns. Even if the value of some features changes over time due to changes in tastes and technology, people may find new value in the same old things. For example, natural harbors attracted trade and development in the early histories of many cities. Today, coastal proximity may matter more in attracting new residents and tourists, making it what economists call a natural *consumption amenity*. Similarly, hills may have historically provided military defensibility, while today they may be valued for the beautiful views and fresh air they provide. Economic

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geographers sometimes refer to these natural factors as *first nature* advantages or *locational fundamentals*.⁴

Human geography, or agglomeration economies.

Second, some places attract activity because proximity to other households and businesses is valuable. For example, by locating near suppliers and customers, businesses reduce the cost of transporting their goods. Households in a large city benefit from a greater variety of shops, restaurants, theaters, and other goods and services found in abundance in large metropolitan areas. Workers are more productive when they can observe and learn from others. These types of advantages are collectively called *agglomeration* economies, *economies of density*, or sometimes *second nature* advantages to distinguish them from the first nature advantages associated with natural geography.⁵ If agglomeration economies are strong, then the location choices of households and firms are unlikely to deviate from historical development patterns, implying persistence in the spatial distribution of activity. In other words, since there are benefits from locating near others, places with high concentrations of people will continue to attract economic activity.

The more valuable it is to locate near others, the more that patterns of development will depend on history.⁶ Conceivably, there might be many suitable sites for a given city. Which site actually is selected depends on seemingly small, random historical factors — a convenient place to haul cargo around river rapids might eventually develop into a major trading center, for example.⁷ When many locations seem capable of supporting an agglomeration of households and firms, economists say there may be *multiple equilibria* or *multiple steady states* in the location and sizes of cities. In this case, which sites actually get selected for cities depends on history, and patterns of development are path dependent.

One concern that path dependence raises is that somehow a city might get stuck in a “bad” equilibrium. That is, unbound by the vagaries of history, we (collectively) might have chosen a more advantageous site for a city today. For example, in the wake of Hurricane Katrina, New Orleans, once so well situated to trade, may be a poorly located city today.⁸ On the other hand, the problems of path dependence may be small. After all, the costs and missed opportunities from being stuck in a bad equilibrium must be less than the cost of moving people to a better location.⁹ Then again, considering what it would cost to try to relocate a whole city’s worth of families and businesses, a poorly located city could still mean that the costs of path dependence are large.

The human geography of the past, or sunk factors.

Third, some places are attractive not because of the contemporaneous benefits of being near other households and firms, but because there are benefits from durable capital left over from decades or centuries ago. This human geography of the past leaves both a built legacy in the form of bridges, railroads, houses, and other lasting features and an institutional legacy in the form of state and local boundaries, zoning codes, and other geopolitical features. Proximity to these factors can be valuable for a long time. Economists consider these prior durable investments *sunk* factors: Even if contemporary decision-makers might not see a benefit in constructing these factors anew, they are costly to replicate or move elsewhere and are therefore left in place. Households and firms continue to be attracted to towns and cities served by these physical and legal structures even long after the incentives that had prompted decision-makers to create them have lapsed. For example, imagine two declining Rust Belt towns connected by a bridge built during their heyday that still serves local residents and businesses, even though it wouldn’t make economic sense to build it today.

An especially important sunk, durable factor is housing. Since houses last a long time, old but still functional houses can provide another reason why households might continue to choose to live someplace, even if it offers few benefits from nature or agglomeration economies. Another important but less tangible factor is the role of institutions. At the local level, land demarcation and zoning are two important institutions that, once established, are difficult to reverse and can have persistent effects on the amount and type of economic activity across neighborhoods and cities.

EVIDENCE ON THE SOURCES OF PERSISTENCE

Economists have found examples of long-run persistence that are consistent with one or more of the three factors discussed above. Has any particular one been shown to be more important than the others when it comes to extreme persistence? Has any single factor exerted the strongest influence? One lesson from examining the literature is that these factors have all varied in importance, depending on the historical and geographic environment.

Natural advantages. There are several historical examples in which natural geography has been shown to contribute to persistence. In a particularly remarkable example, the distribution of population among Japanese cities today is strongly correlated with what the archaeological evidence shows for those areas in 6000 BCE. Despite heavy, random

bombings of Japanese cities, population growth and the location of industries both returned to their prewar trends shortly after World War II.¹⁰ These results support the view that natural features play an enduring role in shaping the economic geography of cities and regions.¹¹

Looking at the pattern of development across the United States as a whole, there is evidence to support the view that locational fundamentals contribute to persistence. U.S. economic activity is not only overwhelmingly concentrated in coastal areas but has become increasingly so over time, which suggests that this persistence is not due to obsolete historical factors.¹² In other words, access to oceans and rivers once conferred advantages to industry and commerce, but the reason why people and businesses hug the coasts today seems to have as much to do with the amenity value of beaches and views.

Surprisingly, economic activity can continue to flourish around natural features that no longer serve any economic purpose.

Looking within individual U.S. metropolitan areas, Sanghoon Lee and I examined the persistence of relative neighborhood incomes over 130 years. Based on residential location patterns from 1880 to 2010, we found that hills and coastal proximity are strongly correlated with income. More important, we found that in some cities, rich neighborhoods have remained rich and poor neighborhoods have stayed poor over time, while in other cities, neighborhoods have changed substantially in terms of relative income over the years. What could have caused such strong persistence within some cities but not others? The evidence suggests geography: In naturally flat, nearly featureless cities (think: Dallas or Atlanta), neighborhood incomes have tended to fluctuate over time. In contrast, in cities where neighborhoods vary a lot in terms of proximity to natural amenities (think: a coastal city like Los Angeles or a hilly city like Pittsburgh), the spatial distribution of income has changed little over decades or even a century. Our results also support the importance of natural amenities for persistence.

Agglomeration economies. Surprisingly, economic activity can continue to flourish around natural features that no longer serve any economic purpose. Since physical geography is no longer relevant, the persistence must

be related to subsequent human activities. Hoyt Bleakley and I document U.S. cities that have persisted at waterfalls and other obstacles to navigation — portages — that required water traffic to detour over land. Portage sites in past centuries attracted commerce and services, and falls provided waterpower for early manufacturing. Even though the historical, naturally derived advantage of these sites was made obsolete over a century ago by electrification and new transportation technologies such as rail and trucking, portage cities today are large relative to nonportage sites. This evidence suggests that nature is not necessary for explaining the persistence of cities. Instead, our evidence attributes the persistence of portage cities to strong agglomeration economies, or human geography.¹³

The neighborhoods of New York tell a similar story. Present-day incomes and prices in Manhattan neighborhoods are strongly correlated with the location of marshes around the time of the first European settlement.¹⁴ In the past, marshes were a natural disadvantage; poor drainage of these areas was associated with flooding and disease. But citywide improvements in drainage and sewerage made this initial natural disadvantage disappear. Even so, the historical pattern of income has persisted as poor amenities and public services have reinforced the existing distribution of income.

Nineteenth century England offers direct evidence that agglomeration economies can play a role in persistence. In contrast to the fast recovery of Japanese cities from wartime destruction, a large, temporary shock had persistent effects on English city sizes.¹⁵ Dramatic reductions in the supply of raw cotton to the British textile industry during the U.S. Civil War had a long-run impact on English towns where cotton textile production had been concentrated before the war. These towns experienced an increase in bankruptcies — especially among capital suppliers, such as machinery and metal-goods producers — and long-run declines in employment and population. How could a short-term setback in one industry translate into long-term diminished prospects for these towns? Suppliers that had depended on local cotton mills to buy their machinery were vulnerable and quick to fail when their customers cut back. But machinery suppliers that sold to wool mills were less affected. Subsequently, cotton towns were left without an important sector, even as it grew in importance in other towns. The reduced scale of metal and machinery suppliers, which left cotton towns without that future source of growth, is key to understand-

ing the persistent effects of a temporary shortage.

Sunk factors. Finally, there is evidence that historical investments in housing, transportation infrastructure, and institutions may also keep a location viable. Such durable, fixed features are costly to replicate elsewhere and can therefore explain persistence, even in the absence of natural advantages or current agglomeration economies.

Durable housing is an important reason why people might continue to live in a city, even in the absence of natural amenities or substantial benefits from agglomeration.¹⁶ Thus, a city's housing stock helps keep residents rooted there, even after a negative economic shock such as the decline of a regional industry. Only when a city's inventory of livable homes begins to shrink does its population start to fall. In the meantime, though, people remain in the city, because houses are cheaper there than elsewhere.¹⁷ Evidence on the role of durable housing in persistence is also found in the aftermath of the 1906 San Francisco earthquake and fires.¹⁸ Blocks in the burned-out areas were rebuilt at significantly higher densities than in neighboring areas that were undamaged by fire. Given the opportunity to start fresh, homeowners and developers decided that historical decisions no longer suited their current economic needs. But elsewhere, the durability of housing continued to be an important factor in persistent land use.

Many studies show persistent effects from transportation infrastructure on the spatial distribution of present-day economic activity.¹⁹ For instance, Swedish towns that had been connected to the country's nascent rail network grew faster and remain larger today.²⁰ In the U.S., rail investments in the 19th century had long-lasting effects on the distribution of population and urbanization and industrialization.²¹ Interestingly, even temporary railroads may permanently affect the spatial distribution of population. In Ghana, Kenya, and the rest of sub-Saharan Africa, cities and agricultural development continue to follow extinct rail lines.²² These patterns suggest that investments in transportation infrastructure may complement agglomeration benefits in generating persistence.

There is also growing evidence that local institutions can persistently affect the location of activity. Contrasting metes and bounds systems — in which property lines are dictated by rivers and other natural features and are therefore irregular — and rectangular systems — in which property lines are dictated by longitude and latitude — shows large initial benefits to land values from the latter system

that have persisted.²³ The rectangular system lowers enforcement, trading, and coordination costs in infrastructure investments such as roads and fences, affecting the location and size of economic activity even today.

Likewise, long-gone streetcar lines in Los Angeles have had permanent effects on the layout of cities.²⁴ Population density today is strongly correlated with the location of streetcar stops in the 1910s, and this correlation has been increasing over time. Historical streetcar lines also have been found to have strongly predicted the subsequent 1922 zoning designations (which were enacted after the streetcar

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lines were developed), which in turn continue to shape urban land use decisions today. These findings point to zoning as an institution that drives persistence in the spatial distribution of activity.²⁵

CONSEQUENCES OF PERSISTENCE

What are the consequences of extreme persistence in the geographic distribution of economic activity? Within cities, one reason to care about persistence in where people live is that a household's location may determine whether its members can enjoy certain local goods and services. For example, residents in some neighborhoods may be cut off from good schools, libraries, stores, or other amenities that are abundant and varied in higher-income neighborhoods. To the extent that residents of amenity-poor neighborhoods tend to eventually move to amenity-rich neighborhoods as their own fortunes improve, it may not matter as much if the same neighborhoods remain starting points for waves of low-income households. But households in poor neighborhoods are often less mobile — because of discrimination, family ties, or lack of means — so inequality in the standard of living from one neighborhood to the next might be exacerbated in cities where the neighborhood distribution of incomes is fixed. Unlike a city whose neighborhoods periodically undergo decline, gentrification, and influxes of

residents with different income levels, the residents of a city with a static income distribution may face more unequal access to amenities.

Some evidence suggests that persistence has important consequences for economic growth.²⁶ Recall that if the locations and sizes of cities are strongly history dependent, then they might get stuck in a bad equilibrium. For instance, the collapse of the Roman Empire interrupted urbanization in Britain but not in northwestern France. As urbanization recovered in medieval times, French towns were more likely than British towns to be found in their former Roman locations, a difference that persists to this day. Interestingly, new British towns were more likely to be founded near navigable waterways, in contrast to French towns that, stuck in the old Roman locations, were without such access. (The Roman city network was based primarily on military considerations.) As a result, the British urban network grew faster during the Middle Ages than French cities did. In other words, persistence in the location of French towns hampered growth in medieval France.

PERSISTENCE AND POLICY

Natural advantages, agglomeration economies, and sunk factors — alone or in combination — can explain all these remarkable historical examples of persistence. For example, to explain persistence in Japanese city sizes over eight millennia, it seems only natural to look to Japan's rugged and highly varied terrain. In contrast, across the U.S. Midwest and South, where the landscape is relatively smooth, agglomeration economies are the best explanation for 200 years of persistence in relative city sizes. And within a city, where the natural geography and agglomeration economies may not change much from one block to the next, local institutions such as zoning and parcel demarcation may

exert a century-long influence on the spatial organization of economic activity.

In considering place-making policies that attempt to create or attract economic activity to particular locations, one lesson from studying persistence is that policies that work against these three factors are unlikely to succeed. For example, airline hubs are characterized by large sunk costs and economies of scale.²⁷ Therefore, creating a new air hub from scratch requires overcoming the large advantages of existing hubs. Similarly, as my research with Lee suggests, in cities with great variation in their natural geography such as Los Angeles, policy is unlikely to improve the relative condition of neighborhoods with inferior natural amenities. In other words, an implausibly large investment would be needed to improve South Los Angeles to the level of Beverly Hills.

Policies that take full advantage of agglomeration economies or large sunk costs may be most effective in creating long-lasting change in neighborhoods and cities. For example, if certain kinds of economic activity would generate strong benefits for other businesses and households, then a nudge from policy to foster those activities may kick off a virtuous cycle, generating persistent effects. But enthusiasm about these policies must be tempered by recognizing the scale of intervention required. For instance, the creation of the Tennessee Valley Authority led to persistent gains in manufacturing in targeted counties, and research suggests that the importance of increasing returns to scale in manufacturing was crucial for effecting durable changes.²⁸ But the TVA's "nudge" was targeted to some of the most remote and rugged counties in the eastern U.S. Correspondingly, the TVA's success in achieving persistent effects in the face of these natural disadvantages hinged on the enormous outlays associated with "one of the most ambitious place-based economic development policies in the history of the United States."²⁹ ■

NOTES

¹ See William Maloney and Felipe Valencia Caicedo.

² See Fabian Wahl. Persistence in comparative development across subnational regions parallels that among countries over thousands of years. See Jared Diamond; Ola Olsson and Douglas Hibbs; Diego Comin, William Easterly, and Erick Gong; and Enrico Spolaore and Romain Wacziarg.

³ Of course, in reality, restrictions on immigration and housing have often impeded people's freedom of movement. But the examples of long-run persistence discussed in this article often go beyond these restrictions in both geographic breadth and time.

⁴ See Ellen Churchill Semple and William Cronon regarding first nature advantages, and Donald Davis and David Weinstein (2002) on locational fundamentals.

⁵ See my 2011 *Business Review* article and Jerry Carlino's 2001 and 2011 *Business Review* articles for more discussion of agglomeration economies.

⁶ See my 2012 *Business Review* article.

⁷ Paul Krugman's 1991 article also discusses how people's expectations might play a role in choosing the equilibrium location of cities.

⁸ See Ed Glaeser. In a different context, Nathan Nunn and Diego Puga argue that slavery raids in coastal Africa left economic activity concentrated in rugged areas, which today suffer economically from being difficult to reach.

⁹ See Jim Rauch.

¹⁰ In separate studies, Davis and Weinstein emphasize the role of locational fundamentals such as rivers and mountains in generating this persistence. They also examine city populations and the location of industries before and after World War II.

¹¹ See also studies of the effects of wartime destruction in Germany by Stephen Brakman, Harry Garretsen, and Marc Shramm; in Vietnam by Edward Miguel and Gérard Roland; and in Spain by David Cuberes and Rafael González-Val. My 2012 *Business Review* article also discusses these results. A limitation of wartime destruction studies is that things besides physical geography — especially institutions, sentimental attachments, and networks of family ties, friendships, and job connections — may have held constant during that time, despite the bombings.

¹² See Jordan Rappaport and Jeff Sachs.

¹³ Hydroelectric dams constructed before the 1950s, when improvements in thermal power generation and the advent of high-tension transmission lines made proximity to water power obsolete, had persistent effects on the location of industry and population. Edson Severnini attributes this persistence to agglomeration economies.

¹⁴ See Carlos Villareal.

¹⁵ See Walker Hanlon.

¹⁶ See Ed Glaeser and Joe Gyourko.

¹⁷ Kyle Mangum argues that this is an important explanation for persistent differences in unemployment rates among U.S. metropolitan areas: Some cities, particularly those in the Rust Belt, have long had higher unemployment than cities in the South and West. Mangum argues that low housing prices in declining cities can help explain why some unemployed workers don't migrate elsewhere.

¹⁸ See Jim Siodla.

¹⁹ See Stephen Redding, Daniel Sturm, and Nikolaus Wolf on long-run spatial effects of airport hub investments in Germany, and Amitabh Chandra and Eric Thompson, Nate Baum-Snow, and Gilles Duranton and Matt Turner on the long-run spatial effects of highway investments in the U.S.

²⁰ See Thor Berger and Kerstin Enflo.

²¹ See Dave Donaldson and Richard Hornbeck on population and Jeremy Atack, Michael Haines, and Robert Margo on urbanization and industrialization.

²² Remi Jedwab, Edward Kerby, and Alexander Moradi use data from colonial railroads in these countries.

²³ Gary Libecap and Dean Lueck examine the role of land demarcation systems.

²⁴ See Leah Brooks and Byron Lutz.

²⁵ Evidence on the role of institutions in the spatial persistence of income and population within countries parallels a broader literature on the role of institutions across countries. For example, see the papers by Daron Acemoglu, Simon Johnson, and James Robinson.

²⁶ See Guy Michaels and Ferdinand Rauch.

²⁷ See Redding, Sturm, and Wolf.

²⁸ Created by the federal government during the Great Depression, the TVA sponsored large infrastructure investments in the Tennessee Valley region, including dams, electrification, roads, canals, and flood control.

²⁹ The study by Patrick Kline and Enrico Moretti illustrates the promise and challenges of such policies.

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