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Grounds For Sculpture, Hamilton, New Jersey

PHOTO BY DIANNE HALLOWELL

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SECOND QUARTER 2015

BUSINESS REVIEW

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 prosperity 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 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]

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.

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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The Redistributive Consequences of Monetary Policy

BY MAKOTO NAKAJIMA

The Federal Reserve conducts monetary policy in order to achieve maximum employment, stable prices, and moderate long-term interest rates. Monetary policy currently implemented by the Federal Reserve and other major central banks is not intended to benefit one segment of the population at the expense of another by redistributing income and wealth. Any decisions regarding redistribution are considered to be the province of fiscal policy, which is determined by elected policymakers. However, it is probably impossible to avoid the redistributive consequences of monetary policymaking. As this article will explore, households differ in many dimensions — including their assets and debt, income sources, and vulnerability to unemployment — and monetary policy affects all these factors differently.

Even if one accepts the idea that monetary policy is not immune to redistributive effects, one could argue that the redistributive consequences are probably negligible if booms and recessions are mild enough that monetary policy does not need to cause large effects to ameliorate the fluctuations of the economy or keep inflation stable. The period between the mid-1980s and mid-2000s, called the Great Moderation, was such a period. During those years, the Federal Reserve conducted conventional monetary policy by making relatively small adjustments in the short-term policy target interest rate, known as the federal funds rate. However, in response to the Great Recession, the Federal Reserve moved aggressively by not only cutting the federal funds rate to essentially zero but also by implementing various unconventional measures such as communicating the expected timing and degree of future changes in the federal funds rate and purchasing large amounts of U.S. Treasury securities and mortgage-backed securities. When a central bank conducts such aggressive monetary policy, redistributive consequences might be more important.

It might be also true that the gain to society's well-being from stabilizing the overall economy is greater than the loss coming from associated redistributive effects, in which case we could safely focus on the overall effects and ignore the redistributive effects. Former Fed Chairman Ben Bernanke argued along these lines in January 2012 in response to the argument that the Fed was hurting savers by keeping the policy rate low:

> In the case of savers, you know, we think about all these issues, and we certainly recognize that the low interest rates that we've been using to try to stimulate investment and expansion of the economy also imposes a cost on savers who have a lower return. … I guess the response I would make is that the savers in our economy are dependent on a healthy economy in order to get adequate return. … So I think what we need to do, as is often the case when the economy gets into a very weak situation, then low interest rates are needed to help restore the economy to something closer to full employment and to increase growth and that, in return, will lead ultimately to higher returns across all assets for savers and investors.[1]

One could also argue that, in the long run, the redistributive consequences of monetary policy might average out. In other words, if the same type of households that tend to gain from monetary policy during economic expansions also tend to lose from monetary policy during recessions, then over time the average effect could be a wash. However, there is a good chance that the redistributive effects do not average out because business cycles are known to be

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asymmetric — expansions tend to be long and moderate, while recessions tend to be short and sharp. Since World War II, U.S. expansions have averaged almost six years and recessions less than a year.[2]

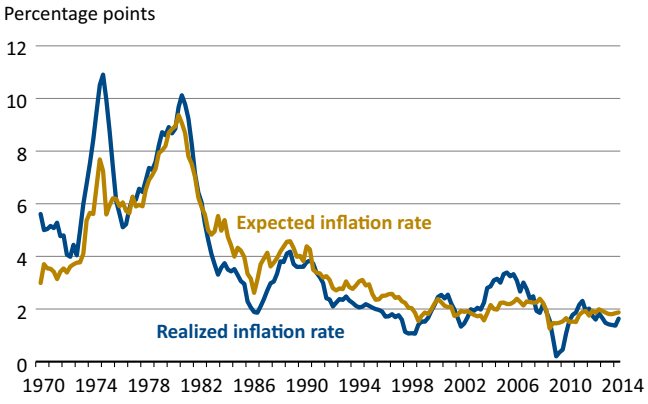
More research is needed to determine with great confidence whether the redistributive effects of monetary policy are significant enough that policymakers should explicitly consider their effects. Fortunately, there is a growing body of research on the issue. In this article, I start by investigating various channels through which monetary policy has redistributive consequences.[3] Then I go on to discuss the effects of unconventional monetary policy measures.[4]

THE INFLATION CHANNEL

Surprise inflation's effects on assets and debt. Monetary policy is expected to affect the level of overall prices as well as the rate at which that level is rising — in other words, inflation. But inflation does not always behave as intended. When monetary policy causes unexpected changes in inflation, some people might gain or lose from the surprise, because, for example, they hold different kinds of assets or debt — such as housing, stocks, bonds, and fixed- or adjustable-rate mortgages — based on how much inflation they expect in coming years.

Expected inflation — as measured by surveys — and actual inflation generally move together, but the differences between the two indicate that people do not forecast inflation perfectly. The figure compares expected inflation and realized inflation. Not only is actual inflation not forecast perfectly all the time, the difference between expected and actual inflation sometimes persists for a long time. For example, in the early 1970s, when the U.S. economy experienced an episode of high and volatile inflation, even professional forecasters significantly underestimated actual inflation. They also overestimated inflation after the rate declined sharply in the mid-1980s. When individuals make financial decisions based on inflation expectations that turn out to be incorrect, the discrepancy between expected and realized inflation could cause a redistribution of wealth. The effect of wealth redistribution could be stronger if such discrepancies persist.

Surprise Inflation Sometimes Persists



Sources: Survey of Professional Forecasters, Federal Reserve Bank of Philadelphia; U.S. Bureau of Economic Analysis.
Note: Expected inflation is based on one-year-ahead median GDP deflator inflation expectations in the SPF. Realized inflation is the BEA's implicit GDP deflator measure.

How does surprise inflation cause redistribution? In order to answer this question, let's think about how different kinds of assets are affected differently by inflation. In particular, it is useful to distinguish between *nominal* and *real* assets. Nominal assets are those whose payoff is a fixed dollar amount that is not adjusted for changes in the general level of prices. Think about a bond whose face value is $100 and that pays its holders $5. The rate of return on such an asset whose payoff does not change with the rate of inflation is called a nominal return. In this example, the nominal return of the bond is 5 percent. However, ultimately, what people care about when investing in assets is how many more goods and services they can buy with the return they earn. This is where inflation enters into the calculation. Let's say the inflation rate is 2 percent per year. This means that, on average, goods and services become 2 percent more expensive after a year. In other words, money loses 2 percent of its value every year. After taking inflation into account, the effective return on a bond with a 5 percent nominal return is 3 percent, because things have become 2 percent more expensive. The return after taking inflation into account is called the real return. In this case, the real return of the bond is 3 percent. So one can see that when the inflation rate goes up unexpectedly, the value of a nominal asset declines, because the real return that the holder receives declines. If the inflation rate increases from 1 percent to 2 percent, the real return of the 5 percent nominal asset declines from 4 percent to 3 percent, and the price of the nominal asset declines, reflecting the loss of value.

Real assets are those whose value is not affected by inflation, although, of course, many real assets are not perfectly immune to inflation for various reasons. One example is housing. When inflation occurs and prices of goods and services go up, the value of housing goes up as well. Moreover, the benefits that the house gives you in terms of shelter are not affected by inflation. If you rent the house, the rent

may naturally go up by 2 percent as well. In this sense, the value of housing is immune to changes in inflation.[5] Another example is stocks. When surprise inflation occurs, and if firms' future profits perfectly incorporate the effects of that inflation, stock prices go up to keep up with inflation.[6]

Debt can also be classified as nominal and real. The most familiar example of nominal debt is the fixed-rate home mortgage. If you have a 30-year mortgage with a fixed interest rate of 5 percent, the real rate (after taking inflation into account) declines if the inflation rate rises unexpectedly, reducing the real value of debt. Notice that the mortgage holder benefits from the unexpected rise in inflation and subsequent decline in the value of the mortgage debt, while the holder of a nominal asset such as a bond suffers from surprise inflation.

Moreover, the size of the effect from surprise inflation depends crucially on both the maturity of the nominal asset or debt and on how long the surprise inflation lasts. An investor who holds a bond that matures after one year is affected by surprise inflation for only a year, even if the surprise inflation lasts more than a year. This is because the return of the bond is fixed for only a year. However, if surprise inflation lasts for 10 years, an investor who holds a bond that matures in 10 years is affected for those 10 years. Yet, if surprise inflation lasts only a year, the real return for the holder of a bond that matures in 10 years is affected for only that one year. Therefore, the value of a bond that matures in 10 years is affected more strongly than that of a bond that matures after a year if the surprise inflation is persistent. Similarly, an adjustable-rate mortgage is considered real debt because the interest rate can adjust frequently along with changes in expected inflation.[7]

The portfolio composition channel. When monetary policy causes surprise inflation, some households gain and some lose, because, as we have seen, unexpected inflation changes the value of nominal assets and debt, and households hold different amounts and types of assets and debt. Thus, unexpected inflation transfers wealth from households with nominal assets to those with nominal debt. This channel can be called the *portfolio composition channel*.

The amount and type of assets and debt that households tend to hold varies significantly, often along demographic lines. Since these different patterns determine how inflation transfers wealth from one type of household to another, let's focus on the diverse patterns among poor, middle-class, and rich households in different age groups. Table 1 summarizes the average net nominal position — which is the value of nominal assets minus the value of nominal debt as a proportion of net worth — for each demographic group in 1989. For example, for households headed by persons age 35 or younger, a net nominal position of –42.6 means that, on average, those households held more nominal debt and that the average size of their net debt position was 42.6 percent of their average net worth. *Calculating Net Asset Positions* explains how Table 1 was constructed. We can easily see the following:

TABLE 1

Young Middle-Class Households Hold More Nominal Debt

Net nominal position as percent of net worth, by household type.

Age of head of household	≤35	36–45	46–55	56–65	66–75	≥75
By household income						
All income levels	-42.6	-10.1	2.3	15.2	19.4	30.6
Poor (bottom 20%)	-36.6	-33.8	-5.5	7.5	17.5	26.4
Middle class (middle 70%)	-114.0	-31.6	-4.8	14.0	25.2	38.1
Rich (top 10%)	-14.0	3.8	6.6	16.3	16.7	27.5

Source: 1989 Survey of Consumer Finances, in Doepke and Schneider (2006).

- Young households tend to borrow, mainly through mortgage loans, which are nominal debt. That is why their net nominal position is negative and large.
- Young middle-class households tend to hold the most nominal debt, since they typically hold the biggest mortgages. Poor households are more likely to rent, while rich households typically do not need to borrow as much as the middle class.
- Older households tend to hold nominal assets. After paying off their mortgage loans, they tend to diversify their portfolios by investing a portion of their wealth in nominal assets.

Why do different households hold different compositions of assets and debt? There are various reasons. First, whether a household owns or rents its home makes a substantial difference in its portfolio allocation, since housing is the single biggest item in the portfolios of the majority of households. In addition, the structure of the home mortgage market matters. In the U.S., long-term fixed-rate mortgages are more common than in many other countries, and the mortgage interest rate is subsidized through government-sponsored enterprises such as Fannie Mae and Freddie Mac. When a household purchases a house using a conventional fixed-rate mortgage, the household is naturally exposed to

Calculating Net Asset Positions

Net worth consists of housing, business interests, and financial assets and debt. According to the Survey of Consumer Finances, households headed by someone age 35 or younger had an average net worth of $50,000 in 2010 dollars. The average value of their housing was $37,000, which might seem low, but many households in this group do not own their homes. The average value of their business interests was $13,000 and their financial assets averaged $26,000, which included stocks ($4,000) and other financial assets ($22,000), for a total average value of assets of $76,000. Their debt averaged $26,000.

What portion of their components of wealth were nominal and therefore could be affected by inflation? Doepke and Schneider classify as nominal only a small proportion of this group's financial assets but most of their debt, since most of it was fixed-rate mortgage debt. Although the exact proportion that Doepke and Schneider calculated was based on a lot of detailed adjustments, for simplicity, we can consider 20 percent of nonstock financial assets as nominal (and therefore affected by inflation) and all debt as nominal. Under these simplified assumptions, their net nominal asset position was $4,400 (20 percent of nonstock financial assets) minus $26,000 (debt), which equals –$23,800. This dollar amount is –43.2 percent of their average net worth ($50,000), which is close to the corresponding number in Table 1 (–42.6 percent).

inflation risk — fluctuations of the future inflation rate.[8]

Second, as Andres Erosa and Gustavo Ventura observe from data, lower-income and lower-wealth households tend to use cash and checks for a larger fraction of their transactions. Naturally, these households tend to keep a larger fraction of their assets in cash and other short-term nominal assets such as checking accounts, which makes them vulnerable to inflation risk. Combined with the channels explored above, lower-income households that rent their homes (and thus have no mortgage) tend to be hurt by inflation, while lower-income households that own their homes, especially if they have a mortgage, tend to gain from inflation.

Third, higher-income households might be more likely to adjust their portfolios to avoid inflation risk, either because they are more knowledgeable or they are more willing and able to pay the costs necessary to pay off debt or buy or sell stocks or bonds. In either case, they end up more protected against changes in expected inflation.

How significant are the portfolio composition effects? An influential study by Matthias Doepke and Martin Schneider calculates the impact of a surprise increase of 5 percentage points in the inflation rate. They consider a hypothetical case in which the Federal Reserve unexpectedly announces that the inflation rate will be 5 percentage points higher than initially expected for the next 10 years and find significant redistributive consequences across different types of households. Although inflation is unlikely to rise that much in the near future, it was not unreasonable to think about such high inflation in the 1970s (see the figure on page 10).[9] Moreover, the experiment enables us to evaluate the significance of the portfolio composition effect in general.

Table 2 summarizes the effects on different households. Doepke and Schneider study two hypothetical cases. In the first (labeled *quicker reaction*), households are assumed to be able to react to surprise inflation when their assets and debt mature. In other words, households are no longer affected by surprise inflation after that point. This is the conservative and probably more realistic case. In the other case (labeled *slower reaction*), households cannot react to surprise inflation for 10 years. This case is less conservative and gives the maximum theoretical effects from surprise inflation.

In the quicker-reaction experiment, young middle-class households are big winners from surprise inflation. They gain the equivalent of 18.9 percent of their wealth. Poorer young households do not gain as much because they tend to be renters rather than homeowners, and thus they do not have much debt. Richer young households do not gain as much either, because they are less leveraged with home mortgage debt. The losers are older households, especially rich ones. They lose the equivalent of 4.7 percent of their wealth. Poor older house-

TABLE 2

Surprise Inflation Redistributes Wealth to Young Middle-Class Households

Percentage gain or loss from unexpected 5 percentage point increase in inflation for 10 years.

Age of head of household	≤35	36–45	46–55	56–65	66–75	≥75
Quicker reaction:						
Poor (bottom 20%)	0.2	4.0	0.6	-0.5	-1.3	-1.0
Middle class (middle 70%)	18.9	5.8	1.4	-1.4	-2.7	-2.6
Rich (top 10%)	2.1	-0.9	-1.6	-2.4	-2.9	-4.7
Slower reaction:						
Poor (bottom 20%)	14.4	13.3	2.2	-2.9	-6.9	-10.4
Middle class (middle 70%)	44.9	12.4	1.9	-5.5	-9.9	-15.0
Rich (top 10%)	5.5	-1.5	-2.6	-6.4	-6.6	-10.8

Source: Doepke and Schneider (2006).

holds do not suffer as much as rich ones, since the poor tend to hold more of their assets in cash rather than bonds.

In the slower-reaction experiment, the results are stronger by construction. The results are supposed to provide the upper bound of the effects of surprise inflation. In this experiment, for example, middle-class households headed by persons age 35 or younger gain the equivalent of 45 percent of their net worth from surprise inflation, while rich households headed by persons age 75 and older lose the equivalent of 11 percent of their wealth.

Although central banks around the world do not explicitly consider redistributive effects through the portfolio composition channel when setting policy, central banks are involved in maintaining data on diverse portfolio composition across different households. For instance, the Riksbank, the central bank of Sweden, collects and analyzes data on household debt.[10] The Federal Reserve, in cooperation with the Treasury Department, publishes the triennial Survey of Consumer Finances, which covers U.S. household balance sheets, types of income, and demographic characteristics.[11]

Global implications. Surprise inflation generates redistribution not only across different households but also across countries. Doepke and Schneider analyze the redistribution among them, too. As we have seen, redistribution through the portfolio allocation channel occurs because different entities hold different compositions of assets and debt. So let's start by asking how governments are affected by their portfolio compositions. The U.S. government holds a large balance of nominal debt because it has been issuing Treasury bonds and bills to finance its fiscal deficit. Much of its debt is held by foreign countries. Therefore, relative to the U.S., foreign countries own nominal assets.

Under these circumstances, what are the redistributive consequences of surprise inflation? As one might expect, the U.S. government, like households with home mortgages, gains from the decline in the value of its debt when the inflation rate goes up unexpectedly. On the other hand, foreign countries suffer from the loss in value of the U.S. bonds they own. Doepke and Schneider estimate how much the U.S. government and foreign countries gain or lose.[12] Assuming the quicker reaction to surprise inflation of 5 percentage points for 10 years, the U.S. government gains as much as 5.2 percent of U.S. GDP, while foreign countries lose as much as 3.2 percent of U.S. GDP. Under the slower reaction scenario — which is an extreme case — the U.S. government gains 13.0 percent of its GDP, while the rest of the world loses 5.2 percent.

In sum, surprise inflation transfers wealth from older and richer American households to younger middle-class households and from foreign countries to the U.S. government. Of course, gains for the U.S. government are ultimately gains for the American people. But how different groups of American households benefit from those gains varies as well, depending on how the gains are used.[13]

Redistribution through expected inflation. So far I have focused on the effects of unexpected inflation, but expected inflation also causes redistribution, as different households own different amounts of cash. People often find it convenient to hold cash to use for transactions, even though cash doesn't earn any interest and its value is constantly eroded by inflation. Since inflation works as a tax on holding cash, this channel is known as the *inflation tax channel*.

Table 3 shows the percentage of expenditures paid by cash, debit, and credit card for different income groups. Since lower-income households tend to conduct a larger fraction of transactions with cash, and thus tend to hold a larger fraction of their assets in cash, they tend to lose more from inflation, even expected inflation. Erosa and Ventura use a theoretical model to evaluate the redistributive effects of expected inflation through the inflation tax channel and find that, indeed, inflation burdens lower-income households disproportionately.

INCOME CHANNELS

As I discussed at the beginning, monetary policy is intended to affect not only prices but also real economic activity. The Federal Reserve's mandate includes promoting maximum employment.[14] When the Federal Reserve is trying to stimulate employment, different groups of people

TABLE 3

Low-Income Households Rely on Inflation-Sensitive Cash

	Percent of expenditures paid for with:			
Household income	Cash	Debit cards	Credit cards	Other
Less than $25,000	55%	31%	5%	9%
25,000–49,999	29	51	15	5
50,000–74.999	22	49	24	5
75,000–99,999	16	46	35	3
100,000–124,999	16	43	37	4
125,000–199,000	14	40	37	9
200,000 and above	10	15	66	9

Source: Bennett, Conover, O'Brien, and Advincula; Federal Reserve Bank of San Francisco (2014).

might be affected differently by the same monetary policy. Let's explore potential redistribution channels that occur when monetary policy is intended to either stimulate or cool down the U.S. economy.

The wage heterogeneity channel. When monetary policy affects the labor income or wages of different groups of the population differently through its diverse effects on employment, this channel is called the *wage heterogeneity channel*.

The risk of unemployment is distributed unequally across different groups of people, resulting in redistribution through the effect of monetary policy on unemployment risk. Michael Elsby, Bart Hobjin, and Aysegul Sahin document two facts related to this channel. First, the unemployment rate is higher on average among the young and those with less education. For example, the average unemployment rate between 1982 and 2010 was 12.6 percent for people age 16 to 24, while the average unemployment rate was 3.6 percent for people age 55 and older. Among people of all ages with less than a high school diploma, unemployment averaged 8.8 percent, while for those with at least a college degree it averaged 2.6 percent. The second fact is that unemployment fluctuates more for groups whose average unemployment rate is high. In other words, in a recession, the unemployment rate goes up more for those groups whose average unemployment rate is already higher than it is for the overall labor force. Between 2007 and 2009 — the Great Recession years — the overall unemployment rate went up from 4.6 percent to 9.3 percent, a 4.7 percentage point increase. However, for people with less than a high school diploma, the unemployment rate went up by 7.4 percentage points, while for those with at least a college degree the rate went up by only 2.6 percentage points. During the same period, the unemployment rate for people age 16 to 24 went up by 7.0 percentage points, while for those age 55 and older the rate went up by only 3.5 percentage points.

If as a result of accommodative monetary policy unemployment were to fall more for those who are younger and have less education, the policy could be said to be redistributing income across diverse groups of people. Moreover, as I emphasize in my recent work with Nils Gornemann and Keith Kuester, individuals with less income or education tend to hold less wealth and thus are less likely to have savings to supplement their income while they are unemployed. Under these circumstances, accommodative monetary policy that reduces their risk of unemployment might be even more effective in helping those individuals, especially when borrowing is difficult.

The income composition channel. A household's total income includes not only wages but also any financial income such as returns on stocks, bonds, real estate, or other assets that members of the household own. Because different households have different mixes of wages and financial income, and because monetary policy affects wages differently than it affects financial income, the overall effect of monetary policy will vary from one type of household to another. This channel of redistribution is called the *income composition channel*.

The income composition channel might be especially important in the U.S. because wealth, which is the source of financial income, is highly unequally distributed in the U.S.[13] As Table 4 shows, 33.6 percent of the total wealth in the U.S. in 2007, including financial assets as well as housing, was held by the top 1 percent of all U.S. households, while the bottom 60 percent of households held only 5.4 percent of the total wealth. Similarly, households in the bottom 20 percent of the wealth distribution received 79 percent of their income from wages and 2 percent from financial assets such as capital and businesses. Households in the top 1 percent of the wealth distribution derived 66 percent of their income from assets and only 30 percent from wages.

Now, suppose the Federal Reserve raises interest rates unexpectedly. If higher real interest rates slow down economic activity, unemployment rises and wages decline. On the other hand, higher real interest rates imply that income

TABLE 4

Financial Assets Are a Main Income Source Only for the Wealthy

	Wealth quintiles					Top 1%
	1st	2nd	3rd	4th	5th	
Share of total wealth	-0.2%	1.1%	4.5%	11.2%	3.4%	33.6%
Composition of income						
Labor income (from wages)	78.9	81.2	78.6	77.1	51.4	30.2
Financial income (from capital and business interests)	2.0	4.7	7.2	10.2	39.7	65.7
Transfer income (from government programs)	15.5	12	12.4	12.1	8.2	3.6

Source: 2007 Survey of Consumer Finances, in Diaz-Gimenez, Glover, and Rios-Rull (2011).

from some financial assets could increase. Since, as we have seen in Table 4, only a small proportion of households earn a large proportion of income from financial income, while most households derive their income mainly from wages, higher real interest rates induced by monetary policy imply that income is redistributed from less-wealthy households to wealthier ones. Similarly, if the Federal Reserve lowers interest rates, and if the economy responds to the accommodative monetary policy as expected, income might be redistributed from the wealthy to the less-wealthy.

However, remember that various effects are in play here. Accommodative monetary policy could have a positive effect on the stock market. In that case, wealthy households, which invest more of their wealth in stocks, would benefit. Yet, if accommodative monetary policy raises the expected future inflation rate, the value of nominal assets, which wealthy households tend to hold more of, declines. Whether and how much a wealthy household gains or loses from monetary policy depends on the relative strength of these different effects on the composition of its portfolio of assets and debt.

A study by Olivier Coibion, Yuriy Gorodnichenko, Lorenz Kueng, and John Silvia shows that, in the U.S., when there is a surprise increase in the interest rate that monetary policy affects, income and consumption inequality widen. Specifically, when the policy interest rate rises 1 percent per year, the income of the top 10 percent of income-earners rises by around 1 percent, while the income of the bottom 10 percent of income-earners either declines slightly or does not change. Consumption by the top 10 percent of households in terms of spending increases by as much as 2 percent, while spending by the bottom 10 percent of households declines by the same degree. These findings suggest that the redistributive consequences of monetary policy through the income composition channel are significant. My recent work with Gornemann and Kuester shows that when the standard model that macroeconomists use to analyze monetary policy is extended to include households with varying compositions of income, it can generate sizable redistributive effects through the income composition channel.

REDISTRIBUTION FROM UNCONVENTIONAL POLICY

When the monetary policymaker has already lowered its target interest rate to virtually zero, it has no room to lower it further should the economy need additional accommodation. In order to deal with the situation, policymakers have employed unconventional measures, such as committing to a future interest rate (when such a commitment is made publicly, it is known as *forward guidance*) or large-scale purchases of various assets such as long-term Treasuries or mortgage-backed securities (commonly referred to as *quantitative easing*).

Research focusing on the redistributive effects of unconventional monetary policy is virtually nonexistent, because policymakers started using forward guidance and quantitative easing only recently, as a response to the Great Recession and the economy's slow recovery since then. Yet, to the extent that these unconventional measures affect future inflation or real activity, redistributive consequences similar to those associated with conventional monetary policy are expected to occur. However, there are other consequences that are relevant only with quantitative easing. Let me discuss one example. When the Federal Reserve purchases mortgage-backed securities en masse, it does so with the intention of driving down mortgage interest rates, thus making it more affordable for people to purchase houses. This increase in demand for housing is expected to increase housing prices in general and therefore also benefit current homeowners by increasing the value of their homes. On the other hand, higher house prices hurt homebuyers, even while they benefit from lower mortgage rates. Generally speaking, by affecting mortgage interest rates, these unconventional monetary policy tools could generate redistribution from homebuyers to current homeowners. The general message is that when the market for a particular type of asset is affected by large-scale purchases of such assets, the policy could create winners and losers depending on who holds those types of assets.

CONCLUSION

It is important to be aware that, even if it is intended to affect all segments of the population equally, monetary policy is probably not going to be completely neutral. If the various redistributive effects that I have discussed in this article are small compared with the ways in which monetary policy affects all segments of the population equally, the redistributive consequences might be less of a concern. However, the answer to this question probably depends on the economic environment. More research is needed for weighting various redistributive effects against the nonredistributive effects that policymakers have traditionally focused on. ■

NOTES

[1] See the press conference transcript.

[2] Average durations as determined by the National Bureau of Economic Research's Business Cycle Dating Committee, www.nber.org/cycles/cyclesmain.html.

[3] Monetary policy may also redistribute wealth and income geographically, although those dynamics are beyond the scope of this article. See the *Business Review* article by Gerald Carlino and Robert DeFina.

[4] An important strand of the literature that I do not discuss here is about the optimal average level of inflation. An interested reader might consult the *Business Review* article by Daniel Sanches (2012) or the overview by Stephanie Schmitt-Grohe and Martin Uribe (2010).

[5] In reality, house prices do not move in perfect unison with inflation, since inflation and house prices are affected by economic activities differently.

[6] Again, in reality, the relationship is far from being perfectly in sync.

[7] However, there is often a limit as to how much the interest rate of an adjustable-rate mortgage can change. This restriction makes adjustable-rate mortgages not perfectly immune from surprise inflation.

[8] Notice that the effect here is asymmetric, because when the mortgage rate goes down together with the inflation rate, borrowers can refinance their mortgages and benefit from the lower rate, although refinancing is not cost-free.

[9] The average longer-run outlook for inflation held by members of the Federal Open Market Committee, the monetary policy-setting committee of the Federal Reserve, is around 2 percent. See www.federalreserve.gov/monetarypolicy/files/FOMC_LongerRunGoals.pdf.

[10] See www.riksbank.se/en/Press-and-published/Notices/2014/Riksbank-continues-analysing-household-debt/.

[11] The survey is conducted by NORC (formerly the National Opinion Research Center) at the University of Chicago.

[12] The calculations assume that the entities hold the same mix of assets that they did in 1989.

[13] Cesaire Meh, Jose-Victor Rios-Rull, and Yaz Terajima use Canadian data to analyze how households' gains and losses would differ depending on how the government allocated its gains through different fiscal policies.

[14] As stated in the Federal Reserve Act, "The Board of Governors of the Federal Reserve System and the Federal Open Market Committee shall maintain long-run growth of the monetary and credit aggregates commensurate with the economy's long-run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates." See www.federalreserve.gov/aboutthefed/section2a.htm.

[15] Javier Diaz-Gimenez, Andy Glover, and Jose-Victor Rios-Rull tabulated the data from the 2007 Survey of Consumer Finances.

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What's Holding Back Homebuilding?

BY PAUL R. FLORA

Homebuilding is typically a casualty of economic downturns, but it is also true that most economic recoveries are built upon a resumption of pounding hammers and buzzing blades. Not so with the recovery from the Great Recession. After new home construction slowed dramatically in the recession, the sector not only failed to lead the overall recovery as usual but significantly lagged it. Even now that overall economic growth and employment have largely resumed growing solidly, homebuilding and construction employment levels remain far below normal in Pennsylvania, New Jersey, and Delaware as well as in the nation.

Why? What was different this time? The housing boom and bust significantly altered key dynamics in the housing sector that have yet to resolve. Mortgage delinquencies and foreclosures soared to their highest rates since at least the Great Depression, and though they've fallen somewhat, they remain atypically high. The housing bust and the severe recession it spawned also reduced the financial wherewithal of many individuals and families, changing attitudes and behaviors enough to lower household formation rates and create a greater propensity to rent rather than own.

Drawing on economic data, research by the Federal Reserve and others, news accounts, and conversations with numerous homebuilders, this article reviews how the housing boom and bust influenced the weak recovery in new home construction and total construction employment, focusing mainly on the three Third District states served by the Philadelphia Fed.[1]

CONSTRUCTION HIRING IS LAGGING

Construction employment is underperforming compared with past recoveries.[2] Had the construction sector behaved in this recession-expansion cycle as it had in the prior two, its net employment would have increased by 26,000 workers instead of declining by 61,000 workers — a potential difference of 87,000 jobs.[3] Although construction is not alone in this regard — trade; information; finance, insurance, and real estate; and state and local government have all been slower to resume hiring than in the past — construction's underperformance is more stark (Figure 1).[4] Moreover, much of the underperformance in services, trade, and the rest of the economy may be related to the same factors causing weak residential construction, especially the low household formation rate.

Posing hypotheticals is risky. A significant portion of the net job loss in construction is desirable from an efficient markets perspective. That is, we wouldn't expect employment levels to return to what was, arguably, an elevated level during the housing bubble. Also remember that this business cycle has not ended. Greater job growth may lie ahead, and sectors that have lagged in our three states may yet catch up with past cycles.[5]

Hypotheticals aside, the three-state region has suffered a net loss of 88,000 jobs (0.1 percent annualized) since the peak in Decem-

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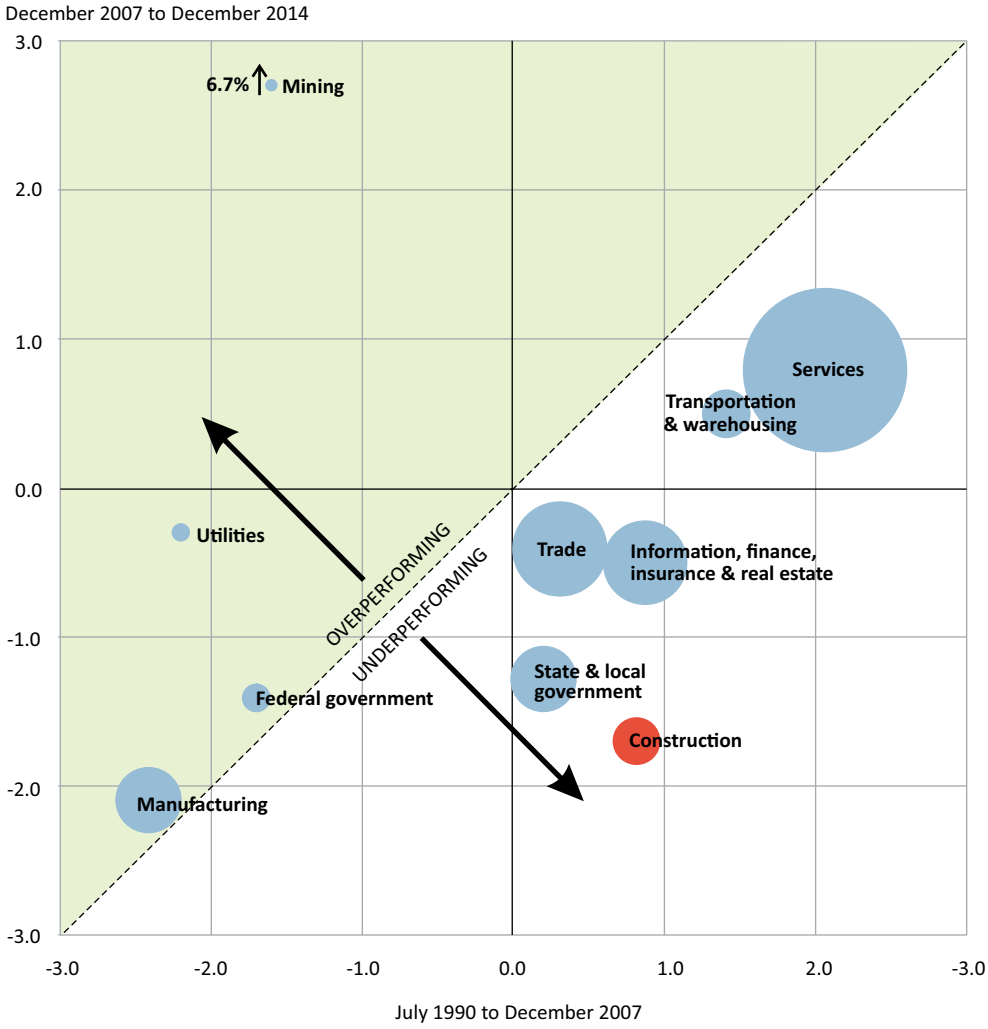
ber 2007. The largest losses have come from construction (61,000 jobs, or –1.7 percent) and manufacturing (155,000, or –2.1 percent); the largest gain has come from services (316,000, or 0.8 percent). These trends are similar to the nation's employment, which has grown a mere 0.2 percent annualized over the same period. U.S. construction job losses stand at 2.1 percent, or 1.2 million jobs.

FIGURE 1

Construction Hiring Is Underperforming vs. Prior Cycles

Annualized payroll job growth rates in the three-state region.



Source: Bureau of Labor Statistics, via Haver Analytics.
Notes: Monthly data based on 2014 annual benchmark. Seasonally adjusted.

SEVERE, PERSISTENT CONSEQUENCES

The two initial consequences of an emerging housing bubble, if not its definition, are oversupply as homes are increasingly purchased for short-term investment rather than to live in and house prices that exceed their longer-run value.[6] In the frothiest markets, such as in Florida, investors made quick profits by reselling even dilapidated homes in impoverished neighborhoods to buyers with little or no evidence of adequate creditworthiness.[7] News coverage at the time documented a case of 10 houses sold to one low-income buyer with no-down-payment loans that required little or no documentation to verify income or assets.[8] With the exception of vacation homes in shore areas and in the Poconos, growth was generally slower in our Third District, and there was less opportunity for rising prices and frothy market conditions.

Even in the absence of any other negative consequences, this oversupply would require substantial time to work off, as owners were left holding houses with no buyers in sight when the bubble burst. Such a situation had occurred in Texas and other energy states in the mid-1990s.[9] But this time there were greater consequences that spread across the country.

The ensuing financial crisis revealed overvalued homes, underwater mortgages, unemployed borrowers, and undercapitalized financial institutions. Housing prices fell, foreclosures rose, and the economic crash that followed set off a second round of bad debt as people lost their jobs, then their homes. It was these secondary effects from house price declines and high unemployment in the bubble's aftermath that had the greater economic impact in our Third District states.

No recession since the Great Depression — not the double-dip recessions of the early 1980s or the 1990–91 recession that was triggered in part by the S&L crisis — generated anything close to the staggering rate of delin-

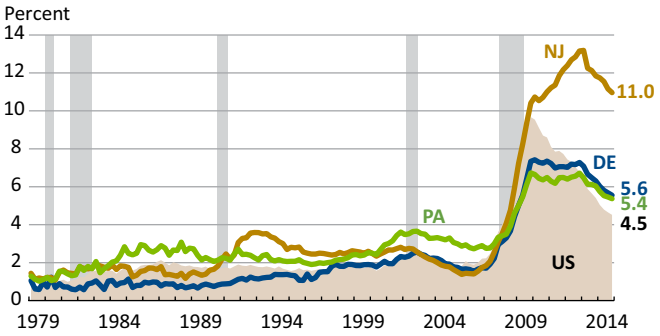
quencies and foreclosures that occurred during the Great Recession. The rate of seriously delinquent loans increased nearly fivefold in the nation from its 2006 average (Figure 2). Delaware's rate increased nearly as much as the nation's. Pennsylvania's rate increased less than threefold. However, New Jersey's rate continued to increase until it was nearly nine times greater than in 2006. Rates rose much higher still in Arizona, California, Florida, and Nevada (the "sand states").

In most states, including Delaware and Pennsylvania, the rate has fallen since 2009. However, these problem loans remain at historically high levels. Moving delinquent loans into and through the foreclosure process has been especially challenging in New Jersey, which now has the highest percentage of seriously delinquent loans among all 50 states.

FIGURE 2

Distressed Mortgages Remain Far Above Normal

Percent of mortgages in foreclosure or more than 90 days past due.



Source: Mortgage Bankers Association, via Haver Analytics.
Notes: Quarterly data. Not seasonally adjusted.

DEMAND SHIFTING BY TYPE, LOCATION

A confluence of trends has emerged that homebuilders are watching closely. Demand for apartments has grown throughout the recession and recovery as a consequence of damaged credit scores, lower incomes, and other difficulties of securing a mortgage. The Great Recession has also increased people's wariness of homeownership. Moreover, demand for apartments and condominiums in urban centers has increased at the expense of new single-family suburban housing. Generational shifts may also be contributing. Millennials (defined in this case as those born from 1981 to 1997) recently came to outnumber baby boomers (1946 to 1964), whose rising death rate is reducing demand for housing.[10] In addition, popular theories suggest that retiring boomers are showing a taste for urban living, while millennials are also attracted by the lifestyle.[11]

In our three states, the shift has reduced rental vacancy rates and increased homeowner vacancy rates. Moreover, vacant homes that are delinquent or in foreclosure but are not available for sale or rent are excluded from this measure.[12] They represent part of the shadow inventory that may yet emerge as housing markets stabilize.

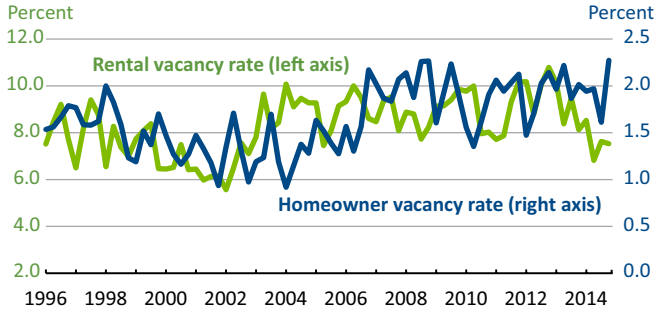
In addition, the greater share of multifamily housing further dampens construction employment. Constructing single-family homes is more labor intensive than constructing apartment buildings and condos, which deploys more heavy equipment and delivers fewer square feet per unit.[13]

In recent years, Third District builders have commented most about the low household formation rates that had prevailed from 2006 through 2013. The overall trend had already been moving lower for the prior three decades;

FIGURE 3

Rental Market Tightening, Owner Housing Still Soft

Regional vacancy rates for Pennsylvania, New Jersey, and Delaware.

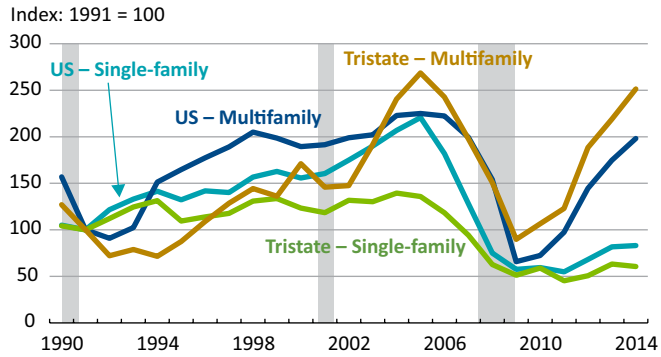


Sources: Census Bureau Current Population Survey/Homeowner Vacancy Survey, via Haver Analytics.
Notes: Quarterly data. Not seasonally adjusted. Rates are calculated by weighting each state's vacancy rate by that state's proportion of the total units in the region.

FIGURE 4

Single-Family Construction Remains Weak Here and in U.S.

Housing permits by type of home for the three-state region and the nation.

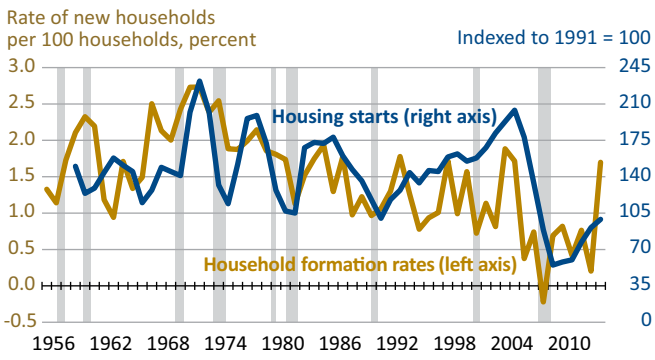


Source: Census Bureau.
Note: Monthly data aggregated to annual averages and indexed to 1991.

FIGURE 5

After Long Slump, Household Formation Surged in 2014

U.S. household formation rates and housing starts.



Sources: Census Bureau Housing Vacancy Survey and New Residential Construction series, via Haver Analytics.

however, the rate collapsed during the Great Recession.[14] Credit conditions, slow employment growth, rising student debt, and changing attitudes toward homeownership are among the factors contributing to low household formation rates.[15]

Each new household generally drives new spending on furnishings and services such as cable hookups. So, the dampening effect of low household formation rates on new home construction has also contributed to subpar demand for goods and services, which weighs on employment in those sectors.

WHAT MIGHT LIE AHEAD?

Data released in January offered some hope to builders and the broader economy. The 2014 household formation rate rebounded to 1.7 — more than three times higher than the average over the prior eight years.[16] The 2014 upturn represents just one year, and household formation can be volatile from year to year. Yet, most of the largest declines have occurred near recession years. So it seems unlikely that household formation will retreat to its recent lows. Since new residential construction, represented in Figure 5 as housing starts, tends to follow the household formation rate, another decent year of household formation should drive a pickup in housing construction. An important question for employment is the extent to which those starts will be for single- or multifamily homes.

The Great Recession has significantly disrupted both the demand for and the supply of housing in the region and the nation. Progress remains slow, and other demographic and market trends are still developing. Generally, builders continue to react to the ongoing uncertainty by hesitating to overextend their businesses by adding workers and equipment. The evidence may soon be clearer as to whether household formation has continued to grow and whether builders benefited from the spring 2015 homebuying season. ■

NOTES

[1] In this report, construction employment for the three states includes logging and mining workers in Delaware, which reports these sectors together, but the number of mining and logging jobs is too small to have a substantive impact on these results. The mining category includes logging.

[2] In the chart, sectors clustered near the dashed 45-degree line have generated about the same annualized rate of job growth from December 2007 (the prior expansion's peak) through December 2014 as from July 1990 through December 2007. Sectors above the line have "overperformed" in the latest business cycle; sectors below have "underperformed." The construction sector is farthest away from the 45-degree line on the underperforming side.

[3] Business cycles for which consistent employment data were available were examined back to 1990. These business cycles are also generally more alike in that manufacturing was no longer contributing such large cyclical swings after the double-dip recession in the early 1980s.

[4] Also stark is the overperformance of mining, which is literally off the chart with an annualized job growth rate of 6.7 percent this cycle, mostly attributable to Pennsylvania's Marcellus shale boom. However, the sector represents only 0.4 percent of total employment. Manufacturing and federal government employment in the three states have also overperformed in the sense that their payrolls have contracted slightly less this cycle.

[5] In fact, construction employment growth in our Third District states over the five-and-a-half years since the Great Recession ended has not been significantly weaker than in the first five-and-a-half years after the 1990-91 recession. That recession had been driven in part by the savings and loan crisis, which temporarily reduced financing to housing developers and prospective homebuyers, and it took eight-and-a-half years to recover in our three states.

[6] Wenli Li's *Business Review* article examines how speculators fed the boom.

[7] See the *Tampa Bay Times* article.

[8] See the *St. Petersburg Times* article.

[9] See the presentation by John Duca and others at a 2014 Dallas Fed conference.

[10] Richard Fry of Pew documents the shift.

[11] For example, see Leigh Gallagher's book.

[12] Melissa Kresin's Census Bureau report details these other categories of vacancies.

[13] From conversations with builders.

[14] See Andrew Paciorek's discussion paper.

[15] Meta Brown and Sydnee Caldwell discuss the various factors in their New York Fed blog posting.

[16] The high 2014 rate of net new households per 100 households was driven by especially strong gains in September and October. The 2014 rate is more typical of rates prior to and including 1981 (which averaged 1.9) than with rates since 1981 (which averaged 1.1).

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RESEARCH RAP

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INSIDER BANK RUNS: COMMUNITY BANK FRAGILITY AND THE FINANCIAL CRISIS OF 2007

From 2007 to 2010, more than 200 community banks in the United States failed. Many of these failed community banking organizations (CBOs) held less than $1 billion in total assets. As economic conditions worsen, banking organizations are expected to preserve capital to withstand unexpected losses. This study examines CBOs prior to failure or becoming problem institutions to understand if, on average, a run on capital by insiders via dividend payouts led to greater financial fragility at the onset of the crisis. The authors use a control group of similar-sized banks that did not fail or become problem institutions to compare their results and to draw statistical conclusions. They use standard control variables highlighting corporate governance and managerial ownership, such as S-corporation designation and bank complexity that might create incentives more conducive to insider enrichment than to the welfare of depositors or debtholders. Although the new Dodd-Frank legislation exempted smaller banks from many proposed requirements, the authors' results show that capital distributions to insiders contributed to community bank weakness during the financial crisis.

Working Paper 15–09. Christopher Henderson, Federal Reserve Bank of Philadelphia; William W. Lang, Federal Reserve Bank of Philadelphia; William E. Jackson III, University of Alabama.

STRESS TESTS AND INFORMATION DISCLOSURE

The authors study an optimal disclosure policy of a regulator that has information about banks' ability to overcome future liquidity shocks. They focus on the following tradeoff: Disclosing some information may be necessary to prevent a market breakdown, but disclosing too much information destroys risk-sharing opportunities (the Hirshleifer effect). The authors find that during normal times, no disclosure is optimal, but during bad times, partial disclosure is optimal. The authors characterize the optimal form of this partial disclosure. They relate their results to the Bayesian persuasion literature and to the debate on disclosure of stress test results.

Working Paper 15–10. Supersedes Working Paper 13–26. Itay Goldstein, Wharton School, University of Pennsylvania; Yaron Leitner, Federal Reserve Bank of Philadelphia.

INFORMATION LOSSES IN HOME PURCHASE APPRAISALS

Home appraisals are produced for millions of residential mortgage transactions each year, but appraisals are rarely below the transaction price. The authors exploit a unique data set to show that the mortgage application process creates an incentive to substitute the transaction price for the true appraised value when the latter is lower. The authors relate the frequency of information loss (appraisals set equal to transaction price) to market conditions and other factors that plausibly determine the degree of distortion. Information loss in appraisals may increase the procyclicality of housing booms and busts.

Working Paper 15–11. Paul S. Calem, Federal Reserve Bank of Philadelphia; Lauren Lambie-Hanson, Federal Reserve Bank of Philadelphia; Leonard I. Nakamura, Federal Reserve Bank of Philadelphia.

ASSESSING BANKRUPTCY REFORM IN A MODEL WITH TEMPTATION AND EQUILIBRIUM DEFAULT

A life-cycle model with equilibrium default in which consumers with and without temptation coexist is constructed to evaluate the 2005 bankruptcy law reform and other counterfactual reforms. The calibrated model indicates that the 2005 bankruptcy reform achieves its goal of reducing the number of bankruptcy filings, as seen in the data, but at the cost of loss in social welfare. The creditor-friendly reform provides borrowers with a stronger commitment to repay and thus yields lower default premia and better consumption smoothing. However, those who borrow and default due to temptation or unavoidable large expenditures suffer more under the reform due to higher costs or means-testing requirement. Moreover, those who borrow due to temptation suffer from overborrowing when the borrowing cost declines. The model indicates that the negative welfare effects dominate.

Working Paper 15–12. Makoto Nakajima, Federal Reserve Bank of Philadelphia.

A QUANTITATIVE ANALYSIS OF THE U.S. HOUSING AND MORTGAGE MARKETS AND THE FORECLOSURE CRISIS

The authors present a model of long-duration collateralized debt with risk of default. Applied to the housing market, it can match the homeownership rate, the average foreclosure rate, and the lower tail of the distribution of home-equity ratios across homeowners prior to the recent crisis. The authors stress the role of favorable tax treatment of housing in matching these facts. They then use the model to account for the foreclosure crisis in terms of three shocks: overbuilding, financial frictions, and foreclosure delays. The financial friction shock accounts for much of the decline in house prices, while the foreclosure delays account for most of the rise in foreclosures. The scale of the foreclosure crisis might have been smaller if mortgage interest payments were not tax deductible. Temporarily higher inflation might have lowered the foreclosure rate as well.

Working Paper 15–13. Supersedes Working Paper 11–26. Satyajit Chatterjee, Federal Reserve Bank of Philadelphia; Burcu Eyigungor, Federal Reserve Bank of Philadelphia.

A COST-BENEFIT ANALYSIS OF JUDICIAL FORECLOSURE DELAY AND A PRELIMINARY LOOK AT NEW MORTGAGE SERVICING RULES

Since the start of the financial crisis, the authors have seen an extraordinary lengthening of foreclosure timelines, particularly in states that require judicial review to complete a foreclosure but also recently in nonjudicial states. The authors' analysis synthesizes findings from several lines of research, updates results, and presents new analysis to examine the costs and benefits of judicial foreclosure review. Consistent with previous studies, the authors find that judicial review imposes large costs with few, if any, offsetting benefits. They also provide early analysis of the new mortgage servicing rules enacted by the Consumer Financial Protection Bureau (CFPB) and find that these rules are contributing to even longer timelines, especially in nonjudicial states.

Working Paper 15–14. Larry Cordell, Federal Reserve Bank of Philadelphia; Lauren Lambie-Hanson, Federal Reserve Bank of Philadelphia.

SECURITIZATION AND MORTGAGE DEFAULT

The author finds that private-securitized loans perform worse than observably similar, nonsecuritized loans, which provides evidence for adverse selection. The effect of securitization is strongest for prime mortgages, which have not been studied widely in the previous literature and particular prime adjustable-rate mortgages (ARMs): These become delinquent at a 30 percent higher rate when privately securitized. By contrast, the author's baseline estimates for subprime mortgages show that private-securitized loans default at lower rates. The author shows, however, that "early defaulting loans" account for this: those that were so risky that they defaulted before they could be securitized.

Working Paper 15–15. Supersedes Working Paper 09–21/R. Ronel Elul, Federal Reserve Bank of Philadelphia.

DO PHILLIPS CURVES CONDITIONALLY HELP TO FORECAST INFLATION?

This paper reexamines the forecasting ability of Phillips curves from both an unconditional and conditional perspective by applying the method developed by Giacomini and White (2006). The authors find that forecasts from the Phillips curve models tend to be unconditionally inferior to those from their univariate forecasting models. The authors also find, however, that conditioning on the state of the economy sometimes does improve the performance of the Phillips curve model in a statistically significant manner. When the authors do find improvement, it is asymmetric — Phillips curve forecasts tend to be more accurate when the economy is weak and less accurate when the economy is strong. Any improvement the authors found, however, vanished over the post-1984 period.

Working Paper 15–16. Michael Dotsey, Federal Reserve Bank of Philadelphia; Shigeru Fujita, Federal Reserve Bank of Philadelphia; Tom Stark, Federal Reserve Bank of Philadelphia.

DO STUDENT LOAN BORROWERS OPPORTUNISTICALLY DEFAULT? EVIDENCE FROM BANKRUPTCY REFORM

Bankruptcy reform in 2005 eliminated debtors' ability to discharge private student loan debt in bankruptcy. This law aimed to reduce costly defaults by diminishing the perceived incentive of some private student loan borrowers to declare bankruptcy even if they had sufficient income to service their debt. Using a unique, nationally representative sample of anonymized credit bureau files, the authors examine the bankruptcy filing and delinquency rates of private student loan borrowers in response to the 2005 bankruptcy reform. The authors do not find evidence that the nondischargeability provision reduced the likelihood of filing bankruptcy among private student loan borrowers as compared with other debtors whose incentives were not directly affected by the policy.

Working Paper 15–17. Rajeev Darolia, University of Missouri, Visiting Scholar, Federal Reserve Bank of Philadelphia; Dubravka Ritter, Federal Reserve Bank of Philadelphia.

ON THE INHERENT INSTABILITY OF PRIVATE MONEY

A primary concern in monetary economics is whether a purely private monetary regime is consistent with macroeconomic stability. The author shows that a competitive regime is inherently unstable due to the properties of endogenously determined limits on private money creation. Precisely, there is a continuum of equilibria characterized by a self-fulfilling

collapse of the value of private money and a persistent decline in the demand for money. The author associates these equilibrium allocations with self-fulfilling banking crises. It is possible to formulate a fiscal intervention that results in the global determinacy of equilibrium, with the property that the value of private money remains stable. Thus, the goal of monetary stability necessarily requires some form of government intervention.

Working Paper 15–18. Supersedes Working Paper 12–19/R. Daniel R. Sanches, Federal Reserve Bank of Philadelphia.

PRIVATE MONEY AND BANKING REGULATION

The authors show that a competitive banking system is inconsistent with an optimum quantity of private money. Because bankers cannot commit to their promises and the composition of their assets is not publicly observable, a positive franchise value is required to induce the full convertibility of bank liabilities. Under perfect competition, a positive franchise value can be obtained only if the return on bank liabilities is sufficiently low, which imposes a cost on those who hold these liabilities for transaction purposes. If the banking system is monopolistic, then an efficient allocation is incentive-feasible. In this case, the members of the banking system obtain a higher return on assets, making it feasible to pay a sufficiently high return on bank liabilities. Finally, the authors argue that the regulation of the banking system is required to obtain efficiency.

Working Paper 15–19. Supersedes Working Paper 12–11/R. Cyril Monnet, University of Bern; Daniel R. Sanches, Federal Reserve Bank of Philadelphia.

ON THE WELFARE PROPERTIES OF FRACTIONAL RESERVE BANKING

Monetary economists have long recognized a tension between the benefits of fractional reserve banking, such as the ability to undertake more profitable (long-term) investment opportunities, and the difficulties associated with it, such as the risk of insolvency for each bank and the associated losses to bank liability holders. The author shows that a specific banking arrangement (a joint-liability scheme) provides an effective mechanism for ensuring the ex-post transfer of reserves from liquid banks to illiquid banks, so it is possible to select a socially efficient reserve ratio in the banking system that preserves the safety of bank liabilities as a store of value and maximizes the rate of return paid to bank liability holders.

Working Paper 15–20. Supersedes Working Paper 13–32/R. Daniel R. Sanches, Federal Reserve Bank of Philadelphia.

CREATIVITY AND ECONOMIC GROWTH: THEORY, MEASURES, AND POTENTIALS FOR MOROCCO

The current era of globalization is dominated by the rise of investments in intangible capital rather than tangible capital — the ascendance of creativity over plant and equipment. This brief paper is motivated by the possibility that emerging market economies such as Morocco might take greater advantage of new tools and policies designed for this new era. To begin, the author discusses the transformation of the global economy and the consequences of the transformed global economy for economic thinking and measurement. The author refers to both old and new literature on the measurement of intangible investment and capital. Then, the author discusses the rising role of creativity and cultural difference in the development of these new economic forces, using the example of the Harry Potter book series. The author then considers how cultural enhancement serves multiple purposes for a nation. Finally, the author turns to some of the possible implications of these economic forces for Morocco, stressing that these implications are speculative.

Working Paper 15–21. Leonard I. Nakamura, Federal Reserve Bank of Philadelphia.

HETEROGENEITY IN DECENTRALIZED ASSET MARKETS

The authors study a search and bargaining model of an asset market, where investors' heterogeneous valuations for the asset are drawn from an arbitrary distribution. The authors' solution technique renders the analysis fully tractable and allows them to provide a full characterization of the equilibrium, in closed-form, both in and out of steady-state. The authors use this characterization for two purposes. First, they establish that the model can naturally account for a number of stylized facts that have been documented in empirical studies of over-the-counter asset markets. In particular, the authors show that heterogeneity among market participants implies that assets are reallocated through "intermediation chains," ultimately producing a core-periphery trading network and non-trivial distributions of prices and trading times. Second, the authors show that the model generates a number of novel results that underscore the importance of heterogeneity in decentralized markets. The authors highlight two: First, heterogeneity magnifies the price impact of search frictions; and second, search frictions have larger effects on price levels than on price dispersion. Hence, quantifying the price discount or premium created by search frictions based on observed price dispersion can be misleading.

Working Paper 15–22. Julien Hugonnier, École Polytechnique Fédérale de Lausanne, Swiss Finance Institute; Benjamin Lester, Federal Reserve Bank of Philadelphia; Pierre-Olivier Weill, University of California–Los Angeles, National Bureau of Economic Research.

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