Economic Insights

Regional Spotlight

Why Are Men Working Less These Days?

Where Is Everybody? The Shrinking Labor Force Participation Rate
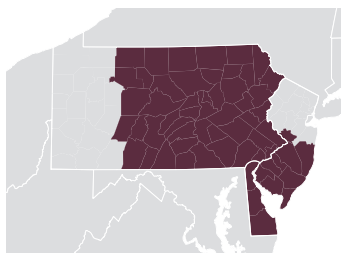
Research Update

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About the Cover

On the first attempt to ring it in 1753, the bell that the British colony of Pennsylvania had ordered from a **London foundry** cracked. Recast by Philadelphia metalsmiths John Pass and John Stow, it pealed from atop the Provincial Assembly (later the Pennsylvania State House, now Independence Hall) to mark such occasions as King George III's ascension to the throne in 1761, the Battles of Lexington and Concord in 1775, the ratification of the Constitution in 1787, and the deaths of Benjamin Franklin in 1790 and George Washington in 1799. By 1839, antislavery publications had coined the name Liberty Bell, inspired by its inscription from Leviticus 25:10. Likely in the 1840s it acquired the iconic crack that has left it mostly mute yet fully resonant as a worldwide symbol of freedom. The **Independence Hall Association** offers an account of the Liberty Bell's history.

Photo Credit: J. Fusco for Visit Philadelphia.

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Purchasing Power Across the U.S.

Where you live can determine how far a dollar goes. But pay varies regionally, too. To get a true picture of an area's affordability, it helps to understand regional price parities.

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BY ELIF SEN AND ADAM SCAVETTE

It's common knowledge that the cost of living varies drastically across the United States. Housing prices in the San Jose area are the highest for any metro area in the country, while housing can be had in parts of Alabama for nearly one-tenth that. Of course, wages vary, too. Workers in Silicon Valley earn considerably more than those in the Deep South. But do wage differences offset housing costs? Job-hunters considering moving to another city, even one in the same state, need a way to know what prices are like there and whether their pay will be high enough to maintain their desired standard of living. Economists, too, want to be able to compare certain types of economic data across cities and regions, particularly information on consumer spending–a critical category that accounts for nearly 70 percent of the nation's output–in a way that controls for different regional price levels. How do we get a sense of how prices in a given city or region compare with prices in another or how fast prices are rising in one place versus the next? By creating a basis for comparing an area's cost of living, we can construct a standard for comparing how much purchasing power its residents have.

The Bureau of Labor Statistics (BLS) produces the most well-known measure of U.S. prices, the consumer price index (CPI). It tracks how prices change from month to month and year to year for a standard "basket" of consumer goods and services representing major consumption categories such as food, housing, transportation, education, and medical care. Similar price index data are available at the local level, including for 14 major metropolitan statistical areas. Like the nation, these metro areas have experienced overall price growth over time. However, the rate of price increases differs meaningfully from one city to another. While national price inflation averaged 2.2 percent from 1998 through 2015, prices in these 14 metro areas grew at varying rates (Figure 1). The San Francisco and Miami metro areas, for instance, had slightly faster price growth, above 2.5 percent, over those 17 years, while prices in and around Atlanta, Cleveland, Chicago, and Detroit rose less than 2.0 percent a year on average.

But while the CPI tells us how prices of goods and services in a particular area change over time, it provides no information about the underlying prices themselves and therefore allows no direct comparisons of price levels among metro areas. Prices grew faster in San Francisco than in Chicago from 1998 to 2015, but without information about each area's base price levels, it is not possible to draw conclusions about how much higher or lower prices were in one city versus the other using the CPI. The CPI is designed to measure prices over time but not space; that is, the composition of the basket of items that the BLS tracks is consistent over time in an area, but it is not always identical to the basket of items being followed in another location. Rather, the composition of each basket is based on what local stores sell and so can vary substantially by area. For instance, the price of winter boots would more likely be included to measure the average price of footwear for the Chicago area than for the Honolulu area. So, how can we compare price levels in different geographic areas?

Meaningful Variations in Metro Inflation

Average annual CPI inflation rates for MSAs and U.S., 1998–2015.
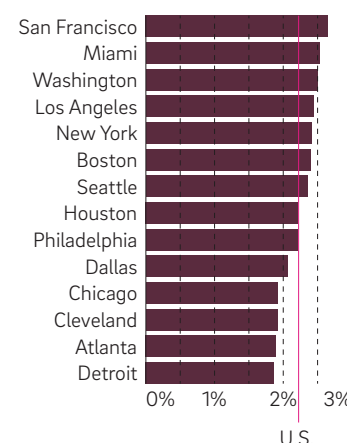
Source: Bureau of Labor Statistics.

Note: Averages are geometric means.

Unless otherwise noted, we refer to official **metropolitan statistical areas (MSAs)** as metro areas.

Regional Price Parities

To gain a sense of price variations around the country, we can look to the Bureau of Economic Analysis' (BEA) regional price parities, or RPPs. Whereas the CPI compares price growth over time, RPPs compare price levels at a single point in time. Regional price parities produce detailed estimates of price level differences by spending category for all 50 states and the District of Columbia, for metropolitan and nonmetropolitan portions of states, and for 381 metropolitan areas and the combined nonmetropolitan portion of the U.S. The BEA derives its estimates of item price levels in each area from the CPI and housing cost data from the Census Bureau's American Community Survey, controlling for differences in item or housing characteristics among areas.[1]

Unlike the monthly CPI, however, regional price parities are calculated annually and are available after a 16-month lag.[2] RPPs are also relatively new, with data going back only to 2008. Nevertheless, having data for every U.S. metropolitan area gives us insight into price variation across the country beyond its largest cities. However, even though the BEA provides an average

regional price parity for all nonmetropolitan areas in the U.S. combined, regional price parities still overlook nuances in price variations in less densely populated nonmetropolitan and rural areas.

What Do RPPs Tell Us?

Regional price parities give a sense of how much higher or lower effective prices are in an area relative to the nation overall as well as between cities. Because RPPs are constructed as indexes, with the national average set at 100, they allow for easy comparison of prices between a given area and the nation overall. For example, in 2014, the Philadelphia-Camden-Wilmington, PA-NJ-DE-MD, metro area had an RPP value of 107.2, which means that prices in the Philadelphia metro area are, on average, 7.2 percent higher than the national average.

Metro areas with higher RPPs, and therefore higher relative prices, shown in darker shades on the map, tend to be denser, particularly those along the Boston-Washington corridor and the West Coast (Figure 2). In 2014, RPPs ranged from 79.7 in the Beckley, WV, metro area to 123.5 in the Urban Honolulu, HI, metro area. Residents of Beckley experienced prices that were more than 20 percent below the national average, and residents

Denser Areas Mean Higher Prices

Prices for all items in metro areas relative to the nation, 2014.

Prices vs. national average

- More than 10% higher
- 3% to 10%
- −3% to 3%
- −10% to −3%
- More than 10% lower

Source: Bureau of Economic Analysis.

Note: Light gray areas indicate nonmetropolitan areas, whose prices averaged 12.2 percent below the national average.
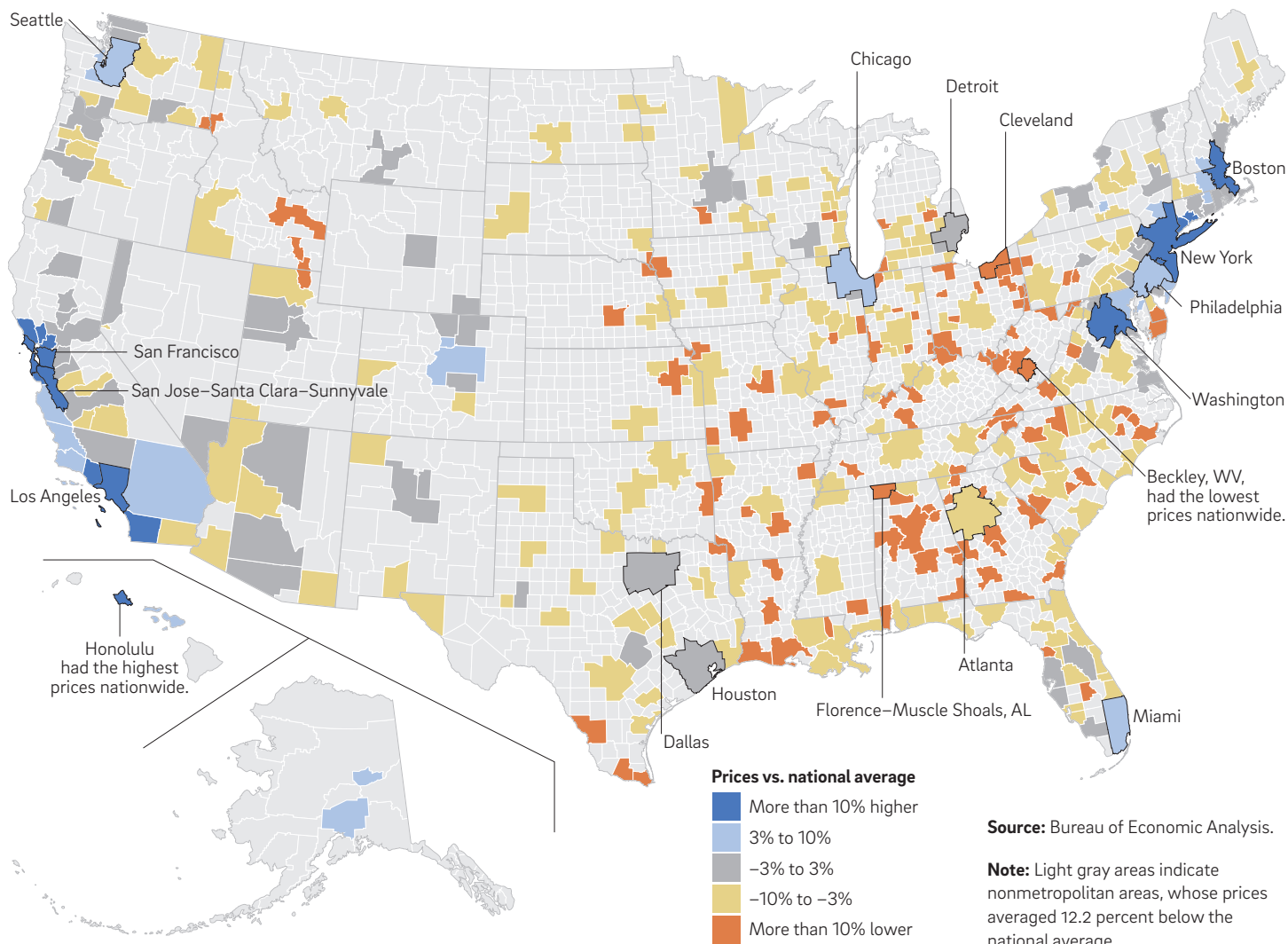
of Honolulu faced prices nearly 24 percent higher than the national average. For residents of nonmetropolitan areas of the United States, prices were 12.2 percent lower (RPP = 87.8) than the national average.

Price levels between MSAs can also be directly compared by calculating the ratio of their respective RPPs. For example, a common selling point about Philadelphia is that it is cheaper to live there than in New York or Washington, D.C. A comparison of their RPP values confirms this: Prices in the Philadelphia metro area are 12.3 percent lower than prices in the New York metro area and 10.2 percent lower than in the D.C. area.

Prices for market goods in a given area are influenced by several factors. Housing rents capture differences in amenity values between cities, while trade costs influence the prices of goods in different areas. Examining the main categories of expenditures for which RPP data are available—all items, goods, rents, and other services—sheds some light on what drives these price variations across the country.[3]

In the RPP data, the range of values for rents exceeds the range of values for all items and for goods or other services (Figure 3), especially among the metro areas with higher prices. The standard deviation for rent RPPs is more than three times the standard deviation of overall RPPs, indicating a wider dispersion of rents than of prices for all items over all U.S. metro areas.

Rents Drive the Variation in Overall Prices

Range of RPP by category, percent 2014.
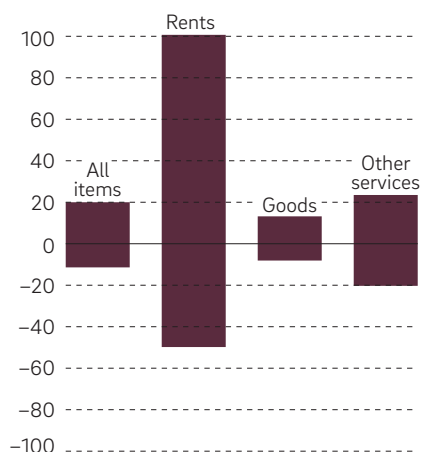
Sources: Bureau of Economic Analysis and authors' calculations.

Spending on housing makes up a large portion of a household's expenditures, 20 to 30 percent, on average.[4] Furthermore, as many news articles that highlight sky-high rents in New York City or Silicon Valley make clear, rents vary drastically by city, or even neighborhood. Rents in a given area reflect differences in amenity values between cities and are determined by a host of additional factors that vary by location, including how great the demand is for housing, the quality of the housing stock, and how loose or restrictive zoning regulations are that govern the location and types of residences.

The impact of rents on overall prices is evident when we compare the price parities for all items, goods, rents, and other services in the Florence-Muscle Shoals, AL, Philadelphia-Camden-Wilmington, and San Jose-Sunnyvale-Santa Clara, CA, metro areas (Figure 4). Prices for goods and for other services in the Florence-Muscle Shoals metro area are slightly below the national average (2.4 percent and 5.7 percent lower, respectively), but because rents are nearly half the national average, overall prices are even lower (15.6 percent). Conversely, housing costs in the San Jose metro area are more than twice the national average, while costs there for goods and for other services exceed the national average by only 8.2 percent and 9.3 percent, respectively. Overall prices in Silicon Valley are nearly 23 percent higher than the national average.

Measuring Regional Inflation

Though the CPI provides a direct way to measure regional inflation in 14 metro areas, RPPs can indirectly tell us how prices have changed from one year to the next within all U.S. metro areas, most of which the metro CPI does not cover. To measure how much more or less expensive an area has become, we can multiply its RPP by the national personal consumption expenditures (PCE) index to produce an implicit regional price deflator.[5] Using this method, prices in the Philadelphia area grew 1.4 percent from 2013 to 2014. As measured by the CPI, Philadelphia area inflation over the same period was 1.3 percent, similar but not identical to the RPP measurement.[6] The differences in the source data and methodology between the CPI and RPPs also contribute to differences in their inflation measurements.

Measuring Purchasing Power

RPPs allow us to create a standard to compare income- and spending-related economic data and purchasing power over market goods across areas.[7] When the BEA releases statistics on personal income for states and metro areas, it uses RPPs to adjust the nominal income figures to account for local variations in prices to give a more accurate picture of income dynamics among metro areas.

For example, a Philadelphian considering taking a job in New York City needs to weigh a number of factors before deciding whether to accept the offer and move, including the new salary offer in relation to the new cost of living. The RPP data show that housing costs and other prices in Philadelphia are lower than in New York. Will he or she earn enough to cover the cost of housing, food, and other needs in New York? Although higher-cost areas tend to pay higher wages, having the highest wages may not translate into the most purchasing power.

We can use the price parities for all items to adjust wages and other spending-related economic data between areas by controlling for price level differences

Effect of Housing on Overall Prices Is Clear

Regional price parities by category for a low-, middle-, and high-cost MSA, 2014.
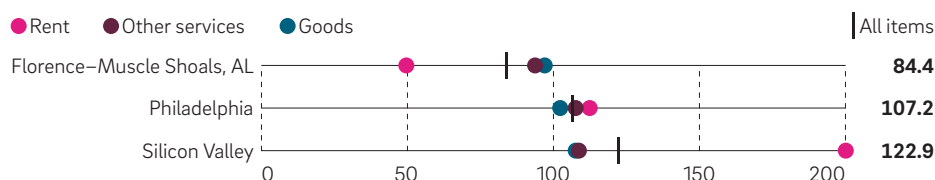
Source: Bureau of Economic Analysis.

How Do Prices Vary in Our Region?

Tristate Prices Notably Higher in the East
Regional price parities in Pennsylvania, New Jersey, and Delaware MSAs.

Price parities tend to be higher in metro areas and in the east.

New York **122.3**

Lehigh Valley **100.3**

Johnstown **85.5**

Price Parities
National avg.=100

- > 110
- 103–110
- 97–103
- 90–97
- < 90

* Not fully within the tristate area

Price parities tend to be lower in central and western Pennsylvania.

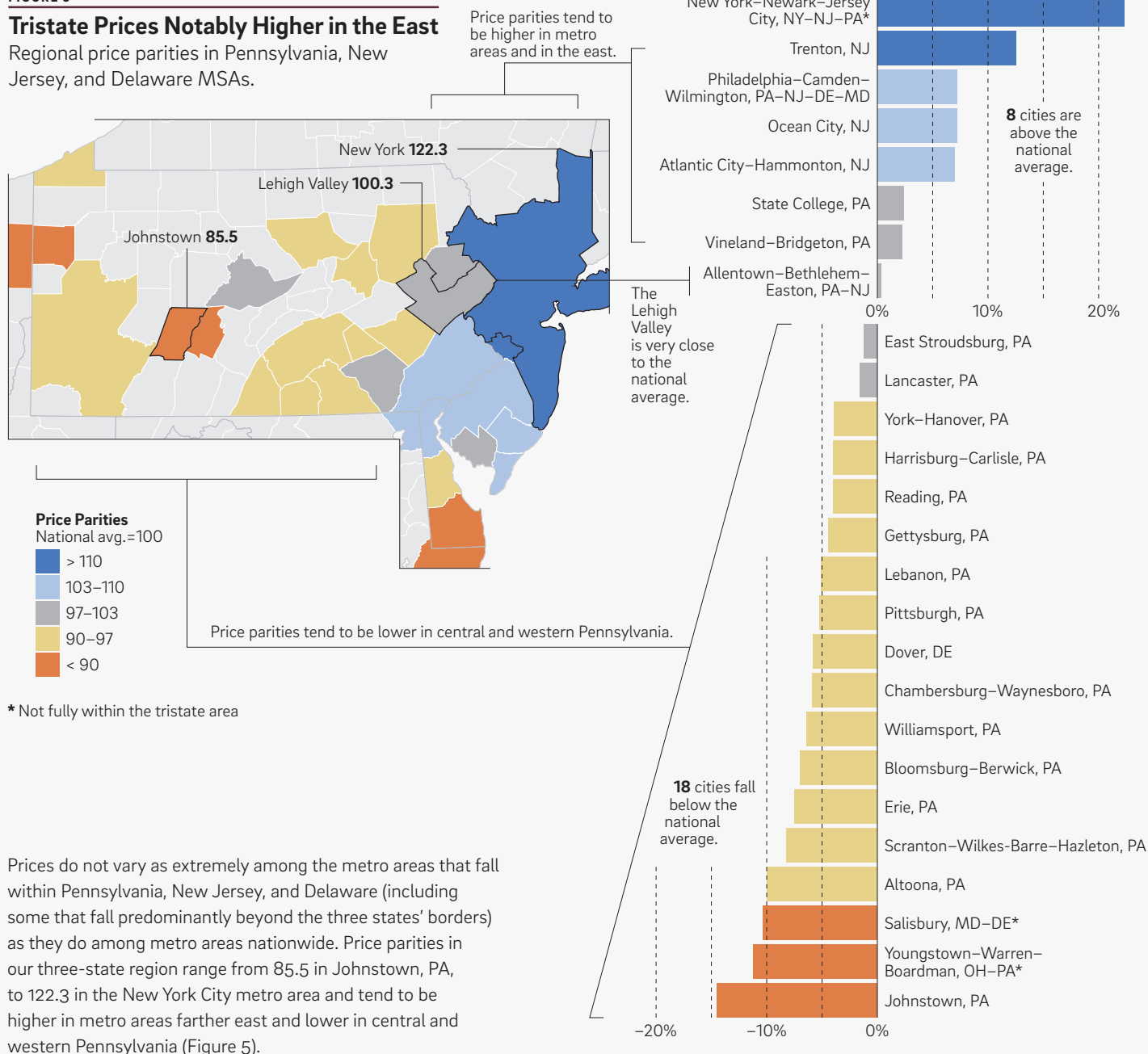New York–Newark–Jersey City, NY–NJ–PA*

Trenton, NJ

Philadelphia–Camden–Wilmington, PA–NJ–DE–MD

Ocean City, NJ

Atlantic City–Hammonton, NJ

State College, PA

Vineland–Bridgeton, PA

Allentown–Bethlehem–Easton, PA–NJ

8 cities are above the national average.

The Lehigh Valley is very close to the national average.

0%   10%   20%

East Stroudsburg, PA

Lancaster, PA

York–Hanover, PA

Harrisburg–Carlisle, PA

Reading, PA

Gettysburg, PA

Lebanon, PA

Pittsburgh, PA

Dover, DE

Chambersburg–Waynesboro, PA

Williamsport, PA

Bloomsburg–Berwick, PA

Erie, PA

Scranton–Wilkes-Barre–Hazleton, PA

Altoona, PA

Salisbury, MD–DE*

Youngstown–Warren–Boardman, OH–PA*

Johnstown, PA

18 cities fall below the national average.

−20%   −10%   0%

Prices do not vary as extremely among the metro areas that fall within Pennsylvania, New Jersey, and Delaware (including some that fall predominantly beyond the three states' borders) as they do among metro areas nationwide. Price parities in our three-state region range from 85.5 in Johnstown, PA, to 122.3 in the New York City metro area and tend to be higher in metro areas farther east and lower in central and western Pennsylvania (Figure 5).

Relative to the nation, tristate prices range from roughly 15 percent lower to more than 20 percent higher. However, prices in most metro areas in our region are lower than the national average. Seven metro areas had higher prices than the nation, including the New York metro area, which mostly lies beyond the three-state region; prices in the Lehigh Valley, officially known as the Allentown–Bethlehem–

Easton, PA–NJ metro area, are roughly in line with prices in the nation overall (RPP = 100.3).

To measure differences in purchasing power around our region, we applied the adjustment technique described on the adjoining pages to the nominal

annual median wage for each metro area in our three states. In areas with RPPs below 100, adjusted wages will be higher than nominal wages, and in areas with RPPs above 100, adjusted wages will be lower than nominal wages (Figure 6). For example, the 2014 annual median wage in Johnstown was $29,480 and in the Lehigh Valley was $34,970. Yet,

How Far Does That Salary Really Go?

Nominal and price-adjusted median wages for tristate metro areas, 2014.

	Nominal annual median wage ($)	RPP	Adjusted annual median wage ($)
Allentown–Bethlehem–Easton, PA–NJ	34,970	100.3	**34,865**
Altoona, PA	29,700	90.0	**33,000**
Atlantic City–Hammonton, NJ	32,630	107.0	**30,495**
Dover, DE	32,620	94.2	**34,628**
Erie, PA	29,880	92.5	**32,303**
Harrisburg–Carlisle, PA	36,700	96.0	**38,229**
Johnstown, PA	29,480	85.5	**34,480**
Lancaster, PA	33,160	98.4	**33,699**
Lebanon, PA	32,740	94.9	**34,499**
New York–Northern New Jersey–Long Island, NY–NJ–PA*	43,660	122.3	**35,699**
Ocean City, NJ	30,410	107.2	**28,368**
Philadelphia–Camden–Wilmington, PA–NJ–DE–MD	39,480	107.2	**36,828**
Pittsburgh, PA	35,530	94.8	**37,479**
Reading, PA	35,660	96.0	**37,146**
Salisbury, MD–DE*	31,370	89.7	**34,972**
Scranton–Wilkes-Barre–Hazleton, PA	32,250	91.8	**35,131**
State College, PA	35,060	102.4	**34,238**
Trenton–Ewing, NJ	50,300	112.5	**44,711**
Vineland–Millville–Bridgeton, NJ	35,730	102.2	**34,961**
Williamsport, PA	31,820	93.6	**33,996**
York–Hanover, PA	34,250	96.1	**35,640**
Youngstown–Warren–Boardman, OH–PA*	29,870	88.8	**33,637**

Sources: Bureau of Labor Statistics, Bureau of Economic Analysis, and authors' calculations.

* Not fully within the tristate area

once regional prices differences are taken into account, a worker earning the median wage in Johnstown, PA, where prices are lower than the national average, has purchasing power comparable to that of a worker earning the median wage in the Lehigh Valley, despite earning about $5,000 less.

using a simple formula: value / (RPP/100). For example, in 2014 the New York metro area had the eighth-highest annual median wage ($43,660) and third-highest regional price parity (122.3) of all U.S. metro areas. But after adjusting the median wage[8] data to incorporate the cost of living as measured by the RPP, the median wage earned in the New York metro area falls to $35,699, placing it 123rd in terms of purchasing power[9] among U.S. metro areas. The Philadelphia metro area, which is ranked 22nd in terms of annual median wage, also falls in ranking after adjusting for prices, though not quite as far, to 90th.

Accounting for Latent Costs

Regional price variations aid our understanding of how individuals and firms decide where to locate, a topic of considerable ongoing research. But while regional price parities capture an area's market costs to consumers, they do not account for certain costs and benefits that are hard to quantify but also valuable to consider, such as the quality of the schools, nightlife, or bike lanes. Workers weigh these nonmarket costs and benefits as well when deciding where to live and work. This location decision varies by person, as one individual will value an area's amenities differently than another will.[10] Prices and purchasing power are not the only factors an individual worker considers when deciding where to locate. For example, RPPs may show that it is cheaper for someone working in Philadelphia to live in the Scranton-Wilkes-Barre-Hazleton area, where rents and the prices of goods and services are lower. But how that person values each area's amenities, the cost in time and money of a longer commute, and other factors will determine where that person locates.

Final Thoughts

Even though we all use the same currency in the U.S., a dollar in one city does not go as far as a dollar in another. That means households and firms face sometimes-extreme differences in prices from city to city and region to region, complicating their financial decision-making. Likewise, policymakers at all levels of government need to consider regional price variations when considering changes in wage policies or housing regulations. Even with monetary policy, the existence of different regional inflation rates means national interest rate policy may have differential effects.[11] If monetary policy impacts local economies differently, businesses and local governments can use regional price parity comparisons to better anticipate those effects. ▣

Notes

1 This is a complex, multiple-step process. See the methodology description in "Real Personal Income and Regional Price Parities" (2016).

2 At the time this article was written, RPPs were available through 2014. Data for 2015 were released in June 2017.

3 RPP data are also available for 16 expenditure classes, which include education, food, housing, medical, other, recreation, and transportation (goods and services); apparel (only goods); and rents (only services).

4 Rents expenditures make up 20.6 percent of the BEA's personal consumption expenditures measure and 30.5 percent of the BLS's Consumer Expenditure Survey, which is meant to capture out-of-pocket expenditures and doesn't include, for example, the portion of workers' health insurance premiums covered by their employers.

5 Implicit price growth (or regional inflation) = $\left(P_{i,t}/P_{i,t\text{-}1}\right) = \left(RPP_{i,t}/RPP_{i,t\text{-}1}\right) * \left(P_{US,t}/P_{US,t\text{-}1}\right)$ where i is the region and t is the time period. Therefore, price growth in a region is equal to the change in the regional price parity for a region multiplied by the change in prices in the nation as a whole, as measured by the national PCE price index.

6 The RPP measure of inflation is an indirect estimate based on national price trends, whereas the CPI provides a direct measure of regional inflation based on price changes in a given area. Differences in the source data and methodology between the CPI and RPPs also contribute to differences in their inflation measurements.

7 It should be noted that the discussion of purchasing power in this article relates only to market goods. RPP data are constructed using consumption data and include no information about additional costs of living specific to a given place, such as local taxes, amenities, etc.

8 The median wage provides an imperfect picture of regional variation in wages, as it does not take into account differences in workforce composition among metro areas. MSAs with high concentrations of high-paying jobs in fields such as engineering and software development will appear to have much higher wages across the board than MSAs with primarily lower-paying occupations such as teaching and retail service. In such cases, the median wage would not reflect wage differences for engineers, say, in the one area versus the other.

9 It should also be noted that these measures do not describe welfare differences across MSAs, since they do not incorporate the value of public goods or the locations of amenities. We cover this briefly in the "Accounting for Latent Costs" section.

10 In addition to amenities, a worker's decision can also be influenced by individual characteristics such as income, education level, occupation, or skill level. See Jeff Brinkman's *Business Review* article.

11 See the 1996 and 1999 *Business Review* articles by Gerald A. Carlino and Robert DeFina. Also, see Theodore Crone's 1999 *Business Review* article.

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Why Are Men Working Less These Days?

Common explanations for the drop in employment among men without college degrees invoke everything from robots to disability to working wives. But what does the evidence say?

Ryan Michaels is a senior economist at the Federal Reserve Bank of Philadelphia. The views expressed in this article are not necessarily those of the Federal Reserve.

BY RYAN MICHAELS

Employment of men in their prime working years has fallen over the past five decades, particularly among men without college educations. This decline has alarmed policymakers. Noting that the prime working years are typically a worker's most productive, the Council of Economic Advisers in 2016 suggested that declines in employment may be dragging down economic output and diminishing family well-being. Accordingly, there have been calls for increasing investment in education and expanding tax credits for working with the hope of attracting more men to the workplace. Considering that any policy response to employment's downward slide should be informed by the reasons underlying it, we want to ask: What accounts for this downward trend?

Standard microeconomic theory says that people work if their earnings from employment are sufficiently high relative to whatever income is available to them if they're not working. Accordingly, the natural place to search for an explanation for the fall in employment is to explore whether the payoff from working has fallen relative to the payoff from not working. The usual suspects fall into one of two categories: factors that have suppressed wages among workers with no college degrees, and factors that have increased the income available to those out of work. One example of a force depressing earnings is labor-saving technology, which has reduced the demand for noncollege-educated workers. The second category of factors includes, for instance, expansions in eligibility for federal benefit programs, such as disability insurance benefits.

Standard theory thus expounds a simple narrative for the decline in male employment: The reason men today are working less than earlier generations did must be that the wages they can earn are now lower relative to other income sources, including government benefits and spousal earnings. If the theory is correct, we should observe that these other income sources replace, or make up for, an increasing share of men's forgone earnings.

To take this question of declining male employment beyond plausible narratives into quantifiable territory thus requires looking for evidence of any movement in this replacement rate, which expresses the amount of income a person can tap without working as a share of the wage the person can earn by working. To set the stage for this analysis, let us first take a closer look at the large and long decline in male employment.

See the related article in this issue, "Where Is Everybody? The Shrinking Labor Force Participation Rate."

Employment vs. Unemployment

This article is concerned with trends in the employment rate. I define an individual's employment rate as the fraction of the year he or she is employed. So, if a man works for 46 weeks of the year, his employment rate is roughly 88.5 percent. The aggregate employment rate can then be measured by averaging the employment rates of individual survey respondents.

A related concept is the unemployment rate. To be officially considered unemployed, a person has to report being currently out of work, actively looking for employment, and able and willing to start a new job if one is offered. The unemployment rate is calculated by dividing the number of people who are unemployed by the total number of people working or looking for work—the labor force.

Our measurement of the employment rate differs in two respects. First, by incorporating data on weeks worked, it captures changes in both the number of people who are working and in how much they are working per year. Second, it captures a broader sample of individuals, as it measures the time spent out of work by both the unemployed as well as by those who have left the labor force and are therefore no longer counted as unemployed.

As a result, the employment and unemployment rates can differ substantially. The unemployment rate in 2016 among prime-age men with no college experience was 6 percent. And yet, as we shall see, the employment rate indicates that almost 20 percent of these men did not work at all that year.

The Extent of the Decline

The employment rate among all prime-age men, those age 25 to 54, has fallen by more than 8 percentage points, from 93.5 percent in 1967 to 85 percent in 2015 (Figure 1).[1] Between 1967 and 1989, the employment rate fell 5 percentage points. Then after plateauing during the 1990s, it began falling again, dropping 3.5 percentage points between 2000 and 2015.[2]

The employment rate among prime-age men with no college experience has become particularly low, as Figure 1 also shows. In 2015, men with at most a high school degree spent on average nearly 23 percent of the year out of work. That translates into an employment rate of just 77 percent, compared with 92 percent in 1967.[3]

Much of the fall in employment is due to an increase in the share of men who do not work at all during the course of a year.[4] Only 3 percent of noncollege-educated men did not work any weeks in 1967 (Figure 2). In 2015, 18 percent of noncollege educated men worked zero weeks–a six-fold increase!

Framework for Understanding Long-Run Labor Supply

How might we understand the decline in male employment? Standard microeconomic theory takes the perspective that workers can, over the long run at least, choose how much to work–their labor supply decision. This theory identifies two key ingredients that enter into a person's decision regarding how much to work.[5]

One is the wage. If the demand for their labor declines and leads to lower wage offers, we expect men to work less. The other is nonwork income, or the income to which a man has access even if he opts not to work. Nonwork income consists mostly of government benefits and other family members' (predominantly spousal) income.[6]

The amount of nonwork income relative to the wage, or the replacement rate, is thus a key determinant of labor supply. A change in one or the other ingredient, by itself, does not tell us all we need to know. Suppose wages fall but nonwork income drops proportionally. In this case, the reduced incentive to work implied by lower wages is offset by a greater incentive to work implied by less outside income. As a result, the number of weeks worked remains unchanged despite the changes in wages and benefits.[7]

To illustrate how one can calculate a replacement rate, suppose that a single man who had formerly worked year-round for $40,000 per year opts to not work at all this year. Instead, he draws benefits that replace half of his forgone wage income, which leaves him with $20,000. The replacement rate in this case is 50 percent.

The notion of the replacement rate can easily incorporate other sources of nonwork income, such as spousal income. Suppose the man is married and that his spouse earns $20,000 per year. The man's withdrawal of labor supply reduces his total household income–work plus nonwork income–from $60,000 to $40,000. In other words, the household retains, or replaces, two-thirds of its original income, for a replacement rate of 67 percent.

According to standard theory, the steep declines that we have observed in employment have a likely culprit: significant increases in the replacement rate. If the replacement rate rises, a man can maintain an even higher share of his former standard of living without having to work. Not surprisingly, this would reduce his motivation for working.[8]

Though not often couched in these terms, many narratives surrounding the fall in employment boil down to a claim that the replacement rate has risen. Arguments emphasizing factors including a greater generosity of public benefit programs,[9] lower real wages,[10] or higher spousal income all identify a particular component of the replacement rate, with the implication being that the rate has increased. So the question is, how do we go about finding evidence that the replacement rate has changed?

Employment Particularly Low for Men With No Degree

Percentage of each year that men age 25–54 worked on average, 1967–2015.
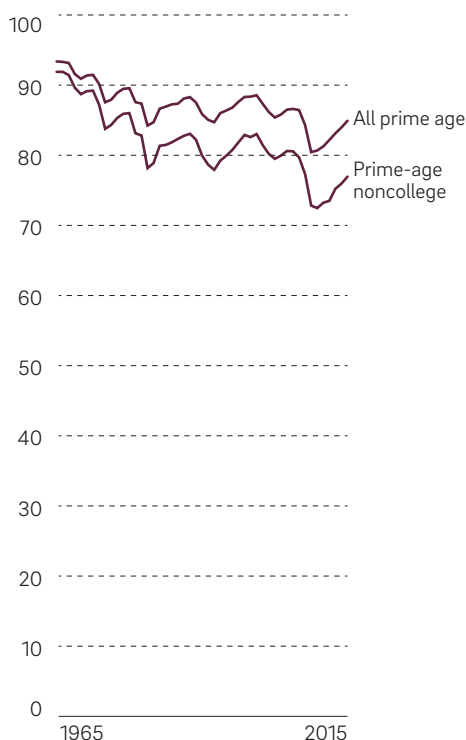
All prime age

Prime-age noncollege

Source: Census Bureau and Bureau of Labor Statistics Current Population Survey Annual Social and Economic Supplement.

More Men Not Working All Year Long

Percentage of noncollege-educated men age 25–54 who did not work at all in a year.

Source: Census Bureau and Bureau of Labor Statistics Current Population Survey Annual Social and Economic Supplement.

What Has Happened to the Replacement Rate? A First Look at the Data

If a man's decision to quit working ends up substantially reducing his household's income, we can infer that his household has few resources that can plug the hole left by his earnings. Accordingly, the replacement rate is likely to be low. But if his household income falls little when he works fewer weeks, the replacement rate is likely to be high. These observations suggest a way of inferring changes in the replacement rate: We need to measure how household income reacts to differences in men's weeks of work and see how this sensitivity of household income has evolved over the past several decades.[11]

Fortunately, data on both household income—which is composed of earnings from employment as well as spousal income and public benefits—and weeks of work are readily available from the Current Population Survey's Annual Social and Economic Supplement. These data enable us to estimate the relationship between the number of weeks worked by prime-age men and their household income.

Restricting our attention (for now) to benefits that can be measured consistently during the period 1967-2015—which include, critically, unemployment and Social Security disability insurance, among other sources[12]—we can see in Figure 3 how household income varies according to the number of weeks worked by prime-age noncollege-educated male heads of household.[13] Among those who worked fewer than 13 weeks, their household income during the years 1967 to 2015 averaged around $30,000, measured in 2015 dollars. Virtually all of this income came from either government benefit programs or other household members' income, in particular, the man's spouse. In contrast, the income of households whose noncollege-educated prime-age male heads worked year-round averaged more than $70,000, with the men's earnings making up a much larger share and benefits contributing very little.

The change in income that occurs as the number of weeks worked changes is indicative of the replacement rate. For instance, we can compare a household whose male head worked half the year and had an annual income averaging roughly $40,000 and a household whose head did not work and had an income of $30,000 (Figure 3). The household of the man who did not work can be said to have replaced just over 70 percent of the income of the household whose male head worked 26 weeks. By the same token, the household in which the man did not work replaced just under 40 percent of the income of a household whose male head worked year-round.[14]

The key question is whether the replacement rate has changed between 1967 and 2015. As a first step, I divide this time span into two periods—1967-1990 and 1991-2015—and inspect how household income varied with the prime-age noncollege-educated male head's weeks of work in each period (Figure 4). Though household income in the latter period was higher for any number of weeks worked, it appears that income increased across weeks of work at nearly the same rate in both periods. Likewise, if the male head worked relatively little, his household replaced roughly the same percentage of forgone income in both periods. Yet, employment was substantially lower post-1990, an initial indication that changes in replacement rates are unlikely to account for the decline in employment.
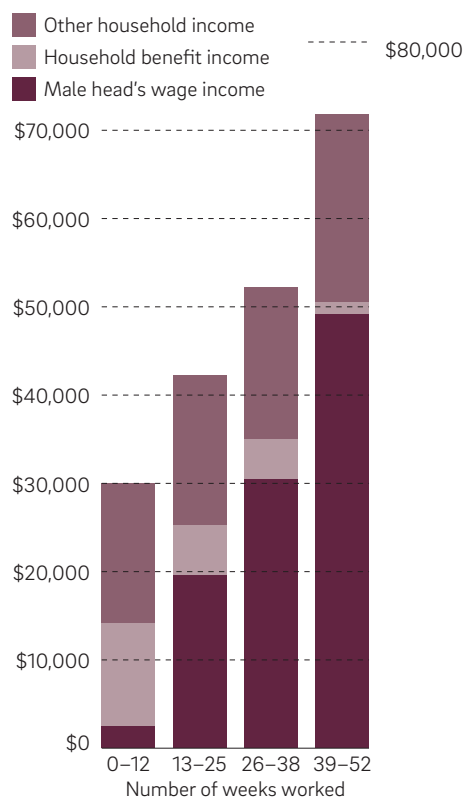
Figure 4 has the virtue of simplicity, but it compares just two periods and, more importantly, papers over important differences in the attributes of men who work different numbers of weeks. Nonetheless, as we shall see, its basic message holds up after several refinements.

A key idea underlying Figure 4 is that we can infer what a nonemployed man's household income would be if he chose to work by looking at the household

incomes of working men. In so doing, we can calculate the replacement rate facing the nonemployed man. But employed and nonemployed men are surely different in many other ways. How can we sensibly compare the two?

As a first step, we can account for the role of differences in certain attributes, such as age and family size. Standard statistical techniques enable us to adjust for the role that these differences play in Figure 4, helping to isolate the relationship between weeks worked and total income for a typical household. When we carry out this analysis on each year of data, the replacement rate–measured, again, as the household income of a noncollege-educated prime-age man who does not work relative to that of a man who works year-round–fluctuates between 30 and 40 percent, with no pronounced upward trend. Furthermore, there is little evidence that the fluctuations in the replacement rate are associated with opposing movements in the employment rate of noncollege prime-age men

Employment, Replacement Rate Show No Evident Link

Changes in employment and replacement rates for noncollege-educated prime-age male household head across three periods, percentage points.

Change in
- Employment rate
- Replacement rate, without adjustments
- Replacement rate, with adjustments

Source: Elsby et al. (2017).

Note: Adjusted rates incorporate imputations of benefit income based on the TRIM program and on administrative data on medical care spending under Medicare and Medicaid.

(Figure 5). The employment rate fell over 6 percentage points between 1967 and 1990 and has fallen nearly 4 more percentage points since 2000. Yet, the replacement rate declined from 36 to 30 percent in the former period and was virtually unchanged at 32 percent in the latter period. When the replacement rate did rise between 1990 and 2000, there was hardly any change in employment.

One lingering concern with this analysis is that employed and nonemployed men with otherwise similar attributes may still not be able to earn the same wage. Nonemployed men may not be working because they face lower wage offers, and higher replacement rates, than implied by our measurements. One way to address this concern is to compare the nonemployed's household incomes only with those of men who work no more than either 13 or 26 weeks, with the idea being that the nonemployed could plausibly earn at least as much as those men who spend much of the year not working. Yet, when Elsby and his coauthors do this, the replacement rate still looks roughly stable during the past five decades.[15]

A final set of concerns relates to data quality. The estimates of benefit income underlying Figures 3-5 suffer from two shortcomings. First, recall that we have thus far used only the benefit income available from the CPS in all years. The survey has been asking households whether they participate in certain benefit programs–the Supplemental Nutrition Assistance Program (SNAP), better known as food stamps; Medicaid; and Medicare (for which many Social Security disability recipients are eligible)–only since 1980.[16] So, we need to re-estimate the replacement rate starting in 1980 to incorporate these benefits. Second, households tend to under-report their benefit income.[17] To correct for this error, we can identify benefit-eligible households and impute benefit income to them so that it matches the total amount of money that these programs report paying out in benefits.[18] Although these additions to and refinements of our measures of benefit income result in smaller estimated declines in the replacement rate (Figure 5), they still provide no strong evidence that declines in employment correspond to increases in the replacement rate.

Reconsidering a Few Popular Hypotheses

The long-run stability of the replacement rate may be surprising. The demand for lower-skilled work has diminished over recent decades, and there are well-known examples of increases in the sources of income available to out-of-work male household heads. One might expect these trends to result in a higher replacement rate. How can we reconcile these narratives to our results?

Consider first the implications of declines in wages.[19] Real (inflation-adjusted) hourly earnings of noncollege-educated prime-age men have fallen almost 15 percent over the past 40 years. These declines would presumably reduce the return from working relative to the income that can be accessed while not working, leading to a higher replacement rate.

This narrative is initially compelling but ultimately incomplete. One reason is that several public benefit programs tie the size of payments to earnings. As a result, changes in benefits can partly offset the effect of changes in earnings, blunting any change in the replacement rate and, thus, in the incentive to work. Perhaps the program that best illustrates this feature is unemployment insurance. Though state laws differ somewhat, a claimant's weekly unemployment insurance payment generally scales with his average weekly earnings, replacing nearly 50 cents of every dollar of earnings. Thus, if earnings fall, benefits dip roughly proportionately, leaving the incentive to work unchanged.[20] There is no evidence of a long-term rise in the share of earnings replaced by unemployment insurance.[21]

The benefit formula used to allot food stamps is also responsive to earnings, though it works in a slightly different fashion. For each additional week that an individual works, his household's food stamp allotment is reduced by 30 percent of his weekly earnings.[22] Therefore, the lower the man's weekly earnings, the less his family's allotment is reduced in dollar terms. In other words, the disincentive to work implied by low wages is partly offset by the fact that his household loses less of its food stamps if he works.[23]

A second explanation for the fall in employment stresses the role of expansions in benefit eligibility. The idea here is that,
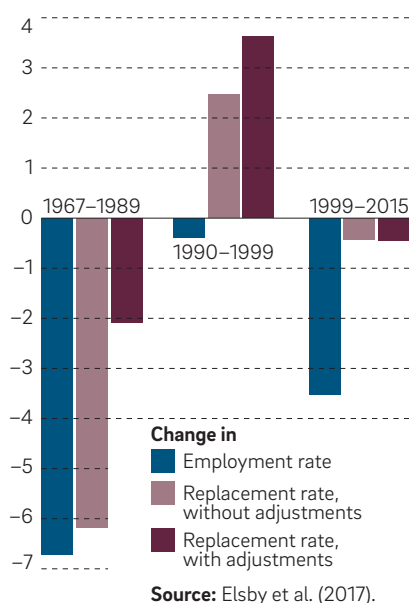
even if the eligibility formulas did not change dramatically, the programs now accept more recipients. Hence, the typical male head of household faces a higher replacement rate.

Social Security disability insurance has drawn considerable attention because of the rise in the disability rolls, which reflects, in part, legislative actions to expand eligibility.[24] Yet, it is unlikely that changes in Social Security policy significantly raised the overall replacement rate facing prime-age men. Whereas the share of older men (age 55-64) receiving federal disability benefits increased by nearly 8.5 percentage points during the past 50 years,[25] prime-age men (age 25-54) have had much less contact with the program. The share of prime-age men receiving disability benefits increased by just 2 percentage points, which accounts for only about one-quarter of the rise in the share not working during a year.[26]

Another program that has drawn substantial interest is food stamps. Between 1979 and 2007, however, participation hardly budged on net, whereas the employment rate of all prime-age men fell 3 percentage points.[27] The only meaningful increase in prime-age male SNAP participation occurred during the Great Recession, with the participation rate rising from 4 percent in 2007 to 8.5 percent by 2015.[28] The generosity of SNAP payments also increased during this time. Even so, SNAP is just one source of nonwork income, even in households whose male heads are essentially out of work. Among prime-age men who work fewer than 13 weeks out of the year, increases in SNAP payouts implied an increase in annual nonwork income of at most 3 percent in 2015.[29]

A third hypothesis looks at the rise in women's labor force participation, which has increased the spousal income available to married men. However, marriage has become far less common than it used to be among noncollege-educated prime-age men. Even after accounting for the increase in cohabitation, the share of these men living with a spouse or female partner has declined from 84 percent in the late 1960s to 60 percent today.[30] As a result, despite the enormous increase in female labor force participation, noncollege-educated prime-age men are now only slightly more likely to live with a working woman. In fact, among men who work less than half the year, 21 percent live with a female spouse or partner who works more than half the year–a state of affairs essentially no different than what had prevailed in the late 1960s.[31] The second challenge to this narrative is that, in married-couple households, other sources of income are partly displaced by the rising incomes of working wives. For instance, spousal income can disqualify a family from income-tested benefits such as SNAP and Temporary Assistance for Needy Families (TANF).

Why Has Employment Fallen Amid a Stable Replacement Rate?

Recall that our framework for labor supply presumes that men can, at least over the longer run, choose how much to work. However, some men may be unable to find work at any wage because of a criminal record or poor health. Ex-offenders are legally barred from many jobs in the health care and security services industries. The increase in the number of ex-offenders could, therefore, lead to lower employment. In addition, the number of men who report work-limiting impairments has increased, suggesting that poor health may have a bigger role than suggested by the change in the disability rolls.

Incarceration

The number of ex-offenders has risen over the past 30 years, especially among black men. Ex-offenders are nonincarcerated individuals who were previously incarcerated in a state or federal prison. The share of ex-offenders among black men with no college experience rose nearly 12 percentage points between 1980 and 2010.[32]

An increase in the ex-offender share is expected to depress employment.[33] Prior incarceration has been found to reduce the probability of employment among young men, though there is considerable disagreement as to the exact size of the effect–with estimates of the reduction ranging from 24 percentage points[34] to no more than 7.5 percentage points.[35]

And yet, the fall in employment among prime-age noncollege-educated black men has been so substantial that the rise in the ex-offender share probably accounts for only a modest portion of it. To see why, suppose incarceration reduces the probability of future employment by 24 percentage points, and note that 12 percent more of the population consists of ex-offenders. Then, the employment rate among black men would be expected to fall only about 2.8 percentage points (0.24 × 0.12) as a result of incarceration. Meanwhile, the share of prime-age noncollege-educated black men who do not work at all in a year has increased 24 percentage points in the past 50 years.[36]

Health Limitations

The number of men who report having a health condition that limits their ability to work is considerably greater than the number who receive Social Security disability benefits. Whereas 3 percent of prime-age men receive disability benefits, twice as many men reported having difficulty working because of a physical, mental, or emotional condition lasting six months or longer. Among the noncollege-educated, 9 percent report a work limitation.[37] The men who report a health condition that limits their ability to work appear to suffer from chronic pain that requires medication.[38]

But has the change in employment been driven by a change in the number of men with work limitations? If an increasing prevalence of poor health is driving down employment of non-college men, we should observe an increase in the share of the nonemployed who report a disability. According to CPS data, however, the disabled share of the nonemployed has not risen during the past 40 years. This finding strongly suggests that the ranks of the nonemployed have expanded for many reasons other than disability.[39]

Final Thoughts

Standard microeconomic theory points to the role of the replacement rate in understanding movements in employment. Yet, it is surprisingly hard to uncover evidence of a significant

rise in the replacement rate. What other economic mechanisms might lie behind the declining trend in male employment?

One point of departure is the rather narrow view of nonwork time embedded in the replacement rate. The replacement rate values nonwork time only in terms of current nonwork income. However, if we take a broader view of nonwork time, it becomes clear that its value can increase even if current nonwork income–and the replacement rate–does not. At least two forces may have contributed to an increase in the value of nonwork time, and in turn to a fall in employment.

The first is an increase in the quality of leisure activities. Recent research has pointed, for instance, to technological advances in recreational computer activities, such as video gaming, that enhance the value of leisure time.[40] However, this argument applies in particular to men younger than 30 over the past 15 years. It remains to be seen whether changes in the quality of leisure time can account more broadly for the fall in employment.

A second reason that time off the clock may be considered more valuable has to do with the rise in wage inequality over the past several decades.[41] When wage inequality rises, nonwork time can be more valuable because it can be used to search for high-wage positions. This higher value of time spent job-hunting implies lower current employment even if current nonwork income–and our measure of the replacement rate–does not increase.[42] One shortcoming of this argument, though, is suggested by Figure 2: The fall in employment has been concentrated among men who do not work at all, rather than men who simply wait longer to return to work.

To conclude, let me highlight two other strands of research that can broaden our view on long-run labor supply and potentially shed light on the causes of the decline in employment among noncollege-educated men. One suggests that barriers to re-employment among out-of-work men may be more widespread than previously thought. The fall in employment has occurred during a period of declining demand for manufacturing workers and, more generally, for workers doing manual tasks.[43] The coincidence of these two trends suggests that men may face far more substantial impediments to changing careers. Yet critical questions remain: What are these barriers? Why do they have such seemingly long-lasting effects?

A second, burgeoning literature on social interactions questions the assumption in standard theory that one's preferences are formed independently of others' actions. Some phenomena can be better understood as a result the dependence of individual preferences on the choices of others.[44] In the context of labor markets, perhaps the value of an individual's nonwork time depends on the labor supply choices of others. For instance, an individual will enjoy additional nonwork time more if his peers have increased their nonwork time. This holds out the intriguing possibility that declines in employment can snowball even in the absence of large changes in the replacement rate, though further research is needed.

> ## What other economic mechanisms might lie behind the declining trend in male employment?

Notes

1 Recent declines in overall labor force participation stem to a considerable extent from aging. Our focus on prime-age men helps de-emphasize the effect of aging on employment trends. For a thorough assessment of recent trends in participation across demographic groups, see the 2014 paper by Stephanie Aaronson and her coauthors.

2 These data come from the Census Bureau and Bureau of Labor Statistics' Current Population Survey's (CPS) Annual Social and Economic Supplement. Our sample of noninstitutionalized prime-age men excludes retirees as well as men who are in school or in the military. We also drop the self-employed, since self-employment may reflect a lack of wage and salary employment opportunities, which we want to focus on. The definition of the employment rate follows influential papers by Chinhui Juhn in 1992 and by Juhn, Kevin Murphy, and Robert Topel in 1991 and 2002.

3 The share of men with no college was 75 percent in 1967 and is less than 40 percent today. This decline suggests that many of the most highly skilled high school graduates who would not have gone to college five decades ago are now more likely to enroll. This shift in composition of the noncollege group can account for 3 to 4 percentage points of the 15 percentage point fall in their employment rate. See the 2017 analysis by Mike Elsby, Ryan Michaels, David Ratner, and Matthew Shapiro.

4 See also Juhn, Murphy, and Topel's 2002 work.

5 See, for example, the 1999 work by Richard Blundell and Thomas MaCurdy and Robert Moffitt's 2002 work. In the short run, there may be reasons why a worker is unable to work as much as he or she wants. See the forthcoming paper by Per Krusell and his coauthors.

6 Although the wife's income may include wages, it is treated as nonwork income from the man's perspective. Nonwork income also includes interest and dividends as well as alimony and child support, though these sources make up a small share of income in households with noncollege-educated prime-age men.

7 The balancing of these two effects reflects standard assumptions about household preferences regarding consumption and labor supply. See Timo Boppart and Per Krusell's paper for an alternative theory of (very) long-run labor supply in which increases in average wages do permanently lower the number of weeks worked.

8 Changes in replacement rates should also affect female labor supply. So, why the focus on men? One answer is that the increase in female labor force participation appears to be stem in part from other reasons specific to women, such as advances in and wider use of birth control. See the papers by Claudia Goldin and Lawrence Katz in 2002 and Martha Baily in 2006. Francine Blau and Lawrence Kahn's 2007 work also found that higher female participation largely reflects a shift in women's willingness to work that is unexplained by changes in wages or family circumstances.

9 See Nicholas Eberstadt's 2016 work.

10 See the Council of Economic Advisers' 2016 report.

11 In a standard theory of labor supply, Elsby and his coauthors illustrate algebraically that a change in the replacement rate is always manifest as a change in the sensitivity of household income.

12 Other sources of benefit income include Supplemental Security Income (SSI), workers' compensation, and Temporary Assistance for Needy Families (TANF), the successor to Aid to Families with Dependent Children. SSI income has been reported in the CPS since the program was founded in the mid-1970s. SSI income before then is treated as zero. As for compensation, the CPS measure includes only cash earnings. Though it asks whether respondents have employer-provided insurance, it does not consistently include a measure of its value. Later (as part of Figure 5), we incorporate data from the National Compensation Survey to impute a value of private insurance to respondents.

13 For the analysis of replacement rates, we use weeks of work for the male head of household, our definition of which is more encompassing than the CPS definition. In the CPS, one respondent per household identifies himself or herself as the head. We instead include all self-declared male heads, as well as spouses, partners, and housemates of female heads. This definition enlarges the sample of heads in the CPS and still retains the advantage of focusing on weeks of work for one male in each household. Accordingly, we exclude children and other male relatives who live in the household. See the analysis of Elsby and his coauthors for details on males who are not in our sample of male heads of household. The employment rate of male heads increases by 10.5 percentage points between 1967 and 2015.

14 The most common choices are not working any weeks and working essentially year-round, or 50 to 52 weeks. Accordingly, the association between household income and weeks of work can be understood very simply by looking at the difference in annual income between households whose male heads work zero weeks and those who work year-round.

15 It still could be that men who work zero weeks receive lower wage offers than men who work at least a few weeks. In a separate exercise, Elsby and his coauthors look at how the household income of a given

male head changes when his weeks of work change. This strategy avoids comparing outcomes across different households but is inapplicable for men who work zero weeks in consecutive years. This approach also reveals no upward trend in the replacement rate.

16 Whereas the CPS measures the dollar value of food stamp benefits, it asks respondents only whether they participated in Medicare or Medicaid. Elsby and his coauthors combine these responses with administrative estimates of medical care expenditures per beneficiary under Medicare and Medicaid to impute dollar values for these benefits. To incorporate these programs into the replacement rate series prior to 1980, I assume that each program's effect on the replacement rate increased linearly between its founding date and 1980.

17 See the 2015 work of Bruce Meyer, Wallace Mok, and James Sullivan.

18 Following Elsby and his coauthors, I implement an algorithm developed by the Urban Institute, the Transfer Income Model, or TRIM. It can be used to impute SSI, TANF, food stamps, and federal housing benefits such as Section 8 vouchers for nearly every year since 1995. Correcting for Medicare, Medicaid, and Social Security disability underreporting is an aim of ongoing research. The replacement rate series is carried forward from 1990 by increasing the original series at the pace implied by the TRIM-based estimates of benefit income.

19 See Juhn's 1992 article, and her 1991 and 2002 articles with Murphy and Topel. See also Moffitt's 2012 piece. Juhn argues that declines in wages were especially critical after 1972, whereas declines in employment between 1967 and 1972 were attributed to other factors that shifted labor supply.

20 One caveat is that states cap the weekly benefit amount. However, earnings data from the CPS show that nearly three-quarters of noncollege-educated men with weekly earnings in 2015 would have received less than the maximum benefit if they had become unemployed.

21 See Wayne Vroman's 2002 work. This replacement rate rose temporarily in the Great Recession when Congress extended the duration of unemployment benefits from the usual 26 weeks to up to 99 weeks. See Jesse Rothstein's 2011 work and the 2016 work of Marcus Hagedorn and his coauthors.

22 The 30 percent rate was codified in the Food Stamp Act of 1977, though it had been in effect since at least 1971. See the Congressional Budget Office's 1977 report.

23 On the other hand, the maximum food stamp allotment, which is awarded if the household reports no earnings, has risen in real (inflation-adjusted) terms by 13 percent since the Food Stamp Act of 1977 took effect in 1979.

24 David Autor and Mark Duggan provide their findings in a nontechnical 2006 article in the *Journal of Economic Perspectives*. Burcu Eyigungor's 2014 article in the Philadelphia Fed *Business Review* provides an accessible overview.

25 Data are from the Social Security Administration and show the number of male beneficiaries under 54. There are virtually no recipients under age 25. Note that these calculations, as well as subsequent ones regarding SNAP benefits, rely on records that do not specify beneficiaries' education level, so they refer to all prime-age men.

26 The progressive structure of the benefit formula has also meant that the share of earnings replaced by disability income has increased (even if the overall replacement rate, factoring in all nonwork income, has not). See Scott Muller's 2008 work, and Autor and Duggan's 2003 article.

27 Data are from the Department of Agriculture and are available for ages 18–59, which we treat as "prime age" for these purposes. Estimates prior to 1979 are not comparable.

28 In 2009, the Department of Agriculture encouraged states to expand eligibility by lifting income and asset limits on SNAP applicants. By 2011, roughly 40 states had done so. See Peter Ganong and Jeffrey Liebman's 2013 article and Casey Mulligan's 2012 book.

29 This is calculated by comparing actual average food stamp benefits per household with what would have been observed assuming the 2007 participation rate prevailed in all future years.

30 The data underlying the calculations in this paragraph are from the CPS.

31 See also the Council of Economic Advisers' 2016 report.

32 These calculations (available upon request) build off a forthcoming article by Sarah Shannon and her coauthors. Estimates derived from Thomas Bonczar's 2003 work imply a slightly higher ex-offender share (16.2 percent in 2001) but a slightly smaller increase over time (9.4 percentage points between 1974 and 2001).

33 In contrast, an increase in the number of current inmates implies a higher employment rate, because incarceration excludes from the labor force men who would have faced a low probability of employment. See Katz and Alan Krueger's 1999 work.

34 See Richard Freeman's 1992 article and a 2005 paper by Harry Holzer and his coauthors. Both papers look at men younger than 34. In the calculations to follow, we assume that the effect of past incarceration is the same for older men.

35 See Jeffrey Grogger's 1995 paper.

36 There is another point of intersection between crime and employment: If wages from criminal activity rise relative to wages from legal work, young men may choose the former over the latter. This substitution of illegal for legal work surely went on in the 1980s amid the growing drug trade. See Freeman's 1992 discussion. For further analysis of black male employment, see also John Bound and Freeman's 1992 article and Holzer's 2009 survey.

37 As self-reported in the Census Bureau's 2007 American Community Survey (ACS), which offers a much larger sample than the CPS. The disability-related questions on the ACS changed after 2007 (see https://www.census.gov/people/disability/methodology/acs.html), so this is the last year of data I use.

38 Krueger's 2016 article finds that among prime-age men out of the labor force who report having a disability, over two-thirds report that they spend at least some of the day in pain.

39 The nonemployed refer to noncollege-educated prime-age men who work fewer than 26 weeks in a year. A disabled worker is one who reports being "ill or disabled and unable to work." Note that the disabled share of the nonemployed is distinct from the nonemployed share of the disabled. Even though the latter has steadily risen (see the article by Bound and Timothy Waidmann), the disabled share of the nonemployed does not have to increase if many men are out of work for other reasons. Juhn's 1992 paper also found no evidence of an increase in the disabled share of the nonemployed.

40 See the 2017 study by Mark Aguiar and others.

41 Read Daron Acemoglu and David Autor's chapter in the 2011 *Handbook of Labor Economics*.

42 See Lawrence Summers's 1986 piece.

43 These declines were documented in 2016 by Guido Matias Cortes and others and in 2017 by Kerwin Kofi Charles and his coauthors. For an early analysis of the long-term implications of job displacement, see Lars Ljungqvist and Thomas Sargent's 1998 paper.

44 See Gary Becker and Kevin Murphy's book.

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Where Is Everybody? The Shrinking Labor Force Participation Rate

More Americans are neither working nor looking for work. What is going on?

BY MICHAEL DOTSEY, SHIGERU FUJITA, AND LEENA RUDANKO

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The labor force participation rate has been falling in this country for nearly two decades. For men of prime working age, it has been falling for more than half a century. And the fall has been particularly acute among black men. The decline in participation has also accelerated since the Great Recession, largely due to the start of retirement by baby boomers. Low participation is distinct from unemployment–looking for a job but not finding one–which has fallen sharply since the recession. It is also distinct from the lingering problem of underemployment– settling for part-time or occasional work but wanting full-time work that matches one's skills. Rather, a falling participation rate means more people are simply unable or unwilling to work at current wages.

The effects of nonparticipation on society are potentially severe: slower economic growth and a rising *dependency ratio*. The U.S. civilian labor force participation rate is the sum of all those who are either employed or officially considered unemployed divided by the total population over age 16. So a steadily shrinking participation rate means that the fraction of the population that is either gainfully employed or actively seeking work is steadily dwindling. This slows the growth of GDP, because fewer people are contributing to the nation's output of goods and services. In addition, the economic returns generated by fewer workers must be spread more thinly via transfers through government programs such as Social Security and Medicare, or through family assistance or charity, to support the growing fraction of the population out of the labor force. As a result, a society with a lower participation rate is also burdened with higher tax rates because the government has a narrower tax base from which to draw revenue.

Whether nonparticipation is a good or bad thing for an individual worker and his or her family is more ambiguous. Some workers leave the labor force to raise their children or care for their elderly parents; many women in particular report deriving meaning from the activities they choose to pursue while not employed. The benefits of being out of the labor force for a few years while going to school are tangible: Educated workers earn more, and the economy gains more productive workers. And to the extent that unpaid work benefits the larger society, nonparticipation in the labor force can arguably have economic benefits that resist quantification.

But because the declining participation rate in the United States has consequences for the overall economy, it is important to understand what forces are driving participation downward, how it affects output growth, whether it is likely to continue to drop, and what could ameliorate its fall. To delve into these questions, we first trace the path of participation over time.

FIGURE 1

Overall Participation Has Been Falling Since 2000
Labor force participation rate for males, females, and total population over age 16.
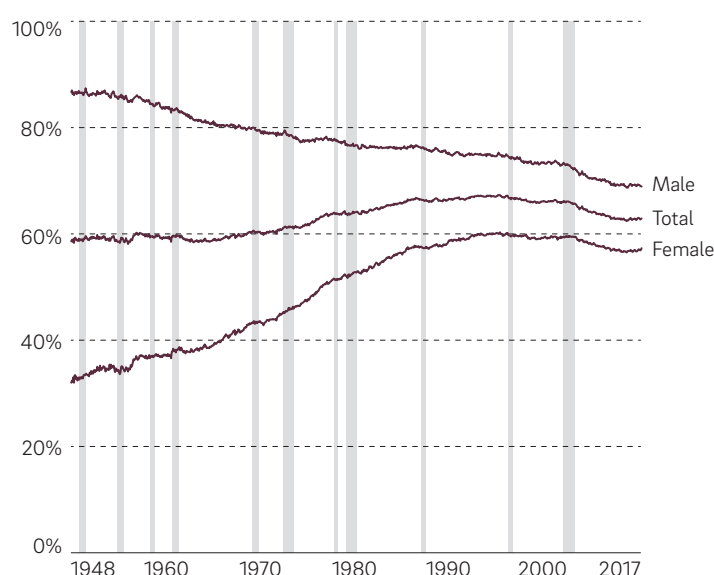
Source: Bureau of Labor Statistics Current Population Survey.

Note: The labor force participation rate is the sum of those employed and the unemployed divided by the U.S. civilian population over age 16.

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Trends in Labor Force Participation

In the 1950s and 1960s, the share of working-age Americans in the labor force was fairly stable, hovering around 58 percent to 60 percent. But as many women began working outside the home in the 1970s, participation soared, peaking at slightly above 67 percent at the turn of this century. Ever since then, however, total participation has been falling and today approaches 63 percent (Figure 1). And since the Great Recession, this decline has accelerated.

Is the declining overall participation rate of recent years mainly a lingering effect of the severe recession, or is it arising from some underlying factor in the economy?

Labor force participation rates are influenced by two types of forces: cyclical ups and downs associated with recessions and economic expansions, and secular forces such as long-term changes in demographics. In a recession, especially a deep one like the one we just experienced, output declines precipitously and firms rapidly shed workers. The average amount of time that a worker is unemployed also increases dramatically in a recession, leading some workers to abandon their job search and, by definition, drop out of the labor force. By not looking for work, they no longer participate. As the economy recovers, however, firms once again begin posting job openings and hiring, the unemployment rate falls, and people who had previously given up on the job market regain employment, thereby re-entering the labor force. The labor force participation rate thus begins its cyclical recovery.

Yet, this cyclical pattern of the participation rate explains only a small fraction of its overall behavior. By far the main drivers of the overall participation rate are secular forces, usually demographic trends and cultural shifts in society. In the final 25 years of the 20th century, the secular force driving the dramatic increase in participation was women's entry into the labor force. That steady increase has now ended, and women's participation has largely stabilized. The largest demographic factor influencing participation now is the aging of the population and the start of retirement for the baby boom generation. During the current recovery, the rising tide of retiring baby boomers has outweighed any modest cyclical recovery in participation.

A simple way to gauge the determinants of labor force participation is to split the people that are out of the labor force into different groups based on the reasons they give for having stopped working or looking for work, namely, they are retired, disabled, want a job but are not looking, are in school, or other. Looking at the distribution tells us how much each group has contributed to the decline in the overall participation rate.

Tallying this evidence shows that the decline in labor force participation since the turn of the century has been due to increases, of relatively equal size, in the number of nonparticipants citing "in school," "disabled," or "retired" as the primary reason for their nonparticipation. However, since 2010, the decline in the participation rate has been driven almost exclusively by retirement, with the other reasons having leveled off. This feature is displayed in Figure 2, which graphs the reasons for not participating in the labor market.

To illustrate how the U.S. population is aging and the share of retirees is growing, Figure 3 shows how the age distribution has evolved since the baby boom began after World War II. In the 1950s, the largest group was infants and small children, those age 0-4, the beginning of the baby boom. As the boomers grew up and came of age, they consistently represented the largest fraction of the population–until just recently. Now, as this generation retires, the repercussions will be felt in the labor force participation rate, the magnitude of which we will seek to quantify in this article.

As significant as this wave of retirements is, it is not the only trend that is reducing participation. Trends among workers in their prime earning years are also unfavorable. After peaking at 98 percent in 1954, the participation of American men 25 to 54 years old began slipping in the late 1960s and has fallen steadily to 88 percent (Figure 4). This is one of the lowest participation rates for prime-age men among developed countries, and only Italy has experienced a greater decline (Figure 5).

Aging has played some role in explaining this trend among prime-age men as well, as there is a pronounced life-cycle pattern to prime-age men's participation in the U.S. labor force. Men participate more intensively in their 30s and 40s than they do earlier or later in life; thus, the hump-shaped pattern in Figure 6. This pattern also stands to reason. Many young men are still in school, and failing health or retirement can prompt older men to drop out of the labor force.

Even so, aging is not the key driver of the longer-run decline in prime-age male labor force participation. What turns out to be more important for explaining this trend is the fact that

Retirement a Key Reason in Recent Years

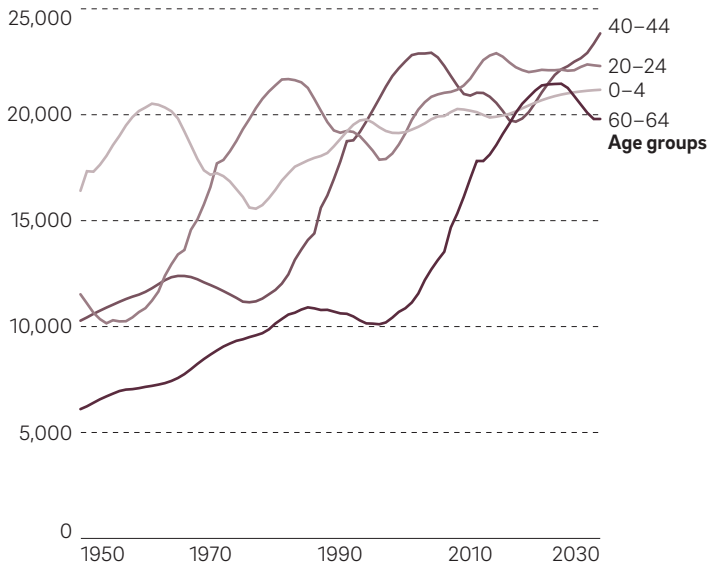Cumulative change in the nonparticipation rate, relative to 2000 Q1, percentage points.

Source: Fujita (2014).

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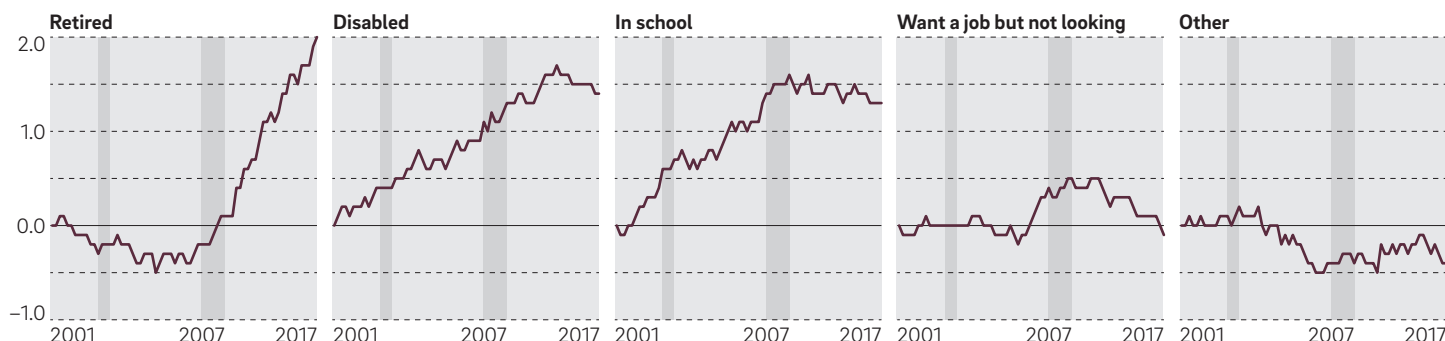
FIGURE 3

Boomers Having an Impact Even on the Way Out

U.S. population by age group, since 1950 and projected to 2030, thousands.
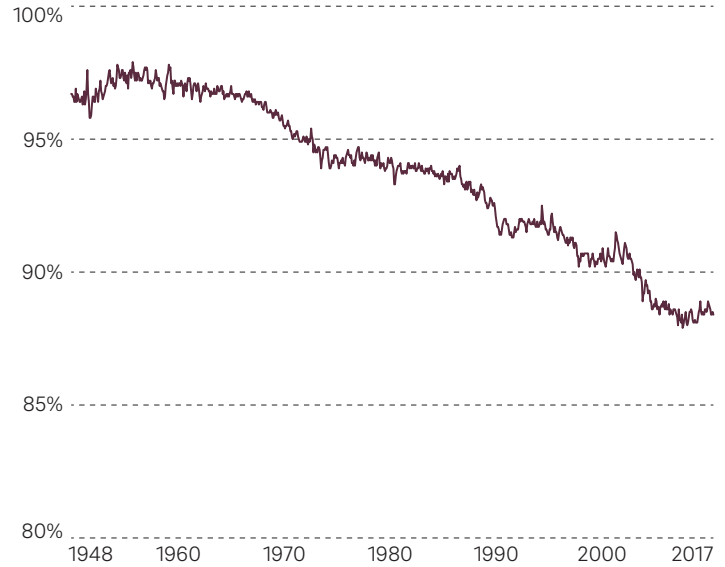

Source: Census Bureau.

FIGURE 4

A Long Fall—and Falling Faster

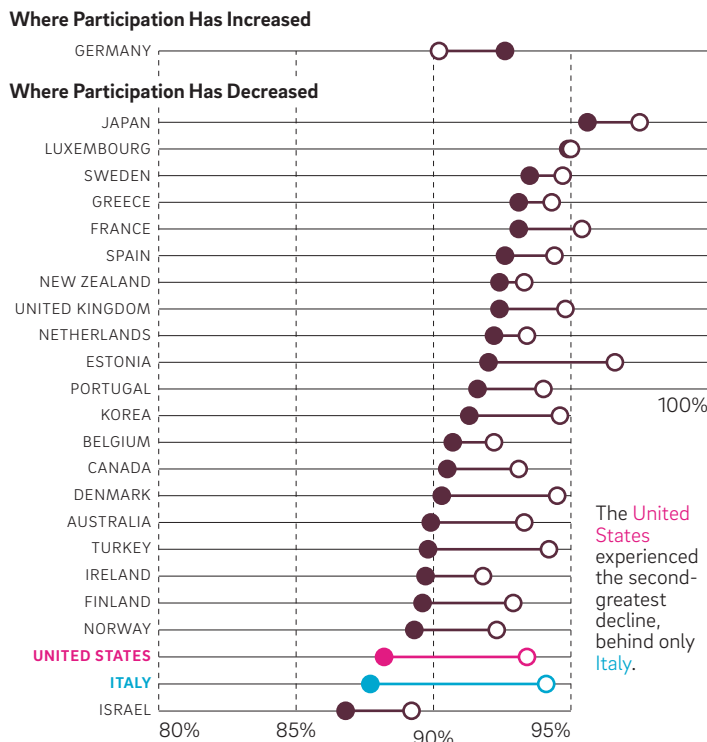U.S. prime-age male labor force participation rate, 1948–2017.

Sources: Bureau of Labor Statistics Current Population Survey.

FIGURE 5

Male Participation Down Across Developed World

Prime-age male labor force participation rates among OECD countries.

○ 1990   ● 2014

Where Participation Has Increased

Where Participation Has Decreased

The United States experienced the second-greatest decline, behind only Italy.

Source: Organization for Economic Cooperation and Development.

FIGURE 6

Men Most Likely to Be in Labor Force in Their 30s

U.S. prime-age male labor force participation over the life cycle, by birth year cohort.
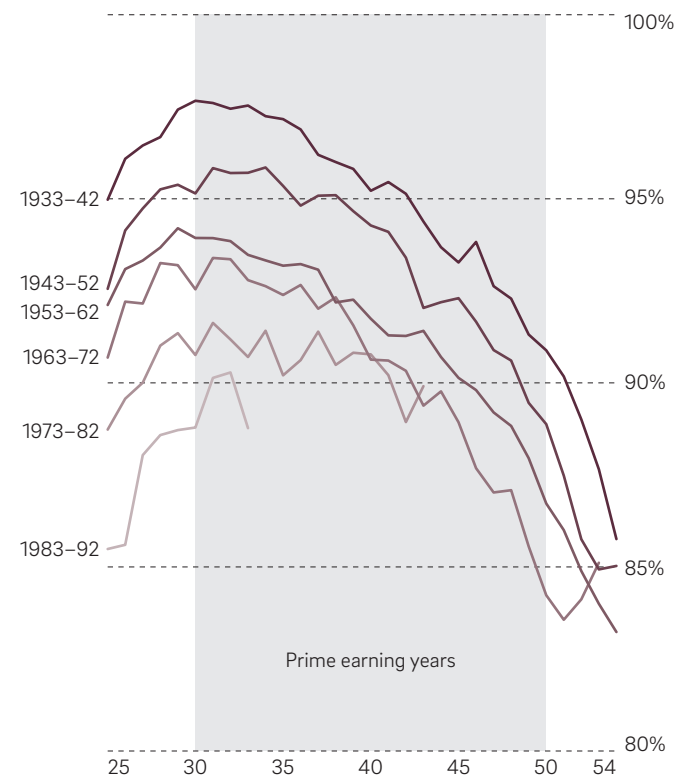
Sources: Bureau of Labor Statistics Current Population Survey Annual Social and Economic Supplement; Council of Economic Advisers.

more recent generations of men are participating less than their predecessors did. To see this cohort effect in the figure, note that each successive cohort's participation rate lies below that of the preceding one. Decomposing the overall effect into these two prominent patterns–life cycle and generational–it is the latter that dominates. Falling participation rates by men born more recently are thus largely responsible for the overall decline in participation by prime-age males, adding to the effects of the retiring baby boomers.

The declines also show tremendous variability depending on educational attainment. While there has been a secular decline for men in all educational groups, the decline has been more pronounced for those with only a high school education or less, than for those with a bachelor's or more advanced degree (Figure 7).

Furthermore, labor force participation rates and their trends vary markedly by race. Black men in the United States have a lower participation rate than Hispanic or white men, and participation rates among black men have also been falling more rapidly (Figure 8).

The reasons behind the decline in prime-age male participation remain less well understood than the predictable impact of aging baby boomers on the overall participation rate. One factor that is likely playing a role in the decline in participation of less-educated men versus more-educated men is the increasing wage gap between high- and low-skill workers. This gap may be attributable to skill-biased technological change–that is, advances in production methods or in the types of services and how they are

See the related article in this issue,
"Why Are Men Working Less These Days?"

provided that end up creating more demand for workers with more education or high-tech training. The ratio of the wage of a male with a high school education to that of one with a college degree declined from 72 percent in 1973 to 51 percent in 2016.

Note also that high school graduates' average wage fell not only in relative terms, but also in absolute terms, by about 15 percent between 1973 and 2016. Increasing globalization and the corresponding decline in U.S. manufacturing jobs may also be a factor, as the share of manufacturing in total nonfarm employment has fallen from over 30 percent after World War II to less than 10 percent today. Another factor may be the increasing incarceration rate and the resulting difficulty in finding work for those who have committed a felony: The male incarceration rate rose from 564 out of 100,000 men in 1990 to 890 in 2014.

Cause for Concern?

What does this slide in participation mean for the U.S. economy? To get some sense of it, we can use a simple accounting framework in which the economy's gross domestic product is a function of three components: labor inputs, capital inputs, and technological advances. All else equal, a slowdown in any of these components will cause a slowdown in output.

Recently, output growth has averaged a mere 2.0 percent compared with the 3.5 percent average growth rate over the previous half-century. Of that previous output growth, 1.3 percentage points was attributable to growth in the U.S. labor force. Since the recession, the labor force has grown only 0.5 percent, less than half its historical average, accounting for roughly a third of the decline in output growth.

The slower growth of the labor force is due to two basic

FIGURE 7

The Less Education, the Less Likely to Participate
U.S. prime-age male labor force participation by educational attainment, 1964–2016.

Sources: Bureau of Labor Statistics Current Population Survey Annual Social and Economic Supplement; Council of Economic Advisers.

FIGURE 8

Black Male Participation Is Falling Faster
U.S. male labor force participation, white, black, Hispanic.
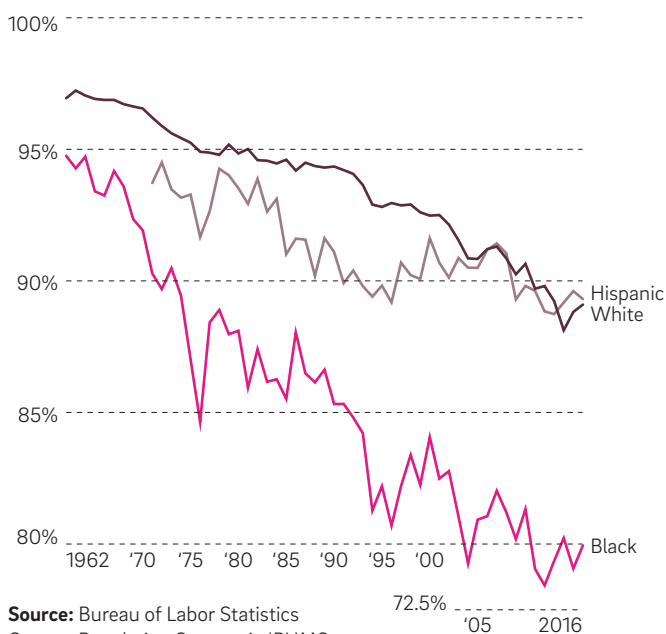
Source: Bureau of Labor Statistics Current Population Survey via IPUMS.

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reasons. One is that the U.S. population is growing more slowly. The other is that a diminishing share of the population has been participating in the labor force over the past seven years.

The aging of the population may also drag on productivity growth directly. It is well known that workers experience rapid wage growth in their 20s through their 40s as they accumulate human capital through on-the-job training or postgraduate education. In other words, a large part of workers' growth in their productivity materializes in the early and middle parts of their careers. But those baby boomers who are still in the labor force are now approaching retirement age, implying that the current makeup of the labor force is not favorably composed toward strong growth in labor productivity.

From an individual well-being perspective, a number of features of the decline in prime-age male participation are also troubling. First, dropping out of the labor force appears not to be a transitory event, in that the majority of men who reported not working in a given month had also not worked over the previous year. Nonparticipation is also associated with a number of deleterious outcomes. Approximately one-third of male nonparticipants live below the federal poverty line, and most of these men get by on government assistance—they receive more government aid than participants do—and on the earnings of their spouses or other members of their households. These men generally do not appear to be engaged in constructive activities such as home production or acquiring more education and skills, but rather, according to time use surveys, they appear to be watching more television and playing more video games (Figure 9).

In studies of individual happiness, prime-age men who are out of the labor force report being less happy, more sad, and more stressed than unemployed men. Men out of the labor force also spend nearly 30 percent of their time alone. By comparison, both younger men and all women who are out of the labor force appear quite content. In fact, young men out of the labor force appear to be happier than young men who are employed. Women who are out of the labor force and employed women appear equally happy.

How Men In and Out of Labor Force Spend Their Days
Number of minutes prime-age males report spending on daily activities.
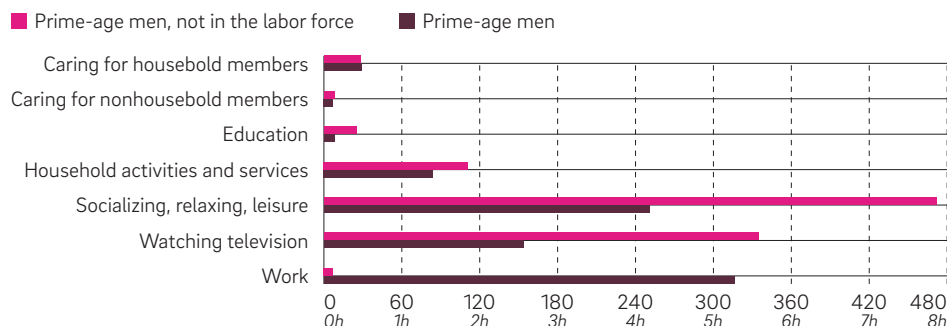
Source: American Time Use Survey; Council of Economic Advisers calculations.

Note: Columns do not sum to 1,440 minutes (24 hours) per day because some survey respondents did not account for every minute.

Unlike men, women who are not in the labor force report deriving significant meaning from their daily activities.

Will Participation Keep Dropping?
As we have seen, it would appear that the ongoing surge in retirements has largely been driving the decline in labor force participation in recent years. Given the large number of people approaching retirement age, this trend of increasing retirements is likely to continue. How long will retirements keep increasing? With the data that are available on the age distribution of the population and mortality rates, it should be simple to provide some estimates.

To this end, we start by forecasting the retirement rate in the near term. That rate is determined by multiplying the retirement rate (the share of retirees) in each age group by the percentage of the population in that age group. How the working-age population is distributed by age is fairly straightforward to calculate, as we know the current age distribution of the population and can use that distribution to estimate the mortality rate at each age. And the age distribution and mortality rate are unlikely to change significantly in the near term.

What may be more difficult to forecast is the retirement rate of each age group. These rates naturally increase as a function of age (Figure 10), and since they also

appear to have changed little in recent years, we will assume they will remain constant over our forecast horizon as well.

Based on this simple calculation—each age group's retirement rate times its share of the population—we project that the retirement rate will increase by 1.1 percentage points by 2019 (Figure 11). This increase in retirement, in turn, will push down the participation rate by the same amount.

Based on the changing age distribution of the population, we also expect retirements to keep rising through the 2020s, implying a roughly 4 percentage point decline in the participation rate by the late 2020s. Of course, this longer-run projection involves more uncertainty, because in time retirement rates may change significantly for other, unknown reasons. But the forecast illustrates the magnitude of the demographic force facing our economy today.
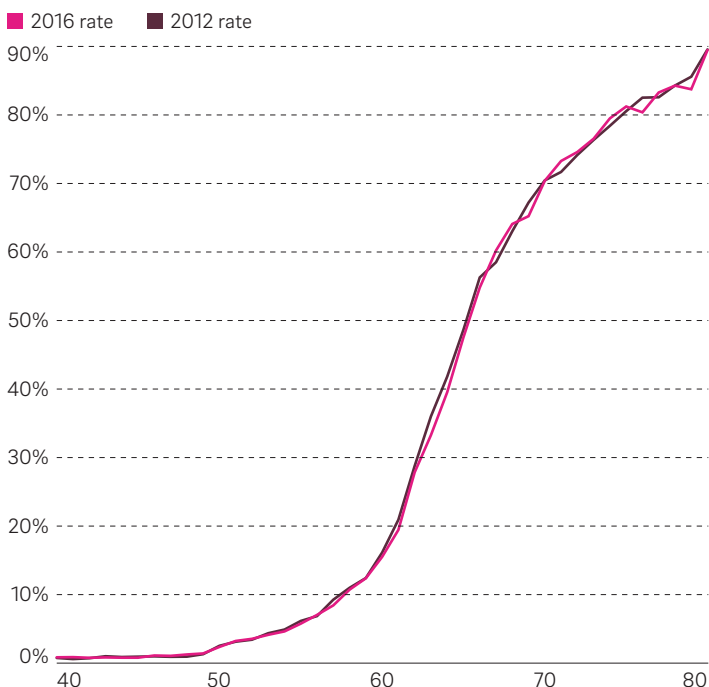
As a check on our forecasting methodology, we also apply it to the period 2011-2015 using the data up to 2010 (Figure 12). The exercise yields retirement rates that are close to the actual rates for those years, showing that our forecast is quite accurate.

Thus, we expect that because of the ongoing surge in retirements, the U.S. will experience a pronounced decrease in labor force participation in coming years, with the resulting loss in economic output discussed.

Retirement Rates at Different Ages Have Changed Little

Percentage of U.S. population entering retirement by age, 2012 vs. 2016.

■ 2016 rate ■ 2012 rate

Sources: Bureau of Labor Statistics Current Population Survey and author calculations.

Retirements Expected to Keep Rising for Years

Actual and projected overall retirement rate.

Sources: Bureau of Labor Statistics Current Population Survey and author calculations.

Increasing the Pool of Workers: Immigration?

As we have seen, the aging of the population is largely responsible for the recent and projected decline in labor force participation. Aging is obviously not reversible, but the pool of available workers could be increased by expanding immigration. If done intelligently, increasing the flow of immigrants with the right skills could accelerate economic growth and could also remedy the age imbalance by adding to the working-age population. Immigrants also tend to have higher labor force participation rates. Foreign-born men residing in the United States have a higher participation rate than native-born U.S. men, and the participation rate of foreign-born men has actually been rising.

While politically sensitive, immigration has played a major role in expanding the U.S. economy over its history. Our country is still a land of immigrants: In 2015, more than 13 percent of the current U.S. population consisted of immigrants–legal and illegal. And this share has been steadily increasing; it was less than 8 percent in 1990.[1] Between 2008 and 2016, the foreign-born U.S. population grew 1.9 percent each year on average, whereas the native-born population grew at the much slower rate of 0.8 percent per year.[2]

Although many of these newcomers were less-skilled illegal immigrants, over the past 15 years the college-educated immigrant population has almost doubled, from 5.9 million to 10.5 million.[3] Meanwhile, H-1B visas, which allow companies to fill specialized jobs with foreign workers, are generally in short supply.

Countering a common belief that immigration hurts native-born Americans, it can be a complementary force, increasing the wages of the native born. That is not to say that there are no individual losers from immigration, but on balance the native-born appear to benefit. For example, Gaetano Basso and Giovanni Peri find that immigration has no significant effect on the wages of the less educated (those with at most a high school education) and a small and generally significantly positive effect on workers who are highly educated (those with at least a college degree). But there are losers, as Gianmarco Ottaviano and Peri show, and those who lose out seem to be largely concentrated among American foreign-born workers.

Another interesting example is found in a study by Peri, Kevin Shih, and Chad Sparber, which shows that a 1 percentage point increase in the share of foreign workers in science, technology, engineering, and mathematics (STEM) actually results in a 7 to 8 percentage point increase in the wage growth of college-educated native workers. The increase in the wages of noncollege-educated native workers was smaller but still significant, at 3 to 4 percentage points, and did not reduce employment among this group.[4] Research also suggests that STEM immigrants may

FIGURE 12

Forecast Methodology Produces a Close to Actual Pace

Retirement rate forecasting performance, 2011–2015.
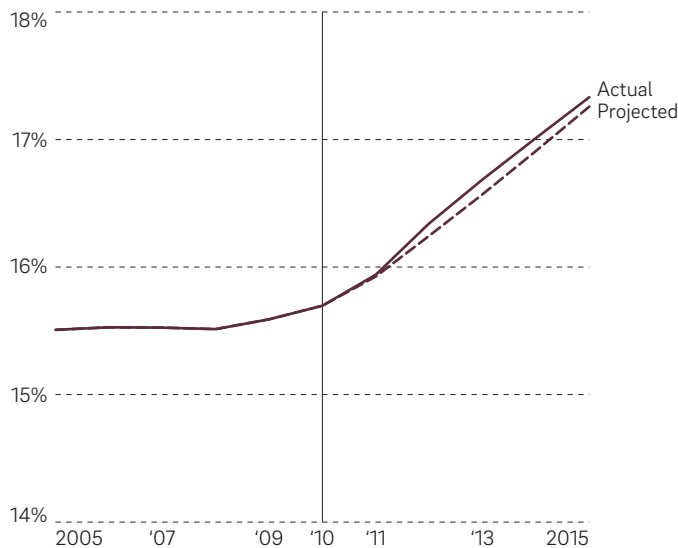
Sources: Bureau of Labor Statistics Current Population Survey and author calculations.

increase productivity in the sectors in which they are employed.[5]

These empirical results are consistent with certain economic theories. In principle, greater population growth is tied to higher per capita economic output growth rates, through a so-called scale effect. The scale effect suggests that per capita output growth is related to higher population growth because more ideas are developed in environments where more people are engaged in research. Because ideas are nonrival—we can all use the same idea at the same time—any single idea can be used by lots of people to produce economic growth. Thus, the scale effect: the more people, the more ideas, the more growth.[6]

Immigration is not the only means of increasing the labor force and its productivity, and it would not solve the decline in prime-age male participation—a difficult problem that should certainly be addressed. But combining the growth in skills that would accompany increased immigration with the productivity spillovers that would occur from having a larger and more highly skilled labor force can have near-term first-order effects on U.S. economic growth, ameliorating the inevitable negative effects of an aging U.S. population that is participating less intensively in labor markets. ▣

Notes

1 This share is based on the American Community Survey and was calculated by the Migration Policy Institute. See the 2017 article by Jie Zong and Jeanne Batalova.

2 The Current Population Survey Table A-7.

3 See the 2016 article by Zong and Batalova.

4 Note that the 1 percentage point increase in the share of foreign-born STEM workers is quantitatively very large and comparable to the increase that actually occurred between 1990 and 2010.

5 These authors also found that immigration of foreign STEM workers increases productivity growth more generally, explaining 30 percent to 50 percent of aggregate U.S. productivity growth between 1990 and 2010. Similar findings have been presented in papers by William Kerr and William Lincoln and Jennifer Hunt and Marjolaine Gauthier-Loiselle. Furthermore, work by Gordon H. Hanson and Matthew J. Slaughter finds that foreign-born workers account for more than half of all STEM workers with Ph.D.s and are significantly represented among those with bachelor's and master's degrees. They find no evidence that the hiring of foreign-born workers undercuts the opportunities of the native born. Immigrants in this area also make meaningful contributions to research and development, thus increasing the growth of knowledge in these subjects.

6 See, for example, the work of Chad Jones and Paul Romer. Also see Chad Jones' 2002 paper.

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Where Is Everybody? The Shrinking Labor Force Participation Rate

Research Update

These papers by Philadelphia Fed economists, analysts, and visiting scholars represent preliminary research that is being circulated for discussion purposes.

Recall and Unemployment

The authors document in the Survey of Income and Program Participation covering 1990–2013 that a surprisingly large share of workers return to their previous employer after a jobless spell and experience very different unemployment and employment outcomes than job switchers. The probability of recall is much less procyclical and volatile than the probability of finding a new employer. The authors add to a quantitative, and otherwise canonical, search-and-matching model of the labor market a recall option, which can be activated freely following aggregate and job-specific productivity shocks. Recall and search effort significantly amplify the cyclical volatility of new job-finding and separation probabilities.

Supersedes Working Paper 14–3/R. Working Paper 17–29. Shigeru Fujita, Federal Reserve Bank of Philadelphia Research Department; Giuseppe Moscarini, Yale University and National Bureau of Economic Research.

Do Non-Compete Covenants Influence State Startup Activity? Evidence from the Michigan Experiment

This paper examines how the enforceability of employee non-compete agreements affects the entry of new establishments and jobs created by these new firms. The author uses a panel of startup activity for the U.S. states for the period 1977 to 2013. He exploits Michigan's inadvertent policy reversal in 1985 that transformed the state from a non-enforcing to an enforcing state as a quasi-natural experiment to estimate the causal effect of enforcement on startup activity. His findings offer little support for the widely held view that enforcement of non-compete agreements negatively affects the entry rate of new firms or the rate of jobs created by new firms. In a difference-in-difference analysis, the author finds that a 10 percent increase in enforcement led to an increase of about 1 percent to about 3 percent in the startup job creation rate in Michigan and, in general, to essentially no change in the startup entry rate. Extending his analysis to consider the effect of increased enforcement on patent activity, the author finds that enforcement had differential effects across technological classifications. Importantly, increased enforcement had a positive and significant effect on the number of quality-adjusted mechanical patents in Michigan, the most important patenting classification in that state.

Working Paper 17–30. Gerald A. Carlino, Federal Reserve Bank of Philadelphia Research Department.

The Role of Startups for Local Labor Markets

The authors investigate the dynamic response of local U.S. labor markets to increased job creation by new firms and compare the effects to overall labor demand shocks. To account for both dynamic and spatial dependence the authors develop a spatial panel VAR that builds on recent advances in the VAR literature to identify structural shocks using external instruments. They find that startup shocks have a small but persistent effect on local employment through population growth. Population growth, in turn, is largely driven by immigration. The authors also investigate how the responses differ by local characteristics such as population density. Finally, they show that startups are not closely linked to innovation.

Working Paper 17–31. Gerald Carlino, Federal Reserve Bank of Philadelphia Research Department; Thorsten Drautzburg, Federal Reserve Bank of Philadelphia Research Department.

Localized Knowledge Spillovers: Evidence from the Spatial Clustering of R&D Labs and Patent Citations

Patent citations are a commonly used indicator of knowledge spillovers among inventors, while clusters of research and development labs are locations in which knowledge spillovers are particularly likely to occur. In this paper, the authors assign patents and citations to newly defined clusters of American R&D labs to capture the geographic extent of knowledge spillovers. Their tests show that the localization of knowledge spillovers, as measured via patent citations, is strongest at small spatial scales and diminishes rapidly with distance. On average, patents within a cluster are about three to six times more likely to cite an inventor in the same cluster than one in a control group. At the same time, the strength of knowledge spillovers varies widely between clusters. The results are robust to the specification of patent technological categories, the method of citation matching and alternate cluster definitions.

Supersedes Working Paper 16–25.
Working Paper 17–32. Kristy Buzard, Syracuse University; Gerald A. Carlino, Federal Reserve Bank of Philadelphia Research Department; Robert M. Hunt, Federal Reserve Bank of Philadelphia Payment Cards Center; Jake K. Carr, The Ohio State University; Tony E. Smith, University of Pennsylvania.

Spatial Commitment Devices and Addictive Goods: Evidence from Removal of Slot Machines from Bars

Commitment device theory suggests that temptations to consume addictive goods could be reduced by the regulatory removal of geographically close environmental cues. The authors provide new evidence on this hypothesis using a quasi-natural experiment, in which gambling regulators removed slot machines from some, but not all, neighborhood bars. The authors find that the removal of slot machines reduced personal bankruptcies of close neighbors (within 100 meters) but not neighbors slightly farther away. This is consistent with the removal of neighborhood slots serving as an effective spatial commitment device, which reduced close neighbors' temptation to gamble, thus allowing them to avoid bankruptcy.

Working Paper 17–34. Vyacheslav Mikhed, Federal Reserve Bank of Philadelphia Payment Cards Center; Barry Scholnick, University of Alberta; Hyungsuk Byun, Government of Alberta.

Land-Use Regulations, Property Values, and Rents: Decomposing the Effects of California Coastal Act

Land-use regulations can lower real estate prices by imposing costs on property owners, but may raise prices by restricting supply and generating amenities. The authors study the effects of the California Coastal Act, one of the nation's most stringent land-use regulations, on prices and rents for multifamily housing units. The Coastal Act applies to a narrow section of the California coast, allowing the authors to compare properties on either side of the jurisdictional boundary. The Coastal Act offers several advantages for measuring the effects of land-use regulations, including plausible exogeneity of the boundary location, which the authors confirm using historical data on boundary placement, and orthogonality of the boundary to other jurisdictional divisions. Extending previous studies, the authors decompose the effects of the regulation into a local effect, the net price effect of restrictions on the subject property and its immediate neighbors, and an external effect, the value of amenities generated by restrictions on all properties within the regulated area. Data on multifamily housing rents are used to isolate the effect of restrictions on adjacent properties (the neighbor effect). The authors' analysis of multifamily housing prices reveals local and external effects of approximately +8% and +5%, respectively. The rent analysis indicates a zero neighbor effect, which suggests that the local benefits of the Coastal Act have not yet materialized but are expected to in the future. This interpretation of the authors' results is supported by additional evidence on building ages and assessed building and land values.

Working Paper 17–33. Christopher Severen, Federal Reserve Bank of Philadelphia Research Department; Andrew J. Plantinga, University of California, Santa Barbara.

Screening & Adverse Selection in Frictional Markets

The authors incorporate a search-theoretic model of imperfect competition into a standard model of asymmetric information with unrestricted contracts. They characterize the unique equilibrium, and use their characterization to explore the interaction between adverse selection, screening, and imperfect competition. The authors show that the relationship between an agent's type, the quantity he trades, and the price he pays is jointly determined by the severity of adverse selection and the concentration of market power. Therefore, quantifying the effects of adverse selection requires controlling for market structure. The authors also show that increasing competition and reducing informational asymmetries can decrease welfare.

Supersedes Working Paper 16–10.
Working Paper 17–35. Benjamin Lester, Federal Reserve Bank of Philadelphia Research Department; Ali Shourideh, Carnegie Mellon University; Venky Venkateswaran, New York University Stern School of Business; Ariel Zetlin-Jones, Carnegie Mellon University.

First-Time Homebuyers: Toward a New Measure

Existing data sources show divergent estimates of the number of homes purchased by first-time homebuyers as a share of all home purchases. In this paper, the authors use a new data set to construct a time series of the share of first-time homebuyers. This series, based on the Federal Reserve Bank of New York Equifax Consumer Credit Panel (CCP), shows a significant decline in this share, particularly for young households, which is consistent with the decline in homeownership in this age cohort since the early 2000s.

Working Paper 17–36. Arthur Acolin, University of Washington; Paul Calem, Federal Reserve Bank of Philadelphia Supervision, Regulation, and Credit Department; Julapa Jagtiani, Federal Reserve Bank of Philadelphia Supervision, Regulation, and Credit Department; Susan Wachter, University of Pennsylvania Wharton School.

Measuring the "Free" Digital Economy Within the GDP and Productivity Accounts

The authors develop an experimental methodology that values "free" digital content through the lens of a production account and is consistent with the framework of the national accounts. The authors build upon the work in Nakamura, et al. (2016) by combining marketing- and advertising-supported content and find that the impact of "free" digital content on U.S. gross domestic product (GDP) has accelerated in recent years, particularly since 2005. However, the explosion in "free" digital content is partially offset by a decrease in "free" print content like newspapers. Including these, real GDP growth would grow at 1.53 percent a year from 2005 to 2015 rather than the official growth rate of 1.42 percent, a tenth of a percent faster. Thus, there is a substantive impact on 2005 to 2015 real growth, even when we do not measure the full consumer surplus benefits of free goods. In addition, from 1995 to 2005, real GDP growth, including "free" content, would grow 0.07 percentage point faster, and in the earlier period, from 1929 to 1995, 0.01 percentage point faster. The authors further find that the personal consumption expenditures (PCE) and core PCE deflators would have risen about 0.1 percentage point more slowly from 2005 to 2015. To analyze the impact of "free" content on measured private business total factor productivity (TFP) growth, the authors account for inputs of "free" content used in production. They find that TFP would grow faster by 0.07 percentage point per year from 2005 to 2014 and faster by 0.07 percentage point from 1995 to 2005.

Working Paper 17–37. Leonard Nakamura, Federal Reserve Bank of Philadelphia Research Department; Jon Samuels, Bureau of Economic Analysis; Rachel Soloveichik, Bureau of Economic Analysis.

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