Full Employment for All:
Technical Appendix

Prepared by PolicyLink and the USC Program for Environmental and Regional Equity

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Overview

The Full Employment for All analysis estimates the economic impacts of full employment for all in 2015 as measured by unemployment and labor force participation rates for the population ages 16 or older. Estimates were generated for the United States as a whole and for the 12 metropolitan statistical areas (based on the Office of Management and Budget's December 2003 metropolitan area definitions) in which Federal Reserve Banks are located. While full employment generally refers to an unemployment rate of somewhere between 4 percent and 5.5 percent for the labor force as a whole, full employment for all specifies that every race/ethnicity and gender group reaches full employment.

Economists typically characterize the economy in the year 2000 as a full-employment economy because the unemployment rate reached 4 percent for the first time since 1970. Despite having reached “full employment” in 2000, the United States has never achieved full employment for all. While Black workers experienced employment gains and the Black/White gap in employment began to narrow during the economic prosperity of the late 1990s, Black unemployment remained twice as high as White unemployment (7.6 percent compared with 3.5 percent in 2000).

For the purpose of this analysis, we created a “full employment for all” economic scenario for the year 2015 using unemployment and labor force participation benchmarks based on the full employment economy of the year 2000: an unemployment rate of no more than 4.0 percent and labor force participation rates of at least 75 percent for men and 60 percent for women, with benchmarks adjusted for age to reflect the different age structure of each racial/ethnic and gender group. For example, young workers have consistently higher unemployment rates; therefore, groups with higher shares of young workers have higher unemployment rates under the full employment scenario.

The rates of unemployment and labor force participation that we defined as consistent with a full employment economy were assigned to each of 12 groups defined by race/ethnicity and gender to estimate gains in the number of workers and subsequent gains in aggregate income and other measures including GDP, taxes, and the number of people lifted out of poverty.

It is important to note that the full employment scenario does not result in lower employment rates for any group—that is, if a group's age-specific rate of labor force participation or employment already surpasses the relevant age-adjusted benchmark, it remains unchanged in the full employment scenario.

Estimates of the economic impacts of full employment for all in 2015 were generated for one metropolitan area (region) in each of the 12 Federal Reserve Districts, as follows:
Fed Region 1: Boston (Boston-Cambridge-Quincy, MA-NH Metro Area)
Fed Region 4: Cleveland (Cleveland-Elyria-Mentor, OH Metro Area)
Fed Region 5: Richmond (Richmond, VA Metro Area)
Fed Region 6: Atlanta (Atlanta-Sandy Springs-Marietta, GA Metro Area)
Fed Region 7: Chicago (Chicago-Naperville-Joliet, IL-IN-WI Metro Area)
Fed Region 8: St. Louis (St. Louis, MO-IL Metro Area)
Fed Region 9: Minneapolis (Minneapolis-St. Paul-Bloomington, MN-WI Metro Area)
Fed Region 10: Kansas City (Kansas City, MO-KS Metro Area)
Fed Region 11: Dallas (Dallas-Fort Worth-Arlington, TX Metro Area)
Fed Region 12: San Francisco (San Francisco-Oakland-Fremont, CA Metro Area)

**Detailed Methodology**

*Estimating the 2015 Baseline Scenario*

The Full Employment for All analysis relies primarily on pooled American Community Survey (ACS) microdata files from the Integrated Public Use Microdata Series (IPUMS) for the years 2009-2013. A pooled five-year sample was used to achieve a sufficient sample size to generate reliable estimates for metropolitan areas (and for particular groups defined by race/ethnicity and gender within each metropolitan area). However, because the unemployment rate in the U.S. has dropped considerably in contrast to the 2009-2013 average, the projected economic gains from moving to a full employment for all economy would inevitably be smaller if we used only current unemployment data rather than the 2009-2013 average as the baseline.

To avoid overstating the size of the gains, we first adjusted unemployment and labor force participation rates by race/ethnicity, gender, and age (using 14 age groups) in each region to reflect changes seen nationally between the 2009-2013 average and 2015, according to data from the March Current Population Survey (CPS). For example, the national unemployment rate for non-Hispanic Black males is 17.7 percent when taking an average of the March 2009-2013 CPS data but only 11.2 percent according to the March 2015 CPS. Thus, we multiplied the ratio of these two values (11.2/17.7) by the unemployment rates by age group for non-Hispanic Black males in the nation as a whole and for each region calculated from the pooled 2009-2013 ACS microdata to estimate their values in 2015. A similar adjustment was made for the unemployment and labor force participation rates of each race/ethnicity, gender, and age group calculated from the 2009-2013 ACS microdata.

Shifts in unemployment and labor force participation by race/ethnicity and gender over the period are certain to vary by region, making the application of national changes to estimate regional values in 2015 imperfect. However, with no reliable data on actual shifts at the regional level, it was determined that making a crude adjustment based on national data was better than no adjustment—particularly to avoid overstating the regional gains.
In order to implement the adjustment to 2015 levels of labor force participation and employment across individuals included in the 2009-2013 ACS microdata, we calculated the number of persons who would join or leave the labor force and employment by race/ethnicity, gender, and age group, and made random assignments to move individuals in/out of the labor force and employment in order to achieve the estimated 2015 rates for each group. For most groups, rates of labor force participation were lower and rates of employment were higher in 2015 than in 2009-2013 (averaged), with the net result being an increase in employment overall.

Estimating earned income values for 2015 in the 2009-2013 ACS microdata was a bit more complicated. It is important to note that income in the ACS is derived from the year prior to the survey whereas labor force status is based on the time at which the survey was conducted. For the few cases that were randomly assigned from being employed to unemployed, estimated 2015 earned income was set to zero; for those that were randomly assigned from being unemployed to employed, estimated 2015 income was set to the sum of the individual's earned income as reported in the 2009-2013 ACS microdata (with all values adjusted for inflation to reflect 2015 dollars) and the average value for their group defined by race/ethnicity, gender, and age. Once 2015 earned income was estimated, it was used to estimate total personal, family, and household income in 2015 by combining it with the original values of all other income sources found in the 2009-2013 ACS microdata (also adjusted for inflation to reflect 2015 dollars).

**Estimating the Full-Employment Scenario**

With 2015 baseline rates of unemployment and labor force participation by race/ethnicity, gender, and age group in place, we then estimated gains in employment and earned income in moving from the 2015 baseline to a full employment economy as defined by meeting particular targets, or benchmarks, for the employment and labor force participation rates based on an examination of historical data. While the concept of full employment has traditionally focused on the unemployment rate, we note that as unemployment falls, labor force participation tends to rise as discouraged workers re-enter the labor force. Thus, we incorporate a rise in labor force participation into the definition of full employment. We based the benchmarks we applied upon the year 2000, which is arguably the last time the nation experienced a full-employment economy. Using labor force statistics from 2000, we assume an unemployment rate of 4.0 percent (or an employment rate of 96.0 percent), and labor force participation rates of 74.8 percent for males and 59.9 percent for females. Note that because labor force participation varies by gender—both currently and historically—we assume this pattern holds under the full employment scenario, hence the separate target labor force participation rates for males and females under full employment.

It is also the case that employment and labor force participation rates vary substantially by age, and we assume these patterns hold under the full employment scenario as well. In other words, rather than assuming that workers of all ages reach the full employment benchmarks noted above (which reflect averages for the population ages 16 or older), we calculated and applied age-adjusted benchmarks for 14 different age groups. To calculate age-adjusted benchmarks, we first computed the ratios of the employment and labor force participation benchmarks under full employment noted above to their corresponding average national levels estimated for 2015 using the 2009-2013 ACS microdata (for the
For example, the overall employment rate for the population ages 16 or older in 2015 was estimated to be 94.5 percent, but for those ages 16 to 19, the employment rate was 82.1 percent. So, rather than setting the full employment benchmark for the 16- to 19-year-old age group at 96.0 percent, it was set at 83.4 percent: the product of the 2015 employment rate for the age group and the ratio of the employment rate under full employment to the 2015 employment rate for the population ages 16 or older \[83.4 = 82.1 \times (96.0/94.5)\]. Because age distributions vary by race/ethnicity, the final rates we estimate for employment and labor force participation under full employment also vary by race/ethnicity (and gender, to a lesser degree) and will not match our benchmarks exactly.

With age-specific benchmarks in place, the next step was to calculate the number of new labor force participants and newly employed under the full employment scenario by race/ethnicity, gender, and age group compared with the 2015 baseline estimates. We then implemented the increases in the 2009-2013 ACS microdata by making random assignments to move individuals into the labor force and employment until the benchmarks were achieved for each group. It is important to note that in instances where a group’s estimated age-specific rate of labor force participation or employment for 2015 already surpasses the relevant age-adjusted benchmark, it was left unchanged in the full employment scenario—that is, nobody was projected to lose employment when moving from the 2015 baseline estimates to full employment.

Similar to the approach we followed in making our 2015 baseline estimates, earned income under the full employment scenario in 2015 was estimated for those who were randomly assigned from being unemployed to employed by adding the average earned income for their particular group defined by race/ethnicity, gender, and age to their actual earned income as reported in the 2009-2013 ACS microdata (with all values adjusted for inflation to reflect 2015 dollars). Earned income derived under the full employment scenario was then used to estimate total personal, family, and household income in 2015 by combining it with the original values of all other income sources found in the 2009-2013 ACS microdata, after adjusting them for inflation to reflect 2015 dollars. The resulting income values were then compared with the 2015 baseline values to estimate the increase in aggregate personal, family, and household income under the full employment scenario.

**Estimating Gains in Tax Revenues, Poverty, and GDP**

Increased tax revenues at the federal, state, and local levels were estimated by applying tax rates for different sections of the income distribution to estimated family incomes under the 2015 baseline scenario and the full employment scenario, calculating estimated tax revenues under each scenario, and taking the difference. The federal tax rates were taken from the report *Who Pays Taxes in America in 2015* by Citizens for Tax Justice, where they are reported for eight percentile groupings: one group for each of the bottom four quintiles, a group for the 81st through 90th percentile, a group for the 91st through 95th percentile, a group for the 96th through 99th percentile, and a group for the top one percent of taxpayers. To estimate federal tax revenues under each scenario, we organized families nationally into the same eight percentile groups using the appropriate measure of family income and multiplied the corresponding tax rates by family income. The state and local rates were drawn from Appendix A of a report by the Institute on Taxation and Economic Policy: *Who Pays? A Distributional*
Analysis of the Tax Systems in All 50 States. For all 50 states and the District of Columbia, this report lists the combined state and local taxes as a share of family income for seven percentile groupings: one group for each of the bottom four quintiles, a group for the 81st through 95th percentile, a group for the 96th through 99th percentile, and a group for the top one percent of taxpayers. To estimate combined state and local tax revenues under each scenario, we organized the families within each state into the same seven percentile groups using the appropriate measure of family income and multiplied the corresponding tax rates by family income. It is important to note that in each report, the income measures used to group taxpayers into percentiles and to derive the tax rate (taxes as a share of income) include both gross income that is subject to taxes and gross income that is exempt, making them comparable to family income estimated using the ACS microdata.

Increased Social Security and Medicare contributions were calculated by applying standard contribution rates to estimated increases in earned income under the full employment scenario. The IRS reports that the current Social Security tax rate is 12.4 percent and the Medicare tax rate is 2.9 percent (including contributions from both employers and employees).

To estimate the number of people who would be brought out of poverty under the full employment scenario, we derived the poverty threshold for each family in the 2009-2013 ACS microdata by dividing total family income by the “poverty” variable included in the IPUMS version of the ACS microdata that was used for the analysis (and then multiplying by 100). The “poverty” variable expresses total family income as a percentage of the federal poverty threshold for each particular family (which depends on family size and composition). Using the poverty thresholds for each family, we were able to estimate the number of people living in poverty under both the 2015 baseline and full employment scenarios, and the difference (i.e., the number lifted out of poverty under full employment). For families with no income reported in the 2009-2013 ACS microdata, we were unable to derive a poverty threshold. With no threshold for comparison to the increase in income under full employment, it was simply assumed that nobody from such families was lifted out of poverty under the full employment scenario even if a family member gained employment. Therefore, our estimates of the number lifted out poverty under full employment may be slightly understated.

Finally, to estimate GDP gains under the full employment scenario, we calculated the percentage increase in total (aggregate) personal income between the 2015 baseline and full employment scenarios, and assumed that GDP would rise by the same percentage. However, because 2015 GDP is not publicly available for metropolitan regions, we first had to estimate it for the 12 regions included in our analysis. To do so, we adjusted an estimate of 2012 GDP for each region from the U.S. Bureau of Economic Analysis (BEA) upward to reflect real national GDP growth calculated using BEA data from 2012 (annual average) and the second quarter of 2015. Therefore, the 2015 baseline estimates reported may differ from estimates reported elsewhere. The national GDP estimate in 2015 that is reported here may also differ from estimates reported elsewhere for other reasons: 1) national GDP reported here is equal to the sum of the GDP by state; 2) GDP by state excludes federal expenditures on personnel stationed abroad and on military structure and military equipment located abroad (except office equipment), while these are typically included in national GDP; and 3) GDP by state and national GDP have different revision schedules. It is worth noting that even under the aggressive full employment benchmark, our estimates of the gains in GDP are conservative as they do not take into consideration the “multiplier effect” of rising income.

