Policies to help the working class in the aftermath of COVID-19: Lessons from the Great Recession

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Abstract

The COVID-19 pandemic and the associated government mandated shutdowns caused a historic shock to the U.S. economy and a disproportionate job loss concentrated among the working class. While an unprecedented social safety net policy response successfully offset earnings loses among lower-wage workers, the risk of continued and persistent unemployment remains higher among the working class. The key lesson from the Great Recession is that strong economic growth and a hot labor market do more to improve the economic wellbeing of the working class and historically disadvantaged groups than a slow recovery that relies on safety net policies to help replace lost earnings. Thus, the best way to prevent a "K-shaped" recovery is to ensure that safety net policies do not interfere with a return to the strong pre-pandemic economy once the health risk subsides, and that pro-growth policies that incentivize business investment and hiring are maintained.

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Introduction

The Great Recession resulted in a deep and prolonged reduction in employment in the United States. Between the eve of the Great Recession in November 2007 and just under two years later in October 2009, the unemployment rate more than doubled from 4.7 percent to 10.0 percent (BLS 2021). It took 9 years for the unemployment rate to return to its pre-recession level of 4.7 percent in 2016 (BLS 2021). It took even longer, 12 years, for the prime age labor force participation rate to return to its pre-recession level in 2019 (BLS 2021). As a result of declining employment, median household market income (which excludes government taxes and transfers as well as the market value of health insurance) fell by 12 percent from 2007 to 2011, and did not fully recover until 2017, as we document below using data from the Current Population Survey – Annual Social and Economic Supplement (CPS-ASEC). (See data appendix for details of this and other income series estimates.)

In response to the Great Recession, the federal government initiated strong social safety net policies to blunt the loss in household market income. Unemployment Insurance (UI) was eventually expanded to 99 weeks in many states (CRS 2014). Work requirements in the Supplemental Nutrition Assistance Program (SNAP) for non-disabled adults without dependents were waived in all states, and most states still had not fully reinstated work requirements by the end of 2019 (USDA 2021). Though not directly linked to the response to the Great Recession, the final phase-in of the Affordable Care Act substantially expanded public health insurance in 2014. These government policies mitigated the loss in market income. Based on our fullest income measure, median household income (including market income, government taxes and transfers as well as the market value of employer and government provided health insurance), remained stable between 2007 and 2014, never falling more than 1 percent below its pre-recession level (as we show below using CPS-ASEC data).

While the safety net response to the Great Recession helped to preserve the incomes of middle-class households and fended off an increase in inequality, it came with a cost – discouraging work and thus contributing to prolonged labor market weakness. As discussed below, the extended duration of UI as well as work disincentives in safety net programs slowed the return to employment in the aftermath of the Great Recession. Of course, the structural causes of the Great Recession – a financial and housing market crisis whose negative effects ramified throughout the economy – would have prevented a swift recovery even in the absence of a strong safety net response. But the extended duration of these policies may have played a role in producing a historically slow recovery.

Nonetheless, this recovery period ultimately proved to be longer lasting and more far reaching across the income distribution than most analysts predicted. Between 2014 and 2019 (the peak year of the 2007-2019 business cycle), both market income and our fuller measures of income grew substantially for the median household (documented below using CPS-ASEC data). Wages grew fastest at the bottom of the distribution. Pro-growth policies played an important role in fueling this late business cycle growth. The Tax Cuts and Jobs Act of 2017 reduced taxes on

businesses, strengthening their incentive to invest in the United States, and the Trump Administration pursued aggressive deregulation. These policies helped boost labor demand, increasing employment and putting upward pressure on wages. The unemployment rate reached a record low of 3.5 percent in February 2020, and wage growth for the lowest wage workers exceeded that of higher wage workers in the two-year period ending in 2019 Q4 (BLS 2021).

The COVID-19 pandemic disrupted the strong economy in early 2020 and cast the United States into a new recession, with the unemployment rate rising from 3.5 percent in February to 14.8 percent in April (BLS 2021). The cause of the COVID-19 crisis is starkly different from that of the Great Recession – an exogenous shock due to a deadly pandemic rather than underlying economic problems. Nevertheless, the experience with the Great Recession provides an important policy lesson for recovery from the COVID-19 recession. An unprecedent expansion of the social safety net in 2020 provided critical immediate relief in response to the COVID-19 shock but continuing these policies after the pandemic subsides could delay an otherwise swift return to the strong pre-COVID economy. Pro-growth policies should be continued, and policies that increase the regulatory and tax burdens on firms and workers should be avoided.

The slow recovery from the Great Recession and the role of safety net programs

The financial crisis in 2007 sparked the Great Recession, resulting in one in ten workers falling into unemployment and almost a decade of elevated unemployment rates (BLS 2021). The major toll this took on households, before accounting for offsetting government tax and transfer policies, can be seen in Figure 1 below. This figure updates the historical analysis of Elwell et al. (2020) which showed median income growth from 1959 through 2016. Here we focus on the 2007-2019 business cycle, which as we will see in the next section, most closely resembles the 1989-2000 business cycle with respect to its secular income growth which was fastest in its final years for lower wage workers. As shown with series [4] (and even more so for series [1], [2] and [3] that rely on tax units and narrower income definitions), real median household market income fell by 12 percent between 2007 and 2011, the largest peak year to trough year decline in market income since at least 1967. Median household market income did not reach its 2007 pre-recession level again until a decade later in 2017. A household of four at the median each year would have experienced a cumulative loss of approximately $57,000 (in 2019 dollars) in market income over the decade between 2007 and 2016, assuming zero counterfactual real income growth.

Figure 1. Various measures of the income of the median tax unit or person normalized to 2007 levels over the 2007-2019 business cycle
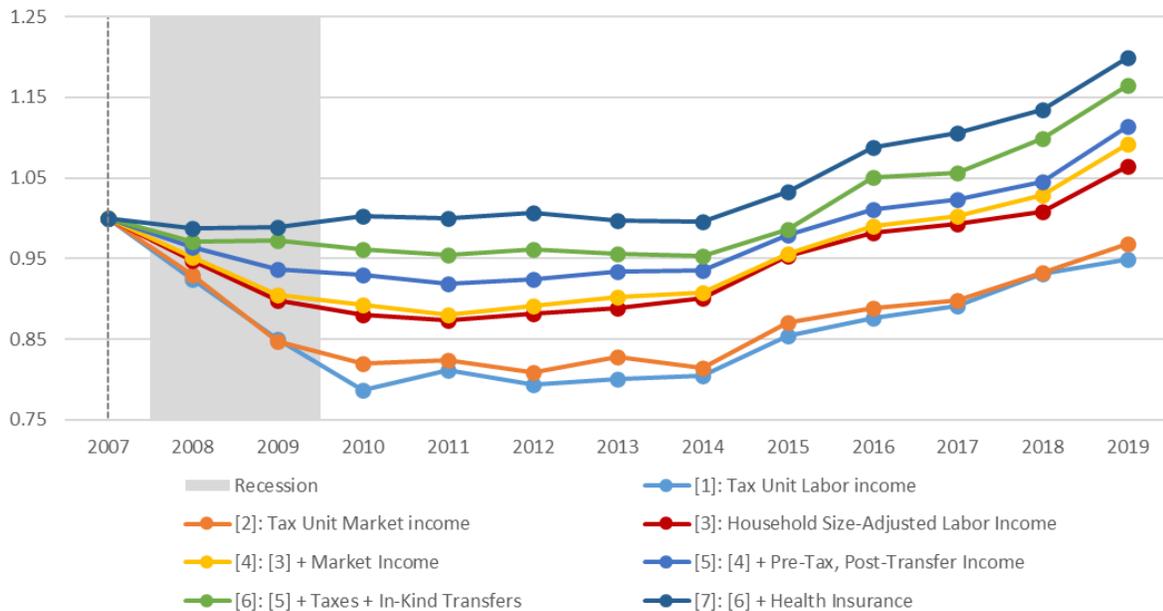
Notes: Median income trends normalized to one in peak business cycle year 2007 with NBER recessions in grey. In series [1] and [2], income is not size adjusted and the tax unit is the sharing unit and unit of analysis. In series [3] through [7], income is household size-adjusted using a square root equivalence scale and the unit of analysis is the individual. For all series, values are adjusted for a survey redesign in the 2013 income year. Median income is adjusted for inflation using the CPI-U-RS in each year. See data appendix for a detailed definition of each income series as well as imputations and data sources.

Tax and cash transfer policies, excluding in-kind transfers and the value of health insurance, partly cushioned the loss in market income. As seen in series [5] in Figure 1, median household pre-tax, post-transfer income fell by 8 percent between 2007 and 2011, and the cumulative income loss experienced before recovering in 2016 was just over $41,000. Accounting for taxes and in-kind transfers in series [6] mitigates the fall in market income even more, now falling by 4 percent between 2007 and 2011, and reducing the cumulative loss in income to about $19,000. When adding the value of health insurance (both employer contributions to health insurance premiums and the market value of public health insurance) in series [7], income fell by just one percent between 2007 and 2008 and fully recovered by 2010, for a cumulative loss of less than $2,000.

Figure 1 shows the success of the social safety net in mitigating substantial, sustained losses in market incomes during and in the aftermath of the Great Recession. This was accomplished through existing means-tested programs, a progressive tax code, and new policies to expand the social safety net in response to the economic crisis.

One of the largest expansions of the social safety net in response to the Great Recession was the extension of UI for up to 99 weeks in many states, almost four times as long as the typical 26 weeks of benefits offered during normal economic periods (CRS 2014). Another important

change was the cessation of SNAP work requirements. Typically, non-disabled adults between the ages of 18 and 49 without dependents can receive SNAP benefits for only three months at a time unless they engage in work activities (i.e., employment itself or work preparation such as training) for at least 80 hours per month. The federal government allowed every state to waive this time limit during the Great Recession, and even in the fourth quarter of 2019, when the U.S. unemployment rate was 3.6 percent, only 17 states had fully revoked their waivers (USDA 2021). Mulligan (2012) estimates that these and other social safety net expansions in response to the Great Recession increased the marginal tax rate for the typical American from 40 percent to 48 percent. The Affordable Care Act provided more permanent assistance to Americans, expanding Medicaid coverage, and providing subsidies for the purchase of private health insurance plans for those with low to moderate incomes.

While these policies successfully mitigated the negative impact of the Great Recession on household incomes as shown in Figure 1, they also discouraged work and may have prolonged the economic downturn. It took 9 years for the unemployment rate to return to its pre-recession level. Though findings are mixed, some research finds that UI extensions may have played an important role in the slow decline in unemployment (e.g., Farber and Valletta 2015; Johnston and Mas 2018; Mitman and Rabinovich 2019). Other safety net expansions may have contributed to the slow recovery as well (see for example, Mulligan 2012, and for contrasting views see the debate between Moffitt 2015 and Mulligan 2015). The SNAP caseload increased each year from 2007 until 2013, for an overall increase of 21 million recipients, then fell only gradually by less than 1 million people for the next two years (USDA 2020). While effect sizes vary, studies have typically found that transfer programs that disincentivize work tend to reduce work (e.g., Hoynes and Schanzenbach 2012; Jacob and Ludwig 2012).

The strong late-business cycle recovery and the role of pro-growth policies

After remaining relatively stagnant through 2014, market incomes grew more quickly beginning in 2015, and in 2017 median household market income finally exceeded its 2007 peak pre-recession level (see figure 1, series 4). Similarly, the unemployment rate first fell below its 2007 low in 2017, reaching 4.1 percent in December (BLS 2021). Since the natural rate of unemployment (a rate caused by frictional and structural unemployment alone) was 4.7 percent (CBO 2017), most analysts expected little additional reduction in the unemployment rate in the following years. For example, CBO (2016) predicted a 4.8 percent unemployment rate in 2019 and CBO (2017) predicted a 4.4 percent unemployment rate in 2019.

Contrary to expectations, the strong late business cycle recovery continued without slowing down through the end of 2019. The unemployment rate fell below 4.0 percent in 2018 and reached a 50-year low of 3.5 percent in 2019 (BLS 2021). Median household market income grew 9 percent between 2017 and 2019, matching its largest two-year increase during the 2007-2019 business cycle (see Figure 1 series 4). When this increase in market income is considered within our income measures that more fully capture the resources available to households, the entire income distribution shifted outward over the 2007-2019 business cycle. Figure 2a shows the real post-tax, post-transfer (plus in-kind transfers) income distribution (series 6 definition in Figure 1) for business cycle peak years 2007 and 2019. Figure 2b shows the same distribution

when adding the market value of employer and government provided health insurance (series 7 in Figure 1). Even excluding the market value of health insurance, real median income increased by about $6,000 (17 percent) over this period. Including the market value of health insurance results in an increase of over $8,000 (20 percent). More importantly, the entire income distribution shifted outward, exhibiting first order stochastic dominance. In other words, over the business cycle of 2007-2019, a rising tide lifted all boats. Over this same period inequality increased slightly in our first measure which excludes the value of health insurance, but decreased slightly once we include the value of health insurance.

Figure 2. Distribution of real household income of persons, business cycle peak years 2007 and 2019
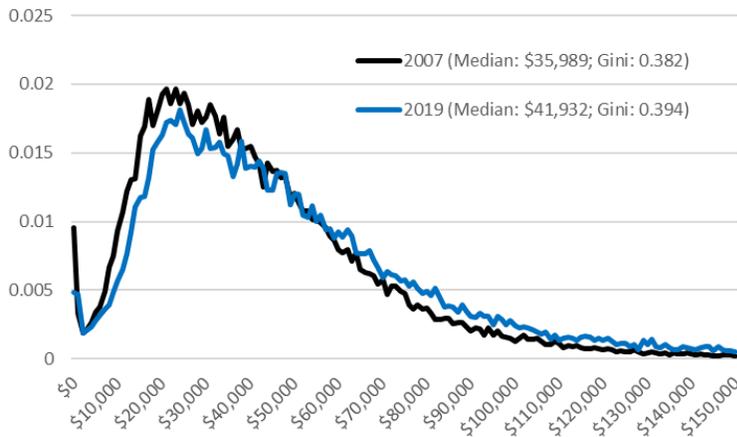
2a: Post-tax, post-transfer income plus in-kind transfers
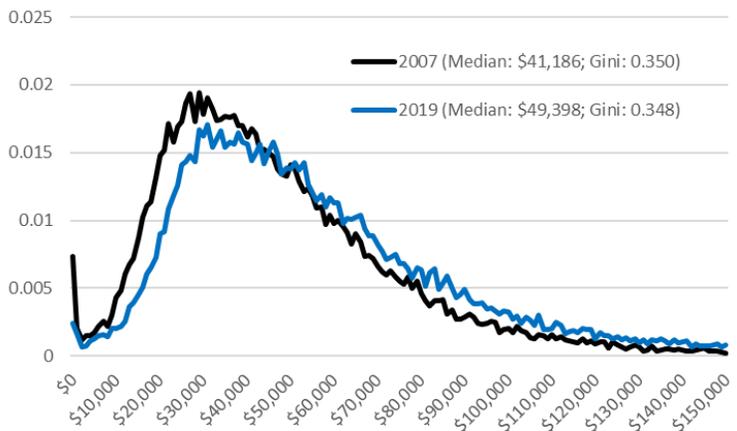
2b: Post-tax, post-transfer income plus in-kind transfers and the value of health insurance

Notes: Income is real household size-adjusted income of individuals using a square root equivalence scale. Figures show the share of the population within each $1,000 income bucket., Individuals with negative incomes are included in the $0-$1,000 income bucket. Median values displayed for 2007 are adjusted for a survey redesign in the 2013 income year. Median income is adjusted for inflation using the CPI-U-RS in 2007. All values are in 2019 dollars. See data appendix for detailed definition of each income series as well as imputations and data sources.

Figure 1 showed a path of changes in median income that resulted in real income growth for the median American over the 2007-2019 business cycle. Figure 2 showed that this growth occurred throughout the income distribution. But what do these statements tell us about income growth among the working class? While there is no commonly accepted definition of "working class," as the various definitions adopted in the articles in this special volume make clear, we nonetheless argue that the overall distributional income growth we report in Figure 2 is likely to hold for most definitions of the "working class" as well. As one piece of evidence, we show in Appendix Figure 1A that when restricted to prime age adults (ages 25 through 54), the results are similar to those for the full sample of Americans. Even in this "prime working-age" group, government tax and transfer policies offset losses in market income for the median household. Furthermore, using our most comprehensive income definition, median household income among this working-age group increased by 15 percent between 2007 and 2019.

As additional evidence of economic improvement for the working class, the benefits of the strong labor market we report above extended to groups whose characteristics are synonymous with the definitions of working class and historically disadvantaged groups considered in other articles in this special volume. Between 2017Q4 and 2019Q4, nominal weekly wages grew by 15.6 percent for workers at the 10th percentile of the wage distribution, outpacing nominal median weekly wage growth of 10.2 percent (BLS 2021). Nominal median weekly wage growth for black workers of 12.0 percent and for Hispanic workers of 10.2 percent between 2017Q4 and 2019Q4 outpaced the 9.8 percent growth for white workers (BLS 2021). Between December 2017 and December 2019, the unemployment rate fell by 0.7 percentage points for black and Hispanic workers, compared to 0.6 percentage points for white workers (BLS 2021).

While social safety net program receipt fell during the late stages of the recovery from the Great Recession, this was more than made up for by the increase in market income. Median household income adjusting for taxes and transfers and including health insurance increased by 8 percent from 2017-2019, the second highest two-year increase during the entire business cycle (see Figure 1 series 7). Using the same income measure, median household income in business cycle peak year 2019 was 20 percent higher than in business cycle peak year 2007 (see Figure 1 series 7). SNAP caseloads fell by 6.6 million people between 2017 and 2019 (USDA 2020), while at the same time food insecurity fell by 1.3 percentage points (Coleman-Jensen et al. 2020). The economic well-being among people with disabilities increased, more so than those without disabilities, even as reliance on disability assistance programs fell (Bengali et al. 2021). The official poverty rate (which includes market income and cash transfers in its resource measure—the same as in series 5 in Figure 1) reached record lows for all racial and ethnic groups in 2019, including falling below 20 percent among Black Americans for the first time on record (Semega et al. 2020).

Thus, while a strong social safety net is vital to protect workers from negative shocks, especially during recessions, it is not a replacement for a strong economy. The working class including traditionally disadvantaged Americans were substantially better off in 2019 than they were during the slow post-recession recovery when the labor market was weaker and transfer

programs were more generous (see for example, Shambaugh and Strain 2021, Ziliak 2021 and Bengali et al. 2021 in this volume).

Pro-growth policies contributed to the strong late-business cycle economic growth. The Tax Cuts and Jobs Act of 2017 cut the top corporate income tax rate from 35 percent to 21 percent, making the United States more competitive with other countries. It also increased the incentive for multinational corporations to bring back revenue to the United States by moving toward a more territorial system for taxation, and allowed for additional business expensing, further reducing the effective tax rate on businesses. These provisions encouraged more investment in the United States. The Trump Administration's strong deregulatory effort complemented the pro-growth effects of tax reform. Between 2017 and 2019, the Trump Administration cut seven regulations for each significant regulatory action it issued, reducing costs on businesses, improving productivity, and encouraging investment (CEA 2021). By strengthening investment incentives, tax reform and deregulation increased the demand for labor, putting upward pressure on wages and employment, likely contributing to gains late in the business cycle that exceeded expectations.

Ultimately, while social safety net policies are essential to provide relief to Americans who experience negative shocks, especially in response to general economic downturns, the experience with the Great Recession and recovery shows that the most effective long-term path toward raising employment and living standards for all is a strong economy. Safety net policies should be designed carefully to minimize work disincentives that can inadvertently delay a strong recovery. And pro-growth policies that incentivize private investment and remove regulatory barriers should be continually pursued, so that economic gains can reach the working class as well as the most disadvantaged Americans.

Lessons for the response to COVID-19

This past business cycle's historically strong labor market was interrupted by the COVID-19 pandemic. The unemployment rate increased from 3.5 percent in February 2020 to 14.8 percent two months later in April (BLS 2021). These were the lowest and highest unemployment rates reached in half a century (BLS 2021). Congress quickly responded to the pandemic-induced downturn by passing a series of legislative packages in March, culminating with the $2.2 trillion CARES Act, that provided healthcare assistance, paid leave benefits, an eviction moratorium and forbearance of mortgage payments in eligible properties, the deferral of student loan payments, unemployment benefits, economic relief payments, and assistance to small businesses to help retain employees (see CEA 2020 for a more extensive analysis of these policies).

Unemployment assistance expansions were unprecedented. Pandemic Unemployment Assistance (PUA) expanded coverage to workers not covered by regular UI, including gig workers and the self-employed. Pandemic Emergency Unemployment Compensation (PEUC) extended unemployment benefits for 13 weeks on top of the typical 26 weeks of coverage under normal benefits and 13 weeks of coverage under Extended Benefits (triggered based on adverse employment conditions in a state). Altogether, a worker in a typical state could thus receive up to 52 weeks of benefits, a duration that was later expanded even further in legislation enacted at the

end of 2020. In addition, all unemployed workers could receive a $600 weekly supplemental benefit on top of regular or PUA benefits under the Federal Pandemic Unemployment Compensation (FPUC) program for four months, from April through July. As an illustration of the unprecedented level of benefits offered, an unemployed worker who earns $400 per week would receive $200 in regular UI benefits in a typical state. Under FPUC, the worker would receive $800 in unemployment assistance per week, twice their typical weekly earnings from working. Ganong et al. (2020) estimate that 76 percent of unemployed workers received more from unemployment assistance than their previous earnings until August due to the FPUC program. When FPUC expired at the end of July, the Trump Administration extended a $300 Federal supplement for a limited duration. The December 2020 appropriations act implemented another $300 supplement and extended coverage of the PUA and PEUC programs through March 2021.

Most households, except those with incomes above $150,000 (for a married couple filing jointly), received full Economic Impact Payments of $1,200 per adult and $500 per child as part of the CARES Act, and an additional $600 per adult or child as part of the December appropriations bill. An eligible family of four has thus received $5,800 across both packages. The U.S. poverty line was $26,200 in 2020 (HHS 2020), and so these payments alone were enough to keep a family of four out of poverty for 2.7 months even if they had no other income and before the receipt of any unemployment assistance due to job loss.

These direct forms of assistance, along with other programs passed by Congress or issued as executive actions by the Trump Administration, provided an unprecedented level of relief to households, and especially to those with lower incomes (see CEA 2020). While pre-transfer income fell by 8.7 percent between February and April 2020, post-transfer income increased by 13.1 percent over the same two-month period (CEA 2021). Han et al. (2020) find that poverty fell in the initial months of the pandemic due to policies providing relief to households.

These forms of assistance, along with business relief particularly in the form of the Paycheck Protection Program that helped keep businesses afloat and mitigated job loss, have helped to ensure that households could weather the sharp pandemic-induced downturn. While work disincentive effects would in normal times be sharp, the special circumstances of this recession and the fact that the programs were intended to be short-lived may have limited disincentive effects on employment (see Altonji et al. 2020; Bartik et al. 2020; and Marinescu et al. 2020 suggesting small disemployment effects of unemployment insurance expansions during the summer of 2020). However, once the pandemic recedes, disincentive effects are likely to return.

Once the pandemic wanes in the months ahead, it will be vital to adhere to the lessons learned from the Great Recession and recovery: Strong economic growth is the best tool to help working class households thrive and to deliver gains to disadvantaged groups. Delaying growth by extending social safety net programs for too long or failing to maintain pro-growth policies could thus inadvertently hurt working class Americans. Specifically, extending supplemental unemployment assistance benefits that create greater than 100 percent implicit tax rates on employment would likely delay the recovery if extended beyond the emergency pandemic response period. The lack of any underlying economic factors underpinning the COVID-19

recession along with the preservation of household and business balance sheets due to the unprecedent fiscal response suggest that once the major health risks from the pandemic largely subside, the U.S could quickly return to the strong pre-pandemic economy. Overextended programs that discourage labor supply could interfere with this process and slow the recovery.

It is similarly important to maintain the pro-growth policies that incentivize businesses to invest in the United States and as a result boost the demand for American workers. Increasing the corporate tax rate and weakening pro-growth provisions of the Tax Cuts and Jobs Act would discourage investment. Rolling back Trump Administration deregulatory efforts that reduced barriers to hiring workers would hold back business expansion and employment gains.

Newly proposed regulations could stand in the way of a quick recovery as well. One of the most drastic proposed labor market regulations is a proposed increase of the federal minimum wage from $7.25 to $15 per hour. A recent CBO report estimates such a change would cause 1.3 million workers to lose their jobs (CBO 2019), and a large academic literature finds that even more modest minimum wage increases have caused significant job loss in states that enacted them (Neumark and Shirley 2021). Some states where wages are lower, such as in Mississippi where half of workers earned $15 or less in 2019 (BLS 2020), would be severely affected by a $15 minimum wage. Even states with higher current wages would likely experience job loss. For example, the relatively high wage city of Seattle saw significant job losses when the minimum wage was increased to $13, such that the increased earnings of those who kept their low-wage jobs and received the higher wage was more than offset by losses in earnings for those who lost their jobs (Jardim et al. 2017).

While the key ingredients for promoting a quick return to the strong pre-pandemic economy are the preservation of labor supply incentives and pro-growth policies that boost labor demand, policies that address other barriers to work and bring people off the sidelines into the labor force are important as well, as other articles in this volume have emphasized. Improving educational and career training opportunities, advancing employment prospects for the growing population of justice-involved individuals, tackling racial disparities and discrimination, improving the design of disability programs to better encourage work, and addressing deep geographic disparities in opportunity can all improve the employment prospects of the working class and disadvantaged groups in the United States. But ultimately, these improvements are not substitutes for a strong economy with a hot labor market as the recovery from the Great Recession has shown.

Conclusion

The COVID-19 pandemic and the associated economic shutdown posed a historic shock to the U.S. economy. Job loss has been concentrated among the working class, raising concerns about a "K-shaped" recovery in which lower wage workers recover much more slowly than higher wage workers. While the unprecedented policy response has helped ensure that lower-wage workers have not suffered more in terms of income loss, the risk of continued and persistent unemployment is higher among the working class. The key lesson from the Great Recession is that strong economic growth and a hot labor market do more to improve the wellbeing of the working class and historically disadvantaged groups than a slow recovery that relies on safety net

policies to help replace reduced incomes. Thus, the best way to prevent a "K-shaped" recovery is to ensure that safety net policies do not interfere with a return to the strong pre-pandemic recovery once the health risk subsides, and that pro-growth policies that incentivize business investment and hiring are maintained.

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Appendix

In this appendix we first show an alternative to Figure 1 that considers only prime age adults instead of the full population. We then describe all the income definitions we use in our analysis including how we impute specific income sources.

Figure 1 shows how median income varied over the 2007-2019 business cycle for alternative measures of income. This is a standard method of tracking how the average American fared over a business cycle. There is no universally accepted definition of the working class. However, it is usually the case that such definitions focus on those of "working-age." In the United States that is often considered to be 25-61 since non-disabled workers are not eligible for Social Security retirement benefits until age 62. For example, this age range is used by Bengali et al. (2021) in their definition of the working class in this volume. An alternative age range is 25-54. This is "prime working-age" in the United States when labor force participation rates are highest. For example, this age range is used by Shambaugh and Strain (2021) and Ziliak (2021) in most of their definitions of the working class in this volume. We experimented with both working age ranges and found similar results but below only report our findings for those aged 25-54.

Appendix Figure 1A below replicates Figure 1, with the only change being that we focus on prime working-age adults (i.e., those ages 25 through 54) instead of the full population. For series [1] and [2] that use tax units as the sharing unit and the unit of analysis, we include all sharing units with at least one adult age 25 through 54. For all other series, we include the income of all people in the household to obtain household size-adjusted income of persons but only include people age 25 through 54 in our sample for calculating medians.

Figure 1A. Various measures of the income of the median tax unit or person normalized to 2007 levels over the 2007-2019 business cycle, adults age 25 through 54
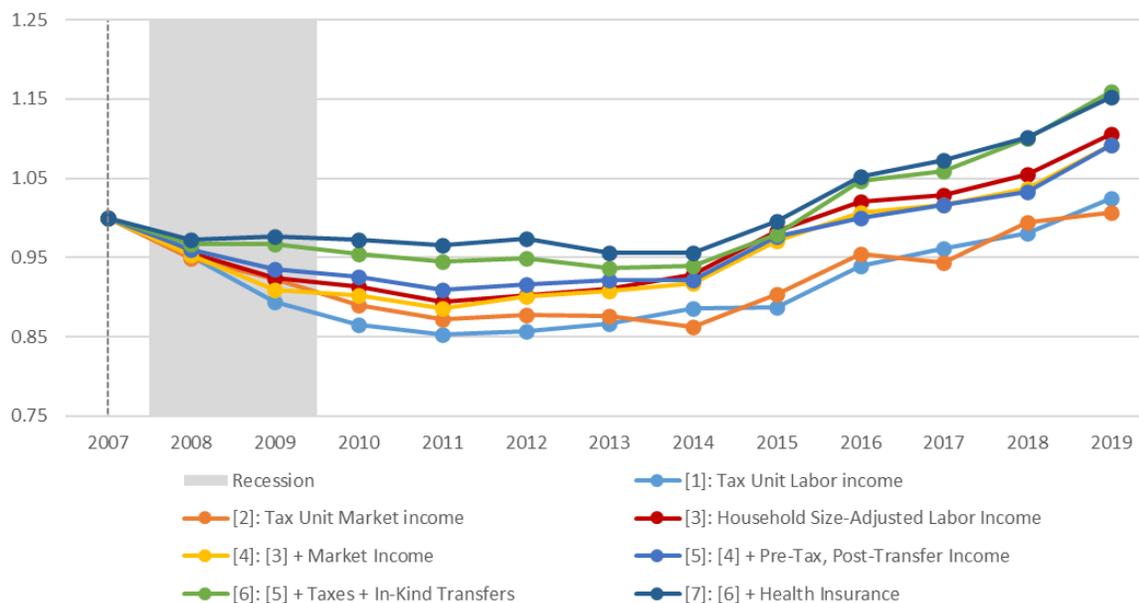
Notes: Median income trends normalized to one in peak business cycle year 2007 with NBER recessions in grey. In series [1] and [2], income is not size-adjusted and the tax unit is the sharing unit and unit of analysis. Only tax units with at least one adult age 25 through 54 are included. In series [3] through [7], income is household size-adjusted using a square root equivalence scale and the unit of analysis is the individual. Medians are calculated over the sample of individuals age 25 through 54 only. For all series, values are adjusted for a survey redesign in the 2013 income year. Median income is adjusted for inflation using the CPI-U-RS in each year. See appendix for a detailed definition of each income series as well as imputations and data sources.

Income Definitions

Below we define each income concept we use and describe our imputation approaches when applicable. We use data from the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) in all our figures. We accessed these data through the IPUMS-CPS database (Flood et al. 2020). Our methodology for defining and imputing income generally follows Elwell et al. (2020). However, in this article we extend that analysis using additional years of data (2017-2019).

Tax Unit Labor Income. This income measure includes only labor earnings – wage and salary income; business/professional practice income including earnings for the self-employed; and farm income (for the self-employed who own their farms). The tax unit is the sharing unit and the unit of analysis, meaning that labor earnings are summed across all members of the tax unit and we consider each tax unit a single observation for calculating statistics such as medians. The CPS ASEC does not ask respondents about their tax unit, and so we impute tax units based on family relationships (using information on marital status, spouses, parents, age, and family unit)

reported in the survey, following the methodology of Piketty and Saez (2003) as discussed more fully in Elwell et al. (2020).

Tax Unit Market Income. This income measure includes all market income – which in addition to labor earnings, includes dividends; interest income; net rental income; royalties; income from estates and trusts; private pensions and annuities; retirement income; federal government employee pensions; alimony; child support; cash contributions from non-household members; and private survivor benefits. The tax unit is the sharing unit and the unit of analysis, as described for tax unit labor income.

Household Size-Adjusted Labor Income. This income measure uses the same income sources as described above for tax unit labor income. However, in this case we use the household as the sharing unit and persons as the unit of analysis. Thus, we first sum all labor income across all members of a given household and assign this household sum to each household member. Next, we size-adjust labor income based on the number of household members – specifically, we divide the household sum of labor income by the square root of the number of household members. We then consider each person a separate observation for calculating statistics such as medians. Note that using the person as the unit of analysis is equivalent to using the household as the unit of analysis where each household is weighted by the number of household members.

Household Size-Adjusted Market Income. This income measure is identical to household size-adjusted labor income as defined above, except that we use market income instead of labor income.

Household Size-Adjusted Pre-Tax, Post-Transfer Income. This income measure adds government cash transfers to the market income definition used above – such as Social Security Old Age and Survivors Insurance, government disability programs, Workers' Compensation, Unemployment Insurance and cash welfare. It is pre-tax income. It also excludes in-kind government transfers and any cash transfers administered via the tax code (e.g., the Earned Income Tax Credit). These are the income sources used for official median income and poverty estimates published annually by the Census Bureau.

Household Size-Adjusted Post-Tax, Post-Transfer Income Plus In-Kind Transfers. This income measure adjusts for taxes and adds in-kind government transfers to the pre-tax, post-transfer income definition used above. We subtract federal and state income taxes paid and add any credits received; and we subtract federal payroll taxes paid by the employee. These taxes are imputed by the Census Bureau based on survey responses about family relationships (used to impute tax units) and income sources. We also include the market value of in-kind transfers including Supplemental Nutrition Assistance Program benefits, federal rental housing assistance, and the school lunch program.

Household Size-Adjusted Post-Tax, Post-Transfer Income Plus In-Kind Transfers and Health Insurance. This income measure adds the market value of health insurance to the post-tax, post-transfer income plus in-kind transfers definition used above. We include the full value of employer contributions to employee health insurance plans and the full market value of government health insurance for those covered by Medicare or Medicaid. As described in Elwell

et al. (2020), the market value of Medicare and Medicaid is calculated as the average cost for recipients in a given state and given risk class. The risk classes for Medicare are (i) aged (65 or older) and (ii) disabled. The risk classes for Medicaid are (i) aged (65 or older), (ii) blind or disabled, (iii) nondisabled children (under 21), and (iv) nondisabled adults (21–64). The Census Bureau imputes the full value of employer contributions to employee health insurance plans through (income year) 2017 and the market value of Medicare and Medicaid through (income year) 2010. We use the Census imputed values when available and impute values ourselves when unavailable. To impute (income years) 2018 and 2019 employer contributions to health insurance, we estimate the relationship between the value of contributions among those covered in (income year) 2017 and the type of plan (self-plan, self-plus one plan, or family plan), full- vs. part-time work status, and the number of weeks worked. We use this relationship to predict employer contributions in (income years) 2018 and 2019, and we increase values based on the Consumer Price Index for medical care. To impute the market value of health insurance in (income years) 2011 through 2019, we follow the approach used by Census Bureau in previous years.