Multidimensional Hardship in the U.S. during the COVID-19 Pandemic

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Abstract

This paper estimates multidimensional hardships experienced by Americans during the Covid-19 pandemic. We use monthly data from the Household Pulse Survey conducted by the U.S. Census Bureau and other agencies to estimate a multidimensional hardship index. Our analysis spans one year of the pandemic, beginning April 2020 and ending March 2021. Results indicate that a high percentage of the adult population experienced mental health symptoms, followed by job insecurity, housing insecurity, and food insufficiency. On average, 13.2 percent of respondents experienced two or more hardships during the year. When COVID-19 cases peaked in July 2020, as many as 16.4 percent experienced multiple hardships. Young adults, and individuals with less education and income were more likely to suffer from hardships. Blacks were more likely to experience food insufficiency and housing insecurity, whereas Hispanics were more likely to experience job insecurity. Statewide values of the multidimensional hardship index revealed that hardships were more prevalent in the South and the West and less so in the Midwest.

Keywords: Covid-19, food insufficiency, hardship, housing insecurity, job insecurity, mental health, pandemic, poverty, U.S.

JEL codes: I1, I3, O51

I. Introduction

The United States (U.S.) was one of the hardest hit countries by the COVID-19 pandemic. Nearly a quarter of the cases detected worldwide were accounted for in the U.S. and within a year from March 2020 to April 2021, more than 550,000 had lost their lives in the country.[1] In addition to the number of people dying or battling the disease, an even greater proportion of population suffered from the resulting economic crisis. Between March and April 2020, 43 states issued orders directing residents to stay at home and nonessential businesses to close in response to the coronavirus pandemic.[2] Businesses, large and small, were forced to shut down. According to the Bureau of Labor Statistics, unemployment rose to a high of 14.7 percent in April 2020. Millions of Americans lost their jobs, struggled to pay rents, and had to rely on food banks to feed their families. An estimated 45 million people or 1 in every 7 individuals were food insecure in 2020 (Feeding America, 2021). Along with food insecurity, the number of Americans experiencing housing insecurity also soared during the pandemic. In 2020, the number of households who fell behind at least three months on their mortgage increased 250 percent to over 2 million households (Consumer Financial Protection Bureau, 2021). Even as the economy has slowly recovered, with the unemployment rate around 6 percent in March 2021, the toll of the pandemic continues to be felt in other forms. As the pandemic enters its second year, many Americans are suffering from mental health challenges as a result of financial hardships, illness and death, social isolation, and a remote-virtual work and school

[1] COVID-19 Death Data and Resources - National Vital Statistics System (cdc.gov)
[2] See States that issued lockdown and stay-at-home orders in response to the coronavirus (COVID-19) pandemic, 2020 - Ballotpedia.

environment. The share of adults experiencing psychological distress has declined only slightly from 24 percent in March 2020 to 21 percent in February 2021.[3]

We use a unique dataset to measure multiple hardships experienced by Americans during the COVID-19 pandemic. We compile data on four hardships: job insecurity, food insufficiency, housing insecurity, and mental distress. Our analysis spans one year of the pandemic, beginning April 2020 and ending March 2021. The data comes from the Household Pulse Survey, an experimental new survey conducted by the U.S. Census Bureau and other agencies.[4] The survey was conducted at a high frequency (weekly/bi-weekly) during the pandemic. The 12 months, which we cover in our analysis, witnessed significant events. During this time, a majority of states passed lockdowns (April 2020), there were two peaks in the daily number of cases (July 2020 and January 2021), and several federal relief packages were announced.[5] Given this background, we analyze the extent to which Americans faced multiple hardships during this period and how the hardship levels varied over time and across different population subgroups.[6]

Official estimates of income poverty for 2020 will be released by the Census Bureau in the Fall of 2021. There have been some working papers, which predict how the pandemic may have

[3] https://www.pewresearch.org/fact-tank/2021/03/16/many-americans-continue-to-experience-mental-health-difficulties-as-pandemic-enters-second-year/

[4] The estimates in this paper (which may be shown in text, figures, and tables) are based on responses from a sample of the population and may differ from actual values because of sampling variability or other factors. As a result, apparent differences between the estimates for two or more groups may not be statistically significant. All comparative statements have undergone statistical testing and are significant at the 90 percent confidence level unless otherwise noted. Standard errors were calculated using replicate weights.

[5] The Family First Coronavirus Response Act (FFCRA) was signed into law on March 18, 2020, the Coronavirus Aid, Relief and Economic Security (CARES) was signed into law on March 27, 2020, the Consolidated Appropriations Act (December 2020), and the American Relief Plan (March 2021).

[6] All comparisons in this paper, unless otherwise noted, are significant at the 90 percent confidence level.

affected the number of income poor in the U.S. The U.S. Department of Health and Human Services (HHS) used different unemployment scenarios to predict poverty rates. In a report published in October 2020, they predicted that the annual poverty rate would slightly rise from 10.5 percent in 2019 to 10.9 percent in 2020.[7] Instead of annual poverty rate, Parolin et al. (2020) focused on monthly poverty rates. They found that the monthly poverty rate increased from 15% to 16.7% from February to September 2020 after taking into account the income transfers from the CARES Act. On the other hand, Han et al. (2020) found that monthly poverty rates in fact decreased from 10.9 percent in January-February 2020 to 9.4 percent in April-May-June 2020, largely due to expanded unemployment insurance and the Economic Impact Payments. Compared to the emerging literature on income poverty, few studies so far have measured multidimensional poverty during the pandemic. This paper is a first attempt, as far as we are aware, at estimating multidimensional hardships experienced by Americans during the COVID-19 pandemic.

Income often does not adequately capture the well-being of an individual. Global initiatives such as the United Nations "Multidimensional Poverty Index", the European Commission's "Going beyond GDP" are evidence that a multidimensional approach to measuring well-being has become more prevalent.[8] In the U.S., numerous studies have measured multidimensional poverty in the years prior to the pandemic.[9] However, as far as we are aware, only one study (Dhongde 2020), has measured multidimensional economic deprivation in the U.S. since the

[7] https://aspe.hhs.gov/pdf-report/poverty-program-eligibility-covid
[8] UN: http://hdr.undp.org/en/2020-MPI and EC initiative: https://ec.europa.eu/environment/beyond_gdp/index_en.html
[9] See for example, Dhongde and Haveman (2017), Glassman (2021), and Mitra and Brucker (2019).

pandemic. Dhongde (2020) used data from the Survey of Household Economics and Decision-making (SHED) in the U.S. conducted in April 2020 and thus covered a much shorter time-period and many fewer households (1,030) compared with our study. That study used indicators such as reduction in income and an inability to pay bills in full, reflecting financial conditions of households in early stages of the pandemic, and found that almost 25 percent of the respondents faced hardships in at least two of the four indicators. As more data becomes available, we hope that a clearer picture will emerge about how the pandemic affected multidimensional poverty in the U.S.; this paper is a first step in that direction.

There is emerging evidence on how Americans fared in each of the hardships that we include in our analysis.[10] However, most studies treat each of the hardships separately. The Household Pulse Survey allows us to track multiple hardships for each individual. Experiencing more than one hardship at the same time can have a more severe impact on an individual's well-being. Economic shocks such as the Great Recession and the Covid-19 pandemic impacted individual's quality of life in multiple ways. The Stiglitz et. al., (2009) report argued that when designing policies, impacts on indicators pertaining to different quality-of-life dimensions should be considered jointly, to address the interactions between dimensions and the needs of people who are disadvantaged in several domains. We measure the joint distribution of four hardship indicators, namely, job insecurity, housing insecurity, food insufficiency and mental health and estimate the overlap of hardships experienced by individuals during the pandemic.

[10] For instance, see Cumming and Kopparam (2021), Center for Budget and Policy Priorities (2021), Keith-Jenkins et al (2021).

We find that on average, 13.2 percent of respondents faced at least two or more hardships during the year. At the peak of COVID-19 cases in July 2020, as many as 16.4 percent experienced multiple hardships. By the end of our coverage in March 2021, about 9.5 percent still faced multiple hardships. During the start of the pandemic in April through July and during the third wave of COVID-19 cases in December and January, the multidimensional hardship index was greater than the official poverty measure, indicating that despite incomes above poverty thresholds, many Americans experienced hardships. For instance, a high proportion (18 percent) of individuals suffered from mental health issues and young adults between the age group 18 to 29 were more likely than other age groups to report that they were feeling down, depressed, or hopeless more than half the days. Among households with annual income less than $25,000, approximately one in three (34 percent) individuals experienced multiple hardships at the same time. Even among households with incomes between $100,000 and $150,000, nearly 6 percent of individuals faced multiple hardships during the pandemic. When controlling for other demographic characteristics, non-Hispanic Blacks were most likely to face food insufficiency and housing insecurity, whereas Hispanics were most likely to experience job insecurity. Multidimensional hardship rates were highest in the South and lowest in the Midwest.[11]

The paper is organized as follows. In Section 2, we provide details about the Pulse Survey data and the hardship indicators used. In Section 3, we summarize our estimates of the multidimensional hardship index and compare the hardship index with income poverty

[11] Unless otherwise noted, all estimates mentioned refer to the entire one year time period.

measures and Covid-19 cases. We show statewide variance in the hardship index and estimate a regression model to test the likelihood that different demographic groups may experience these hardships in Section 4. Section 5 concludes.

II. Data

2.1. Census Household Pulse Survey

The U.S. Census Bureau, in collaboration with seven other federal agencies, created and began utilizing the Household Pulse Survey (HPS) in April of 2020 in order to provide real-time effects of the COVID-19 pandemic on peoples' lives. The HPS is representative of the household population aged 18 years of age and over, at the state and national level as well as for the 15 largest Metropolitan Statistical Areas. The HPS was conducted in three phases between April 2020 and March 2021. The first phase was conducted between April 2020 and July 2020 and data was released on a weekly basis (12 waves). In the next two phases, data was compiled on a bi-weekly basis. The second phase ran from August 2020 through October 2020 (5 waves) while the third phase ran from November through March (10 waves). [12] In this paper, we combine the weekly or bi-weekly data to create monthly cross-sectional data and present our analysis from April 2020 to March 2021.

The HPS is the only publicly available household level survey compiled and released in the U.S. during the pandemic at such a high frequency and it includes more than 2.2 million household

[12] Phase 2 and 3 of Pulse Survey were longer than the Phase 1 survey (interview length increased to 20 minutes on average from 11 minutes on average). Additionally, in August, the Pulse Survey was significantly expanded in size. These factors led to much higher item non-response rates.

respondents. The U.S. Census Bureau's American Community Survey (ACS), with a sample size of 3.5 million households, and the Current Population Survey (CPS-ASEC), with a sample size of 95,000 households, also interview respondents about 2020, but that data is not released until Fall of 2021.[13] The Federal Reserve Board fielded the Survey of Household Economics and Decision-making (SHED) during the pandemic in 2020. Unlike the HPS, the SHED data was not collected on a weekly basis and covered only about 1000 or so households. Thus, the HPS is unique in its detailed questionnaire and high frequency collection.

It is also important to note some of the limitations of HPS.[14] The first limitation is a low response rate throughout the survey. Response rates were 8 percent on average and ranged from a low of 4 percent to a high of 11 percent.[15] This is in contrast to the much higher response rates (60-90 percent) in the larger, annual surveys such as the ACS and the CPS by the Census Bureau. The second limitation is item non-response. While most demographic questions were answered, there were a number of questions about hardship indicators that had missing responses (see Table A1 in the Appendix for details). In these cases, we assumed that the respondent did not suffer from the hardship in question. We thus urge the readers to treat our hardship estimates as providing a lower bound of multidimensional hardship in the U.S. during the pandemic.

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[13] Unlike the ACS or the CPS, the HPS has information only on the respondent and not on other members of the household. However, the survey provides information on the number of adults and children living in the household.

[14] See Technical Documentation and Source and Accuracy Statements that provide more information on errors and how to assess statistical uncertainty of estimates at Household Pulse Survey Technical Documentation (census.gov).

[15] While the Census Bureau adjusted weights in the Pulse Survey to account for non-response, weighting mitigates rather than eliminates non-response bias. See 2020_HPS_NR_Bias_Report-final.pdf (census.gov) for more information on non-response bias in the HPS.

2.2. Hardship Indicators

We use the HPS to compile information on the following four hardships: job insecurity, food insufficiency, housing insecurity, and mental health issues. These indicators were chosen since data on these topics was collected consistently over the year.[16] For each indicator, we define below what is considered as hardship and also explain a broader definition of hardship that we consider based on additional responses.[17] Table A2 in the Appendix shows the survey questions and the relevant responses chosen for both the main definition and the broader definition of hardship and Table A3 shows how we translated the weekly and bi-weekly survey into months. To create monthly data, we combined microdata from multiple survey weeks and calculated all measures using this combined data. To create overall estimates, microdata from the entire period were combined together. Figure 1 shows hardship measures over time.

Job insecurity

The survey has a detailed question on why individuals were not working. It asks people who reported not having worked in the last 7 days for pay or profit their reasons for not working. We classify someone as job insecure if they were not working because they had Covid-19, were concerned about getting Covid-19, were caring for someone with Covid-19, or due to business closings and layoffs due to COVID-19. These responses explicitly link the reason for not working to Covid-19. In the broader definition of job insecurity, we also include individuals who were

[16] Data on indicators of income poverty or physical health was not available, or not available in all rounds.
[17] All Figures and Tables use the main definition of the four hardships. The broader definition is only for comparisons to previous work.

not working because they were caring for elderly people or children not in school or daycare.[18] The U.S. Bureau of Labor Statistics estimated that the unemployment rate for people age 20 and over peaked in April of 2020 at 14.8 percent and steadily decreased to 6.0 percent in March of 2021. We found that on average 13.9 percent of the respondents reported being job insecure; 17.3 percent on average were job insecure if we use the broader definition of job insecurity. As seen in Figure 1, job insecurity rates were above 18 percent in April and May 2020 when many of the states had issued lockdown measures. After another peak in July 2020 (16.4 percent), during the second wave of infections, job insecurity decreased to 10.9 percent in October 2020. Job insecurity reached a final peak in December 2020 (12.9 percent) and decreased in February and March. By March 2021, the job insecurity rate in the survey was at 9.6 percent.

Food Insufficiency

The survey collected data on whether households had enough food to eat. We identify a person as food insufficient if they responded that they live in a household that sometimes or often did not have enough food to eat in the last 7 days (see Cumming and Kopparam, 2021, Ziliack 2021 for a similar measure of food insufficiency). On average, we find that approximately 10 percent of respondents reported that their households were food insufficient. Food insufficiency peaked twice: first in July 2020 at 10.9 percent and second in December 2020 at 11.4 percent. Cumming and Kopparam (2021) estimated about 12 percent of individuals suffered from food insufficiency in December 2020. Despite relief packages, there is evidence that food

[18] It is not clear in the survey whether individuals were not working because they were caring for children not in school or day care because of the pandemic or they have been caring for them even before the pandemic.

insufficiency rates have not decreased significantly in 2021 (Schazenbach and Pitts, 2020, Keith-Jennings et al., 2021). In March 2021, we estimate that 8.3 percent of respondents still suffered from food insufficiency. Following Ziliack (2021), we also use a broader notion of food insufficiency in which we also include individuals who said they had enough but not always the kind of food they wanted to eat. Using this broader definition, we find that, on average, 37.4 percent of households were food insufficient.

Housing Insecurity

Individuals living in households who feel that they have little or no confidence in their ability to make mortgage or rent payments next month are considered housing insecure. On average, approximately 12.2 percent of respondents reported that their households were housing insecure. As seen in Figure 1, housing insecurity first peaked at 15.4 percent in July 2020 and then peaked again at 12.1 percent in December 2020. Housing insecurity decreased to a pandemic low of 9.1 percent by March of 2021. We also include a broader definition of housing insecurity that includes respondents who said they had moderate confidence in their household's ability to pay next month's rent/mortgage or that next month's rent/mortgage payment has been deferred. Under this broader definition, 26.4 percent of households, on average, are considered housing insecure.

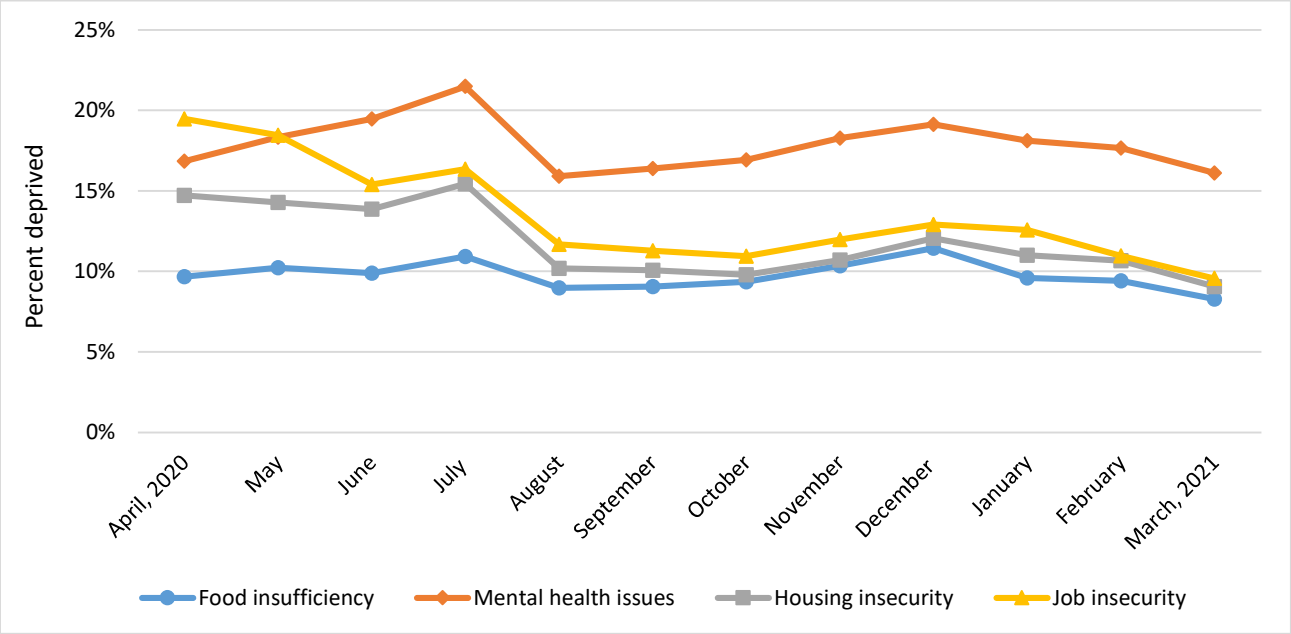
Mental Health Issues

There is a large and growing literature, which examines the relation between economic hardship and mental health in the U.S. during the pandemic. Shuster et al. (2020) surveyed

adults in the U.S. for 10 weeks starting April 2020 and found that the worsening weekly individual economic impact of COVID-19 increased both depression and anxiety. Ettman et al. (2020) found that the prevalence of depression symptoms in the U.S. was more than 3-fold higher during COVID-19 compared with before the COVID-19 pandemic. Individuals with lower social resources, lower economic resources, and greater exposure to stressors such as job loss reported a greater burden of depression symptoms. Outside the U.S., Witteveen and Velthorst (2020) used data from spring 2020 on active members of the labor force of six European nations and found that economic hardships, such as workload decrease and income loss, led to a higher prevalence of expressing adverse mental health, including feelings of depression and health anxiety.

People who reported in the HPS that they were bothered by feeling down, depressed, or hopeless more than half the days in the previous week were considered deprived in mental health. On average, 18.3 percent of respondents reported being deprived in mental health. As seen in Figure 1, the proportion of individuals reporting mental health issues was higher than hardship rates in the other three dimensions in all but the first two months of our time period. Deprivation in mental health peaked at 21.5 percent in July 2020 and peaked once again at 19.1 percent in December 2020. Even as the economy recovered since January 2021, approximately 16 percent of individuals still suffered from mental health issues in March of 2021. In the broader notion, we include individuals who responded as feeling down, depressed, or hopeless, any days in the previous week (a similar notion was used by Swaziek and Wozniak, 2020). Under this definition, we find that a staggering 44.3 percent of respondents were deprived in mental health.

Figure 1: Extent of Hardship in each Indicator over time



Source: Authors' calculations based on Household Pulse Survey, weeks 1 through 27.

2.3. Correlation between Hardship Indicators

There is some evidence in the literature on the association between different hardships. Ganson et. al. (2021) found that job insecurity during the pandemic led to increased anxiety and depression among young adults in the U.S. Sampson et. al. (2021) found that during the pandemic financial stressors (job loss, decreases in pay, trouble paying bills) led to changes in health risk behavior (less exercise, sleep, and healthy eating; more smoking/vaping and drinking alcohol) among women. In Table 1, we show Pearson correlations between the hardship indicators. We do not find a strong association between these indicators, which indicates that none of the indicators duplicates another in terms of hardship.

Table 1: Pearson Correlation Rates among Hardship Indicators

	Food insufficiency	Mental health issues	Housing insecurity	Job insecurity
Food insufficiency	1			
Mental health issues	0.23	1		
Housing insecurity	0.33	0.22	1	
Job insecurity	0.16	0.12	0.18	1

Source: Authors' calculations based on Household Pulse Survey Weeks 1 through 27.
Note: Data from all months was combined together to create correlations.

III. Multidimensional Hardship Index

3.1. Monthly Estimates of Multidimensional Hardship Index

We are interested in measuring multidimensional hardships, that is, when individuals experience multiple hardships at the same time. A Multidimensional Hardship Index (MHI) measures the proportion of the population experiencing hardships in two or more indicators. In Table 2, we present our estimates of the MHI and the MHI based on the broader definitions of hardship for each month during the year. We find that, overall, 13.2 percent of respondents are MHI deprived and 37.1 percent of respondents are deprived according to the border definition of hardship. The MHI peaked in July of 2020 at 16.4 percent, reached a second peak in December of 2020 at 13.7 percent, and decreased to a pandemic low of 9.5 percent in March of 2021. The broader MHI also peaked in July (45.0 percent) and December (35.6 percent) of 2020 and hit a pandemic low of 28.6 percent in March of 2021. The MHI shows that approximately 13.2 percent of the adult population faced at least two hardships. Among individuals with multiple hardships, we find that overall 4.4 percent experienced hardship in three or more indicators and about 1 percent experienced all four hardships.

Table 2: Monthly Estimates of MHI and Broader MHI

	MHI	SE	Broader MHI	SE
April	14.67	0.29	42.07	0.34
May	15.36	0.22	41.84	0.29
June	14.56	0.18	41.55	0.22
July	16.35	0.20	45.01	0.26
August	10.77	0.19	32.90	0.22
September	10.66	0.14	33.00	0.23
October	11.10	0.16	32.46	0.26
November	12.25	0.22	33.75	0.26
December	13.74	0.20	35.62	0.28
January	12.06	0.20	33.01	0.25
February	11.39	0.15	32.13	0.22
March	9.51	0.17	28.58	0.24
Overall	13.17	0.07	37.06	0.08

Source: Authors' calculations based on Household Pulse Survey Weeks 1 through 27.
Note: Overall estimates are based on combined microdata from all months.

In addition to the MHI, we also estimate two other indices proposed by Alkire and Foster (2011). The intensity of hardship index (MHI-2) measures the average number of hardships for people who are included in the MHI. The adjusted headcount index (MHI-3) is the ratio of total hardships experienced by those in the MHI to the total number of hardships that could potentially be experienced by all individuals. Monthly estimates of all three indices are given in Table A4 in the Appendix. Similar to the MHI, the MHI-3 also peaked in July 2020 and then in December 2020, and declined between January 2021 and March 2021. We focus on the MHI in the paper since it is an intuitively easy index to interpret.

In Table 3, we examine the importance of each indicator by excluding that indicator and re-calculating MHI rates based on the other three indicators. For instance, in the benchmark case, 13.2 percent of individuals had at least 2 out of 4 hardships. The table shows that if we remove

housing insecurity as a hardship for example, then 8.6 percent of individuals had two out of three hardships.

Table 3: Sensitivity of MHI Rate to Hardship Indicators

Indicator Excluded	MHI	SE	Broader MHI	SE
No indicators (MHI)	13.17	0.07	37.06	0.08
Food insufficiency	9.43	0.06	34.55	0.08
Mental health issues	7.98	0.05	31.78	0.08
Housing insecurity	8.62	0.05	34.42	0.08
Job insecurity	9.18	0.06	33.76	0.09

Source: Authors' calculations based on Household Pulse Survey Weeks 1 through 27.

3.2. Comparing MHI with Income Poverty

In Figure 2, we compare the MHI with the number of COVID-19 cases in the U.S. and two recently published monthly poverty estimates. The official poverty measure (OPM) is a traditional poverty measure comparing a family's or individual's income to a set of thresholds while the supplemental poverty measure (SPM) is an alternative poverty measure, which uses a broader definition of income than the one used in OPM.[19] Although the Census Bureau does not release the official estimates of OPM or SPM for 2020 until the Fall of 2021, we use poverty estimated by other researchers to compare with the MHI. Values for OPM are taken from Han et al. (2020) and those for SPM are taken from Parolin et al (2020).[20]

[19] The SPM extends the income definition used in the OPM by taking into account non-cash benefits, such as nutritional and energy assistance programs, tax credits such as the Earned Income Tax Credit (EITC), and geographic differences in housing costs, and subtracting necessary expenses such as work-related expenses, medical expenses, and income and payroll taxes paid. Note that the OPM and the SPM rates are for the entire population while the MHI rate is for adults age 18 and over

[20] An important caveat is that the monthly OPM rate used here is actually an annual poverty rate that uses rolling 12-month reference periods while the SPM rate used here is a true monthly poverty rate.

The first wave of cases in the U.S. peaked in mid-April of 2020. Figure 2 shows that between April and June 2020, the MHI and SPM estimates both identified between 14 to 16 percent of the population as deprived/poor, although they were significantly different from each other in May and June. The MHI peaked in July 2020, which coincided with the peak of a second wave of COVID-19 cases in the third week of July 2020. This was the highest value of the MHI, which shows that more than 16.4 percent of individuals experienced at least two hardships.

Hardship in all four indicators declined between July and August 2020 as seen previously in Figure 1. As a result, the MHI declined from 16.4 percent in July to 10.8 percent in August 2020.[21] Between August and November 2020, the MHI estimates were not significantly different than the OPM estimates; both identified about 10 to 11 percent population as deprived/poor. The SPM estimates remained high during this period. The U.S. was hit by a third wave of COVID-19 cases in December 2020. The proportion of multidimensional deprived increased from 11.1 percent in October 2020 to about 13.7 percent in December 2020.

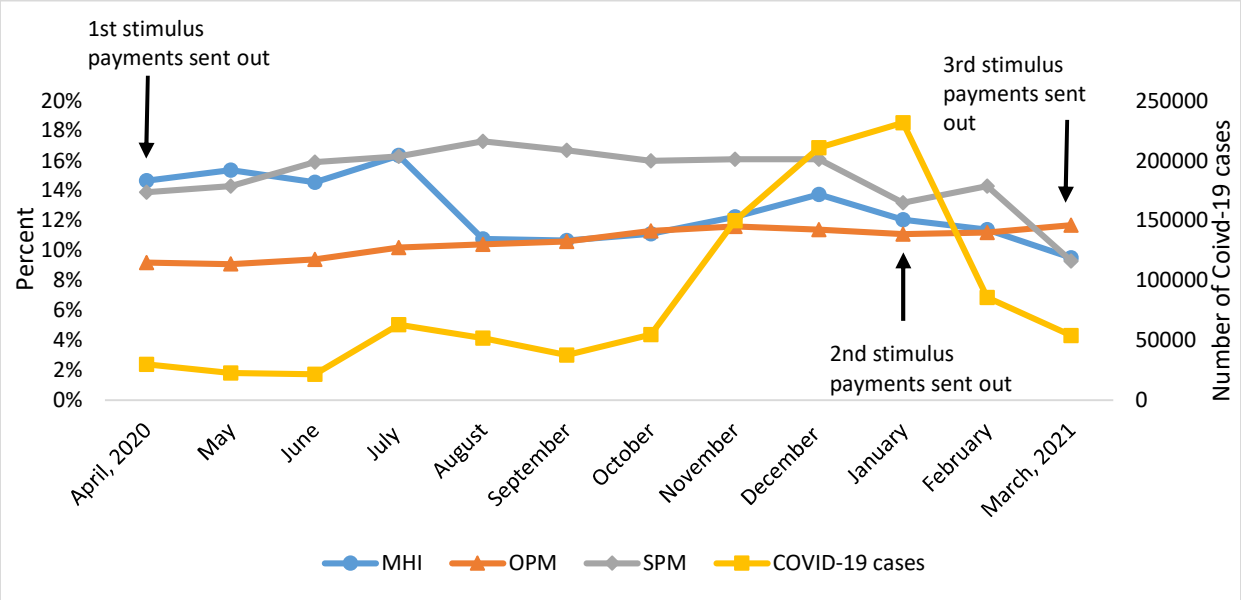
Between December 2020 and January 2021, the MHI was between the OPM and SPM. The lowest value of the MHI coincided with the lowest number of COVID-19 cases in March 2021; yet about 9.5 percent individuals had multiple hardships. By the end of our time period, the MHI was decreasing while the OPM was not changing significantly. This is consistent with previous evidence. Dhongde and Haveman (2017, 2019) found that the multidimensional

[21] The HPS nearly doubled in length between July and August. As a result, item non-response significantly increased as seen in Table A1. Since a non-response was assumed to be a non-hardship in that dimension, part of the large drop in hardship between July and August was likely due to survey changes rather than changes in hardship.

poverty index recovered much faster than the OPM and the SPM during the recovery period following the Great Recession.

There were three significant government interventions during the pandemic. The CARES Act (first stimulus) was signed into law on March 27, 2020 and checks began to be sent out on April 15, 2020. We find that hardship declined between May and June. The Consolidated Appropriations Act (the second stimulus) was signed into law on December 27, 2020 and checks began to be sent out on December 29, 2020. We observe a decrease in the MHI, but not the OPM or SPM, beginning in January. The American Relief Plan (third stimulus) was signed into law on March 11, 2021 and checks began to be sent out the next day. The SPM and the MHI reach their lowest points in March of 2021.

Figure 2: MHI, Income Poverty and the Number of Covid-19 cases in the U.S.



Source: MHI is based on authors' calculations from the Household Pulse Survey Weeks 1 through 27. OPM are from Han et al. (2020) and SPM are from Parolin et al (2020). The universe for the MHI is people age 18 and over while the universe for the OPM and SPM is the total U.S. population. COVID-19 cases are based on mid-month 7-day averages from the CDC.

3.3. Comparing MHI by Household Income

The HPS does not provide information on the exact income levels of households, but it has information on the income category to which a household belongs. In Table 4, we provide overall estimates of the MHI for each of the income categories. Not surprising, the proportion of individuals with multiple hardships declines with rising incomes. Among households with annual income less than $25,000, approximately 34.8 percent of individuals experienced multiple hardships during the year. Among households with incomes closer to the median income category ($50,000 to $74,999), approximately 13.5 percent of individuals had two or more hardships.[22] However, note that even among households with incomes between $100,000 and $149,999, 5.6 percent of individuals faced multiple hardships during the pandemic.

Table 4: Average MHI by Household Income

Annual Household Income	MHI (percent)	Std. Err.
Less than $25,000	34.82	0.29
$25,000 to $34,999	25.02	0.32
$35,000 to $49,999	19.20	0.22
$50,000 to $74,999	13.54	0.18
$75,000 to $99,999	9.06	0.16
$100,000 to $149,999	5.58	0.11
$150,000 to $199,999	3.71	0.12
$200,000 and above	2.43	0.12

Source: Authors' calculations based on Household Pulse Survey Weeks 1 through 27

[22] According to the 2019 American Community Survey, median household income was $65,712.

IV. Variance in Multidimensional Hardship

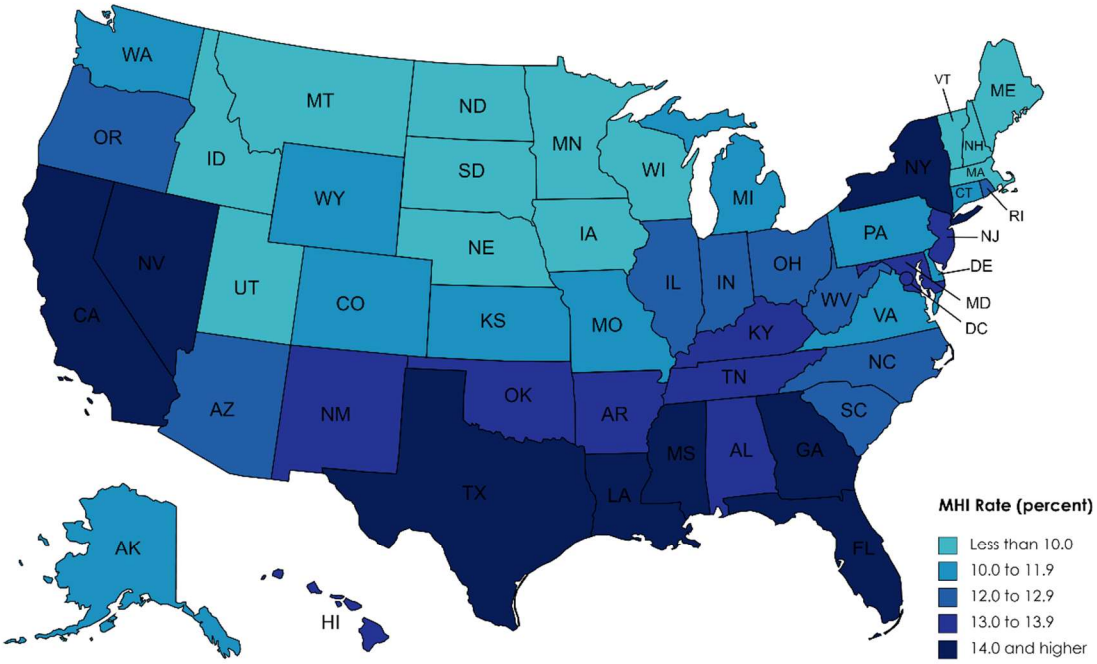
4.1. Multidimensional Hardship by States

It is evident that the multiple hardships experienced simultaneously by individuals varied across states and by demographic characteristics. In Figure 3 we illustrate the statewide distribution of the overall MHI rates. We find that the MHI rate ranged from 8.4 percent in Minnesota to 18.2 percent in Nevada (the U.S. rate is 13.2 percent).[23] The MHI values were highest in the South and lowest in the Midwest. Table A5 in the Appendix lists overall MHI values for each state.

In April of 2020, 43 states and the District of Columbia issued lockdown orders. Hardship in individual dimensions and multidimensional hardship was higher in April in states with lockdown orders than in states without lockdown orders. By May of 2020, there were 26 states and the District of Columbia that still had lockdown orders. Job insecurity was still higher in states with lockdowns than in states without lockdowns. However, there was no difference in mental health and housing insecurity rates while food insufficiency was actually higher in states without lockdown orders than in states with lockdown orders. By June of 2020, lockdown orders remained in effect in only 6 states. While there was no difference in mental health rates between the two kinds of states, the other dimensions and the MHI were all higher in the states with lockdown orders than in the states without lockdown orders.

[23] The MHI rate in Minnesota is not different from the MHI rate in South Dakota, North Dakota, Iowa, Maine, Wisconsin, Montana, New Hampshire, or Vermont at the 90 percent confidence level.

Figure 3: Statewide Variation in the MHI



Source: Authors' calculations based on Household Pulse Survey Weeks 1 through 27. MHI estimates are based on combined microdata from all months.

4.2. Multidimensional Hardship by Demographic Characteristics

The pandemic affected individuals belonging to different age groups, racial groups, income and education levels in different ways. We investigate the relation between hardships experienced with demographic characteristics.

$$Y_{it} = \beta_0 + \beta_1 Indi_{it} + \beta_2 Hhd_{it} + \varepsilon_{it} \quad (1)$$

In equation (1), *i* denotes individuals and *t* denotes the survey week.[24] The vector of individual characteristics (*Indi*) includes age, gender, marital status, race, and education, and the vector of household characteristics (*Hhd*) includes number of children and income bracket. We control for state fixed effects. The dependent variable vector (*Y*) contains each of the four hardships and the MHI. We estimate Equation (1) below using the Linear Probability Model, since each of our dependent variables is binary (whether an individual has a particular hardship or not, or whether an individual is identified as multidimensional deprived or not). Table 5 summarizes the estimated regression coefficients.[25] In the paragraph that follows, all estimates discussed are holding all other demographic controls constant.

We find that young adults, aged between 18 and 29, were most likely to face job insecurity and mental health issues. Individuals belonging to the age group 30 to 49 were most likely to face food insufficiency and housing insecurity.[26] Using the MHI, respondents under age 50 were more likely than older respondents to face multiple hardships.

Compared to men, women were more likely to experience mental health issues and were less likely to experience job insecurity, food insufficiency, and multiple hardships. Separated and never married respondents were more likely to be job insecure,[27] while respondents separated from their spouses were more likely to face food insufficiency, housing insecurity, mental health issues, and multiple hardships. Respondents living with children under age 18 were more likely than respondents without children in the household to face multiple deprivations, food

[24] The regression model uses observations on all respondents and for the entire period: April 2020 to March 2021.
[25] Coefficient results were multiplied by 100 for ease of interpretation and readability.
[26] The difference in rates for 30 to 39 year olds and 40 to 49 year olds was not statistically significant.
[27] The job insecure difference between separated and never married was not statistically significant.

insufficiency, and housing insecurity. Cooney and Shaefer (2021) found that adults with children reported food insecurity and housing hardship at a rate 70 to 100 percent higher than adults without children. On the other hand, we find that respondents without children in the household were more likely to be job insecure and experience mental health issues.

Individual dimension hardship rates and multidimensional hardship rates decreased as education increased and as income increased.

Table 5: Regression estimates from the linear probability model

	Job Insecurity	Food Insufficiency	Housing Insecurity	Mental Health issues	MHI (2+ hardships)
Age 18 to 29		Reference group			
Age 30 to 39	-1.75***	1.62***	2.16***	-3.08***	0.06
	(0.30)	(0.26)	(0.28)	(0.30)	(0.33)
Age 40 to 49	-1.29***	2.13***	1.81***	-4.72***	-0.11
	(0.32)	(0.29)	(0.33)	(0.33)	(0.37)
Age 50 to 59	-1.68***	-0.23	-0.81***	-6.89***	-2.61***
	(0.36)	(0.26)	(0.35)	(0.32)	(0.35)
Age 60 to 69	-5.19***	-4.66***	-7.05***	-13.21***	-9.47***
	(0.33)	(0.23)	(0.30)	(0.33)	(0.33)
Age 70 and above	-9.88***	-7.49***	-11.27***	-18.48***	-14.20***
	(0.31)	(0.28)	(0.33)	(0.39)	(0.37)
Male		Reference group			
Female	-2.02***	-0.53***	0.18	2.33***	-0.69***
	(0.14)	(0.14)	(0.14)	(0.15)	(0.15)
Married		Reference group			
Widowed	-2.98***	0.13	-3.18***	3.30***	-1.12***
	(0.28)	(0.33)	(0.34)	(0.39)	(0.32)
Divorced	0.77***	2.05***	0.03	4.68***	2.07***
	(0.24)	(0.19)	(0.23)	(0.26)	(0.23)
Separated	2.68***	9.36***	7.34***	8.00***	10.10***
	(0.68)	(0.60)	(0.66)	(0.64)	(0.67)
Never married	2.30***	1.34***	-0.93***	5.33***	2.17***
	(0.26)	(0.19)	(0.23)	(0.25)	(0.23)
No Children under 18 In the household		Reference group			
Children under 18 in the household	-0.60***	1.97***	4.62***	-1.78***	1.91***
	(0.16)	(0.14)	(0.21)	(0.17)	(0.18)
White, Non-Hispanic		Reference group			
Black, Non-Hispanic	3.32***	5.47***	11.56***	-3.36***	5.79***
	(0.22)	(0.23)	(0.30)	(0.27)	(0.29)
Asian, Non-Hispanic	2.21***	-1.49***	4.46***	-3.48***	0.44

	(0.34)	(0.25)	(0.29)	(0.33)	(0.30)
Other race, Non-	1.80***	4.48***	4.79***	2.90***	4.51***
Hispanic	(0.37)	(0.31)	(0.29)	(0.38)	(0.35)
Hispanic	4.06***	2.43***	8.54***	-3.21***	3.98***
	(0.27)	(0.23)	(0.29)	(0.25)	(0.27)
No high school degree			Reference group		
High school degree	-1.49***	-6.42***	-7.34***	-2.41***	-6.41***
	(0.45)	(0.44)	(0.38)	(0.46)	(0.48)
Some college	-1.91***	-8.36***	-8.90***	-1.18***	-7.56***
education	(0.42)	(0.41)	(0.40)	(0.44)	(0.45)
College degree or	-5.60***	-11.22***	-13.29***	-4.95***	-12.24***
higher	(0.41)	(0.42)	(0.38)	(0.45)	(0.43)
Less than $25,000			Reference group		
$25,000 to $34,999	-1.63***	-9.09***	-3.13***	-5.21***	-7.60***
	(0.31)	(0.34)	(0.33)	(0.38)	(0.41)
$35,000 to $49,999	-4.14***	-13.04***	-7.21***	-7.82***	-12.08***
	(0.36)	(0.30)	(0.37)	(0.35)	(0.38)
$50,000 to $74,999	-6.08***	-16.51***	-11.62***	-10.72***	-16.51***
	(0.33)	(0.31)	(0.32)	(0.32)	(0.37)
$75,000 to $99,999	-7.90***	-19.35***	-15.24***	-13.19***	-20.15***
	(0.34)	(0.28)	(0.35)	(0.35)	(0.37)
$100,000 to $149,999	-10.38***	-21.08***	-18.77***	-15.34***	-23.07***
	(0.34)	(0.31)	(0.35)	(0.33)	(0.39)
$150,000 to $199,999	-11.81***	-21.54***	-20.70***	-17.50***	-24.46***
	(0.36)	(0.29)	(0.30)	(0.39)	(0.35)
$200,000 and above	-13.36***	-21.47***	-21.87***	-19.08***	-25.32***
	(0.36)	(0.32)	(0.34)	(0.37)	(0.37)
Constant	23.17***	31.63***	31.76***	39.85***	38.71***
	(0.67)	(0.68)	(0.68)	(0.60)	(0.76)
No of observations	1,894,303	1,894,303	1,894,303	1,894,303	1,894,303
Adjusted R-sq	0.0511	0.1242	0.1307	0.0625	0.1336

Note: *p<0.10, **p<0.05, ***p<0.01 Tests whether result is different from zero at the 90, 95, and 99 percent confidence level, respectively. Parenthesis shows replicate weight standard errors. Observations missing demographic data were omitted, while missing dimension data was assumed to be not facing hardship in that dimension.
Source: All regressions based on Household Pulse Survey Weeks 1 through 27 using state fixed effects.

4.3. Variance in Multidimensional Hardship by Race and Ethnicity

There is growing evidence that the pandemic and the resulting hardships affected minority populations to a greater extent. For instance, there has been a persistent racial gap in the risk of food hardships (Gundersen and Ziliak 2018). However, Ziliack (2021) found that the risk of

food insufficiency grew especially wider during the pandemic. We find that, when controlling for other demographics, non-Hispanic Blacks were most likely among the race-ethnicity groups to experience food insufficiency. A report by the Center on Budget and Policy Priorities (2021) found that Black and Latino adults were about three times as likely as White adults to report that their household did not get enough to eat.

As seen in Table 5, non-Hispanic Blacks were also most likely to face housing insecurity, whereas Hispanics were most likely to experience job insecurity. Enriquez and Goldstein (2020) who also used the HPS reported that Latinx respondents fared worse than Whites in terms of job loss. Non-Hispanic other races and Non-Hispanic Whites were most likely than the other groups to experience mental health issues. Ettman et al. (2020) found that among non-Hispanic Whites, the prevalence of depression symptoms during the pandemic rose by 18 percentage points.

In terms of multidimensional hardship, Dhongde (2020) found that more than 37 percent of Hispanics reported hardship in two or more indicators and 8 percent reported hardship in all four indicators of economic deprivation. We find that non-Hispanic Blacks and Hispanics were more likely to face multiple hardships, compared with non-Hispanic Whites; non-Hispanic Asians were not significantly different from non-Hispanic Whites in terms of MHI.

V. Conclusions

The Covid-19 pandemic resulted in more than 550,000 Americans losing their lives and a staggering 30 million plus Americans testing positive to the virus. However, in addition to the public health crisis, the pandemic and the resulting lockdown also led to a severe economic

crisis in the country. In this paper we use micro-level, household survey data collected at a weekly/bi-weekly basis to estimate the proportion of Americans who suffered multiple hardships during the course of one year in the pandemic.

We find that 13.2 percent of respondents, on average, experienced two or more hardships during the year. Typically, the hardship index tracked the number of Covid-19 cases. At the peak of the pandemic, in July 2020, as many as 16.4 percent of individuals experienced multiple hardships. We find that, holding other demographics constant, young adults, aged between 18 and 29, were most likely to face job insecurity and mental health issues. Non-Hispanic Blacks were more likely to experience food insufficiency and housing insecurity, whereas Hispanics were more likely to experience job insecurity holding other demographics constant. People living in the South and West had a higher proportion of individuals with multiple hardships while those in the Midwest had the lowest proportions.

While we believe these are important and interesting results, there are a few caveats to keep in mind as there are significant limitations to the data. First, while samples were large and representative, the sampling frame was limited to housing units that had a cell phone or e-mail address. The HPS also had a low response rate of generally under 10 percent. Since those who chose to respond were not likely to be a random segment of the population, bias is introduced into our estimates. Second, we had non-trivial amount of item non-response (see Table A1). Coupled with this, the length of the survey nearly doubled when we move from July to August. This had the effect of large increases in item non-response which helped contribute to what appeared to be a large decrease in hardship from July to August. Finally, the HPS only samples

adults age 18 and over and, while it asks about household characteristics, it does not gather specific information about individuals in the household other than the respondent.

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Appendix

Table A1: Unit and Item Non-Response Rates by Month

	Unit non-response	Housing insecurity	Food insufficiency	Mental health issues	Job insecurity
April	96.01	0.51	1.70	9.47	1.10
May	91.65	0.40	2.41	10.43	0.72
June	91.84	0.51	2.45	9.10	0.87
July	91.14	0.53	2.62	8.98	0.79
August	92.27	0.69	12.73	20.06	1.54
September	89.40	0.75	11.96	19.23	1.47
October	90.58	0.69	12.14	19.79	1.49
November	92.88	0.58	13.46	21.23	1.33
December	93.03	0.75	13.14	20.65	1.23
January	93.34	0.71	14.59	22.08	1.46
February	92.41	0.64	14.11	21.87	1.64
March	92.49	0.65	15.15	23.31	1.88
Overall	91.59	0.58	8.55	15.96	1.18

Source: Authors' calculations based on Household Pulse Survey Weeks 1 through 27

Table A2: Hardship Indicators and Average Percent of Individuals with Hardship

Hardship Indicator	Survey Question	Possible Responses	Hardship	Broader Hardship
Job insecurity	Asked of people who responded that they have not worked for pay or profit in the last 7 days. What is your main reason for not working for pay or profit?	1) I did not want to be employed at this time **2) I am/was sick with coronavirus symptoms** **3) I am/was caring for someone with coronavirus symptoms** 4) I am/was caring for children not in school or daycare.* 5) I am/was caring for an elderly person.* 6) I am/was sick (not coronavirus related) or disabled 7) I am retired **8) My employer experienced a reduction in business (including furlough) due to coronavirus pandemic** **9) I am/was laid off due to coronavirus pandemic** **10) My employer closed temporarily due to the coronavirus pandemic** **11) My employer went out of business due to the coronavirus pandemic** 12) other reason **13) I was concerned about getting or spreading the coronavirus**	13.92	17.30
Food Insufficiency	In the last seven days, which of these statements best describes the food eaten in your household?	1) Enough of the kinds of food (I/we) wanted to eat 2) Enough, but not always the kinds of food (I/we) wanted to eat* **3) Sometimes not enough to eat** **4) Often not enough to eat**	9.88	37.35
Housing Insecurity	How confident are you that your household will be able to pay your next rent or mortgage payment on time?	**1) No confidence** **2) Slight confidence** 3) Moderate confidence* 4) high confidence 5) Payment is/will be deferred*	12.24	26.43
Mental health issues	Over the last 7 days, how often have to been bothered by feeling down, depressed, or hopeless?	1) Not at all 2) Several days* **3) More than half the days** **4) Nearly every day**	18.28	44.26
MHI	N/A	Defined as deprivation in at least 2 out of 4 indicators	13.17	37.06

Note: Questions and response come from the Household Pulse Survey Weeks 1 through 27. Responses in bold are included in the hardship measure. In addition to the responses in bold, the broader notion of hardship also includes response marked with *.

Table A3: Definition of Months

Phases	Weeks	Months
Phase 1	4/23-5/5	April
	5/7 – 5/12, 5/14 – 5/19, 5/21 – 5/26, 5/28 – 6/2	May
	6/4 – 6/9, 6/11 – 6/16, 6/18 – 6/23, 6/25 – 6/30	June
	7/2 – 7/7, 7/9 – 7/14, 7/16 – 7/21	July
Phase 2	8/19 – 8/31	August
	9/2 – 9/14, 9/16 – 9/28	September
	9/30 – 10/12, 10/14 – 10/26	October
Phase 3	10/28 – 11/9, 11/11 – 11/23	November
	11/25 – 12/7, 12/9 – 12/21	December
	1/6 – 1/8, 1/20 – 2/1	January
	2/3 – 2/15, 2/17 – 3/1	February
	3/3 – 3/15, 3/17 – 3/29	March

Table A4: Estimates of MHI, Average Intensity and Adjusted Headcount Ratio

	MHI Headcount Ratio	SE	MHI-2 Average Intensity	SE	MHI-3 Adjusted headcount ratio	SE
April	14.67	0.29	60.06	0.38	8.81	0.19
May	15.36	0.22	60.50	0.24	9.29	0.14
June	14.56	0.18	59.86	0.19	8.71	0.11
July	16.35	0.20	60.58	0.25	9.90	0.13
August	10.77	0.19	59.71	0.31	6.43	0.12
September	10.66	0.14	59.77	0.21	6.37	0.09
October	11.10	0.16	59.48	0.27	6.61	0.10
November	12.25	0.22	60.36	0.32	7.39	0.14
December	13.74	0.20	61.20	0.28	8.41	0.13
January	12.06	0.20	60.18	0.21	7.26	0.12
February	11.39	0.15	59.51	0.24	6.78	0.10
March	9.51	0.17	59.05	0.32	5.62	0.11
Overall	13.17	0.07	60.14	0.09	7.92	0.04

Source: Authors' calculations based on Household Pulse Survey Weeks 1 through 27; See Dhongde and Haveman (2017) for formulae of the indices.

Table A5: Statewide Estimates of Overall MHI

States	Overall MHI	States	Overall MHI
Alabama	13.60 (0.39)	Montana	8.59 (0.33)
Alaska	11.89 (0.32)	Nebraska	9.43 (0.30)
Arizona	12.54 (0.30)	Nevada	18.16 (0.37)
Arkansas	13.29 (0.34)	New Hampshire	8.53 (0.32)
California	15.47 (0.22)	New Jersey	13.11 (0.33)
Colorado	11.00 (0.31)	New Mexico	13.60 (0.37)
Connecticut	11.82 (0.29)	New York	15.16 (0.34)
Delaware	10.92 (0.32)	North Carolina	12.27 (0.33)
District of Columbia	13.07 (0.39)	North Dakota	9.04 (0.38)
Florida	15.07 (0.29)	Ohio	12.35 (0.35)
Georgia	14.15 (0.36)	Oklahoma	13.49 (0.38)
Hawaii	13.51 (0.46)	Oregon	12.06 (0.30)
Idaho	9.06 (0.23)	Pennsylvania	11.24 (0.28)
Illinois	12.75 (0.29)	Rhode Island	12.21 (0.39)
Indiana	12.15 (0.29)	South Carolina	12.86 (0.39)
Iowa	8.98 (0.30)	South Dakota	9.14 (0.45)
Kansas	10.53 (0.26)	Tennessee	13.59 (0.32)
Kentucky	13.11 (0.36)	Texas	15.76 (0.29)
Louisiana	16.99 (0.36)	Utah	9.08 (0.24)
Maine	8.76 (0.35)	Vermont	8.49 (0.42)
Maryland	13.27 (0.32)	Virginia	10.68 (0.28)
Massachusetts	9.93 (0.26)	Washington	10.67 (0.26)
Michigan	11.81 (0.28)	West Virginia	12.66 (0.44)
Minnesota	8.43 (0.23)	Wisconsin	8.71 (0.28)
Mississippi	16.94 (0.40)	Wyoming	10.00 (0.45)
Missouri	11.18 (0.30)		

Source: Authors' calculations based on Household Pulse Survey Weeks 1 through 27.