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Abstract

In this paper we study consumption inequality before, during, and after the COVID-19 pandemic. Our consumption measure uses data from the U.S. Consumer Expenditure Surveys augmented with additional data and imputations. We compare consumption to a measure of expenditures defined by outlays. We find that consumption inequality declined from 2019 to 2020 before increasing in 2021 and 2022. By 2022, consumption inequality was similar to 2019 levels. Outlay inequality follows a similar pattern but is less equal in 2022 compared to 2019. To better understand the drivers behind this change, we decompose the Gini coefficient by category of consumption and decompose the Theil index by household demographic characteristics. We find that the decline in overall inequality in 2020 was due to shifts away from the consumption categories that were most impacted by the pandemic, which reversed in 2021 and 2022.

Keywords: household consumption, inequality decomposition, COVID-19, Consumer Expenditure Survey

JEL Codes: D10, D31, E21

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Introduction

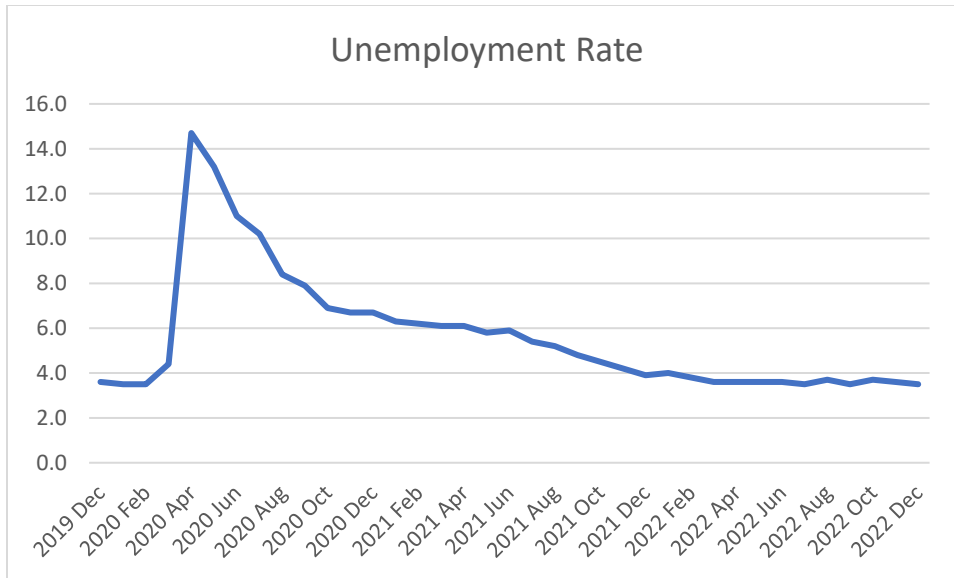
In this paper we study consumption inequality before, during, and after the COVID-19 pandemic. We use quarterly data from the U.S. Consumer Expenditure Surveys (CE) for this study augmented with additional data and imputations to produce our consumption measure. We find that consumption inequality declined from 2019 to 2020 before recovering in 2021 and 2022. By 2022, consumption inequality was similar to 2019 levels. This trend is consistent with other measures of inequality during this period such as after-tax income inequality and expenditures as defined by outlays. To better understand the drivers of the changes in consumption inequality, we decompose the Gini coefficient by category of consumption and decompose the Theil index by household demographic characteristics. For comparison, we perform the same decomposition for expenditure outlays.

The decline in overall inequality in 2020 was due to shifts away from the consumption of certain goods and services, not due to reductions of within consumption category inequality. The categories that were most impacted by the pandemic were those that contributed the most to inequality relative to their share of consumption. These include shelter other than the primary residence, entertainment (ticket and fees), and food away from home. As the consumption of goods and services in these categories recovered after the pandemic, overall consumption inequality increased. For the demographic decomposition, we find that most inequality is explained by within group inequality rather than between groups for the demographic characteristics we consider. The decline in inequality in 2020 is generally caused by a reduction in both between and within group inequality. The between group contribution to inequality by whether households have kids falls over this period, which could reflect the impact of government assistance which targeted families with children.

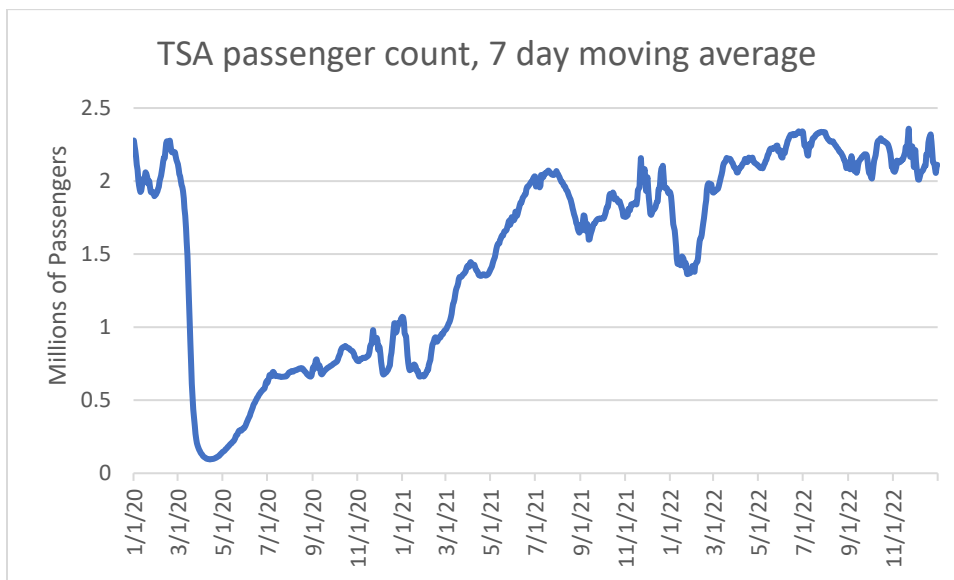
Background

COVID-19 Pandemic: Economic Impact and policy response

The COVID-19 pandemic greatly disrupted the economy. Although, the initial effects of the pandemic on the economy began in early 2020, the major disruptions occurred after the declaration of a federal emergency on March 13, 2020. At this point, states began to restrict in-person activities and close non-essential businesses. Schools moved online, and many people who weren't laid off were able to continue to work from home. The following figure shows the unemployment rate. The unemployment rate went from 3.6 percent in December 2019 to 14.7 percent in April of 2020, before declining and returning to pre-pandemic levels in early 2022. Many macroeconomic variables follow a similar pattern. A sharp disruption at the start of COVID-19, followed by a gradual return to normal. For a detailed study of the economic impact of the onset of the pandemic see Chetty, et al. (2023).



The pandemic led to large shifts in the pattern of household expenditures. Looking at the changes in expenditures in the CE from 2019 to 2020, some categories like food away from home, recreation services, and transportation had large declines. Other categories like food at home and many categories of goods had large increases (BLS 2022). Spending patterns began to normalize in 2021 as the vaccine became widely available and pandemic restrictions were lifted (BLS 2023). Another way to see the impact of COVID-19 on transportation related spending is to look at flight data, though it also reflects the pandemic impact on business travel. The following figure shows the daily TSA passenger counts. Air travel dropped precipitously at the start of the pandemic before gradually recovering over the next few years.



The disruption from the pandemic was unprecedented in recent history, but so was the policy response and speed of the labor market recovery. Some of the major sources of government support for households was the expansion of unemployment benefits (expanding eligibility and

increasing the benefit amount), multiple rounds of direct transfers to households (i.e., Economic Impact Payments), and an expansion of the Child Tax Credit. The direct transfers and Child Tax Credit expansion were phased out for higher levels of income. There was also an expansion of other government programs. For example, Medicaid eligibility was loosened through the continuous enrollment provision (Williams, et al. 2023), and the National School Lunch Program was expanded (Shrider 2021). In-kind benefits are included in our measure of consumption. In the measure of consumption used for this study, cash transfers and tax rebates are not included directly, but they are used to finance consumption expenditures. Another feature of the recovery was the large increase in inflation. Inflation affects the nominal spending patterns over this period, which can have differential impacts on households; however, the inequality analysis in this paper does not require nominal values to be deflated as households are compared at the same point in time. For example, the Gini calculated with nominal values would be the same as the Gini calculated with real values.¹

When looking at consumption over this period, there are 2 important dynamics to consider. First is the sudden onset and gradual recovery from the pandemic itself, which affected the components of consumption differently. This will have different effects for different households because the components of consumption most affected by the pandemic will be larger shares of overall consumption for some households. Similarly, the government assistance will impact some households more than others as will the loss and recovery in labor income. To better understand these impacts on overall consumption inequality, we will decompose the contribution to overall inequality by components of consumption and by household demographics.

Inequality and Poverty During COVID-19

Official data sources and academic research show the profound impact of COVID-19 on inequality and poverty across a range of resource measures. The impact of the COVID-19 pandemic on the labor market and the economy as well as the government response was unprecedented in its scale. Generally, the pandemic recession and recovery led to a decrease in inequality across many measures of resources, particularly for those measures that include the full impact of government assistance.

The Census Bureau produces official income and poverty measures using the Current Population Survey Annual Social and Economic Supplement (CPS-ASEC). In terms of inequality, pre-tax money income inequality increased slightly in 2020 compared to 2019 and remained at a similar level in 2021 and 2022 (Guzman and Kollar 2023). The increase in pre-tax money income inequality occurred despite there being compression in the distribution of wages over this period (Autor, et al. 2023). Similarly, the official poverty rate increased slightly in 2020 and

¹ This is true if a single price index is used to calculate real values. An interesting extension would be to consider the effects of household heterogeneity in experienced inflation on real inequality.

remained at a similar level in 2021 and 2022 (Shrider and Creamer 2023). The official poverty rate is based on annual pre-tax money income as the resource measure and the official poverty thresholds which are updated each year to account for inflation by the All-Items Consumer Price Index (CPI-U). The primary limitation for using pre-tax money income as a measure of household well-being during this period is it fails to capture much of the government assistance, which took the form of tax-credits or in-kind benefits. The Supplemental Poverty Measure (SPM) resource measure is also based on the CPS-ASEC but includes tax credits and in-kind benefits. The SPM poverty rate fell sharply in 2020 and continued to decline in 2021 due to the government assistance in response to COVID-19. The SPM poverty rate increased sharply in 2022 back to the pre-pandemic level reflecting the expiration of the government programs. A limitation of the CPS-ASEC income measures is that there was an especially large underreporting of unemployment benefits during the onset of the pandemic. Regarding this, Larrimore, et al. (2022) document the large underreporting, and show that correcting for the underreporting would have led the official poverty rate to fall in 2020.

The Bureau of Economic Analysis (BEA) produces distributional Personal Income (PI) data which uses the national accounts income concepts. Personal income and disposable personal income become more equally distributed in 2020, with disposable personal income continuing to become more equally distributed in 2021 (BEA 2023). However, both personal income and disposable personal income become less equally distributed in 2022 and return to a similar level as 2019. The 2022 data are preliminary and are the most current available data. Other academic research shows similar patterns in pre-tax and after-tax income inequality. The real time inequality measure of Blanchet, et al. (2022) shows pre-tax income inequality decreasing in 2020 before increasing to levels above pre-pandemic levels. After-tax income inequality shows a similar pattern but is still below pre-pandemic levels as of 2022. Heathcote, et al. (2023) also find a reduction in disposable income inequality during the pandemic.

Wealth can also be used as a measure of resources to measure household well-being. The Survey of Consumer Finances (SCF) produced by the Federal Reserve Board provides detailed information on household wealth. The survey is only conducted every 3 years, so it cannot measure wealth dynamics throughout this period, but the current results for 2022 can be compared to pre-pandemic (2019) values. Overall, real household net worth increased sharply across the distribution (Aladangady, et al. 2023). However, the gains at the bottom of the distribution were larger than at the top of the distribution, so wealth inequality fell. This is similar to the results of Blanchet, et al. (2022) who find that wealth inequality fell except at the very top of the distribution. The SCF's measure of pre-tax income shows that inequality increased from 2019 to 2022.

An advantage of using expenditures or consumption as a measure of well-being during this period is that underreported cash benefits such as unemployment do not impact measures of expenditures or consumption. Another benefit of expenditures or consumption is that there were large shifts in savings behavior during the pandemic. Heathcote, et al. (2023) find a

reduction in consumption expenditure inequality in 2020 and 2021 using Consumer Expenditure Surveys data. BLS (2023) uses CE data to create distributional PCE data, which captures the distribution of consumer expenditures using the concepts and totals from the national accounts. They find that PCE becomes more equally distributed from 2019 to 2020 but returns to pre-pandemic levels of inequality in 2021. Han, et al. (2023) update the consumption measure of Meyer and Sullivan (2012) through 2022 and produce a consumption poverty measure using an absolute threshold updated for inflation. They find that consumption poverty, which was already declining pre-COVID-19, continued to decline through 2022. Using the same consumption measure from this paper, we find that relative consumption poverty fell in 2020 before increasing to pre-pandemic levels by 2022 (Garner, Matsumoto, and Schild 2023). However, using an absolute threshold anchored to the 2019 relative threshold but updated for inflation, we find that poverty fell slightly in 2020 but continued to decline in 2021 and 2022.² Meyer, Murphy, and Sullivan (2022) study consumption at the onset of COVID-19. They find that consumption inequality decreased in 2020 as consumption at the bottom of the consumption distribution was little changed with the onset of the pandemic while consumption at the top of the distribution fell sharply.

Methods

Construction of the BLS consumption measure

In this section we provide a brief overview of our consumption measure. For full details regarding the construction of the measure see Garner, et al. (2023). For many goods and services, consumption will equal expenditure for a given period, so our measure starts with expenditures from the U.S. Consumer Expenditure Surveys Interview component. The CE consists of two separate surveys, an interview and a diary survey, which are administered to separate samples. The diary survey is designed to capture expenditures for commonly purchased items, though expenditures in these categories for commonly purchased items are often included in the interview survey as well. The interview survey captures approximately 95 percent of total expenditures and is the basis of our measure. The unit of analysis is at the consumer unit (CU) level.³ CUs represent expenditure sharing units and are similar to households.

For some categories, expenditures are not a good proxy for consumption. For durable goods, the goods are consumed over multiple periods while the expenditures occur all at once. Also, so

² The results are similar when anchoring to a 2019 threshold that matches the official poverty rate.

³ A consumer unit is defined as either (1) all members of a particular household who are related by blood, marriage, adoption, or other legal arrangements; (2) a person living alone or sharing a household with others or living as a roomer in a private home or lodging house or in permanent living quarters in a hotel or motel, but who is financially independent; or (3) two or more persons living together who pool their income to make joint expenditure decisions. Financial independence is determined by the three major expense categories: housing, food, and other living expenses. To be considered financially independent, a respondent must provide at least two of the three major expense categories. <https://www.bls.gov/opub/hom/glossary.htm#C>

categories of spending are better thought of as savings (e.g., pension contributions) or investments in human capital (e.g., education or medical care) rather than consumption. Importantly for the study of the COVID-19 period, we consider childcare expenses to be investments, like education, rather than consumption. For the durable goods of housing and vehicles, we use a flow of services approach to value the consumption value. For housing, the CE interview asks owners about the rent they would charge someone else to rent their homes;⁴ this is referred to as “rental equivalence” by the CE. We use this instead of out-of-pocket shelter expenditures for owners with and without mortgages. We exclude expenditures for the purchase of major appliances as we assume the flow of services of these are implicit in rental equivalence and reported rents; this assumption is based on the fact that in the U.S., most rental units come furnished with major appliances. For vehicles, we construct a measure of user cost based on estimates of depreciation and opportunity costs (Cho, et al. 2024). Finally, we exclude categories of spending that do not reflect current consumption and purchases for individuals outside of the CU. Health insurance is an important category that has features of both consumption and investment, and the inclusion of health insurance in a consumption measure is controversial. Therefore, we produce versions with and without health insurance.

Another limitation of the CE data for constructing a measure of consumption is that it only includes expenditures for goods and services. Therefore, it does not include the value of in-kind benefits. One barrier to imputing the value of in-kind benefits is that the CE does not ask about participation (with the exception of SNAP with the value of these implicitly counted in food expenditures). For NSLP, WIC, and LIHEAP, participation is imputed using CPS-ASEC data. Regression models of participation are estimated on the CPS-ASEC data, and the estimated coefficients of these models are used to predict participation in the CE. LIHEAP values are also imputed from CPS ASEC data; however, data from the USDA are used to assign NSLP and WIC values to CUs imputed as participants. Another in-kind benefit not captured by out-of-pocket spending is rental assistance. This is defined as the difference in the market value of rent and what is paid by the CU. For those paying below market rents, their out-of-pocket spending does not reflect the full consumption value of housing. We use regression models for those paying full market rent to impute the value of the consumption for those paying below market rent. Finally, the out-of-pocket expenditures do not capture the full value of health insurance. The CE does ask about health insurance coverage, so we impute the full value of health insurance to capture the value of government assistance or the employer contribution to employer provided health insurance. For our main results we use a measure of consumption that caps health insurance to be no more than 50 percent of total consumption.⁵

⁴ The exact question asked in the CE Interview: “If someone were to rent your home today, how much do you think it would rent for monthly, unfurnished and without utilities?” We assume unfurnished refers to furniture, not to appliances since in the majority of rental having units come with major appliances included.

⁵ There is a concern that the total cost of government provided health insurance overstates the value to the recipient, particularly at the bottom of the distribution. Therefore, the Interagency Technical Working Group (ITWG)

We compare household consumption to expenditures, which we define using an outlays approach.⁶ Unlike consumption, outlays include purchases on behalf of non-CU members. Outlays also include several categories that are not included in consumption such as education, childcare, and medical goods and services. Outlays include out of pocket spending on health insurance premiums, while consumption imputes the full value which includes government and employer contributions. For the durable goods categories, outlays for owned housing include mortgage principal and interest as well as owner's expenses such as maintenance, property tax, and insurance.⁷ For vehicles it includes downpayments as well as any loan payments (principle plus interest).

Once we calculate consumption and expenditure values at the CU level, we calculate equivalized consumption. To adjust consumption for CU size, we use a 3-parameter equivalence scale.⁸

Decomposing changes in inequality

To examine how changing consumption patterns affected consumption inequality during COVID-19, we decompose inequality first by sources of consumption and then by demographic subgroups. The Gini decomposition is based on the method of Lerman and Yitzhaki (1989) for estimating the Gini coefficient from weighted individual (or CU) level data. As noted earlier, for our analysis, CU level data are converted to adult equivalized level data. The data are weighted at the person level, CU weight (FINLWT21) times CU size. This weighting procedure is equivalent to assigning each person within a CU the same adult equivalized consumption as well as rank within the distribution. Each person within a CU receives the same adult equivalent consumption and are weighted using both the CU weight (FINLWT21) and CU size. All individuals within the same CU are ranked as ties. The Gini coefficient for consumption (c) is given by:

$$G = 2 \text{cov}(c, F(c)) / \bar{c}$$

Where $F(c)$ is the cumulative consumption distribution and \bar{c} is the mean. If the weight for CU i is given by w_i (based on the CU weight and CU size) and CUs are ordered in increasing order of adult equivalized consumption, then the cumulative distribution can be estimated as:

on producing a consumption poverty measure recommending capping health insurance such that it was no more than half of total resources.

⁶ Outlays differ from the published CE expenditures. See "What are the differences between total expenditures and total outlays" in the CE FAQ: <https://www.bls.gov/cex/csxfags.htm>

⁷ These owner's expenses are assumed to implicitly be included in rental equivalence, so they are not included separately in consumption.

⁸ The same equivalence scale used in the production of SPM thresholds; see <https://www.bls.gov/pir/spmhome.htm#threshold>; scales based on research of David Betson (1996). "Is Everything Relative?" The Role of Equivalence Scales in Poverty Measurement David M. Betson University of Notre Dame. Available at <https://aspe.hhs.gov/sites/default/files/private/pdf/106776/escale.pdf>

$$\hat{F}_i(c) = \sum_{j=0}^{i-1} w_j + \frac{w_i}{2}$$

Then, the Gini for weighted adult equivalized “individual” level data, where c_i is adult equivalized level consumption, is given by:

$$G = 2 \sum_i^N w_i (c_i - \bar{c}) (\hat{F}_i(c) - \bar{F}) / \bar{c}$$

The Gini coefficient can be decomposed based on the sources of consumption. Following Lerman and Yitzhaki (1985), let g denote the different consumption categories, then the overall Gini can be decomposed as:

$$G = \sum_g G_g R_g S_g$$

The first term is the Gini coefficient of consumption category g (G_g) is given by:

$$G_g = 2 \text{cov}(c_g, F_g) / \bar{c}_g$$

The second term is the Gini correlation of consumption category g . This term is given by:

$$R_g = \frac{\text{cov}(c_g, F)}{\text{cov}(c_g, F_g)}$$

The final term in the decomposition is share of category g in overall consumption and is given by:

$$S_g = \frac{\bar{c}_g}{\bar{c}}$$

The other measure of inequality that we consider is the Theil coefficient, which is one of the family of generalized entropy inequality indexes. The Theil coefficient is given by:

$$Theil = \left(\frac{1}{n}\right) \sum_{i=1}^n \left(\frac{c_i}{\bar{c}}\right) \log\left(\frac{c_i}{\bar{c}}\right)$$

An advantage of the generalized entropy family of indexes is that they are additively separable (Shorrocks 1980), while this is not a characteristic of the Gini. Let k denote the population subgroups, then the Theil index can be decomposed as:

$$Theil = \sum_k \left(\frac{\bar{c}_k n_k}{\bar{c} n}\right) * Theil_k + \left(\frac{1}{n}\right) \sum_k n_k \left(\frac{\bar{c}_k}{\bar{c}}\right) \log\left(\frac{\bar{c}_k}{\bar{c}}\right)$$

The first term measures within-group inequality, and the second term measures the between-group inequality. For an early example of the Gini decomposition for U.S. expenditure inequality see Garner (1993).⁹ Similar to the current study, Garner and Terrell (1998) decompose inequality by source and demographics to study changes in inequality during a large macroeconomic disruption. Instead of COVID-19, they study the post-Soviet transition in the Czech and Slovak Republics.

Results

In this section we first present summary statistics for levels of consumption and outlays. This is followed by our discussion of the trends in inequality for consumption from 2019 to 2022. For comparison, we also consider the inequality trends for equivalized post-tax income based on the CPS-ASEC published by the Census Bureau. All references to consumption refer to a measure that includes health insurance capped unless otherwise noted.

Levels from 2019-2022

Table 1 presents the summary statistics for quarterly equivalized consumption and outlays. Nominal average consumption increased by approximately 21 percent from 2019 to 2022. Inflation, as measured by the chained CPI increased by 13.7 percent, so average real consumption only increased by 5.7 percent. From 2019 to 2020, average nominal consumption fell slightly while median consumption rose. Mean and median outlays are less than those for consumption. Even though there are some expenditures included in total outlays that are not in consumption such as those for medical goods and services, education, childcare, and purchases for non-CU members, these are more than offset by the components of consumption that are not in outlays. These include the full value of health insurance, in-kind benefits, and a rental equivalence value for those who own their own home without a mortgage. Nominal mean and median outlays fall from 2019 to 2020. From 2019 to 2022, nominal mean outlays increase by more than consumption (21.7% vs 21.2%), but nominal median outlays increase by less than consumption (20.3% vs 21.7%).

Table 1. Summary Statistics for Quarterly Equivalized Consumption and Outlays (in current year U.S. \$ except N)

| | 2019 | 2020 | 2021 | 2022 |
|-------------|-------|-------|-------|-------|
| Consumption | | | | |
| Mean | 10041 | 10021 | 10990 | 12172 |
| SD | 5255 | 5038 | 5714 | 6334 |

⁹ Gini decomposition was conducted for CU level expenditures and CU weights as opposed to adult equivalized expenditures and person level weights.

| | | | | |
|---------|-------|-------|-------|-------|
| Median | 8998 | 9073 | 9915 | 10970 |
| Outlays | | | | |
| Mean | 9107 | 8953 | 10062 | 11085 |
| SD | 7455 | 7636 | 8532 | 10507 |
| Median | 7371 | 7307 | 8114 | 8865 |
| N | 21280 | 20158 | 20406 | 19181 |

Inequality from 2019-2022

Table 2 presents the Gini coefficient for consumption, outlays, and CPS-ASEC post tax income. Also presented are the 90:10, 50:10, and 90:50 ratios, the Theil index, and mean log deviation for consumption and outlays. For comparison, we also present the inequality statistics for consumption with no cap for the health insurance value. Consumption is much more equally distributed than post tax income or outlays.¹⁰ Consumption, outlays, and post-tax income become more equally distributed in 2020 compared to 2019. In 2021, post-tax income becomes more equally distributed than 2020 before increasing in 2022 to pre-pandemic levels of inequality. Consumption and outlays become less equally distributed in 2021 and 2022 compared to 2020. Based on the standard errors of the consumption Gini, only 2020 is statistically different than 2019.¹¹ On most measures, outlay inequality is at or slightly lower than pre-pandemic levels. However, based on the Theil index, outlays are less equally distributed in 2022 than pre-pandemic. Capping health insurance leads to slightly higher consumption inequality, however, there is no effect on the change in inequality over the period as inequality for both consumption with health insurance capped and uncapped follow the same pattern.

Table 2. Inequality Statistics

| | 2019 | 2020 | 2021 | 2022 |
|---------------------------------------|------------------|------------------|------------------|------------------|
| CPS ASEC Post Tax Income, equivalized | | | | |
| Gini | 0.416 | 0.399 | 0.394 | 0.417 |
| Consumption, equivalized | | | | |
| Gini | 0.250 (0.003) | 0.241 (0.003) | 0.247 (0.004) | 0.249 (0.004) |
| Mean log deviation | 0.104 | 0.098 | 0.102 | 0.103 |
| Theil | 0.110 | 0.102 | 0.107 | 0.108 |
| 90:10 ratio | 3.006 | 2.895 | 2.944 | 2.979 |

¹⁰ Meyer and Sullivan (2023) present inequality in consumption results through 2017. The 90:10 ratio for their measure in 2017 is 3.7. The difference between the 90:10 measure in 2019 is likely due to differences in scope between the measures. Our measure includes health insurance and in-kind benefit programs that are not included in Meyer and Sullivan (2023). These scope differences lead consumption to be more equally distributed.

¹¹ Standard errors are calculated using bootstrapping and are based on CE replicate weights.

| | | | | |
|---|------------------|------------------|------------------|------------------|
| 50:10 ratio | 1.717 | 1.700 | 1.712 | 1.727 |
| 90:50 ratio | 1.751 | 1.703 | 1.720 | 1.725 |
| Consumption, equivalized, Health Insurance Uncapped | | | | |
| Gini | 0.248 (0.003) | 0.239 (0.003) | 0.245 (0.004) | 0.247 (0.004) |
| Mean log deviation | 0.102 | 0.097 | 0.100 | 0.101 |
| Theil | 0.108 | 0.101 | 0.106 | 0.107 |
| 90:10 ratio | 2.971 | 2.867 | 2.923 | 2.957 |
| 50:10 ratio | 1.710 | 1.696 | 1.704 | 1.720 |
| 90:50 ratio | 1.737 | 1.690 | 1.715 | 1.718 |
| Outlays, equivalized | | | | |
| Gini | 0.355 | 0.343 | 0.354 | 0.355 |
| Mean log deviation | 0.215 | 0.198 | 0.212 | 0.212 |
| Theil | 0.226 | 0.215 | 0.231 | 0.236 |
| 90:10 | 4.931 | 4.505 | 4.758 | 4.819 |
| 50:10 | 2.216 | 2.096 | 2.163 | 2.167 |
| 90:50 | 2.225 | 2.149 | 2.200 | 2.224 |

Note: CPS ASEC post tax income from Shrider, et al. (2021); Semega and Kollar (2022); and Guzman and Kollar (2023)

Table 3 presents the quintile shares and top 5 percent share for consumption, outlays, and post-tax income for each of the years. Consumption has a larger lowest quintile share and a smaller highest quintile share compared to post tax income or outlays. The changes in quintile shares over time are similar to the changes in the overall Ginis. The lowest quintile share of consumption only increased slightly in 2020. The reduction in consumption inequality in 2020 is mostly due to an increase in the 2nd quintile share. For outlays, the top quintile (and top 5%) share is greater in 2022 than 2019. This helps to explain why the Theil index has increased, as it places more weight on the top tail of the distribution than the other inequality measures.

Table 3. Shares of Total

| | 2019 | 2020 | 2021 | 2022 |
|--------------------------|-------|-------|-------|-------|
| Consumption, equivalized | | | | |
| Lowest Quintile | 9.7% | 9.9% | 9.8% | 9.8% |
| 2nd Quintile | 14.3% | 14.7% | 14.5% | 14.5% |
| 3rd Quintile | 17.9% | 18.1% | 18.0% | 17.9% |
| 4th Quintile | 22.3% | 22.3% | 22.2% | 22.1% |
| Top Quintile | 35.8% | 35.1% | 35.5% | 35.7% |
| Top 5 Percent | 13.5% | 13.1% | 13.4% | 13.5% |
| Outlays, equivalized | | | | |
| Lowest Quintile | 6.7% | 7.1% | 6.9% | 6.9% |
| 2nd Quintile | 11.5% | 11.8% | 11.6% | 11.6% |

| | | | | |
|--|-------|-------|-------|-------|
| 3rd Quintile | 16.1% | 16.3% | 16.1% | 15.9% |
| 4th Quintile | 22.3% | 22.2% | 22.0% | 22.1% |
| Top Quintile | 43.3% | 42.5% | 43.4% | 43.5% |
| Top 5 Percent | 18.3% | 17.9% | 18.8% | 18.8% |
| CPS ASEC Post Tax Income, equivalized | | | | |
| Lowest Quintile | 4.7% | 5.1% | 5.4% | 4.5% |
| 2nd Quintile | 10.4% | 10.9% | 10.9% | 10.5% |
| 3rd Quintile | 15.7% | 16.0% | 16.0% | 15.8% |
| 4th Quintile | 22.6% | 22.8% | 22.6% | 22.6% |
| Top Quintile | 46.6% | 45.2% | 45.1% | 46.6% |
| Top 5 Percent | 19.9% | 18.9% | 19.0% | 19.9% |

Note: CPS-ASEC Post tax income from Shrider, et al. (2021); Semega and Kollar (2022); and Guzman and Kollar (2023)

Decomposition of Consumption Inequality

In this section, we present the results of the Gini decomposition by category of consumption (with health insurance capped) and total outlays . For the decomposition by category of consumption we break overall consumption into the following categories:

- food at home
- food away from home
- apparel
- shelter – residences (owned and rented primary residences plus owned secondary residences)
- shelter – on trips
- shelter – school
- utilities
- flow of services from vehicles
- transportation excluding flow of services from owned vehicles
- entertainment fees and tickets
- entertainment other
- health insurance
- in-kind benefits
- other.

For outlays we use the same categories, with an additional category to capture expenditure categories not included in consumption. For most categories, consumption and outlays are comparable in scope with the exception of purchases for non-CU members which are included in outlays but not consumption. For vehicles, consumption measures the flow of services while outlays use out of pocket payments (downpayment and any loan payments). For owned shelter,

consumption measures the rental equivalence for owner housing (for primary residence and vacations homes) while outlays use mortgage payments. The category “other” includes household expenses, which for outlays includes childcare expenses. Some categories of expenditures like education, cash contributions, and personal insurance are excluded from consumption. For our analysis, we include these in a not in consumption category. For health, consumption includes the full value of health insurance, while outlays use the out-of-pocket insurance payments and spending on medical goods and services. Finally, in-kind benefits are not included in outlays.

We also present the Theil decomposition for consumption and outlays for select demographic groups: race/ethnicity, education, presence and age of children, and geography. Overall consumption inequality is decomposed into: 4 race/ethnicity subgroups: white non-Hispanic, black non-Hispanic, Hispanic, and other; and 5 subgroups for education (defined as the highest education attainment of the CU head or spouse): less than high school, high school graduate, some college or associate’s degree, bachelor’s degree, and advanced degree; whether or not the CU has children, and for households with children 3 groups by age of children: at least one child under 6, no children under 6 and at least one between 6 and 13, and no children under 13 and at least one 14 to 17. We also do the decomposition by quintile of pre-tax income.

For the decomposition by geography we use the 4 Census regions, 9 Census Divisions, states, and urban/rural designation. One concern with states is that the CE sample sizes for some states will be very small. So, we group states based on similar responses to COVID-19 (as states in the same division or region could have had much different responses). Using the ranking of Kerpen, et al. (2023), we group states into quintiles of overall COVID-19 response.

These demographic characteristics were chosen because we hypothesize that certain subgroups were more impacted by the pandemic and the State and Federal responses to COVID-19, such as business closures and pandemic related benefits. For example, those with children were impacted by school and childcare centers closing, but benefits were also targeted towards households with children. Those with lower education were more likely to experience job loss during the pandemic. From 2019 to 2020, the overall annual average unemployment rate increased by 4.4 percentage points. The increase was larger for lower education groups. The annual average unemployment rate for those with a high school degree but no college increased by 5.7 percentage points and by 6.6 percentage points for those with less than a high school diploma. Certain racial and ethnic groups were also more likely to experience job loss. The average annual unemployment rate for blacks increased by 5.5 percentage points from 2019 to 2020, and the unemployment rate for Hispanics increased by 6.2 percentage points. We also examine geographic differences because there was significant heterogeneity in the policy response to COVID-19 across the U.S.

Table 4 presents the consumption Gini contributions by category. Each category’s contribution is expressed as a percentage of the overall Gini for the year. The decline in consumption inequality in 2020 was driven by a decline in the contribution from a number of pandemic sensitive

categories such as food away from home, shelter on trips, entertainment fees and tickets, and transportation other than the flow of services from owned cars and trucks. Partially offsetting the declines in these categories was an increase in contribution to overall inequality for residences, food at home, and health insurance. From 2020 to 2021, these patterns reverse with an increasing contribution to overall inequality from the pandemic sensitive categories.

Table 4: Consumption Gini Contribution Share by Category

| | 2019 | 2020 | 2021 | 2022 |
|------------------|-------|-------|-------|-------|
| Overall Gini | 0.250 | 0.241 | 0.247 | 0.249 |
| Food | | | | |
| at Home | 5.5% | 6.6% | 6.2% | 6.1% |
| Away from Home | 6.4% | 3.8% | 5.9% | 6.4% |
| Shelter | | | | |
| Residences | 32.6% | 35.6% | 33.4% | 32.9% |
| On Trips | 2.4% | 1.1% | 2.1% | 2.6% |
| School | -0.1% | 0.0% | 0.0% | 0.0% |
| Transportation | | | | |
| Flows | 4.3% | 4.4% | 4.4% | 4.9% |
| Other | 9.6% | 6.5% | 8.3% | 10.0% |
| Entertainment | | | | |
| Fees and Tickets | 2.3% | 1.4% | 2.3% | 2.3% |
| Other | 3.7% | 4.1% | 5.0% | 4.2% |
| Apparel | 2.4% | 1.6% | 1.8% | 1.8% |
| Utilities | 3.9% | 4.1% | 3.7% | 3.6% |
| Health Insurance | 17.9% | 21.2% | 16.8% | 15.6% |
| In-kind Benefits | -0.6% | -0.4% | -0.8% | -0.8% |
| Other | 9.7% | 9.9% | 11.0% | 10.3% |

Note: All results are weighted as the person level (FINLWT21*CU Size).

Table 5 presents the outlay Gini contribution by category. The pandemic sensitive categories show a similar pattern to consumption, which makes sense as the consumption and outlays in these categories only differ in that consumption excludes purchases for non-CU members. Looking at the categories with greater scope differences between the measures. Residence's contribution to outlay inequality (based on principal and interest payments for owned residences) follows a similar pattern as its contribution to consumption inequality (based on rental equivalence). Owned vehicle consumption has a relatively stable contribution to consumption inequality, while vehicles contribute more to outlay inequality in 2020 compared to 2019. Health's contribution to outlay inequality is more stable than health insurance's contribution to consumption inequality. Health outlays include out of pocket payments on medical goods and services which were greatly impacted by the pandemic. On the other hand, health outlays only include the out-of-pocket portion of insurance premiums and don't include government or employer contributions. The not in consumption category of outlays had a slight increase in its contribution to overall inequality in 2020.

Table 5: Outlay Gini Contribution Share by Category

| | 2019 | 2020 | 2021 | 2022 |
|--------------------|-------|-------|-------|-------|
| Overall Gini | 0.355 | 0.343 | 0.354 | 0.355 |
| Food | | | | |
| at Home | 4.2% | 5.2% | 4.6% | 4.5% |
| Away from Home | 5.5% | 3.6% | 5.0% | 5.5% |
| Shelter | | | | |
| Residences | 21.9% | 24.4% | 21.5% | 21.5% |
| On trips | 1.9% | 1.0% | 1.7% | 2.1% |
| School | 0.3% | 0.3% | 0.5% | 0.4% |
| Transportation | | | | |
| Vehicles | 8.2% | 9.4% | 9.0% | 8.0% |
| Other | 8.3% | 5.9% | 7.0% | 8.4% |
| Entertainment | | | | |
| Fees and Tickets | 2.0% | 1.3% | 1.9% | 2.0% |
| Other | 2.9% | 3.3% | 3.7% | 3.0% |
| Apparel | 2.2% | 1.6% | 1.9% | 1.9% |
| Utilities | 2.8% | 2.9% | 2.6% | 2.4% |
| Health | 7.1% | 7.2% | 6.9% | 6.7% |
| Other | 9.4% | 9.3% | 9.9% | 9.3% |
| Not in Consumption | 23.2% | 24.8% | 23.8% | 24.3% |

Note: All results are weighted as the person level (FINLWT21*CU Size).

Fully understanding what is driving the category contributions to Gini requires looking at the different components of the decomposition. Tables 6 and 8 (presented at the end of the paper) present the Gini decomposition results for consumption and outlays for each of the years. For each year and category of consumption or outlays, the tables present the consumption or outlay share (S), the category Gini (G), and the correlation with the rank of consumption or outlays (R). When looking at the correlation with the rank of consumption, residences and shelter on trips have the strongest correlations with overall consumption. In-kind benefits and shelter at school have negative correlations, meaning that low overall consumption CUs are more likely to have higher consumption levels of these categories. For the category Gini coefficients, shelter on trips, other entertainment, apparel, and utilities have the largest within category Gini coefficients. These end up contributing to overall inequality because these categories have a positive correlation with overall consumption, meaning that people with high consumption in these categories tend to have high overall consumption. Shelter at school and in-kind benefits also have large category Ginis, but this is due to many CUs having zero consumption in these categories. Since these categories have negative correlation with overall consumption, these end up reducing overall inequality as households with positive shelter at school and in-kind benefits tend to have lower consumption. The consumption shares of food away from home, shelter on trips, entertainment, and apparel had large decreases from 2019 to 2020 as these are the categories that were most affected by the pandemic.

The general pattern for R, S, G Gini decomposition for outlays is similar for the pandemic affected categories. Comparing to the consumption decomposition results for the categories with scope differences shows some differences. For residences, the share of outlays is much lower than the consumption share and the within Gini is higher. This is due to some owner households having zero outlays but with rental equivalence. For vehicles, the within category Gini for outlays is much higher than for consumption. Similar to owned housing, many CUs will have zero outlays in a given quarter but will have an imputed consumption value based on the vehicles they do own. Out of pocket health expenditure is a much lower share of total outlays than the full value of health insurance is as a share of total consumption, which reflects employer provided benefits and government insurance/subsidies. The within category Gini for health outlays is lower than that for health insurance.

Tables 7 and 9 (also presented at the end of the paper) present the overall Gini contributions normalized by the category's share. This normalization is useful since categories with large shares of total consumption or total outlays will have larger contributions to the overall Gini. If this term is greater than 1, the category contributes more to the Gini than its share of consumption or outlays. Shelter on trips and other entertainment have the largest relative shares. Both categories contribute to the overall Gini at over twice their share of consumption. For outlays, these categories still have large relative contributions, but less than their relative contribution to consumption inequality. The categories with the lowest relative contributions to consumption inequality are health insurance and the flow of services from owned vehicles. From 2019 to 2020, the categories that had a decrease in their relative share was food away from home, shelter on trips, entertainment – tickets and fees, and apparel. The relative share contributions of these categories to overall inequality recovered in 2021 and 2022. For categories of outlays that differ most from the corresponding consumption categories, residences, vehicles, and health all have a greater relative contribution to outlay inequality than consumption inequality.

The decline in inequality in 2020 can be explained by decreased spending in pandemic sensitive categories that contribute a large amount to inequality relative to their share of consumption. However, offsetting this decline is that the categories gaining share also contribute to inequality. For example, shelter – residence's relative contribution is similar in 2019 and 2020, but it contributes 0.005 more to the overall Gini in 2020 due to its share of consumption increasing. However, the categories with declining shares have greater relative contributions to inequality. So, the shift in spending from shelter on trips and entertainment – tickets and fees to residences decreases overall inequality.

In-kind benefits reduce overall inequality, but do not explain the change in inequality over this period as the in-kind contribution to overall inequality is similar each year. This is despite the expansion of the National School Lunch Program (NSLP) during the pandemic. Since the beneficiaries of the expansion represent a particular type of consumer unit (those with school age children), this is one area where a demographic decomposition of inequality would be more

useful rather than a decomposition by source. We now turn to the demographic decomposition of the Theil Index.

Table 10 presents the composition over time of the different demographic categories we consider. Large changes in the demographic composition can affect the Theil decomposition. Over this period, the demographic shares for the categories we consider are relatively stable.

Table 10: Demographic composition over time

| Demographic Category | 2019 | 2020 | 2021 | 2022 |
|--|-------|-------|-------|-------|
| Race and Ethnicity | | | | |
| White, non-Hispanic | 62.2% | 62.2% | 61.3% | 60.6% |
| Black, non-Hispanic | 12.9% | 12.6% | 12.9% | 12.7% |
| Hispanic | 17.8% | 18.0% | 18.3% | 18.5% |
| Other, non-Hispanic | 7.1% | 7.3% | 7.6% | 8.1% |
| Education | | | | |
| Less than high school | 8.7% | 7.8% | 8.1% | 8.3% |
| High school graduate | 18.8% | 18.4% | 18.9% | 18.1% |
| Some college or Associates degree | 29.4% | 27.5% | 26.9% | 27.4% |
| Bachelors Degree | 24.5% | 25.8% | 25.8% | 25.4% |
| Advanced Degree | 18.5% | 20.5% | 20.4% | 20.8% |
| Presence of Children | | | | |
| No children | 50.0% | 49.7% | 51.0% | 51.2% |
| Children | 50.0% | 50.3% | 49.0% | 48.8% |
| Age of Children | | | | |
| At least one child under 6 | 46.1% | 45.9% | 43.8% | 43.1% |
| No children under 6, at least one between 6 and 13 | 38.4% | 36.9% | 39.3% | 39.4% |
| Has children under 18, but none under 14 | 15.6% | 17.2% | 16.9% | 17.5% |

Note: All results are weighted as the person level (FINLWT21*CU Size). Age of children is restricted to CUs with any children.

Table 11 presents the decomposition of overall consumption and outlay inequality by demographic characteristics. Overall inequality is divided into within-group inequality and between-group inequality. The demographic categories we consider are race/ethnicity, education (measured as the highest education level attained by the household head or spouse), presence of children, age of children, and pre-tax income quintile.

Table 11: Within-Group and Between-Group Inequality for CU level demographics: 2019 through 2022

| | Consumption | | | | Outlays | | | |
|---------------------|-------------|--------|--------|--------|---------|--------|--------|--------|
| | 2019 | 2020 | 2021 | 2022 | 2019 | 2020 | 2021 | 2022 |
| Overall Thiel Index | 0.1095 | 0.1023 | 0.1074 | 0.1083 | 0.2260 | 0.2146 | 0.2315 | 0.2365 |

| | | | | | | | | | |
|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--|
| Race and Ethnicity | | | | | | | | | |
| Within-group inequality | 0.1012 | 0.0945 | 0.0987 | 0.1008 | 0.2094 | 0.2000 | 0.2155 | 0.2231 | |
| Between-group inequality | 0.0084 | 0.0078 | 0.0087 | 0.0075 | 0.0166 | 0.0146 | 0.0159 | 0.0133 | |
| Education | | | | | | | | | |
| Within-group inequality | 0.0898 | 0.0879 | 0.0908 | 0.0906 | 0.1717 | 0.1711 | 0.1848 | 0.1873 | |
| Between-group inequality | 0.0197 | 0.0144 | 0.0166 | 0.0178 | 0.0543 | 0.0435 | 0.0466 | 0.0492 | |
| Presence of Children | | | | | | | | | |
| Within-group inequality | 0.1007 | 0.0946 | 0.1021 | 0.1028 | 0.2196 | 0.2100 | 0.2286 | 0.2332 | |
| Between-group inequality | 0.0088 | 0.0078 | 0.0052 | 0.0056 | 0.0064 | 0.0046 | 0.0028 | 0.0033 | |
| Age of children | | | | | | | | | |
| Within-group inequality | 0.0845 | 0.0849 | 0.0910 | 0.0868 | 0.1991 | 0.1860 | 0.2150 | 0.2009 | |
| Between-group inequality | 0.0008 | 0.0013 | 0.0021 | 0.0010 | 0.0020 | 0.0032 | 0.0060 | 0.0031 | |
| Income quintile | | | | | | | | | |
| Within-group inequality | 0.0792 | 0.0784 | 0.0802 | 0.0797 | 0.1267 | 0.1282 | 0.1360 | 0.1432 | |
| Between-group inequality | 0.0303 | 0.0239 | 0.0272 | 0.0286 | 0.0993 | 0.0864 | 0.0955 | 0.0933 | |

Note: All results are weighted as the person level (FINLWT21*CU Size). Age of children is restricted to CUs with any children.

Similar to the Gini, overall consumption inequality as measured by the Theil index fell in 2020 before partially recovering in 2021 and 2022. For outlays, the Theil index is higher in 2021 and 2022 than in 2019. For all demographic categories, within-group inequality explains the vast majority of overall inequality. For race/ethnicity, education, and presence of children, declines in both within and between group inequality contribute to the fall in inequality in 2020, but the decline in between group inequality was relatively greater. Outlays and consumption inequality demographic decompositions are similar from 2019 to 2020. From 2020 to 2021, there is a much larger increase in with-group inequality for outlays. In 2021, the within-group inequality contributes more to overall outlay inequality than in 2019. The age of children decomposition is restricted to households with children. For both outlays and consumption, there is an increase in between group inequality in 2020 with a further increase in 2021.

We also consider the Theil decomposition by geography. The hypothesis is that different geographic areas were differentially impacted by the pandemic and had different policy responses, and this could have impacted consumption inequality during this period. The geographic variables we consider are urban vs rural, Census region, Census division, and states. Given sample size limitations, we also group states by their policy responses to COVID-19 using the rankings of Kerpen, et al. (2023). If the relevant factor is policy response, region and division may end up grouping states with different COVID-19 responses.

Table 12 shows the within and between group Theil decomposition for consumption and outlays by geography. Regardless of geographic grouping, within-group inequality accounts for the vast majority of overall inequality. The decomposition for regions, divisions, states, and states grouped by pandemic response shows a similar pattern for both consumption and outlays. Both between and within group inequality fell in 2020, before bouncing back in 2021 and 2022. For

consumption, the between-group inequality was higher than pre-pandemic levels for each of the geographic groupings in 2021 and 2022 despite overall inequality being lower. The larger relative increase in between-group inequality in 2021 when grouping states by COVID-19 response after a smaller decrease from 2019 to 2020 suggests the state-level COVID-19 policies were more impactful during the reopening phase. The urban/rural categories explain little of the overall inequality, though there is a decline in the between-group inequality share in 2020.

Table 12: Within-Group and Between-Group Consumption and Outlay Inequality for Geography: 2019 through 2022

| | Consumption | | | | Outlays | | | |
|---|-------------|--------|--------|--------|---------|--------|--------|--------|
| | 2019 | 2020 | 2021 | 2022 | 2019 | 2020 | 2021 | 2022 |
| Overall Thiel Index | 0.1095 | 0.1023 | 0.1074 | 0.1083 | 0.2260 | 0.2146 | 0.2315 | 0.2365 |
| Census Region | | | | | | | | |
| Within-group inequality | 0.1073 | 0.1002 | 0.1048 | 0.1057 | 0.2235 | 0.2121 | 0.2288 | 0.2328 |
| Between-group inequality | 0.0022 | 0.0021 | 0.0026 | 0.0026 | 0.0025 | 0.0025 | 0.0026 | 0.0036 |
| Census Division | | | | | | | | |
| Within-group inequality | 0.1061 | 0.0990 | 0.1036 | 0.1046 | 0.2215 | 0.2103 | 0.2273 | 0.2312 |
| Between-group inequality | 0.0034 | 0.0033 | 0.0037 | 0.0038 | 0.0045 | 0.0044 | 0.0042 | 0.0052 |
| State | | | | | | | | |
| Within-group inequality | 0.1038 | 0.0972 | 0.1014 | 0.1026 | 0.2160 | 0.2045 | 0.2216 | 0.2261 |
| Between-group inequality | 0.0057 | 0.0051 | 0.0060 | 0.0057 | 0.0100 | 0.0101 | 0.0099 | 0.0104 |
| States, ranked and grouped by quintile of COVID-19 Response | | | | | | | | |
| Within-group inequality | 0.1071 | 0.1001 | 0.1046 | 0.1056 | 0.2240 | 0.2130 | 0.2289 | 0.2331 |
| Between-group inequality | 0.0024 | 0.0022 | 0.0028 | 0.0028 | 0.0020 | 0.0016 | 0.0026 | 0.0034 |
| Urban vs Rural | | | | | | | | |
| Within-group inequality | 0.1092 | 0.1023 | 0.1068 | 0.1075 | 0.2256 | 0.2145 | 0.2314 | 0.2362 |
| Between-group inequality | 0.0003 | 0.0000 | 0.0000 | 0.0001 | 0.0004 | 0.0001 | 0.0001 | 0.0002 |

Note: All results are weighted as the person level (FINLWT21*CU Size). The state ranking of COVID-19 responses is from Kerpen, et al. (2023).

Tables 13 and 14 (presented at the end), show the Thiel indexes over time for the different demographic and geographic groups. They generally track the overall within group inequality over time (decline in inequality in 2020 followed by a full or partial return to 2019 levels in the following years), but there are some interesting patterns. The Census regions with the highest initial consumption inequality (South and West) ended up with lower consumption inequality by 2022, while the Census regions with the lowest initial inequality (Northeast and Midwest) ended up with higher inequality. The pattern for outlay inequality was similar except for the South which had an increase in outlay inequality from 2019 to 2022. In terms of interesting demographic results, consumption inequality increased in 2020 for households with children,

while outlay inequality increased. Most education groups had a decrease in consumption inequality in 2020 except for the less than high school group which had an increase.

Overall, the demographic decomposition results suggest that the differential impact of the COVID-19 recession and policy response did affect consumption and expenditure inequality. One limitation of the analysis is that we only consider each demographic and geographic variable separately. In future versions we will expand the analysis to control for multiple demographic variables simultaneously.

Conclusion and Future Work

Consumption and expenditure outlay inequality fell in 2020 with the onset of the pandemic before recovering in 2021 and 2022. For expenditures, as measured by outlays, inequality after the pandemic was greater than before. In this paper, we present decomposition results which shed some light on the drivers behind the changes in consumption and outlay inequality during this period. First, we decompose the Gini coefficient by type of consumption or outlay. The decline in inequality in 2020 was due to a reduction in consumption, disproportionately at the top of the distribution, in the categories that were most impacted by the pandemic such as shelter other than primary residence, entertainment – tickets and fees, and food away from home. As consumption in these categories recovered, consumption inequality returned closer to 2019 levels.

The decomposition by demographic results is less clear and points to the need for additional investigation. As expected, inequality across families with and without children declined in 2020, which could be due to the various assistance programs that disproportionately targeted families with children. However, the inequality across families with and without children never recovered, which we would expect as these assistance programs expired. Another surprising result is that we find minimal effects of geography in 2020. There was a lot of geographic variation in the severity of the initial outbreak and the state's policy responses in terms of business and school closures. Also, industries like tourism that were most impacted by the pandemic are more important in some areas. However, there is an increase in inequality between areas in 2021, which suggests an uneven reopening across geographic areas.

Finally, there are improvements to the consumption measure that could affect the analysis of inequality. First, we currently only use data from the CE Interview survey. However, a small percentage of expenditures are only captured on the Diary survey. We plan to integrate the Diary expenditures in a future version of the measure. Also, there is a concern that expenditures at the top of the distribution are underrepresented in the CE. One way to account for this is to apply an adjustment to the top tail of the distribution as has been done for the CE-PCE distributional analysis (BLS 2023). This will change the overall level of consumption and outlay

inequality, though it may not have a large impact on the trends over time as the effect of the adjustment should be similar each year.

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Additional Tables

Table 6a. Gini Decomposition for Consumption for 2019 & 2020

| | 2019 | | | 2020 | | |
|------------------|---|--------------------------|---|---|--------------------------|---|
| | Correlation with Rank of Consumption (R) | Gini of Source (G) | Share of Total Consumption (S) | Correlation with Rank of Consumption (R) | Gini of Source (G) | Share of Total Consumption (S) |
| Food | | | | | | |
| at Home | 0.512 | 0.291 | 0.093 | 0.525 | 0.294 | 0.103 |
| Away from Home | 0.604 | 0.549 | 0.049 | 0.463 | 0.580 | 0.035 |
| Shelter | | | | | | |
| Residences | 0.785 | 0.391 | 0.265 | 0.783 | 0.386 | 0.284 |
| On trips | 0.706 | 0.923 | 0.009 | 0.615 | 0.957 | 0.005 |
| School | -0.240 | 0.997 | 0.001 | -0.179 | 0.999 | 0.000 |
| Transportation | | | | | | |
| Flows | 0.469 | 0.455 | 0.050 | 0.468 | 0.468 | 0.049 |
| Other | 0.613 | 0.429 | 0.091 | 0.498 | 0.429 | 0.074 |
| Entertainment | | | | | | |
| Fees and Tickets | 0.636 | 0.837 | 0.011 | 0.614 | 0.905 | 0.006 |
| Other | 0.601 | 0.607 | 0.026 | 0.583 | 0.619 | 0.028 |
| Apparel | 0.496 | 0.663 | 0.019 | 0.376 | 0.672 | 0.015 |
| Utilities | 0.535 | 0.300 | 0.061 | 0.540 | 0.289 | 0.063 |
| Health Insurance | 0.542 | 0.318 | 0.259 | 0.576 | 0.326 | 0.273 |
| In-kind Benefits | -0.216 | 0.929 | 0.008 | -0.173 | 0.976 | 0.006 |
| Other | 0.678 | 0.601 | 0.059 | 0.658 | 0.600 | 0.060 |

Note: All results are weighted as the person level (FINLWT21*CU Size).

Table 6b. Gini Decomposition for Consumption for 2021 & 2022

| | 2021 | | | 2022 | | |
|----------------|---|--------------------------|---|---|--------------------------|---|
| | Correlation with Rank of Consumption (R) | Gini of Source (G) | Share of Total Consumption (S) | Correlation with Rank of Consumption (R) | Gini of Source (G) | Share of Total Consumption (S) |
| Food | | | | | | |
| at Home | 0.516 | 0.295 | 0.100 | 0.508 | 0.296 | 0.100 |
| Away from Home | 0.563 | 0.551 | 0.047 | 0.600 | 0.552 | 0.048 |
| Shelter | | | | | | |
| Residences | 0.783 | 0.379 | 0.278 | 0.782 | 0.381 | 0.275 |
| On trips | 0.649 | 0.923 | 0.009 | 0.696 | 0.913 | 0.010 |
| School | -0.193 | 0.998 | 0.000 | -0.291 | 0.999 | 0.000 |
| Transportation | | | | | | |

| | | | | | | |
|------------------|--------|-------|-------|--------|-------|-------|
| Flows | 0.472 | 0.477 | 0.048 | 0.501 | 0.464 | 0.053 |
| Other | 0.571 | 0.431 | 0.083 | 0.611 | 0.437 | 0.093 |
| Entertainment | | | | | | |
| Fees and Tickets | 0.669 | 0.883 | 0.010 | 0.638 | 0.844 | 0.011 |
| Other | 0.631 | 0.660 | 0.030 | 0.619 | 0.656 | 0.026 |
| Apparel | 0.397 | 0.596 | 0.018 | 0.410 | 0.607 | 0.018 |
| Utilities | 0.520 | 0.305 | 0.058 | 0.513 | 0.304 | 0.057 |
| Health Insurance | 0.522 | 0.321 | 0.247 | 0.504 | 0.323 | 0.239 |
| In-kind Benefits | -0.265 | 0.905 | 0.008 | -0.267 | 0.872 | 0.009 |
| Other | 0.688 | 0.605 | 0.065 | 0.696 | 0.601 | 0.061 |

Note: All results are weighted as the person level (FINLWT21*CU Size).

Table 7. Consumption Gini Contribution by Source: Relative Share of Overall Gini ($R \cdot G \cdot S$)/(Gini*S)

| | 2019 | 2020 | 2021 | 2022 |
|------------------|--------|--------|--------|--------|
| Food | | | | |
| at Home | 0.597 | 0.639 | 0.618 | 0.605 |
| Away from Home | 1.327 | 1.112 | 1.256 | 1.332 |
| Shelter | | | | |
| Residences | 1.229 | 1.252 | 1.203 | 1.199 |
| On trips | 2.606 | 2.437 | 2.428 | 2.555 |
| School | -0.956 | -0.741 | -0.781 | -1.168 |
| Transportation | | | | |
| Flows | 0.854 | 0.906 | 0.912 | 0.936 |
| Other | 1.050 | 0.885 | 0.997 | 1.075 |
| Entertainment | | | | |
| Fees and Tickets | 2.130 | 2.302 | 2.394 | 2.166 |
| Other | 1.461 | 1.497 | 1.689 | 1.633 |
| Apparel | 1.316 | 1.046 | 0.960 | 1.002 |
| Utilities | 0.642 | 0.647 | 0.644 | 0.628 |
| Health Insurance | 0.689 | 0.777 | 0.680 | 0.654 |
| In-kind Benefits | -0.804 | -0.700 | -0.972 | -0.937 |
| Other | 1.629 | 1.635 | 1.687 | 1.683 |

Note: All results are weighted as the person level (FINLWT21*CU Size).

Table 8: Outlay Gini Decomposition for 2019 & 2020

| | 2019 | | | 2020 | | |
|----------------|--------------------------------------|--------------------|----------------------------|--------------------------------------|--------------------|----------------------|
| | Correlation with Rank of Outlays (R) | Gini of Source (G) | Share of Total Outlays (S) | Correlation with Rank of Outlays (R) | Gini of Source (G) | Share of Outlays (S) |
| Food | | | | | | |
| at Home | 0.506 | 0.291 | 0.102 | 0.526 | 0.294 | 0.115 |
| Away from Home | 0.666 | 0.550 | 0.053 | 0.546 | 0.580 | 0.039 |

| | | | | | | |
|--------------------|-------|-------|-------|-------|-------|-------|
| Shelter | | | | | | |
| Residences | 0.742 | 0.467 | 0.224 | 0.750 | 0.460 | 0.242 |
| On trips | 0.718 | 0.922 | 0.010 | 0.661 | 0.957 | 0.005 |
| School | 0.780 | 0.996 | 0.001 | 0.798 | 0.996 | 0.001 |
| Transportation | | | | | | |
| Vehicles | 0.616 | 0.805 | 0.059 | 0.631 | 0.817 | 0.063 |
| Other | 0.678 | 0.430 | 0.101 | 0.567 | 0.430 | 0.083 |
| Entertainment | | | | | | |
| Fees and Tickets | 0.690 | 0.836 | 0.012 | 0.669 | 0.905 | 0.007 |
| Other | 0.597 | 0.600 | 0.029 | 0.586 | 0.614 | 0.031 |
| Apparel | 0.558 | 0.660 | 0.021 | 0.469 | 0.671 | 0.018 |
| Utilities | 0.505 | 0.297 | 0.067 | 0.490 | 0.287 | 0.071 |
| Health | 0.558 | 0.565 | 0.080 | 0.538 | 0.568 | 0.081 |
| Other | 0.701 | 0.610 | 0.078 | 0.678 | 0.603 | 0.078 |
| Not in Consumption | 0.816 | 0.625 | 0.162 | 0.813 | 0.629 | 0.166 |

Note: All results are weighted as the person level (FINLWT21*CU Size).

Table 8b. Outlay Gini Decomposition for 2021 & 2022

| | 2021 | | | 2022 | | |
|--------------------|--------------------------------------|--------------------|----------------------------|--------------------------------------|--------------------|----------------------------|
| | Correlation with Rank of Outlays (R) | Gini of Source (G) | Share of Total Outlays (S) | Correlation with Rank of Outlays (R) | Gini of Source (G) | Share of Total Outlays (S) |
| Food | | | | | | |
| at Home | 0.502 | 0.295 | 0.109 | 0.488 | 0.296 | 0.110 |
| Away from Home | 0.630 | 0.553 | 0.051 | 0.657 | 0.555 | 0.054 |
| Shelter | | | | | | |
| Residences | 0.730 | 0.464 | 0.225 | 0.738 | 0.468 | 0.221 |
| On trips | 0.676 | 0.922 | 0.010 | 0.699 | 0.912 | 0.011 |
| School | 0.865 | 0.996 | 0.002 | 0.755 | 0.996 | 0.002 |
| Transportation | | | | | | |
| Vehicles | 0.634 | 0.824 | 0.061 | 0.621 | 0.821 | 0.056 |
| Other | 0.627 | 0.432 | 0.091 | 0.663 | 0.439 | 0.103 |
| Entertainment | | | | | | |
| Fees and Tickets | 0.718 | 0.882 | 0.011 | 0.690 | 0.842 | 0.012 |
| Other | 0.627 | 0.647 | 0.032 | 0.593 | 0.641 | 0.028 |
| Apparel | 0.489 | 0.597 | 0.023 | 0.507 | 0.608 | 0.022 |
| Utilities | 0.475 | 0.302 | 0.064 | 0.453 | 0.301 | 0.063 |
| Health | 0.545 | 0.584 | 0.077 | 0.549 | 0.584 | 0.074 |
| Other | 0.689 | 0.610 | 0.083 | 0.695 | 0.605 | 0.079 |
| Not in Consumption | 0.816 | 0.641 | 0.161 | 0.819 | 0.635 | 0.166 |

Note: All results are weighted as the person level (FINLWT21*CU Size).

| | | | | | | | | |
|---|--------|--------|--------|--------|--------|--------|--------|--------|
| No children | 0.1125 | 0.1011 | 0.1091 | 0.1143 | 0.2344 | 0.2274 | 0.2349 | 0.2568 |
| Children | 0.0853 | 0.0862 | 0.0932 | 0.0878 | 0.2012 | 0.1892 | 0.2210 | 0.2040 |
| Age of children | | | | | | | | |
| Children under 6 | 0.0800 | 0.0784 | 0.0757 | 0.0779 | 0.1950 | 0.1755 | 0.2017 | 0.1909 |
| No children under 6, but at least one 6-13 | 0.0868 | 0.0835 | 0.0843 | 0.0906 | 0.2013 | 0.1864 | 0.1865 | 0.2038 |
| No children under 14, but at least one under 18 | 0.0914 | 0.1029 | 0.1381 | 0.0978 | 0.2045 | 0.2079 | 0.2931 | 0.2149 |
| Income quintile | | | | | | | | |
| Bottom quintile | 0.0944 | 0.0912 | 0.0915 | 0.0825 | 0.2123 | 0.1863 | 0.1845 | 0.1679 |
| 2 nd quintile | 0.0835 | 0.0833 | 0.0814 | 0.0846 | 0.1236 | 0.1294 | 0.1270 | 0.2148 |
| 3 rd quintile | 0.0699 | 0.0714 | 0.0773 | 0.0777 | 0.0949 | 0.1087 | 0.1177 | 0.1171 |
| 4 th quintile | 0.0553 | 0.0585 | 0.0602 | 0.0593 | 0.0854 | 0.1062 | 0.0859 | 0.0898 |
| Top quintile | 0.0915 | 0.0875 | 0.0898 | 0.0914 | 0.1428 | 0.1329 | 0.1632 | 0.1530 |

Note: All results are weighted as the person level (FINLWT21*CU Size). Age of children is restricted to CUs with children.

Table 14: Within-Group and Between-Group Inequality for Geography: 2019 through 2022

| | Consumption | | | | Outlays | | | |
|---|-------------|--------|--------|--------|---------|--------|--------|--------|
| | 2019 | 2020 | 2021 | 2022 | 2019 | 2020 | 2021 | 2022 |
| Overall Thiel Index | 0.1095 | 0.1023 | 0.1074 | 0.1083 | 0.2260 | 0.2146 | 0.2315 | 0.2365 |
| Census Region | | | | | | | | |
| Northeast | 0.0911 | 0.0927 | 0.1067 | 0.0997 | 0.2146 | 0.2589 | 0.2511 | 0.2365 |
| Midwest | 0.0958 | 0.0912 | 0.1055 | 0.0975 | 0.1926 | 0.1862 | 0.2233 | 0.1999 |
| South | 0.1121 | 0.1008 | 0.1004 | 0.1080 | 0.2285 | 0.2022 | 0.2287 | 0.2447 |
| West | 0.1215 | 0.1119 | 0.1048 | 0.1133 | 0.2475 | 0.2116 | 0.2171 | 0.2399 |
| Census Division | | | | | | | | |
| New England | 0.0853 | 0.0771 | 0.0760 | 0.0838 | 0.2324 | 0.2767 | 0.1799 | 0.1896 |
| Middle Atlantic | 0.0922 | 0.0981 | 0.1181 | 0.1050 | 0.2004 | 0.2478 | 0.2782 | 0.2530 |
| East North Central | 0.0868 | 0.0901 | 0.1108 | 0.0971 | 0.1740 | 0.1741 | 0.2483 | 0.2053 |
| West North Central | 0.1136 | 0.0924 | 0.0937 | 0.0983 | 0.2219 | 0.1994 | 0.1710 | 0.1884 |
| South Atlantic | 0.1047 | 0.1031 | 0.0991 | 0.1124 | 0.2155 | 0.2063 | 0.2245 | 0.2169 |
| East South Central | 0.1096 | 0.0981 | 0.0896 | 0.0955 | 0.2242 | 0.2393 | 0.2280 | 0.2383 |
| West South Central | 0.1241 | 0.0948 | 0.1020 | 0.0998 | 0.2493 | 0.1702 | 0.2246 | 0.2908 |
| Mountain | 0.0982 | 0.1011 | 0.1087 | 0.1081 | 0.1974 | 0.2022 | 0.2134 | 0.2508 |
| Pacific | 0.1266 | 0.1127 | 0.1070 | 0.1135 | 0.2677 | 0.2144 | 0.2182 | 0.2345 |
| States, ranked and grouped by quintile of COVID-19 Response | | | | | | | | |
| Rank 1-10 | 0.0988 | 0.1004 | 0.1013 | 0.1212 | 0.1926 | 0.2293 | 0.2335 | 0.2570 |

| | | | | | | | | |
|----------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Rank 11-20 | 0.1012 | 0.0877 | 0.0954 | 0.0939 | 0.2123 | 0.1916 | 0.1957 | 0.1962 |
| Rank 21-30 | 0.1267 | 0.1025 | 0.1049 | 0.1080 | 0.2495 | 0.2033 | 0.2224 | 0.2696 |
| Rank 31-40 | 0.0973 | 0.1031 | 0.1072 | 0.0978 | 0.1998 | 0.2071 | 0.2442 | 0.2004 |
| Rank 41-51 | 0.1067 | 0.1025 | 0.1081 | 0.1069 | 0.2386 | 0.2238 | 0.2364 | 0.2361 |
| Urban vs Rural | | | | | | | | |
| Urban | 0.1105 | 0.1023 | 0.1066 | 0.1079 | 0.2288 | 0.2147 | 0.2297 | 0.2345 |
| Rural | 0.1036 | 0.1022 | 0.1107 | 0.1098 | 0.2108 | 0.2139 | 0.2387 | 0.2437 |

Note: All results are weighted as the person level (FINLWT21*CU Size). The state ranking of COVID-19 responses is from Kerpen, et al. (2023).
