

Accounting for Household Production in the National Accounts

An Update 1965–2020

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The value of household production has been an issue of longstanding interest. The Bureau of Economic Analysis (BEA) publishes a satellite account that estimates the value of production by households (Landefeld and McCulla 2000; Landefeld, Fraumeni, and Vojtech 2009; Bridgman and others 2012; Bridgman 2016; Kanal and Kornegay 2019). This article updates these estimates for the years 2018 to 2020.

This period is particularly interesting because it includes the onset of the COVID-19 pandemic. The pandemic led to unprecedented changes to economic activity. One of its major features was that people spent more time at home. This raises the question of whether people increased household production, which is unpaid work done at home, such as cooking, cleaning, and child care.

We find that household production did increase significantly during 2020. This increase provided a partial buffer to the COVID-19 recession, reducing but not eliminating the decline in economic activity. This marks a major change, since household production had become less important relative to the market production measured by gross domestic product (GDP). We find that both the hours devoted to household production and the value of those hours increased.

Most of the change in hours is due to people moving from employment to nonemployment. People who do not work in the market do more household production, a force that is particularly strong for women. The COVID-19 recession had a notably strong negative impact on women's employment, in contrast to the previous recession that had a bigger impact on men's employment.

The pandemic did influence the relative importance of different activities within a demographic group (employment status by gender), even though total hours were flat. Activities that occur outside the home declined, but this was offset by some activities that occur within the home.

Surprisingly, child care did not increase much within demographic groups despite widespread closure of in-person schooling and daycare. The increase in home child care needs were met by women shifting from employment to nonemployment and an increase in secondary child care—looking after children while primarily performing a different activity. Secondary child care is omitted from the estimates, largely for practical reasons. However, the increase in secondary child care was relatively small. Omitting it does not change our main finding, that household production provided a partial buffer to the COVID-19 recession.

In the long-run trends, household production's size relative to market production has declined. Compared to 1965, household production is smaller relative to GDP despite the 2020 increase in its relative importance.

Methodology

We begin by presenting the methodology we use for estimating the satellite account, which is unchanged from previous BEA estimates. We provide a summary of this methodology and direct interested readers to Bridgman and others (2012) for a full treatment.

This method uses the income approach to measuring value added, which imputes the value of the payments to the factors of production. We calculate the volume of the factors of production used in household production. These are stocks of consumer durables (capital input) and household production hours (labor input). We then impute a value of these factors using market equivalents. For example, the value added of a home-cooked meal is the value of cooking time plus the capital cost of the appliances. We use the wages of paid household workers, such as nannies, to value hours and the returns to household financial assets to value the services of consumer durables. These are the correct prices under the assumption that the household equalizes the marginal return to market and nonmarket activity (Diewert and Schreyer 2014; Bridgman 2015). It is consistent with international standards (U.N. Economic Commission for Europe 2017) and can be implemented with available data.

There are seven categories of household production: cooking, housework, odd jobs, gardening, shopping, child care, and domestic travel. The domestic travel category captures the amount of time spent traveling in support of the other household production activities, not time spent going on vacations or commuting to (market) work. For example, time spent driving to a day-care center (child care), time spent riding on a bus to a grocery store (shopping), and so forth.

One of the most significant pieces of underlying data used in this account is household production hours. Beginning in 2003, the source for hours is the American Time Use Survey (ATUS). The annual ATUS is a large-scale survey, currently having response sizes of about 9,000 diary days. It is sponsored by the U.S. Bureau of Labor Statistics (BLS) and conducted by the U.S. Census Bureau.

We make an adjustment for the 2020 time use data because the COVID-19 pandemic disrupted ATUS collection. Data were not collected between March 19, 2020, and May 11, 2020, when the quarantine at the onset of pandemic in the United States closed the ATUS call center in Jeffersonville, IN. Therefore, there is a period in which we do not observe time use.

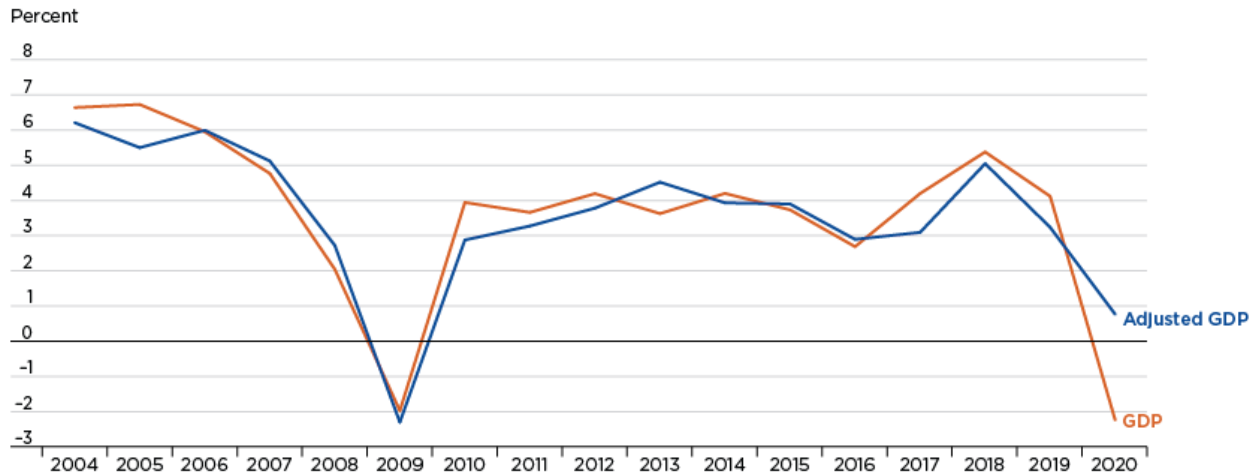
We fill in this missing data by assuming that average hours per week by demographic combination (gender by employment status) during the blackout period were the same as those during the weeks we observe.

We think this will provide a reasonably good estimate of time use given the constraints. Since these data were not collected, we will never know with certainty how people were spending their time during the unprecedented quarantine period. However, short-run time use movements in the past have been driven by changes in employment status rather than from changes within a demographic combination. While there have been long-run trends in time use, these move slowly. Recently, these trends in production hours have been quite small, especially compared to the big changes in the 1980s. Even during the Great Recession, time use within categories did not change much. The changes were driven by people moving from nonemployment to employment. As we will see below, this relative stability in total hours within demographic categories largely holds during the pandemic for the time we do observe. We have full-year estimates of our demographic combinations, so what is usually the main driver of short-run time use changes is well measured.

Household Production during the COVID-19 Recession

The onset of the pandemic led to a sharp decline in market activity with a related fall in employment. Household production could provide a buffer to the decline in market work because some of the hours that were used in market production could shift to household production. In this section, we investigate how much of a buffer household production provided during the COVID-19 recession.

Chart 1. GDP and Adjusted GDP Growth Rates, 2004–2020



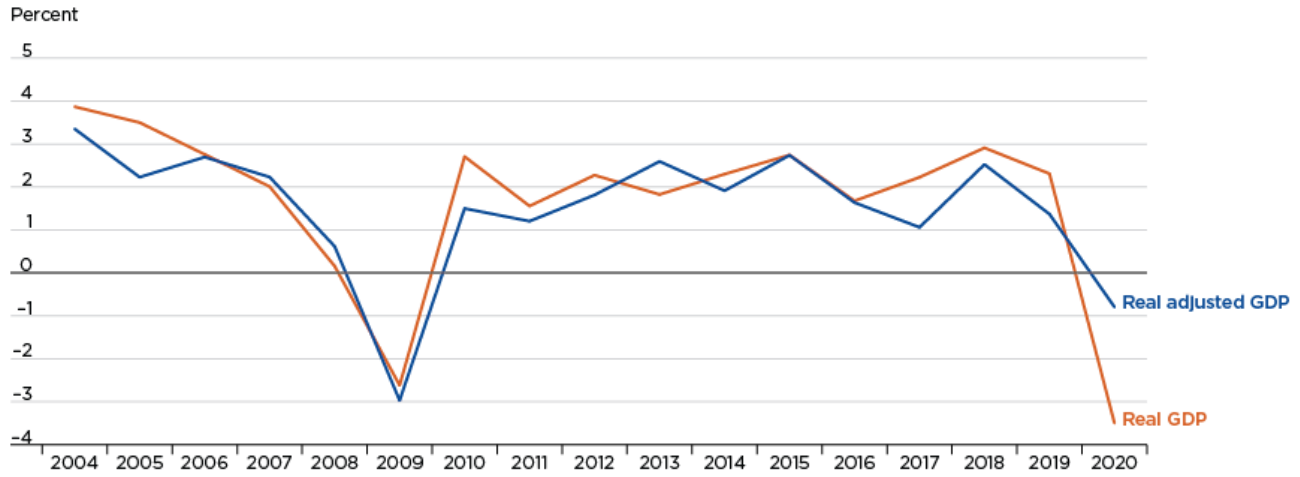
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Chart 1 shows growth rate of nominal GDP and adjusted GDP (GDP plus household production) from 2004 to 2020. This period is when we have high-quality annual source data from the ATUS. It includes two recessions, the Great Recession in 2008–2009 and the COVID-19 recession in 2020. Both are significant events, with large declines in real GDP and employment.

Both recessions show up as noticeable declines in GDP. Adjusted GDP generally has the same growth rate as GDP. This is true during the Great Recession but not during the COVID-19 recession. While adjusted GDP growth slows, it does not show a large decline like GDP.

A concern with this comparison is that analysts use real, not nominal, GDP to measure the business cycle. This raises the possibility that the buffering effect is just due to price increases, not real economic activity. Unfortunately, we do not have a direct market equivalent to the household production price deflator. However, we can use the same principles we used to calculate nominal household production to get an estimate of real activity. Those principles imply that price change of household production is proportional to that of market substitutes (Bridgman 2015). We use the services GDP deflator to deflate household production. This series matches the available price indices for market substitutes to household activities, such as child care, closely. Since not all our activities have a published price index, we use the overall services price index.

Chart 2. Real GDP and Adjusted GDP Growth Rates, 2004-2020



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Chart 2 shows that deflation mitigates but does not eliminate buffering effect. Services inflation was a bit higher than that of total GDP. Real adjusted GDP shows a slight decline in 2020, but this is much less than real GDP. The contrast with the Great Recession remains, as there is no buffering effect there in the deflated series.

The household sector buffered the recession but did not eliminate it. The adjusted GDP is still below the previous years' growth rate in 2020. This finding is consistent with the findings in Leukhina and Yu (2020), who also find limited buffering effects from household production.

The COVID-19 recession was different because both the total household hours and the valuation of those hours increased sharply. Total hours increased from 300 billion to 308 billion from 2019 to 2020. In contrast, total hours were flat during the Great Recession. The value of those hours increased during the COVID-19 recession, as the wage of household workers increased from \$10.93 to \$12.71 an hour. In contrast, household worker wages fell slightly during the Great Recession. We will discuss both these changes in more detail below.

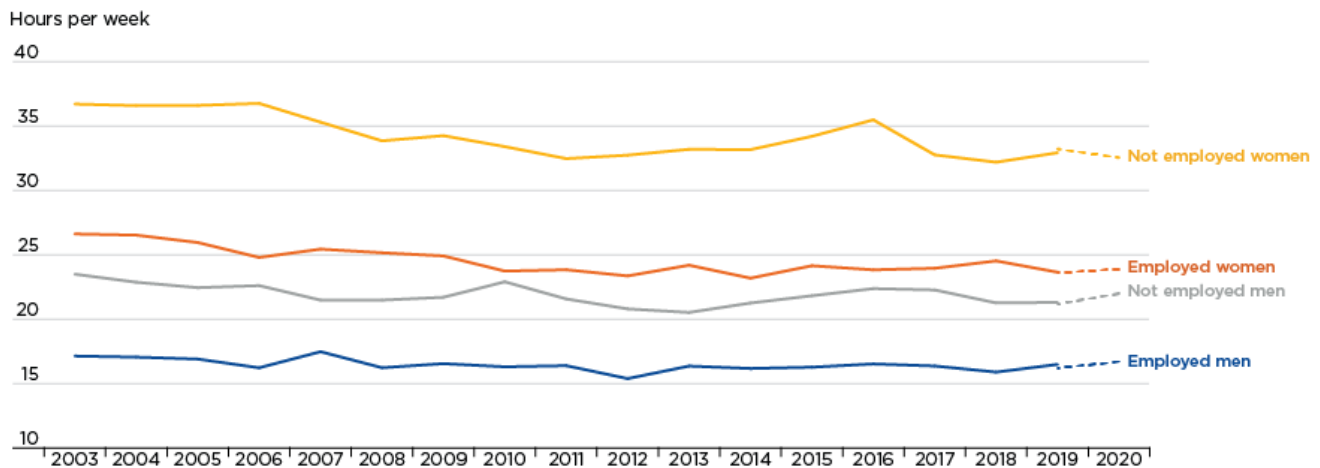
Household Production Hours

In this section, we examine disaggregated time use to see why household hours increased during the COVID-19 recession but not the Great Recession. We find that most of the change is due to changes in employment status, while total household hours within a demographic group (employment status by gender) were nearly constant. The movement of women out of employment was the main driver. While total hours were nearly constant, activities shifted from those outside the home (like shopping and travel) to those inside the home (cooking and household chores).

Total hours

We begin by looking at total hours by demographic group. The time series plots show two series for each hours estimate. The solid line is the full-year estimate. We do not have such an estimate for 2020. However, BLS provides weights that allow us to compare household hours during the part of the year that was collected in 2020 with the same dates in 2019. The dashed series shows the average weekly hours using the partial-year weights.

Chart 3. Total Weekly Hours by Demographic Group, 2003–2020



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Chart 3 shows total weekly household production hours by demographic group (employment status by gender). These data show several facts.

First, 2019 hours using the truncated year (omitting the dates that are missing from the 2020 data) gives very similar answers to the full year's data. This is evidence that our procedure to fill in the missing data is not significantly affected by changes in hours over the year (seasonality).

Second, there are not big changes in hours within the demographic groups. Men show a slight increase in time, but it is well within the historical range. These hours have been relatively stable in the past decade. Prior to 2010, there had been a decline in women's hours.

Total hours of household production increased even though hours within demographic groups were flat. This increase is the result of the differences in hours across groups and a significant shift to nonemployment during the COVID-19 recession.

Chart 3 shows there are significant differences across groups. Women, particularly not employed women, spend more time on household activities than men. Within each gender, not employed people perform more household production than employed people. This difference is larger for women than men. The gap

between not employed and employed women is about 9 hours a week, much larger than the 5 hours for men. (See Kanal and Kornegay 2019 for a fuller treatment of the differences across demographic groups.)

Increases in nonemployment are common during recessions, and we did not see an increase in hours in the past. The Great Recession had a similar decrease in employment as that in the COVID-19 recession, but household hours did not show an increase. The big difference is who left employment. The employment rate of women fell 3 percentage points during 2020, compared to only 1 percentage point in the Great Recession. In contrast, men employment left employment at a greater rate during the Great Recession. Alon and others (2022) contrast the Great Recession, which they refer to as a “Mancession,” to the COVID-19 recession, which they call a “Shecession.”

Hours by activity

Total hours by demographic group show surprisingly little change during the COVID-19 recession. However, there are significant changes across activities. People have shifted their time from activities that occur outside the home to those that occur within the home. These two shifts offset each other, leaving total hours unchanged.

In this section, we examine total hours within a demographic group by the major activities. These activities are cooking, housework, odd jobs, gardening, shopping, child care, and domestic travel. The panels in Chart 4 report these data.

Chart 4a. Time Use by Activity: Child Care

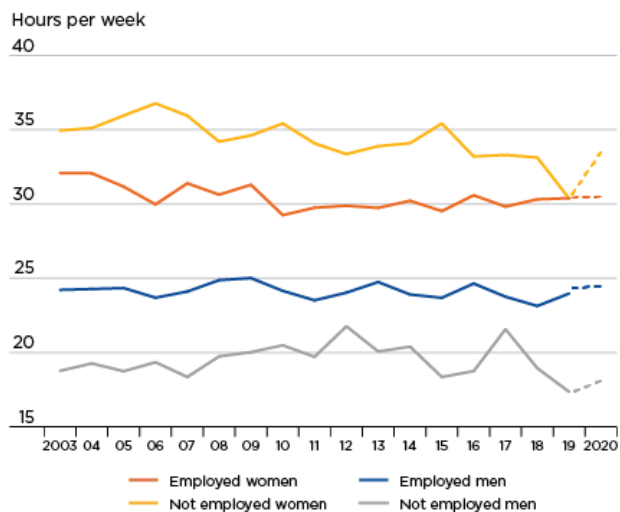


Chart 4b. Time Use by Activity: Cooking

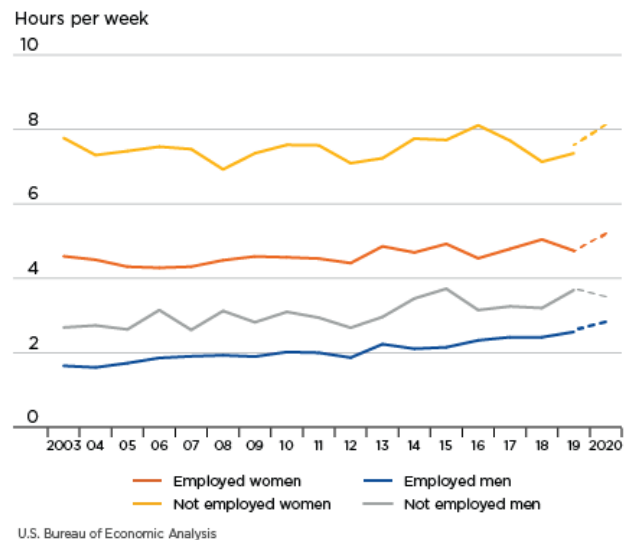
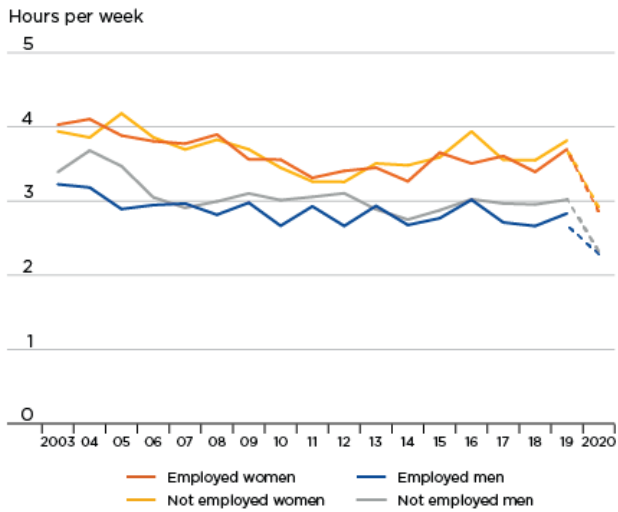
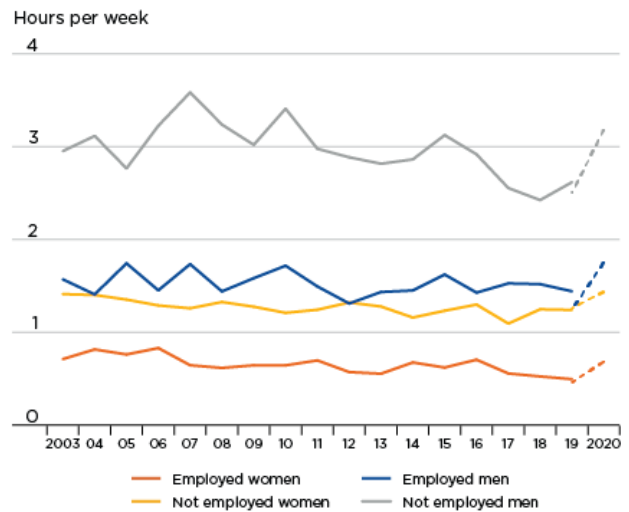


Chart 4c. Time Use by Activity: Domestic Travel



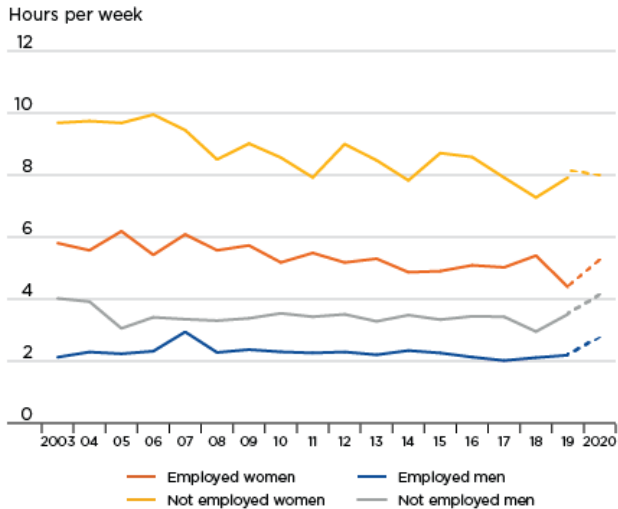
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Chart 4d. Time Use by Activity: Gardening



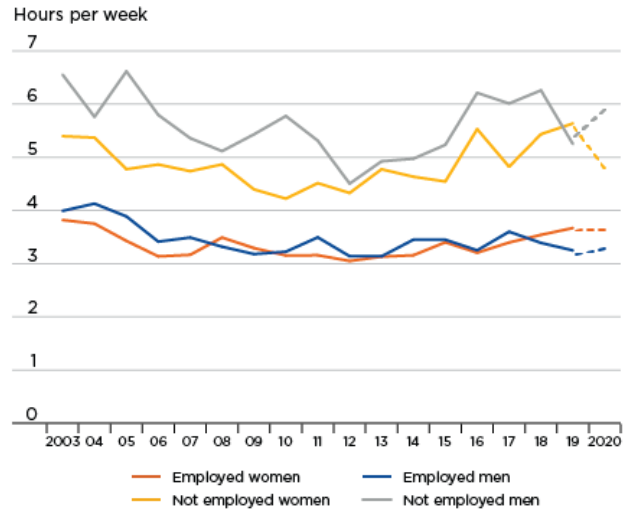
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Chart 4e. Time Use by Activity: Housework



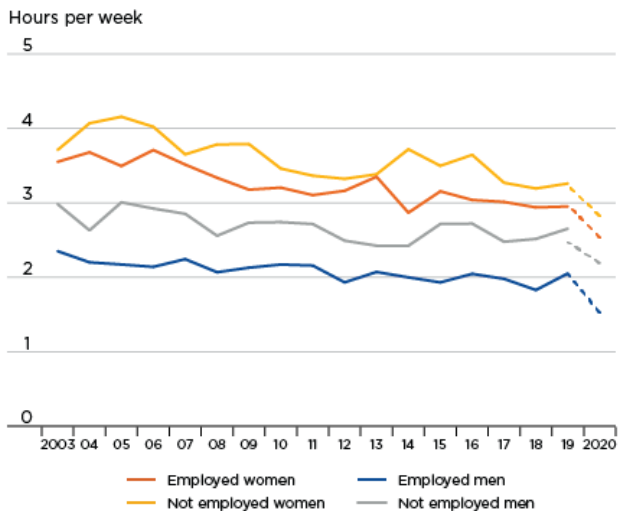
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Chart 4f. Time Use by Activity: Odd Jobs



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Chart 4g. Time Use by Activity: Shopping



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Two activities that are generally performed outside the home, domestic travel and shopping, show major declines. There is a sharp decline in weekly hours of shopping and domestic travel across all genders and employment statuses during the pandemic. It shouldn't come as a surprise that there is a sharp decline in this category across the board during the pandemic, as travel for any purpose was halted.

Three activities that occur at home—cooking, housework, and gardening—have increased. Being physically present in the home increased the opportunity to do these tasks. Also, COVID-19 led to restrictions on restaurants, so it is logical that people shifted away from meals eaten outside the home. While none of the increases in hours are very large relative to the pre-COVID-19 levels, they do add up. Cooking and housework were an important part of people's household production, so even modest increases in these categories matter.

The two remaining activities do not show a significant change: odd jobs and child care. While not employed women show an increase in child care hours, it only returns their time to what it was in 2018. Given the significant changes in child care during COVID-19, with the widespread closure of in-person teaching and daycare, we find this result surprising enough that we examine it in detail.

Child care during COVID-19

Before examining why child care within the demographic groups changed so little, we note that child care hours did increase due to reduced employment of women. Not employed women perform more than 2 additional hours of child care per week than employed women. Some have suggested that the two are linked, with the loss of market child care reducing women's employment (Alon and others 2020).

Turning to why child care did not increase within demographic categories substantially, we begin by noting that our estimates cover the entire economy, and most households do not have minor children present. According to the 2020 Annual Social and Economic Supplement of the Current Population Survey, 40 percent of households had children under 18. Only half of those (21 percent of total households) had children under 13, the ages that require the most direct child care. Many of those children were too young to attend school, so school closures may not have changed their parents' time use much.

Our estimates only include “primary” child care, times when child care is the main activity. There was an increase in “secondary” child care, looking after children while primarily performing another task. For example, a parent working from home while an infant naps would be counted as a market work, not household production. It is excluded for practical reasons, as our source data do not collect secondary child care in a consistent manner (Allard and others 2007). Further, it is unclear how to value this care. Secondary child care is being “on call” to perform child care as needed. Being on call to do an activity is usually paid less than doing that activity. It is not clear what discount we should use on secondary hours. See Folbre and Yoon (2007) for a fuller discussion of this issue.

While secondary child care hours increased, the increase is modest, even within the minority of households with young children. The ATUS asks whether a child under the age of 13 was under care while doing a non-child care activity. (Teenagers are presumed to not require active care when a parent is present.) Among households with such children, parents report that they increased secondary child care by an hour per day in May to December 2020 compared to the same period in 2019 (Bureau of Labor Statistics 2021).

While this is a notable increase, it is a relatively small increase compared to the 5 hours a day that these parents performed in 2019, especially considering the major changes in schooling. Further, other household production tasks were the primary activity for one-fifth of that increase so are already included in the estimates. If we were to include secondary child care, the level of household production would increase but the change to growth from 2019 to 2020 would be relatively small.

Summary

Looking at hours by activity within demographic groups, we see significant changes within household production that largely cancel out. Activities done in the home increased, but this was offset by falling hours in activities outside the home. Including secondary child care would increase the buffering impact of household production, but the effect is surprisingly modest. Shifts across demographic groups, particularly the shift of women out of employment, are the driving force behind the change in hours.

Household Worker Wages

Another source of the increase in household production was an increase in the value of household hours, which are the most important factor of production. Household workers' wages, the market price we use to value household production hours, increased from \$10.93 in 2019 to \$12.71 in 2020. This wage increase shows up in other parts of the economy closely related to household services. For example, there is a similar increase in (non-household) child care worker wages. It also contrasts with the Great Recession, where household worker wages fell slightly. It is out of the scope of this article to explain why these wages increased so much, but they appear to be real increases rather than error due to disrupted data collection.

Under our methodology, this implies a big increase in the marginal value that people put on household production. There are some reasons to believe this is the case. More time in the home may make household services more valuable. The value of a clean house or someone to look after children may be higher if you spend more time there, so people may be more willing to pay more for household workers.

The methodology relies on the assumption that households can adjust their activity between the home and the market to equalize the marginal value of these activities. However, we know that markets were disrupted, so the marginal equalization of value may also be disrupted. This disruption could take two forms. It could be the case that people were willing to work for lower wages but were legally prevented by quarantine restrictions. In this case, the wage increase could be overstated. It could also be the case that people may want a different mix of market and nonmarket activity with COVID-19, and it takes time to shift to the new mix.

We acknowledge that the pandemic increases the uncertainty of the estimates, but we believe the buffering effect is not exclusively due to measurement issues related to disrupted markets. The most restrictive quarantine measures, such as stay-at-home orders, ended in most of the country by the summer of 2020. Therefore, household workers could be hired in most of the country for most of 2020. The pandemic started early in 2020, giving people time to change their mix of activities.

Long-Term Trends

Up to this point, we have examined short-run, business cycle frequency trends. This section examines the long-run trends in household production. It extends the previous analysis of Kanal and Kornegay (2019), with new data to take us from 2017 to 2020.

Tables 1 and 2 break out the adjustments into categories for the years 1965 and 2020. Table 1 is separated into two sections, both containing new data for 2020 and rates of growth based on this new data. One uses National Income and Product Accounts (NIPA) measures, while the other uses measures from the Household Production Satellite Account. Under NIPA measures, the categories under services of consumer durables and nonmarket services are zero because they are not included in NIPA GDP. The estimates of these categories, which are part of our satellite account, are shown under the heading “Household Production Satellite Account measures.” These estimates lead to an increase in personal consumption expenditures. Note that these tables are nominal since we do not have price indices for the household production components. We do not want to add imprecision to the categorical breakout by using the stand-in price index we used above.

Table 2 contains data on the percentage share of GDP as defined by NIPA or household satellite account measures for various aggregate categories in both years. The first column contains the percentage growth of aggregate measures in the same year household production is included in GDP. The second column shows the relative impact on NIPA GDP when household production is included in the same year, where “impact” is defined as the increase in the aggregate measure upon the inclusion of household production divided by NIPA GDP. The third and fourth columns simply measure the aggregate share of GDP as defined by NIPA measures and household satellite account measures, respectively.

Personal investment is a new category that is created from adding investment in consumer durables from personal consumption expenditures and residential investment. Residential investment is categorized under gross business investment in the NIPAs. Reclassifying consumer durables as personal investment raises GDP because of the inclusion of a return on consumer investment. Moving residential investment under personal investment simply shifts it into a new category, but it doesn't change the measure. (See Bridgman and others 2012, for a fuller treatment of the differences between the NIPAs and satellite accounts.)

Including the household sector in GDP slows the growth rate of output. From 1965 to 2020, the average annual growth rate of nominal GDP was 6.3 percent. When household production is included, this growth rate drops to 6.1 percent. Household production has declined in significance over time as more women engage in market work. This sector accounted for 37 percent of the satellite account's output in 1965, but that declined to 25 percent in 2020 (table 2). The recent uptick in household production increased the relative size of the household sector. It was only 22 percent of the satellite accounts output in 2019. But it did not undo the longer-run decline in the relative importance of the sector. Note that the buffering effect documented above occurred despite the falling relative size of this sector.

Summary Table 1. Existing and Adjusted Measures of Gross Domestic Product (GDP), Rates of Change, and Contributions to Growth, 1965 and 2020

	NIPA measures				Household production satellite account measures			
	1965	2020	Average annual rate of change	Contribution to GDP growth	1965	2020	Average annual rate of change	Contribution to GDP
	Billions of dollars		Percent		Billions of dollars		Percent	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gross domestic product	742.3	20,893.7	6.3	100.0	1,019.7	26,210.6	6.1	100.0
Personal consumption expenditures (PCE) and investment	443.0	14,047.6	6.5	67.5	755.5	20,262.2	6.2	77.4
PCE	443.0	14,047.6	6.5	67.5	658.7	17,852.0	6.2	68.3
Nondurables	163.3	3,037.4	5.5	14.3	163.3	3,037.4	5.5	11.4
Services	213.3	9,393.7	7.1	45.6	490.7	14,710.5	6.4	56.4
Housing	76.6	2,668.1	6.7	12.9	76.6	2,668.1	6.7	10.3
Services of consumer durables	0.0	0.0	n.a.	n.a.	55.0	1,401.9	6.1	5.3
Depreciation of consumer durables	0.0	0.0	n.a.	n.a.	45.8	1,208.5	6.1	4.6
Return to consumer durables	0.0	0.0	n.a.	n.a.	9.2	193.4	5.7	0.7
Nonmarket services	0.0	0.0	n.a.	n.a.	222.4	3,914.9	5.4	14.7
Other	136.7	6,725.6	7.3	32.7	136.7	6,725.6	7.3	26.2
Consumer durables ¹	66.4	1,616.4	6.0	7.7	4.7	104.0	5.8	0.4
Investment	0.0	0.0	n.a.	n.a.	96.9	2,410.2	6.0	9.2
Residential	0.0	0.0	n.a.	n.a.	35.2	897.8	6.1	3.4
Consumer durables ¹	0.0	0.0	n.a.	n.a.	61.7	1,512.4	6.0	5.8
Gross business investment	129.6	3,637.8	6.2	17.4	94.5	2,740.0	6.3	10.5
Nonresidential fixed investment	85.2	2,799.6	6.6	13.5	85.2	2,799.6	6.6	10.8
Change in business inventories	9.2	-59.6	-203.4	-0.3	9.2	-59.6	-203.4	-0.3
Residential	35.2	897.8	6.1	4.3	n.a.	n.a.	n.a.	n.a.
Net exports	5.6	-651.2	-209.0	-3.3	5.6	-651.2	-209.0	-2.6
Government consumption and investment	164.1	3,859.5	5.9	18.3	164.1	3,859.5	5.9	14.7
Other aggregates								
Labor income	405.4	11,572.2	6.3	55.4	627.8	15,487.0	6.0	59.0
Personal income	570.7	19,627.6	6.6	94.6	848.0	24,944.4	6.3	95.7
Personal savings	58.8	2,887.5	7.3	14.0	74.7	3,191.4	7.1	12.4
Private investment	129.6	3,637.8	6.2	17.4	191.3	5,150.2	6.2	19.7
Gross savings	182.9	4,002.9	5.8	19.0	244.6	5,515.3	5.8	20.9

n.a. Not applicable

1. Under current NIPA methodology, a portion of expenditures on “other motor vehicles and parts” are allocated as maintenance expenditures and are not capitalized in the fixed assets accounts.

Summary Table 2. Impacts on Components, on Existing Gross Domestic Product (GDP), and on Component Shares, 1965 and 2020

(Percent)

	Component increase from adjustment		Impact of adjustment on National Income and Product Accounts (NIPA) GDP		Component shares of NIPA GDP		Satellite components share of satellite GDP	
	1965	2020	1965	2020	1965	2020	1965	2020
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gross domestic product	37	25	37	25	100	100	100	100
Personal consumption expenditures (PCE) and investment	71	44	42	30	n.a.	n.a.	74	77
PCE	49	27	29	18	60	67	65	68
Nondurables	0	0	0	0	22	15	16	12
Services	130	57	37	25	29	45	48	56
Housing	0	0	0	0	10	13	8	10
Services of consumer durables	n.a.	n.a.	7	7	n.a.	n.a.	5	5
Depreciation of consumer durables	n.a.	n.a.	6	6	n.a.	n.a.	4	5
Return to consumer durables	n.a.	n.a.	1	1	n.a.	n.a.	1	1
Nonmarket services	n.a.	n.a.	30	19	n.a.	n.a.	22	15
Other	0	0	0	0	18	32	13	26
Consumer durables ¹	-7	-6	-8	-8	9	8	0	0
Investment	n.a.	n.a.	13	12	n.a.	n.a.	9	9
Residential	0	0	5	4	n.a.	n.a.	3	3
Consumer durables	0	0	8	7	n.a.	n.a.	6	6
Gross business investment ¹	-27	-25	-5	-4	17	17	9	10
Nonresidential fixed investment	0	0	0	0	11	13	8	11
Change in business inventories	0	0	0	0	1	0	1	0
Residential ¹	0	0	-5	-4	5	4	n.a.	n.a.
Net exports	0	0	0	0	1	-3	1	-2
Government consumption and investment	0	0	0	0	22	18	16	15
Other aggregates								
Household PCE and investment share of GDP	n.a.	n.a.	n.a.	n.a.	60	67	74	77
Private investment share of GDP	n.a.	n.a.	n.a.	n.a.	17	17	19	20
Household investment share of private investment	n.a.	n.a.	n.a.	n.a.	0	0	51	47
Nonmarket services and services of consumer durables share of PCE	n.a.	n.a.	n.a.	n.a.	0	0	42	30
Labor income share of national income (GDP)	n.a.	n.a.	n.a.	n.a.	55	55	62	59
Personal saving rate (percent of personal income)	n.a.	n.a.	n.a.	n.a.	10	15	9	13
Personal saving rate (percent of personal disposable income)	n.a.	n.a.	n.a.	n.a.	11	8	14	9
Personal saving as percent of GDP	n.a.	n.a.	n.a.	n.a.	8	14	7	12
National saving rate (gross savings percent of GDP)	n.a.	n.a.	n.a.	n.a.	25	19	24	21

n.a. Not applicable

1. The apparent negative impacts of the adjustments are solely a result of the reclassification of residential and consumer durables.

Conclusion

The COVID-19 pandemic led to significant changes in many aspects of economic activity, including household production. Household production provided a buffer to the associated recession, a feature not seen in the previous recession. This buffer was due to an increase in household production hours and the value of those hours. Hours increased mostly due to women shifting out of employment, with little room for changes within demographic groups.

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