

## Mismeasurement of Housing Services in the Pandemic

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### Abstract

The 2020 COVID-19 pandemic has brought to light a flaw in the accounting and pricing of housing services in consumer spending (PCE) and the consumer price index (CPI). The dramatic shifts in housing usage caused by the pandemic have not registered at all in PCE. This paper takes a fresh look at the use of opportunity costs to measure housing services. It shows how the current gauge can miss real changes in services flows. The paper proposes that housing services be measured instead by hedonic methods, using new survey questions added to the Consumer Expenditure Survey (CES) and the CPI.

**Keywords:** housing services, owners-equivalent rent, CPI, PCE, consumer spending, COVID

### 1. Introduction – Pandemic Reveals Measurement Flaw

The COVID-19 pandemic severely impacted business activity in the economy, either causing a direct cut in output or requiring a complete change in the way businesses produce output. The drop in output was far worse than any other downturn in the past 75 years and the effects were felt across nearly every sector (BEA [1], 2020). However, the GDP data suggest that one major sector – consumption of housing services – was completely impervious to the pandemic. By comparison, consumer expenditures on non-housing services dropped by about 38 percent annualized during the most severe restrictions in second quarter 2020. At first glance, this dichotomy seems plausible given that people were forced to severely cut back on services where they needed to be in close proximity to others, such as restaurants, entertainment, and transportation, but they still needed to live in a house or apartment.

This paper contends that the relative stability of housing services in the PCE did not reflect true changes in the flow of housing services but was in fact the result of inadequate data collection methods. Actual housing services ballooned due to the many adjustments that were made to comply with social distancing requirements. For example, surveys show that the pandemic caused 8 percent of all adults either to move permanently or temporarily, or to have someone move into their home (Cohn, 2020). The shift in living arrangements suggest that the pandemic caused major changes in housing services. Yet the data suggest that the large shifts were not captured in the GDP statistics.

In measuring GDP, the goal is to capture the value of everything that is produced in the United States in a year. The GDP includes the production of cars, clothing, and food. It also includes services, such as education, transportation, healthcare, entertainment, and financial and professional services. According to Bureau of Economic Analysis data (BEA [3], 2020), the biggest portion of consumer services, comprising 23 percent before the pandemic, is the flow of housing services – the value that occupants derive from living in their homes (Mayerhauser and Reinsdorf, 2007).

It is vitally important that the real flow of housing services is measured properly. Mismeasurement of such a large sector runs the risk of making erroneous judgments about economic performance. Also, there has been much written about the shift to work at home and what that means for businesses, but little has been written about measurement of the offsetting shift in home usage. To properly understand the economic implications of the shift to work at home, the data must accurately value the changes in the way homes are used.

### 2. Using Rents to Measure Housing Services

There is no direct measure of the flow of housing services, especially for owner-occupied dwellings. The BEA currently ties its measure to an opportunity cost concept embedded in rents (Diewert and Nakamura, 2009). The flows can come from either owner-occupied units or rental units.

## 2.1 Rental Housing

The opportunity cost method of accounting for the flow of services from rental units is straightforward. The landlord owns capital in the form of the rental housing unit. The owner of the unit sells the use of the dwelling for an agreed upon period and price, stated in the lease. The price (the rent) is the opportunity cost of using the dwelling and is represented in the PCE as consumption of housing services.

## 2.2 Owner-Occupied Housing

Of course, there is no landlord and there is no rental cost to owning a home. That is where the opportunity cost concept comes into play – what could homeowners receive in rents if they opted to rent out their houses (Mayerhauser and Reinsdorf, 2007)? The idea is that the owner-occupied house is capital, just like when the dwelling is rented from a property manager – except that, in this case, the capital is owned by the person using the house. In other words, the BEA treats the household as a business that rents the house to itself. Implicitly, the consumer is foregoing that rental amount by living in the house and not renting it out. That is the opportunity cost and the implied or imputed value of the flow of services that the homeowner derives, which is known as owners-equivalent rent (OER).

## 3. Where Does OER Go Wrong?

The current method, using the opportunity cost of securing the right to use a dwelling as measured by the rental cost, has become ingrained in the thinking about housing services. The measurement of these “rents” is just accepted as fact.<sup>1</sup> However, the concept that the BEA is trying to capture is not actually rents, but the value of the flow of housing services. The idea here is to impute a value for these services both in nominal and real (inflation-adjusted) terms, as well as derive a deflator. Ultimately, the goal is to quantify real flows of services of living in a dwelling, rather than capture changes in price. The issue is that rents and equivalent rents are not measures of real flows – they give the nominal value, but not the real value of living in a dwelling. Consumers derive value from living in a home based on the usage of the home.

In normal times, the real flow of services for living in a house or apartment generally does not change much. People remain in their houses and live their lives the same as always. The measured value for real housing services generally grows at a relatively steady rate over time. In the years preceding the pandemic, the average real growth in housing services was about 1 percent. Importantly, the reported data make it appear as if that steady trend continued even through the pandemic (BEA [2]).

However, there have been dramatic changes in home usage during the COVID-19 pandemic, which should have translated into changes in the flow of housing services in PCE for both owner-occupied and renter-occupied housing. Neither actual rents nor implied rents can distinguish between changes in real flows of services and changes in the price of those flows. The inability of the data to detect large swings in real activity indicates a shortcoming in the opportunity-cost-based measurement.

## 4. Changes in Housing Usage during COVID

The shutdowns and restrictions associated with the pandemic caused four profound changes in the flow of housing services: (1) Millions of people began to work and go to school from home, creating workstations and performing most of their job and education functions remotely. (2) People prepared and ate more meals at home, rather than going out to restaurants or eating at school. (3) Adult children moved in with their parents during the pandemic, expanding the size and use of parents’ homes at the expense of apartments and school dorms. (4) Homes became the primary location for entertainment, with people watching movies and television series at home rather than going out. In addition, people have upgraded the functionality of their homes, adding pools and other amenities.

### 4.1 Working from Home

Surveys taken in May 2020 during the COVID-19 lockdown, detailing the state of the economy under significant social-distancing restrictions, suggest that about 42 percent of the workforce was working remotely, 33 percent were not working, and just 26 percent were working on site (Bloom, 2020). Gallup Panel data show that, by early April, 62 percent of workers were remote (Brenan, 2020).

This is in sharp contrast to the pre-pandemic workforce, which rarely worked from home. Only 8 percent of wage and salary workers worked from home at least one day per week, according to the American Time Use Survey (BLS, 2019). While flex time had been expanding, steady work from home was rare. Only 2 percent of people working from home were doing so full time, at five or more days per week.

Importantly, the Bloom (2020) study asked questions about the COVID-related shift in home usage due to the transition to work from home.

The survey showed that nearly half the respondents converted a room in their house (not their bedroom) to a private office. A quarter of respondents used their bedroom as a private office, and the final quarter shared a room in their house for work. Since few workers had ever worked from home before, this repurposing of rooms for work represents a meaningful increase in the flow of services from the home and requires a new way of valuation.

This shift in home use during the pandemic is not likely to be a one-time event, because both companies and workers are experiencing increased interest in work at home. Companies are looking to make the transition permanent for some workers as a way to cut real estate costs (Arons, 2020). Also, Gallup Panel surveys show that three in five workers would like to work from home once all the pandemic restriction are lifted (Brenan, 2020).

It will be important for BEA to capture the effects of this transition to work at home if it wants to accurately account for all the housing-related activity in the economy. Cost savings will accrue to businesses that effectively move to remote work. The offset to the business cost savings, however, must be a rise in the measured housing services for households.

#### **4.2 Eating at Home**

The restaurant industry was one of hardest hit during the pandemic. The lockdown effectively shut down all eat-in dining services across the nation. According to U.S. data from the OpenTable network (OpenTable, 2020), the number of seated diners at restaurants dropped to zero in mid-March and stayed there through April. Since then, restaurant meals rebounded, but even a year after the pandemic began, the number of diners remained depressed at about 40 percent below pre-pandemic levels.

Revenues at restaurants and bars dropped to \$30 billion in April from \$65 billion in February, and although revenues rebounded they remained depressed (Census, 2020). The revenues these establishments earned was from take-out orders, which was permissible under the COVID-19 restrictions. This halving of activity showed the forced change in the way people ate during the pandemic.

People did not eat in restaurants, but they still needed to eat. The locus of meals shifted to the home. The drop in meals at restaurants was offset by a massive rise in food preparation and dining at home. One indication of the change was the huge rise in spending at grocery stores. Food purchases for consumption at home jumped to \$82 billion in March from \$64 billion in February and have hovered near \$71 billion since then (Census, 2020). This is one of the few industries that expanded amid the pandemic-induced recession. The shift in meal preparation and consumption away from restaurants and bars to the home represents a significant increase in the usage of homes, which should be reflected in the flow of housing services in PCE.

#### **4.3 Adult Children Moving Home**

The pandemic caused huge dislocations of young adults, ages 18 to 29, who moved back to their parents' homes. According to the Pew Research Center, more than half of all young adults now live with their parents, for the first time since these data started being collected in 1940 (Frey, et al, 2020).<sup>2</sup> The data show that number of households headed by young adults dropped by 12 percent in the five months from the start of the pandemic.

The Pew research suggests that this shift occurred mainly for two reasons: college campuses closed, and many young adults lost their jobs or took pay cuts. Additionally, many young adults may have moved to flee hard-hit COVID areas or to save money on rent while working remotely.

Spending on college dormitories fell dramatically, but college students still went to school online from their parents' homes, which entailed an offsetting rise in housing services. The attendant rise in household size also suggests there is more actual usage of the homes.

Moreover, to the extent that young adults moved out to save money on rent because they no longer needed to live near their worksites, the moves represent a shift away from housing services in rental units (mainly in cities) to housing services at their parents' homes.

#### **4.4 In-Home Entertainment**

Since social distancing limited options for entertainment, people spent more time at home watching television and streaming on the Internet. In fact, these activities have become a mainstay of entertainment for many people. In just the first two weeks of the lockdown, Nielsen reported that streaming platforms such as Netflix, YouTube, Hulu, and

Amazon experienced a 34 percent rise in viewership, and TV usage increased by 25 percent (Porter, 2020). These trends continued, and by Fall 2020 studios decided to release some movies for online streaming rather than wait for theaters to open fully again (Bruney and Kirkland, 2020).

TV and streaming were not the only forms of home entertainment to increase in usage during the pandemic. People made enhancements and improvements to their homes, including installing pools (Faus and Aeppl, 2020). Revenues at home supply stores increased by 13 percent in May, once the severe lockdown was lifted, and maintained most of the gains since then (Census, 2020). According to the Wall Street Journal, “Americans, stuck at home without much to do, started painting, building, fixing and decorating” (Nassauer, 2020). The increase in time spent in the home for recreation and the enhanced amenities have increased the flow of housing services and need to be reflected in the data.

## 5. Direct Measures of Housing Services

This paper shows that there is a need for direct measures of housing services, rather than relying on the opportunity cost implied in rents, to differentiate between changes in real flows and changes in price. The rents and OER can be used as a measure of nominal consumption of housing, but this spending must be benchmarked to real values.

This paper recommends measuring real values of housing services using hedonic methods. This technique treats the value of a good or service as a collection of values of its characteristics. Regression techniques are used to estimate values of measurable characteristics of the good or service to get a total (OECD, 2005).

In order to develop a hedonic approach to valuing the flow of housing services, this paper suggests creating and incorporating survey questions about the characteristics of dwellings (bedrooms, baths, square-footage, and amenities) and the intensity of usage (time in the house, number of people, number working from home, number of meals per day) into the CES, the PCE, and the CPI. These survey questions could pinpoint major shifts in the flow of housing services in real terms.

As a first pass, values for various activities could be defined by applying opportunity costs. For example, the value of a home office could be the cost of renting office space in the area. The value of preparing a meal at home could equal the next best alternative, which would be a take-out meal. The value of a bed could be found in the nightly rentals of a bed in a room of an Airbnb. This process would still entail the use of opportunity cost, but the increased granularity of the data would allow for changes in the value of home usage to be more accurately measured based on the amount of activities for which the house is used.

Once real values are determined for housing services, the rental (nominal) values can be compared with the real values to arrive at a price change. Given the recent massive shifts in home usage in terms of work from home, food preparation, adult children moving back to parents’ homes, and recreation/home improvements, the real flow of housing services probably has increased significantly.

The combination of higher real housing usage and smaller gains in rents (nominal spending) suggests that the actual price of a unit of housing services fell sharply during the pandemic.

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- 1 Forty years ago, the Bureau of Labor Statistics (BLS) did a study comparing two methods of measuring the flow of housing services: (1) the user cost method, which includes costs of owning a home such as real estate taxes, insurance, and an estimate of interest expense based on the home value; and (2) the rental equivalence method, which measures the amount the homeowner would have to pay to rent the home. In 1981, the BLS opted for the current owner equivalent rent methodology (Ptacek and Rippy, 2013).
- 2 The share of young adults living at home jumped to 52 percent in July 2020 from 46 percent in January. These figures come from Pew Research Center analysis of the Census Bureau's Current Population Survey data.