A Disaggregated View of Household Production Trends

By Benjamin Bridgman*

The shift of working time from the household to the market was one of the most important changes in the U.S. economy in the second half of 20th Century, particularly for married women. To understand these shifts, economists have expanded their measurement of household production (HP). The Bureau of Economic Analysis (BEA) regularly publishes a HP Satellite Account (HPSA), the most recent of which was Bridgman, Craig and Kanal (2022). These data report the value of total HP so allow us to track the aggregate shift from household to market production ("marketization"). They do not tell us how marketized individual products are within HP.

Our understanding of the hours shift out of the household is enhanced by looking at individual products within HP. Hours by product show different trends. The decline in U.S. household hours is driven by two (of seven) main products: cooking and housework, a pattern that is common across the world (Bridgman, Duernecker and Herrendorf 2018). Hours alone do not give the full picture of marketization. If labor productivity differs, which Bridgman (2016) argues it does, the value of household hours will differ from market hours.

I modify the BEA's HPSA in two ways to allow for a output-based measure of HP marketization from 1965 to 2021. I split aggregate HP into seven products. This requires allocating labor and capital services to individual products. I also modify the HP estimates to shift them from a value added to an expenditure basis so they can be directly compared to Personal Consumption Expenditures (PCE). The consumption value of a restaurant meal includes the value of materials (e.g. food ingredients) used in the meal. I account for the materials used in HP to make the two sectors comparable. These data allow us to examine long-run trends and the impact of the Covid–19 pandemic.

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I. Measuring HP by Product

I begin by presenting how the HP accounts are estimated by product. I describe the theoretic basis for the estimates and then give a sketch of the data implementation.

BEA's HPSA form the a basis of the estimates. The HPSA impute payments to factors of production to get value added. This method treats HP as being produced by a perfectly competitive firm owned by the household (Diewert and Schreyer 2014). (A similar approach is used to impute the value of owner-occupied housing) Therefore, nominal value added equals payments to factors:

$$P_Y Y = RK + WL$$

where Y is real value added, K is the stock of durables, and L is HP hours. The variables P_Y, R, and W are their respective prices.

Since we are comparing consumption produced in the household with that produced in the market, it is natural to use the expenditure measure of consumption rather than value added. For example, the comparison we would like to make is the value of restaurant versus home-cooked meals. Due to input-output structure, gross output includes value added and materials input. In the cooking example, the value of a restaurant meal includes the cost of the ingredients. To put HP on the same basis, the value of a home-cooked meal should also include the value of the ingredients. Using the Diewert and Schreyer (2014) method for

expenditures implies:

$$P_G G = RK + WL + P_M M$$

where G is real gross output, M is materials, and P_G and P_M are their respective prices.

To obtain product level values, I divide the payments of each factor by product.

$$\sum_j P_{G,j} G_j = \sum_j \{RK_j + WL_j + P_{M,j} M_j\}$$

where j is the index of products.

Therefore, we need to obtain product-level estimates of the three factors of production. I sketch out how I implement these estimate, leaving full detail to the Data Appendix.

The first issue is the level of product detail to estimate. I report seven major product groups: Cooking, Housework, Odd jobs, Gardening, Shopping, Child care, and Travel in Support of Household Production. U.S. hours have been collected at this level for a long time, allowing for estimates back to 1965. These products also match the level of reporting for their market counterparts in PCE, allowing us to examine marketization.

Since the products were selected using the time use categories, labor payments can be directly split using the time use data that underlie the HPSA.

Consumer durables and materials are reported by major type, not by the activity it is used for. There is also no household capital flow or input-output tables to allocate them. I guess their usage by category descriptions. In some cases, the capital or material type has a clear product match (e.g. vehicles to travel or food to cooking). Since I do not have better information, I use even splits for items that cover multiple products. For example, appliances are split equally between cooking and housework since cooking uses stoves and housework uses washing machines. I assume that child care and shopping only use labor.

Allocation of capital and materials is imprecise but I believe resulting data are of sufficient quality for measuring marketization. The largest capital and materials categories (vehicles and food) are unambiguous. HP is not capital intensive so errors in allocation are not likely to be quantitatively important. Hours are the most important factor and these data are high quality.

II. Marketization Trends

To track marketization, we need to match HP products with a market equivalent. I use BEA's detailed PCE table. Only four of the seven HP products have a separately reported market equivalent. I match Cooking to "Meals and non-alcoholic beverages," Travel to "Ground Transportation," Child care to "Child Care," and Housework to the sum of "Domestic services" and "laundry." PCE does not report an equivalent for gardening, odd jobs, and shopping.

I believe that the included products are sufficient for examining marketization. The covered products are 79 percent of HP hours in 1965 and include the two products with major hours declines: cooking and housework. While all three excluded products have market equivalents, the lack of separate reporting indicates there is a small market sector for them.

Figure One reports the HP share of consumer expenditure for the four products with a reported market equivalent. I examine both long-run trends (1965–2019) and the Covid-19 era (2020-21).

The vast majority of consumption of these products is produced in the household. Cooking is the only covered product where more than 10 percent of consumption is provided by the market. Child care is the second most marketized, but market child care only accounts for 10 percent of output at its peak in 2019. Even this relatively small degree of marketization is likely an overestimate. Secondary child care–having a child under care while doing other activities–is omitted from the HPSA due to inconsistent reporting in the time use data. While there are questions about how to value this time, the hours are substantial and likely represent significant HP value (Suh and Folbre 2016).

What accounts for the decline in HP rel-

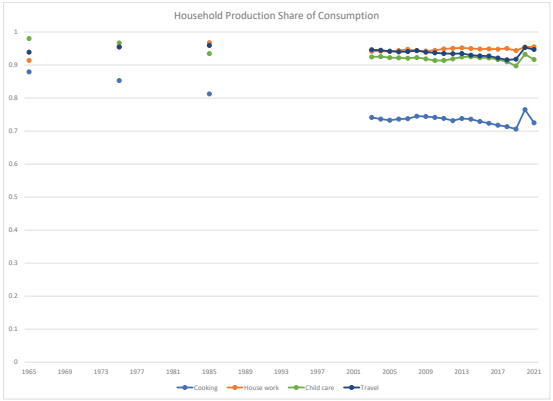

Figure 1. Marketization of Household Products

ative to GDP? Cooking is the only product to show a strong shift to the market, increasing from 12 percent to 29 percent of consumption from 1965 to 2019. Cooking was a large portion of HP, accounting for 43 percent of HP expenditure in 1965, so this product was both very important and showed strong marketization. Child care shows some marketization, with market consumption share expanding from 2 percent in 1965 to 10 percent in 2019. However, this product was a relatively small share of consumption (8 percent in 1965), so contributed much less to the shift to the market. Housework and travel do not show a trend to marketization. In fact, housework shifts out of the market slightly despite a decline in hours. Despite the trend of overall HP significantly declining relative to market GDP, only one product–cooking–shows a large amount of marketization.

The data include two years of the Covid-19 era, when market options for many products were disrupted by quarantines and the disease itself. Cooking, travel, and child care show noticeable de-marketization in 2020, but there is already partial reversion to pre-Covid trends in 2021. This does not just reflect business cycle shifts to the household. There is no such shift during the Great Recession of 2007–9. This suggests that the loss of market options was an important driver of that de-marketization.

III. Implications for Home/Market Time Allocation

What are the implications of these findings for explaining the shift of work from the household to the market? The results suggest that multiple forces worked to reduce HP hours.

Appliances appear to be one of these forces, as argued in Greenwood, Seshadri and Yorukoglu (2005). This effect is strongest for housework, where hours decline even though output shifts out of the market. This suggests that these tasks were automated: Washing machines and dishwashers reduced the time required to clean clothes and dishes. They were productive enough that people reduced sending laundry out to market laundries. The lack of change in housework market share during the Covid pandemic suggests that market alternatives are not important for this product.

Additional forces are needed to fully capture the changes in HP. An explanation of its relative decline needs to explain why meal preparation was significantly marketized while other products were not. Theories that increase women's returns to labor outside the household generate marketization, but would predict that all products should move out of the household. Additional forces are required to provide a full accounting. While a full accounting of this

question is out of scope of this article, reporting HP by product give us additional data to evaluate candidate theories.

IV. Conclusion

I find that most HP products generally show little marketization despite a decline in HP's importance relative to GDP. Only cooking had significant marketization between 1965 and 2021. Housework had a decline in marketization, consistent with the idea that household appliances automated some tasks. The Covid-19 pandemic led to a de-marketization of most products. This finding is consistent with market options being disrupted so production moved into the household. This shift was largely temporary, as most production returned to pre-Covid levels in 2021.

An interesting extension would be to apply the framework to other countries. Among the many questions that could be explored is how much public policy affects female labor force participation. Differences in public subsidies for child care have been suggested as a reason for cross-country differences. Examining the degree of marketization of child care would help test this hypothesis.

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Data Appendix

The estimates transform the aggregate value added reported in BEA's HPSA into expenditure by product. This appendix describes how the HPSA is allocated. For a detailed description of how the HPSA is calculated, see Bridgman et al. (2012).

A1. Capital

Following Bridgman (2022), I only include the capital stocks directly related to household production. I exclude leisure durables and miscellaneous household goods, such as educational books and telephones. I also only use a fraction of vehicles since they are also used for non-HP transportation, such as commuting to work. Following Landefeld and McCulla (2000), I assume that a quarter of vehicle usage is for HP purposes.

A quarter of capital services of "Motor vehicles and parts" is allocated to Travel. "Furniture and furnishings," "Glassware, tableware, and household utensils," and half of "Household appliances" is allocated to Cooking. "Tools and equipment for house and garden" is split between Odd Jobs and Gardening.

A2. Materials

All of "Food purchased for off-premises consumption" is allocated to Cooking. Following the allocation of vehicle stocks, 0.25 of "Gasoline and other energy goods" is allocated to Travel. "Household supplies" is split between Housework and Odd Jobs.