

Aguiar, Mark; Hurst, Erik

**Article**

## Home production, consumption, and labor supply

NBER Reporter Online

**Provided in Cooperation with:**

National Bureau of Economic Research (NBER), Cambridge, Mass.

Suggested Citation: Aguiar, Mark; Hurst, Erik (2009) : Home production, consumption, and labor supply, NBER Reporter Online, NBER, Cambridge, Mass, Iss. 4, pp. 6-9

This Version is available at:

<http://hdl.handle.net/10419/61941>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

sector in taking credit risk. Finally, they conclude that people in the financial sector do seem to have been overpaid by between 30 and 50 percent over the most recent period, despite the more complex

work they did. The natural conclusion from all this is that as regulation clamps down on risk taking, finance salaries will come back to earth, but so will access to credit. Making finance boring will have

costs but, as this article suggests, regardless of the reforms that are carried out, research in corporate finance promises to be interesting for years to come!

---

## Research Summaries

---

# Home Production, Consumption, and Labor Supply

Mark Aguiar and Erik Hurst\*

The way that consumers allocate consumption expenditures over the life cycle, or across states of nature, is a fundamental concern in economics. However, as Reid,<sup>1</sup> Mincer,<sup>2</sup> and Becker<sup>3</sup> noted in seminal contributions, consumption can be viewed as the output of “home production,” which uses inputs purchased in the market as well as non-market time. This implies that the allocation of time and resources via market transactions cannot be understood fully without also understanding how time is allocated outside of the market. As the relative price of their time falls, individuals will substitute away from market expenditures and use more of their own time to produce consumption commodities. Since an individual’s opportunity cost of time has a direct bearing on her total cost of consumption, market expenditures may be a poor proxy for actual consumption.

---

*\*Aguiar and Hurst are Research Associates in the NBER’s Program on Economics and Growth and professors of economics at the University of Rochester and the University of Chicago’s Graduate School of Business, respectively. Their profiles appear later in this issue.*

The opportunity cost of allocating more time to market work is having less time available for non-market activities. To understand shifts in labor market activity, which are reflected in market hours, it is important to know whether the alternative non-market activities are substitutes for or complements to time devoted to market activities. In a series of papers, we study the role of the allocation of non-market time in determining both the behavior of market expenditures over the life cycle and the changing patterns of market hours during the last four decades.

### Framework

We adopt Becker’s modeling framework, in which the consumption commodities that enter the utility function are produced with a combination of time and market goods. When time and market goods are good substitutes in production, then we consider the time spent as home production, but when the two are poor substitutes, we consider the time leisure. For example, “television watching” and “eating a meal” are

both consumption goods. Both combine individual time with market expenditures. However, television watching time and market goods (the television itself, a cable subscription, and so on) will likely be complements. It is relatively hard to economize on one’s television watching time by increasing market purchases. In the meal example, however, time (preparation, clean up, and so on) and goods (groceries, kitchen durables, and the like) are substitutes. The substitutability results from the fact that individuals have the option of purchasing food prepared by others. How market expenditures evolve over the life cycle, and how home production evolves over time, thus depend on whether time and expenditures are complements (as in the first example) or substitutes (as in the second).

This framework is useful for understanding why food expenditure falls at retirement, while non-durable entertainment expenditure increases at the same time. It also can shed light on why the increase in women’s labor force participation since the 1960s was associated with an increase in women’s leisure time.

## Home Production and the Retirement Consumption Puzzle

We first use this framework to address the so called “retirement consumption puzzle.”<sup>4</sup> Previous authors have documented a dramatic decline in food expenditures as households transition from working to retirement. The decline has been interpreted as evidence that the average household receives adverse news about its lifetime resources upon retirement<sup>5</sup> or that households do not plan sufficiently for retirement<sup>6</sup>. However, we show that the decline in expenditure is matched by an equally dramatic rise in the time spent shopping for and preparing meals. A decline in the opportunity cost of time results in a reduction in expenditure and an increase in home production time for those goods for which time and expenditures are substitutes. This is particularly relevant for food expenditure, which has low income elasticity but a high degree of substitutability with non-market time. The low income elasticity often has been used to interpret the decline in food expenditure as having large welfare consequences, while the high degree of substitutability allows a starkly different interpretation.

The key empirical question is whether the observed decline in food expenditure at retirement represents an unanticipated jump in the marginal utility of consumption or optimal time re-allocation. Using detailed data on actual food diaries for a large cross-section of U.S. households (collected by the U.S. Department of Agriculture) we show that neither the quality nor the quantity of food intake deteriorates with retirement status. In other words, the retirement consumption puzzle is no puzzle at all: households smooth the marginal utility of consumption between their working and retirement years even though expenditure falls. Households do switch the composition of inputs toward home production time, a point confirmed by detailed time use diaries. These results highlight how direct measures of consumption can help us to distinguish between anticipated and unanticipated shocks to income while

measures of expenditures may obscure the distinction.

## Shopping, Home Production, and Food Expenditures over the Entire Life Cycle

In a related paper, we use detailed data on shopping time, prices paid, and time allocated to other types of home production to estimate structural parameters of shopping and home production technologies.<sup>7</sup> Our key innovation is the use of detailed scanner data on prices paid by households for a constant quality consumption good (as measured by universal product codes, UPCs) that is linked with detailed demographic data. This dataset comes from the Neilson Homescan Panel. We find that there is substantial heterogeneity in prices paid across households for identical consumption goods in the same metropolitan area at a given point in time. In particular, we find that prices paid are lowest and shopping intensities are highest later in the life cycle. Additionally, we document that lower income households systematically shop more and pay lower prices. The increased time allocated to shopping by older households is associated with more frequent visits to the same store as well as by more extensive use of store and manufacturers discounts. The data suggests that a doubling of shopping frequency lowers prices paid for a given good by 7 to 10 percent. Using this elasticity and observed shopping intensity, we can impute the shopper’s opportunity cost of time. Our imputed measure tracks the life-cycle profile of wages rather closely, particularly after middle age.

Combining our new measure of the price of time with data on time spent in home production, we estimate the parameters of a home production function for food. We find an elasticity of substitution between time and market goods in home production of roughly 1.8. Using these elasticities, we translate observed market expenditures and time spent shopping and in home production into actual consumption equivalents. Like the results for retirement, we find that actual food consumption differs markedly from observed

food expenditures over the life cycle. Food expenditures fall dramatically after the age of 45 while our estimates of actual food intakes increase slightly after middle age. We find that roughly 10 percent of the decline in food expenditures after middle age is attributable to lower prices paid because of an increase in shopping time. The other 90 percent is the result of increased time allocated to home production more broadly (which is primarily composed of the increased time spent preparing meals). These results highlight the danger of interpreting life-cycle expenditure without acknowledging the changing demands on time and the available margins of substituting time for money.

## Work Related Expenses and Life-Cycle Expenditures

In a third paper, we explore the extent to which non-market production and work related expenses can explain the life-cycle trajectory of total expenditures; we move beyond food expenditures to address the life-cycle pattern of all non-durables.<sup>8</sup> Specifically, we reconsider two prominent features of life-cycle consumption expenditures. The first is the fact that expenditures are “hump” shaped over the life cycle, peaking in middle age and then declining steadily thereafter.<sup>9</sup> The second is that cross-sectional consumption inequality increases as individuals grow older.<sup>10</sup> Both have had tremendous influence on economists’ inferences about household preferences, the income process that households face, and the extent to which public and private insurance markets limit household exposure to risk. The main empirical contribution of our paper is to revisit these two familiar facts by disaggregating non-durable expenditures into more detailed consumption categories.

We find that three categories (food, non-durable transportation, and clothing) account for the entire decline in mean expenditure post-middle age and for a substantial amount of the increase in cross-sectional dispersion over the life cycle. No other non-durable categories that we study show a decline in

mean expenditure over the life cycle or an increase in cross-sectional dispersion, particularly after the age of 40. We provide evidence that the categories driving the patterns of life-cycle non-durable expenditure are either inputs into market work (clothing and non-durable transportation) or are amenable to home production (food at home and food away from home). For example, using time diaries we show that after middle age, the use of work related transportation falls sharply while non-work related transportation actually increases. To the extent that non-durable transportation expenditures are proportional to transportation times, the fall in transportation expenditures is the result of declining commuting costs associated with market work. Demand system estimates confirm that controlling for work hours eliminates most of the decline in spending for clothing, non-durable transportation, and food away from home.

These results reinforce our earlier results that changes in the opportunity cost of time will cause movements in expenditures on certain goods even if there is no change in lifetime resources. We show that such a mechanism is responsible for explaining both the decline in non-durable spending after middle age and the increase in the cross-sectional variance of expenditure over the life cycle. We then discuss how the patterns documented in the paper suggest that prior inferences from consumption data regarding discount factors, the ability to plan, or the extent of uninsurable risk faced by households are sensitive to the inclusion of these work related expenses and home produced goods. In the last part of the paper we also show that work related expenses and home production explain a substantial portion of the change in consumption inequality that has occurred within the United States since 1980.

### Home Production Time, the Evolution of Leisure, and Leisure Inequality

In two additional papers, we examine how changes in home production can

influence trends in leisure levels and leisure inequality for men and women during the last forty years.<sup>11</sup> Using detailed time diaries from the United States recorded in 1965, 1975, 1985, 1992–4, and 2003–5, we find that both men and women have dramatically increased the time they allocate to “leisure.” We define leisure as time not spent engaged in market production (work), home production (cooking, cleaning, shopping, and so on), and child care. Basically, our measure of “leisure” includes time spent socializing, going to movies, reading, watching television, listening to music, playing golf, and so on. In terms of the model discussed earlier, we think of leisure as the time input into the production of commodities, where time and expenditures are complements.

In the first paper, we find that prime aged, non-retired men increased their time allocated to leisure by about five hours per week between 1965 and 2005, most of which occurred prior to 1985. This was facilitated by a decline in the time allocated to market work. The time that men allocated to non-market work and child care actually increased during this period (by 3.5 and 1.8 hours per week respectively). For non-retired prime age women, leisure increased by roughly 3.5 hours per week between 1965 and 2005. Again, all of the gains occurred prior to 1985, with some reversal during recent periods. For women, the increase in leisure occurred despite the increase in time allocated to market work. This was possible because women in 2005 spent nearly 11 hours less per week on home production than similar women during the mid-1960s. Again, thinking about the nature of home production is essential for fully understanding the trends in leisure, given observed patterns of market work, particularly for women.

We also document that since 1985, there has been a substantial increase in leisure inequality, particularly for men. Over the last twenty years, male high school dropouts and high school graduates have increased the time they allocated to leisure (by 8.1 and 0.6 hours per week, respectively) while male college graduates recorded a decrease in leisure time (of

6.1 hours per week). Less educated men also decreased the amount of time they devoted to market work, and to home production, over this period. Similar differences in time allocation by education were found after conditioning on employment status. For example, among both unemployed men and disabled men, the less educated men had higher levels of leisure than the more educated men in 2005, while all men had similar allocations of time (conditional on employment status) regardless of education in 1985. The 2005 differences are the result of less educated non-employed men doing less home production, less job search, and less child care than the more educated non-employed men.

### Conclusion

Collectively, our work shows that understanding the nature of non-market work is important for interpreting trends in market outcomes, such as household expenditures and labor supply, both over time and over the life cycle. The decline in consumption expenditures and the increase in consumption inequality observed after middle age can be linked to the changing allocation of time over the life cycle. Similarly, the large increase in labor supply observed for women over the last 40 years was accompanied by an even larger decline in home production, resulting in a net increase in leisure time. However, the substitution of market time for home production did not reverse itself for the declining labor supply of less educated men. This latter phenomenon has resulted in a large increase in leisure for this demographic group, opening a large “leisure gap” between educational groups that did not exist twenty years ago.

---

<sup>1</sup> M. Reid, *Economics of Household Production*, New York, NY: John Wiley and Sons, 1934.

<sup>2</sup> J. Mincer, “Labor Force Participation of Married Women: A Study of Labor Supply”, in *Aspects of Labor Economics, an NBER-Universities Research Conference Volume*, H. Lewis, ed.

Princeton, NJ: Princeton University Press, 1962.

<sup>3</sup> G. Becker, "A Theory of the Allocation of Time," *The Economic Journal*, 75 (1965), pp. 493–517.

<sup>4</sup> M. Aguiar and E. Hurst, "Consumption vs. Expenditure," NBER Working Paper No. 10307, February 2004, and *Journal of Political Economy*, 113 (5) (October 2005), pp. 919–48.

<sup>5</sup> See, for example, J. Banks, R. Blundell, and S. Tanner, "Is There a Retirement Savings Puzzle?" *American Economic Review*, 88(4) (1998), pp. 769–88.

<sup>6</sup> See, for example, B.D. Bernheim, J. Skinner, and S. Weinberg, "What Accounts for the Variation in Retirement

Wealth among U.S. Households?" NBER Working Paper No. 6227, October 1997, and *American Economic Review*, 91(4) (September 2001), pp. 832–57.

<sup>7</sup> M. Aguiar and E. Hurst, "Life Cycle Prices and Production," NBER Working Paper No. 11601, September 2005, and *American Economic Review*, 97(5) (December 2007), pp. 1533–59.

<sup>8</sup> M. Aguiar and E. Hurst, "Deconstructing Life Cycle Expenditure," NBER Working Paper No. 13893, March 2008.

<sup>9</sup> See, for example, J. Heckman, "Life Cycle Consumption and Labor Supply: An Explanation of the Relationship between Income and Consumption over the Life

Cycle," *American Economic Review*, 64(1) (1974), pp. 188–94.

<sup>10</sup> See, for example, A. Deaton and C. Paxson, "Intertemporal Choice and Inequality," NBER Working Paper No. 4328 April 1993, and *Journal of Political Economy*, 102 (3) (1994), pp. 437–67.

<sup>11</sup> M. Aguiar and E. Hurst, "Measuring Trends in Leisure: The Allocation of Time Over Five Decades," NBER Working Paper No. 12082, March 2006, and *Quarterly Journal of Economics*, 122(3) (August 2007), pp. 969–1006; and "The Increase in Leisure Inequality: 1965–2005," NBER Working Paper No. 13837, March 2008, and Washington DC: The AEI Press, 2009.

## The Effects of Medicaid Expansions and Welfare Reform on Fertility and the Health of Women and Children

Robert Kaestner\*

### Medicaid Expansions

Expansion of publicly-financed health insurance programs has been an integral feature of recent efforts to reduce the number of uninsured, non-elderly persons in the United States. The origin of this approach was the creation of Medicaid in 1965. The expansion of Medicaid eligibility to near-poor, pregnant women who were not eligible for Aid to Families with Dependent Children, which took place between 1986 and 1989, solidified the use of this approach for reducing the

*\*Kaestner is a Research Associate in the NBER's Programs on Health Economics and the Economic Well-being of Children. He is also a Professor of Economics at the University of Illinois at Chicago. His profile appears later in this issue.*

number of non-elderly uninsured.

The expansion of Medicaid and the creation of the *State Children's Health Insurance Program* (SCHIP) resulted in a large increase in the number of women and children with publicly financed health insurance. For example, between 1987 and 2008 the proportion of children under age 18 (under age 3) with publicly financed health insurance increased from 16 to 30 percent (20 to 38 percent). Surprisingly, though, the proportion of children without health insurance coverage did not decline commensurately with these changes. Between 1987 and 2008, the proportion of children under age 18 (age 3) without any health insurance coverage decreased from 13 percent to 10 percent (12 percent to 9 percent). The large increase in publicly provided

health insurance coverage and the relatively small decrease in rates of uninsured between 1987 and 2008 suggest that part of the increase in participation in public programs came at the expense of private insurance coverage. This substitution of public for private health insurance coverage — "crowd out" — continues to be an important part of the debate over how to reduce the number of uninsured.<sup>1</sup>

While estimates of the extent of crowd out vary, most studies find some level of crowd out, which differs by age of child and by family income. For example, Yazici and I<sup>2</sup> estimate that approximately 15 percent of the increase in Medicaid enrollment among children up to age 9 between 1988 and 1992 was at the expense of private insurance. Two other important findings emerge from this analysis. First,