Time Use Graphs & Tables

- Greenwood, Seshadri, Yorukoglu, “Engines of Liberation,” ReStud 2005

- Argue that technology, in the form of electricity and household appliances, is the key source of the increase in female labor supply over the 20th Century.

- Base evidence on home production time mostly on Lebergott.

- In contrast, time use sociologists, such as Joann Vanek, estimated that time spent in home production by housewives hardly changed from the 1920s through the 1960s.

- This became known as the Cownn Paradox “More Work for Mother.”
- Joel Mokyr explained it by a concomitant rise in cleanliness standards

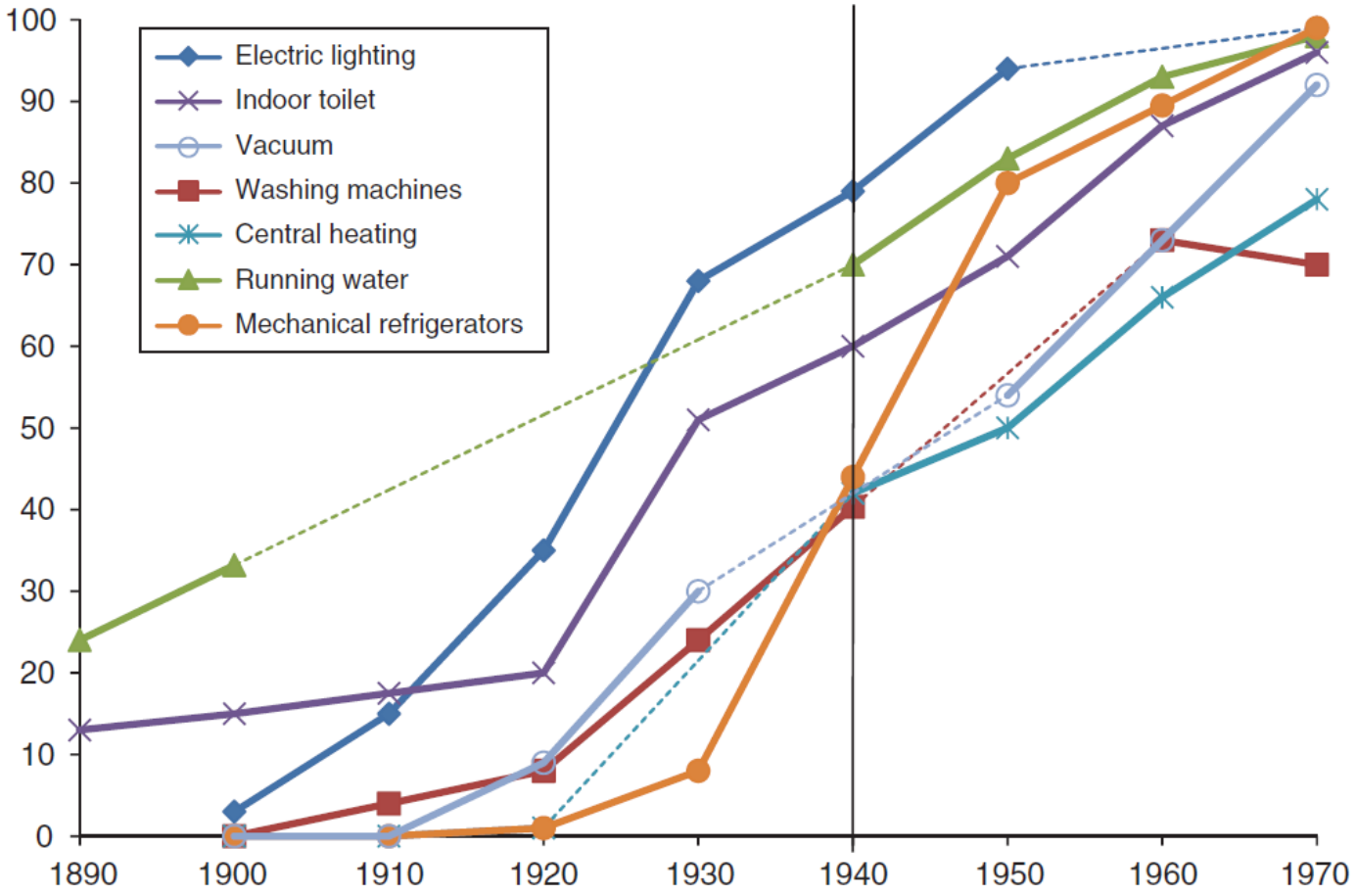

FIGURE 2. PROPORTION OF HOUSEHOLDS WITH MODERN HOUSEHOLD TECHNOLOGY, 1890–1970

Bailey-Collins 2011

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Time Spent in Home Production in the Twentieth-Century United States: New Estimates from Old Data

VALERIE A. RAMEY

THEORETICAL LINKS BETWEEN APPLIANCES AND TIME SPENT IN HOME PRODUCTION

To investigate the role of home technology in the effects of appliances on labor supply, I consider a modified version of an alternative model presented by Greenwood et al.[17] I focus on a static version for ease of exposition, since the results do not depend on dynamic considerations. Also, I assume a simple household optimization problem since

Households choose market consumption C_m, consumption of home produced goods C_h, home production capital K, market hours N_m, home production hours N_h, and leisure l to maximize utility

$$U = \mu \ln(C_m) + \nu \ln(C_h) + (1-\mu-\nu)\ln(l) \quad \text{with} \quad l = 1 - N_m - N_h \tag{1}$$

subject to the production function for home goods

$$C_h = [\theta \cdot K^{\rho} + (1-\theta) N_h^{\rho}]^{(1/\rho)}, \quad \text{with} \quad \rho < 1 \tag{2}$$

and budget constraint

$$C_m + qK = w \cdot N_m \tag{3}$$

where q is the real rental price of home production capital (in terms of consumption goods) and w is the real wage rate for market work. μ, ν, and θ are assumed to be positive and between zero and unity.

Manipulation of the first-order conditions from this maximization problem leads to two key equations for the capital-labor ratio in home production and the ratio of market hours to home production hours

$$\frac{K}{N_h} = \left[\frac{\theta}{1-\theta} \cdot \frac{w}{q} \right]^{\frac{1}{1-\rho}} \tag{4}$$

$$\frac{N_m}{N_h} = \frac{\mu}{\nu} + \left(\frac{w}{q} \right)^{\frac{\rho}{1-\rho}} \left(\frac{\theta}{1-\theta} \right)^{\frac{1}{1-\rho}} \left(1 + \frac{\mu}{\nu} \right) \tag{5}$$

Equation 4 indicates that either a fall in the rental cost of capital q or a rise in the market wage w raises the capital-labor ratio in home production for any value of $\rho < 1$. Differentiation of equation 5 with respect to q and w shows that the effects on market hours versus home hours depend crucially on the elasticity of substitution between capital and labor in home production, $\varepsilon = 1/(1-\rho)$. In particular, one can establish that a fall in q or a rise in w leads to a rise in market hours relative to home hours, N_m/N_h, if $\varepsilon > 1$; no change if $\varepsilon = 1$; and a fall in N_m/N_h, if $\varepsilon < 1$.

To see the intuition, consider the extreme case of a Leontief production function, where $\varepsilon = 0$. In this case, home production capital cannot

be substituted for labor. If capital's price falls, then the household buys more capital and allocates more labor to home production. At the other extreme, if $\varepsilon = \infty$, then households can perfectly substitute capital for labor, and time spent in home production falls.

Thus, this simple theory demonstrates that a rise in home capital such as appliances need not shift labor from the home to the market. With these functional forms, such a shift only occurs if the elasticity of substitution between labor and capital in home production is sufficiently high. The canonical Cobb-Douglas case ($\rho = 0$) predicts *no* change in the ratio of market to home work in the face of either falling durables prices or rising market wages.

Larry E. Jones, Rodolfo E. Manuelli, and Ellen R. McGrattan consider alternative versions of the model in which all production is Cobb-Douglas, but in which utility depends on a composite commodity with a constant elasticity of substitution between market goods and home produced goods.[18] They show that technological progress in the home production sector leads market hours to rise only if market and home goods are complements. If they are substitutes, market hours fall in response to technological innovation in the home sector.

In sum, from the viewpoint of theory, there is no "Cowan Paradox."

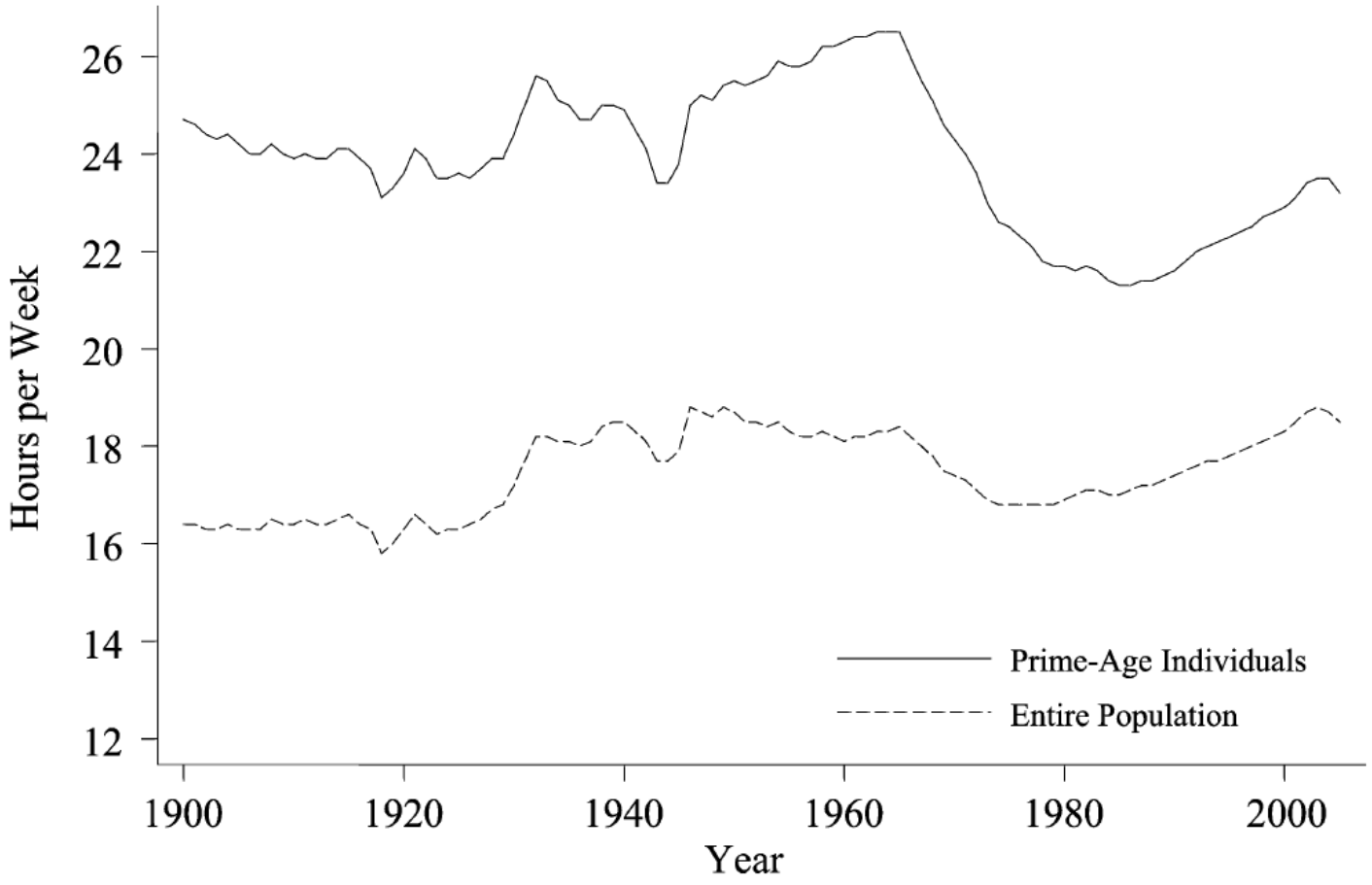


FIGURE 2
AVERAGE WEEKLY HOURS IN HOME PRODUCTION FOR TWO AGGREGATES

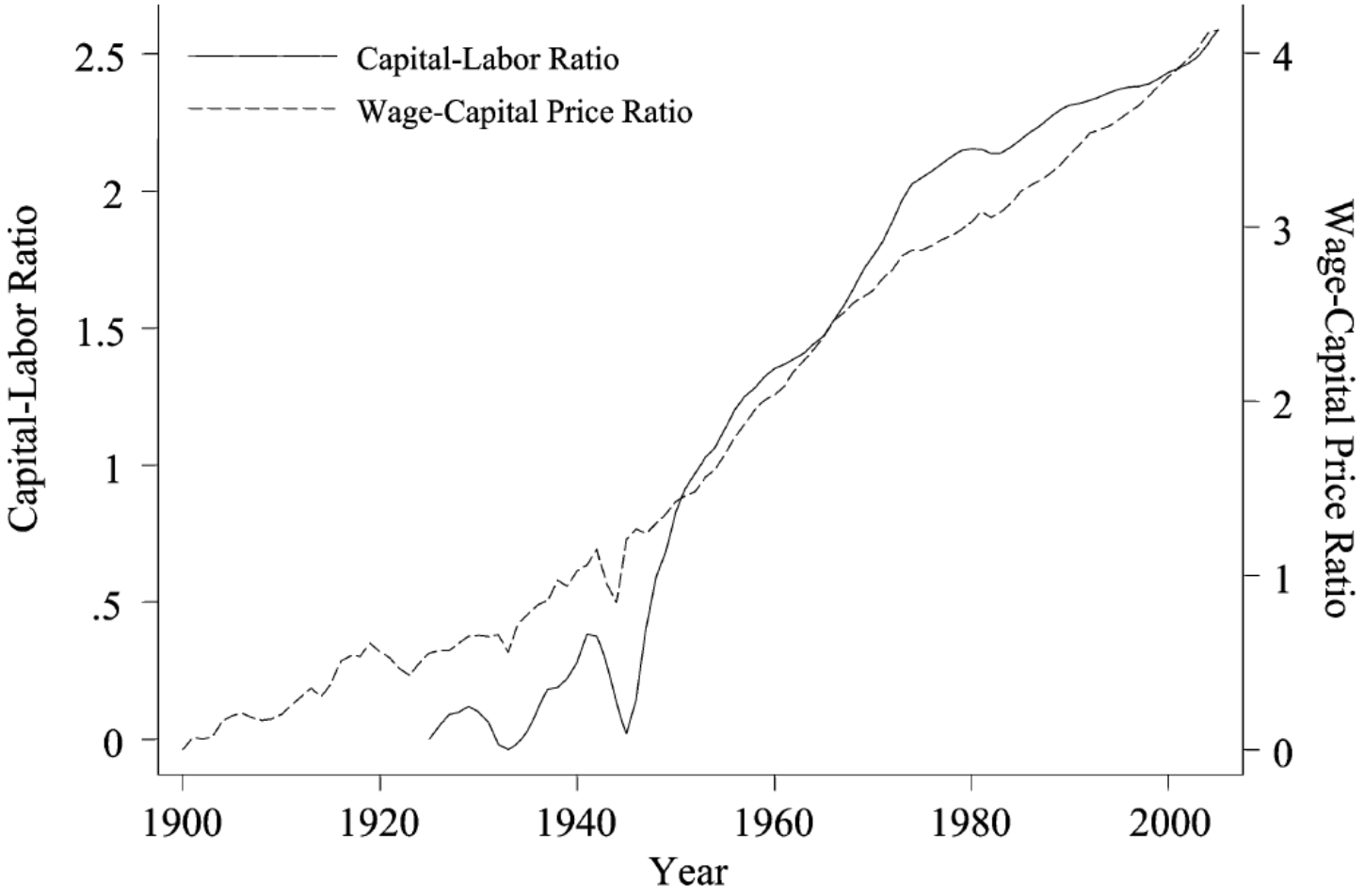


FIGURE 3
CAPITAL-LABOR RATIOS IN HOME PRODUCTION AND FACTOR PRICES

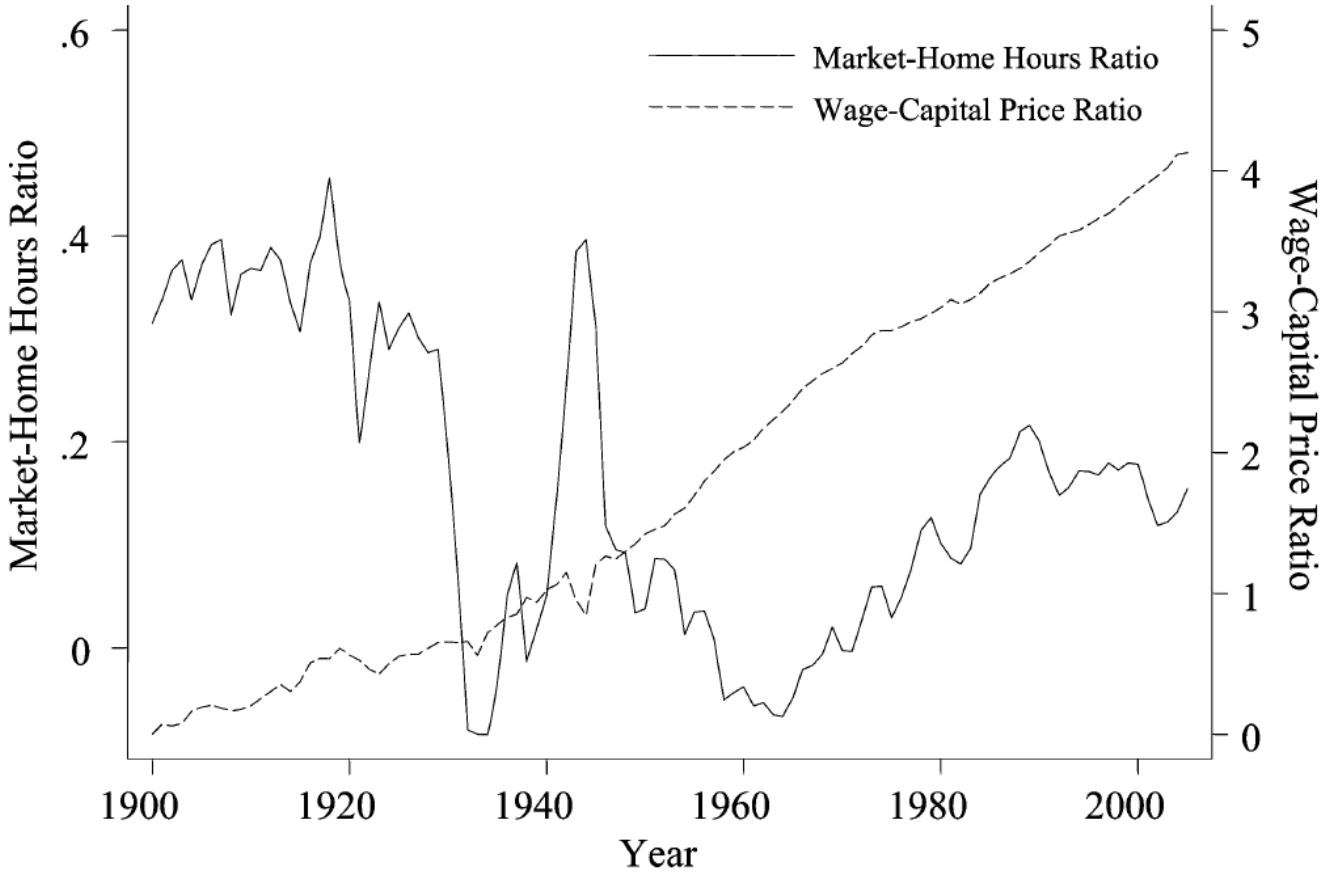


FIGURE 4
RATIO OF MARKET HOURS TO HOME PRODUCTION HOURS AND FACTOR PRICES

Note: The graph shows logarithms of indices.

- Greenwood, Seshadri, Vandenbroucke, “The Baby Boom and the Baby Bust,” AER, March 2005.

- Argue that technology, in the form of electricity and household appliances, led to the baby boom.

- Bailey and Collins, “Did Improvements in Household Technology Cause the Baby Boom? Evidence from Electrification, Appliance Diffusion, and the Amish,” AEJ: Macro 2011.

- Use different diffusion across localities to test – find no effect.

- Show that the Amish also had a baby boom.

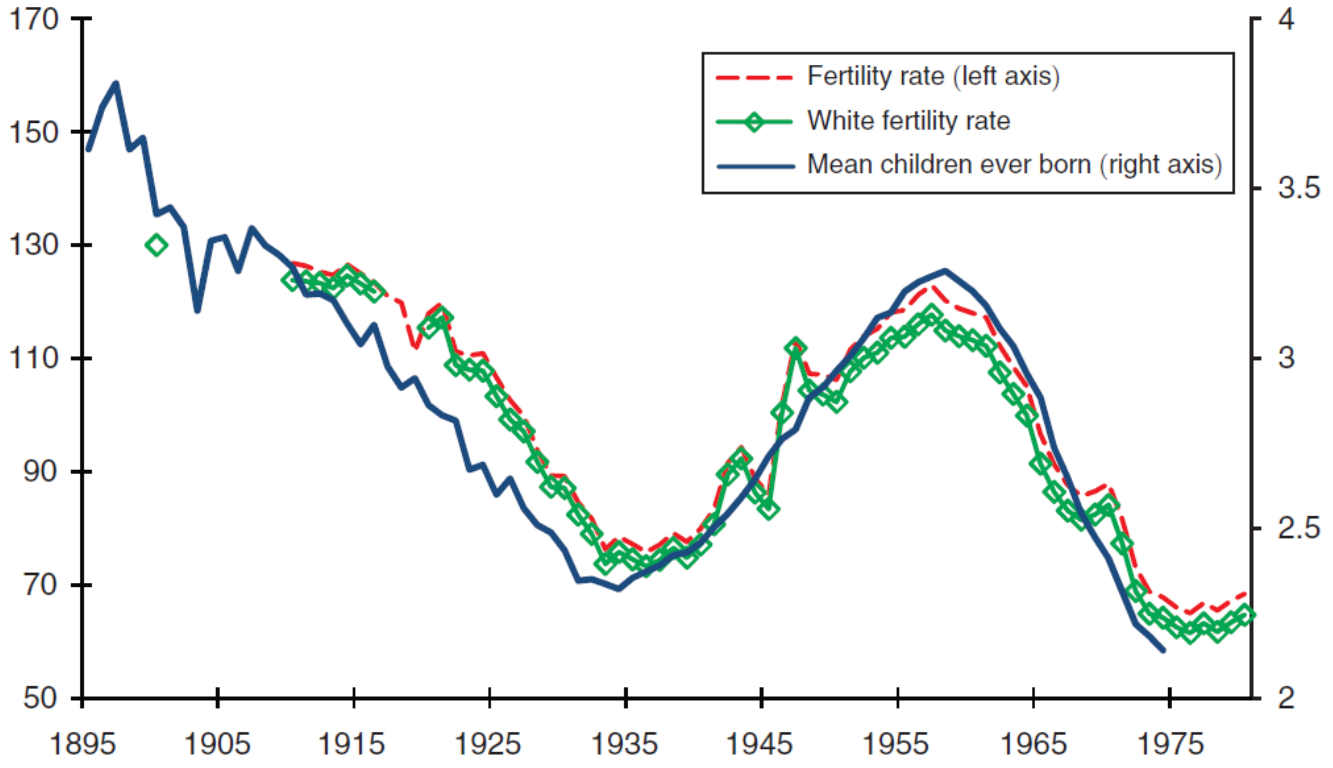


FIGURE 1. US GENERAL FERTILITY RATE AND CHILDREN EVER BORN FROM 1895 TO 1985

Bailey-Collins 2011

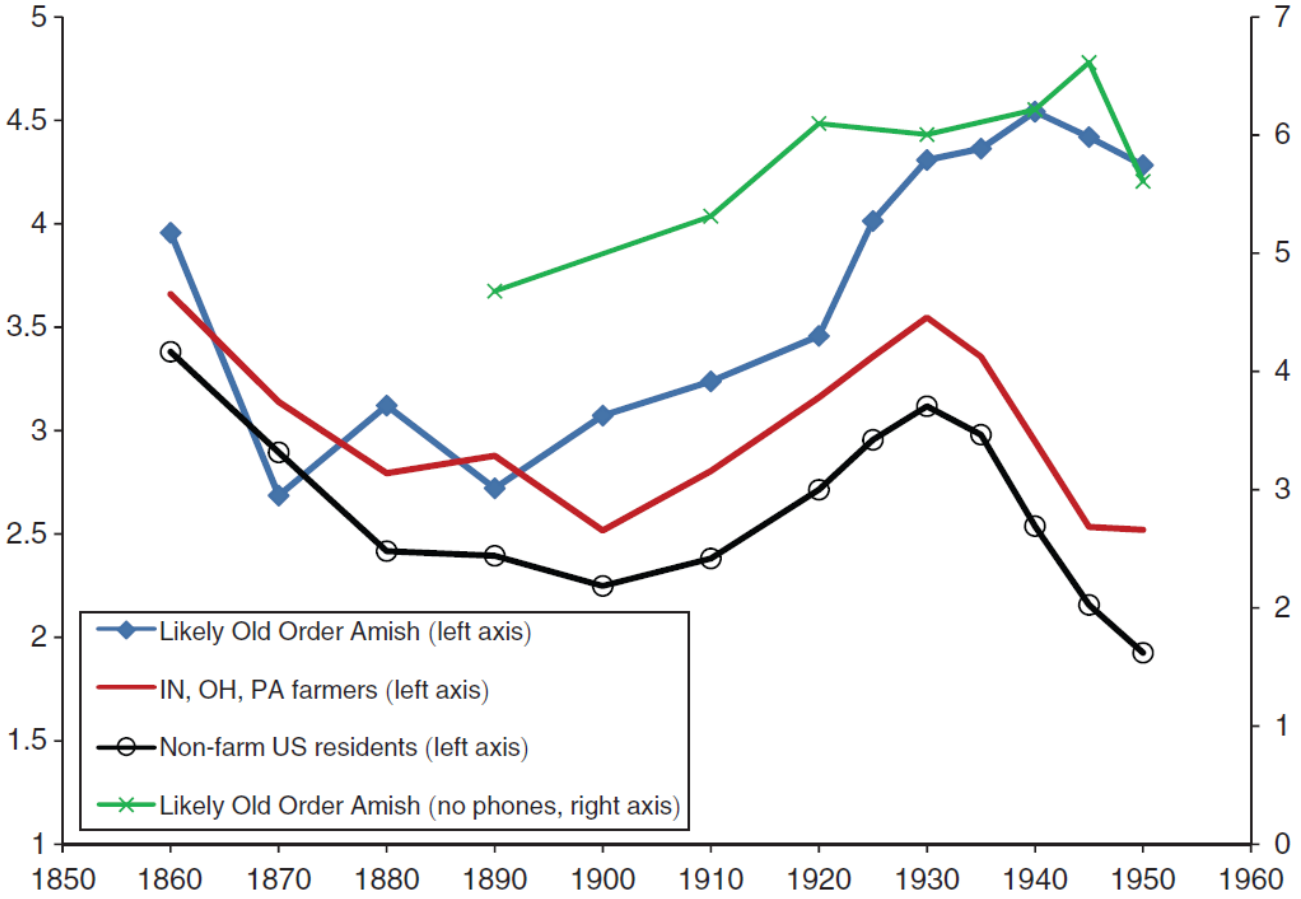


FIGURE 7. MEAN CHILDREN BORN TO LIKELY AMISH AND OTHER US WOMEN BORN 1860–1954

THE RETIREMENT-CONSUMPTION PUZZLE: ANTICIPATED AND ACTUAL DECLINES IN SPENDING AT RETIREMENT

Michael Hurd
Susann Rohwedder

Working Paper 9586
March 2003

ABSTRACT

The simple one-good model of life-cycle consumption requires "consumption smoothing." However, British and U.S. households apparently reduce consumption at retirement and the reduction cannot be explained by the life-cycle model. An interpretation is that retirees are surprised by the inadequacy of resources. This interpretation challenges the life-cycle model where consumers are forward looking. However, data on anticipated consumption changes at retirement and on realized consumption changes following retirement show that the reductions are fully anticipated. Apparently the decline is due to the cessation of work-related expenses and the substitution of home production for market-purchased goods and services.

Mark Aguiar and Erik Hurst

"Consumption versus Expenditure," JPE 2005

"Life-Cycle Prices and Production," AER 2007

"Deconstructing Life Cycle Consumption," JPE 2012

- Aguiar-Hurst, “Consumption versus Expenditure,” JPE 2005

Previous authors have documented a dramatic decline in food expenditures at the time of retirement. We show that this is matched by an equally dramatic rise in time spent shopping for and preparing meals. Using a novel data set that collects detailed food diaries for a large cross section of U.S. households, we show that neither the quality nor the quantity of food intake deteriorates with retirement status. We also show that unemployed households experience a decline in food expenditure and food consumption commensurate with the impact of job displacement on permanent income. These results highlight how direct measures of consumption distinguish between anticipated and unanticipated shocks to income whereas measures of expenditures obscure the distinction.

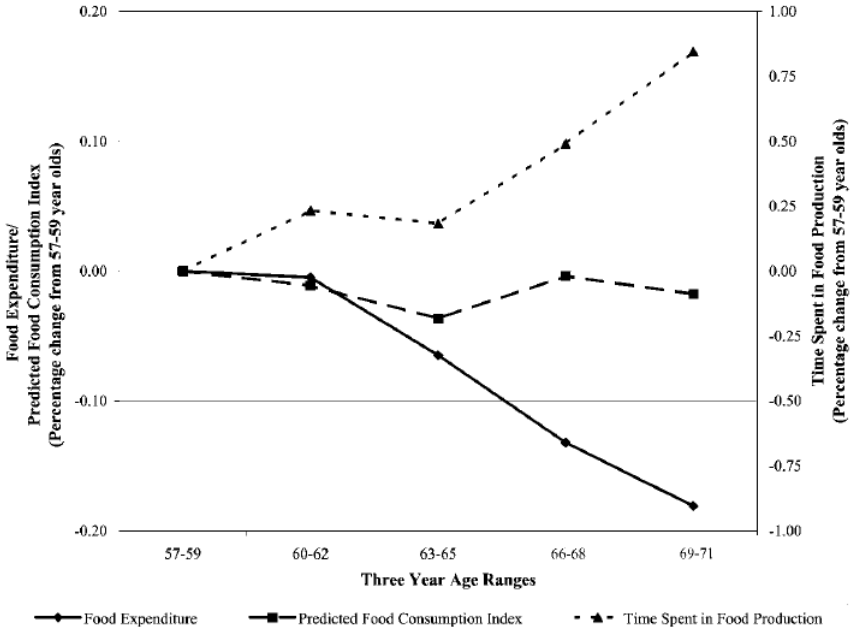


FIG 1.—Percentage change in food expenditure, predicted food consumption index, and time spent on food production for male household heads by three-year age ranges. Data are taken from the pooled 1989–91 and 1994–96 cross sections of the CSFII, excluding the oversample of low-income households. The sample is restricted to male household heads (1,510 households). All series were normalized by the average levels for household heads aged 57–59. All subsequent years are the percentage deviations from the age 57–59 levels. See Sec. IV for details of data and derivation of food consumption index

TABLE 4

INCOME SEMIELASTICITY OF RESTAURANTS WITH TABLE SERVICE AND HIGH-QUALITY FOOD AMONG WORKING HOUSEHOLDS AND CHANGE IN PROPENSITY TO CONSUME IN RETIREMENT

	A. ESTIMATED INCOME SEMIELASTICITY: SAMPLE: HEADS AGED 45–55 WORKING FULL-TIME		B. ESTIMATED RETIREMENT EFFECT: SAMPLE: ALL HOUSEHOLD HEADS AGED 57–71
DEPENDENT VARIABLE	Coefficient on Log Permanent Income (1)	Mean of Dependent Variable (2)	Instrumental Variable Coefficient on Retirement Status Dummy (3)
Propensity to eat away from home:			
Dummy: individual eats away from home (all establishments)	.16	.72	−.18
	(.04)		(.05)
Dummy: individual eats at a cafeteria	.12	.13	−.07
	(.03)		(.03)
Dummy: individual eats at a fast-food establishment	.10	.42	−.16
	(.05)		(.04)
Dummy: individual eats at a restaurant with table service	.16	.41	−.03
	(.05)		(.05)
Propensity to switch away from high quality:			
Dummy: individual eats "lean" ground beef*	.44	.53	.13
	(.12)		(.13)

NOTE.—Data come from the pooled CSFII_89 and CSFII_94 data sets. Sample sizes are 1,101 household heads for panel A and 2,052 household heads for panel B. The dependent variable is a dummy variable taking the value one if the respondent consumed the listed item, and zero otherwise. Eating away from home is defined as eating any meal at a cafeteria, bar, fast-food establishment, or restaurant with table service. The eight-digit food codes categorize whether the beef consumed by individuals was lean or not. Col. 1 reports the coefficient on log income from an instrumental variable regression of the dummy variable on log income and race, sex, height, health, year, and region controls; indicators of permanent income are used as instruments for log income. The instruments include occupation, education, education and occupation interactions, and sex and race interactions. Huber-White standard errors are in parentheses. See the text for a discussion. Panel B reports the coefficient on a dummy variable indicating whether the household head was retired from an instrumental variable regression of the consumption dummy on the retirement dummy and demographic and health controls. Retirement status was instrumented with age dummies.

* The sample was additionally restricted to include only those household heads who reported eating ground beef (159 for panel A and 270 for panel B).

- Aguiar-Hurst, “Life Cycle Prices and Production,” AER 2007

We use scanner data and time diaries to document how households substitute time for money through shopping and home production. We document substantial heterogeneity in prices paid for identical goods for the same area and time, with older households shopping the most and paying the lowest prices. Doubling shopping frequency lowers a good's price by 7 to 10 percent. We estimate the shopper's price of time and use this series to estimate an elasticity of substitution between time and goods in home production of roughly 1.8. The observed life-cycle time allocation implies a consumption series that differs markedly from expenditures. (*JEL* D12, D91)

Aguiar-Hurst, "Deconstructing Life Cycle Consumption," JPE 2012

We revisit two well-known facts regarding life cycle expenditures: the "hump"-shaped profile of nondurable expenditures and the increase in cross-household consumption inequality. We document that the behavior of total nondurables masks surprising heterogeneity in the life cycle profile of individual consumption subcomponents. We provide evidence that the categories driving life cycle consumption either are inputs into market work or are amenable to home production. Using a quantitative model, we document that the disaggregated life cycle consumption profiles imply a level of uninsurable permanent income risk that is substantially lower than that implied by a model using a composite consumption good.

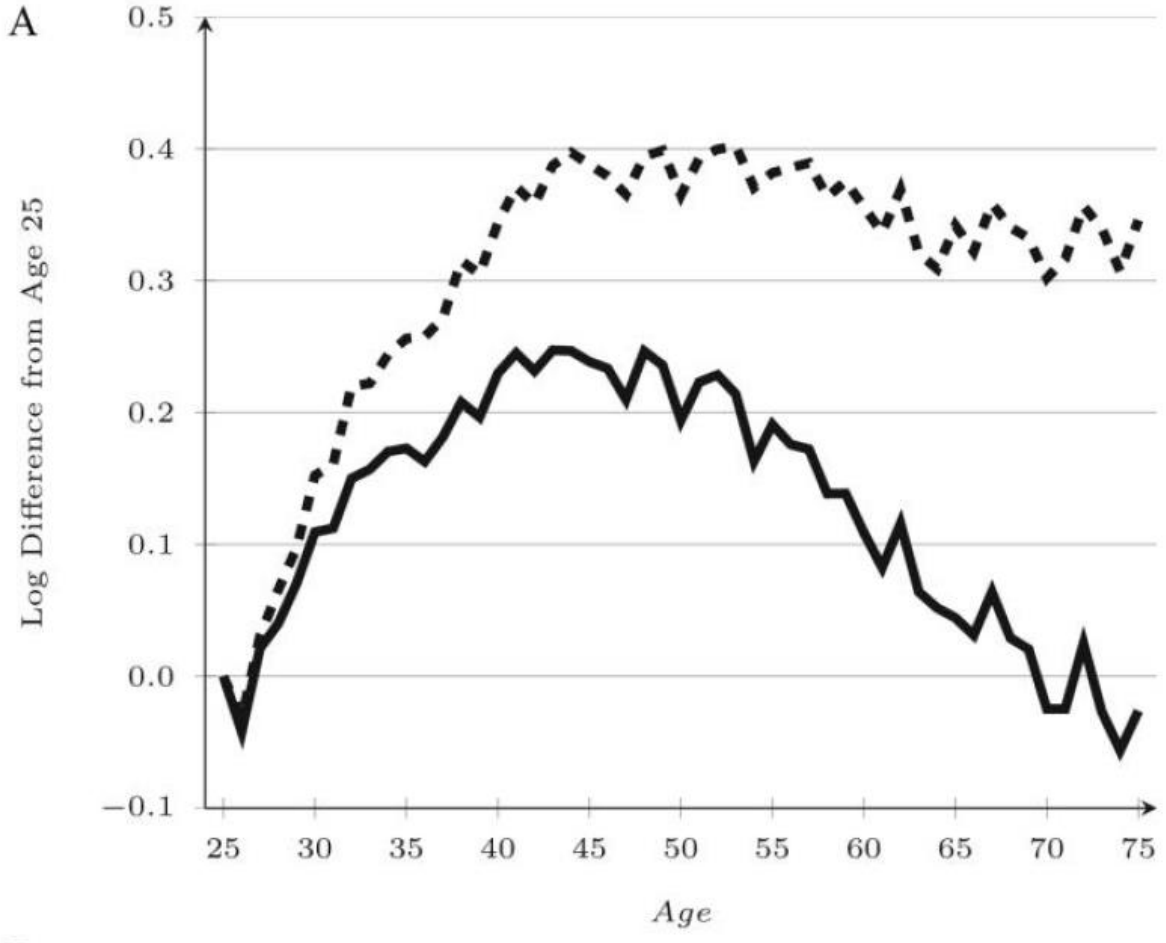
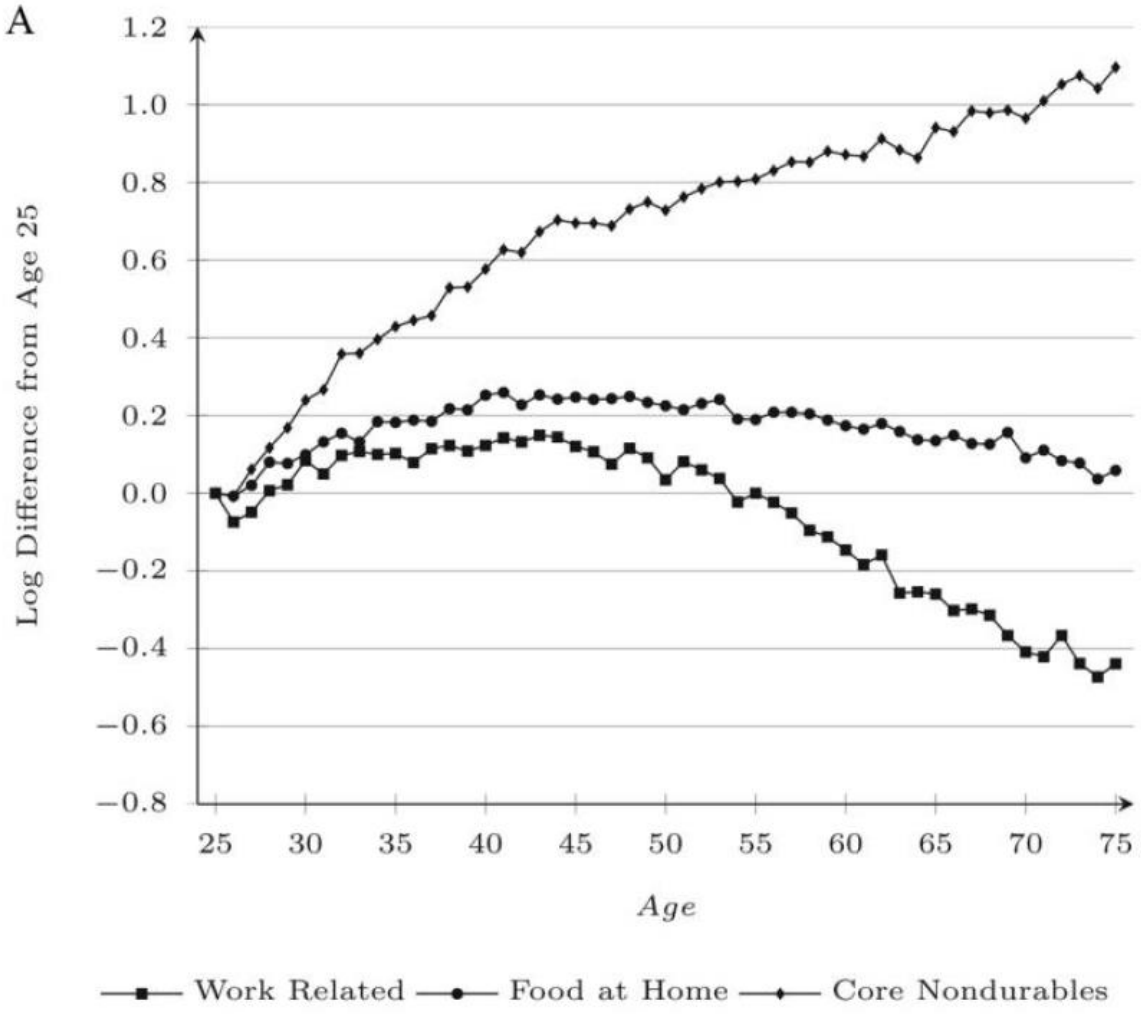


FIG. 1.—Life cycle profiles of nondurable expenditures. Panel *A* plots mean log expenditure by age conditional on cohort, normalized year, and family status controls. Each point


A
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
−0.8
Log Difference from Age 25
25
30
35
40
45
50
55
60
65
70
75
Age
Work Related
Food at Home
Core Nondurables