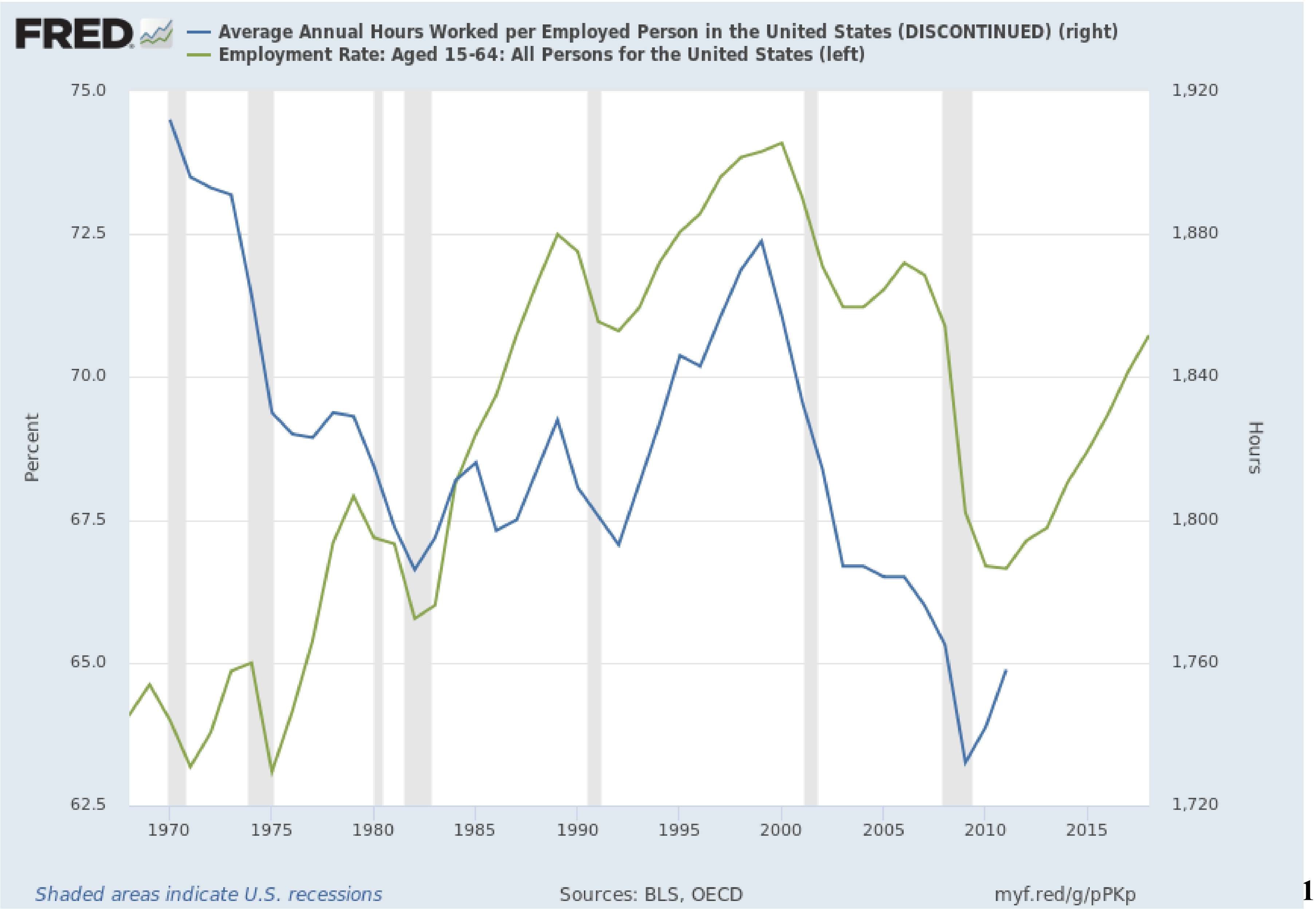
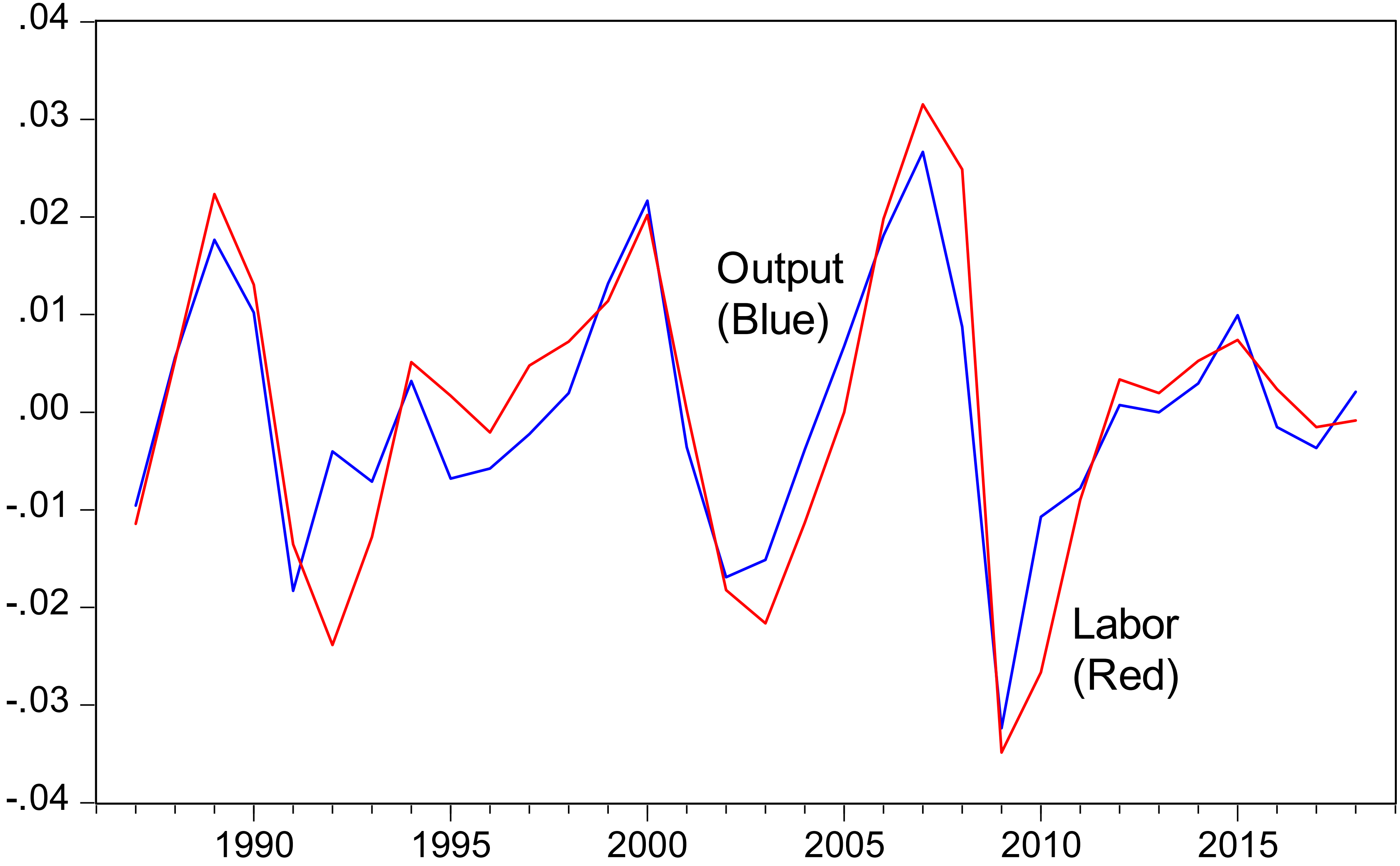
U.S. Emp/Pop and Hours per Worker

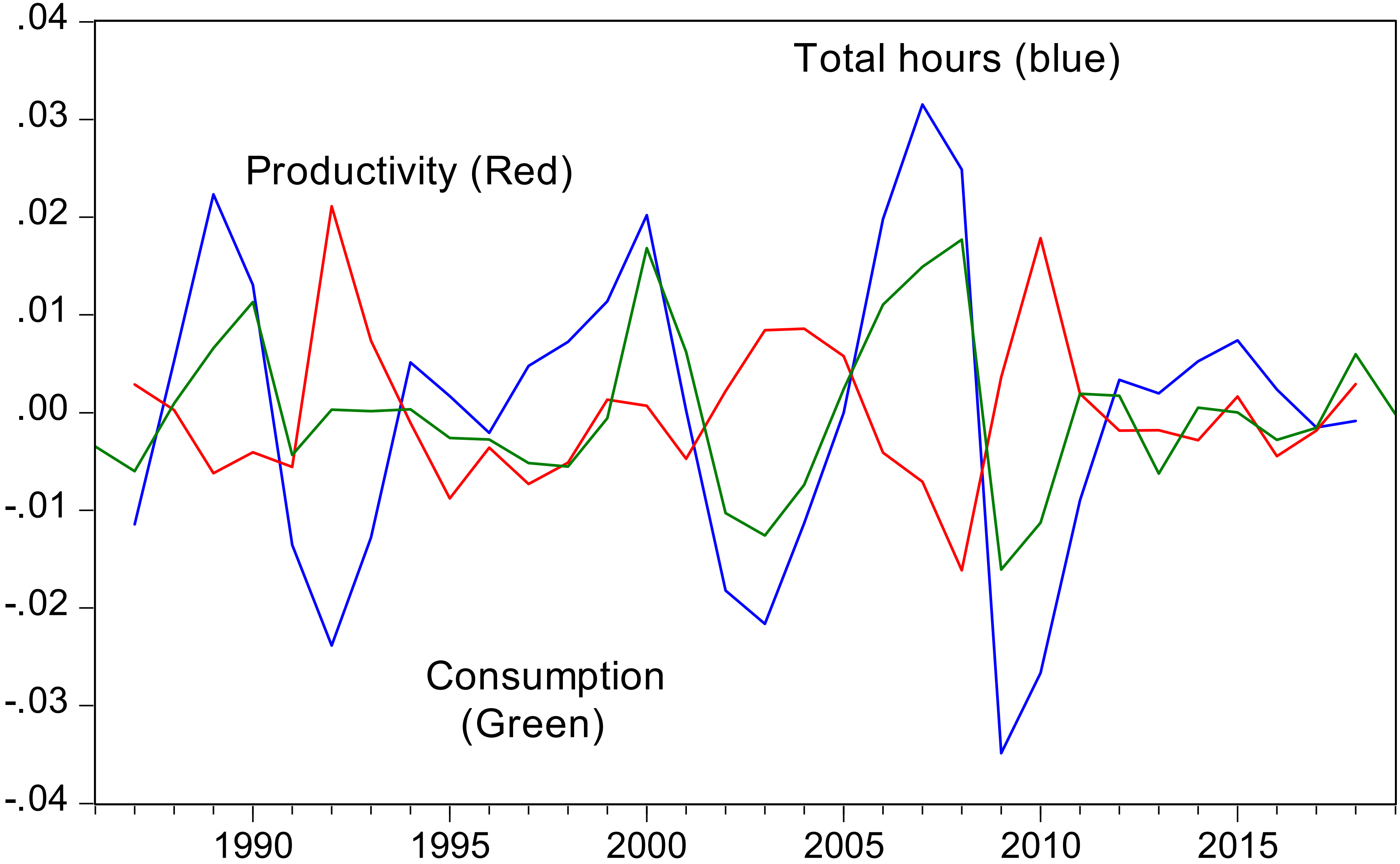


1.1

Cyclicality: Real Output and Total Hours (Private sector, HP filtered)



Cyclicality: Labor Productivity and Consumption (HP filtered, Cons = Nondurs and Services)

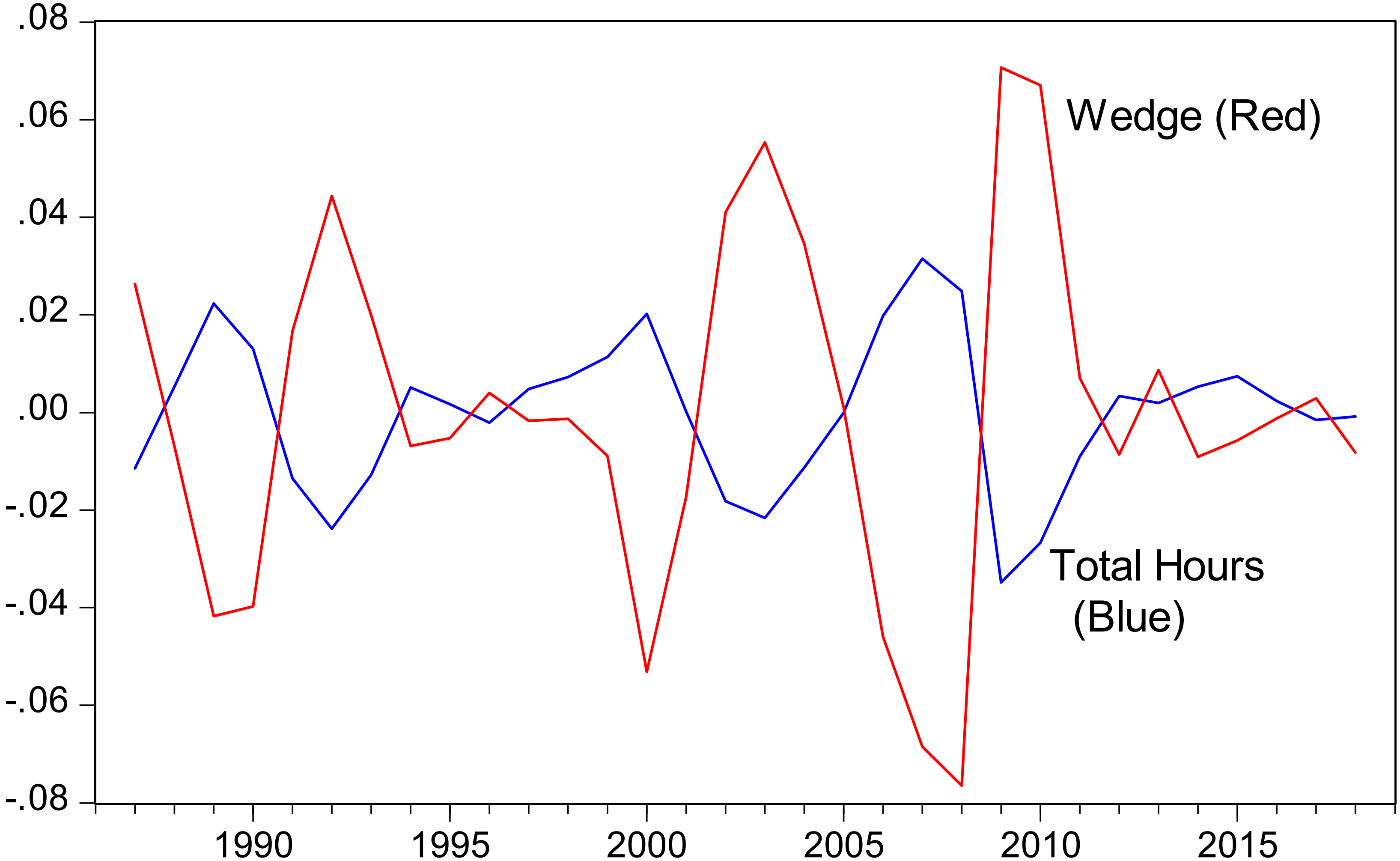


U.S. Labor Wedge, 1987 to 2018

	Elasticity with respect to:	
	Real GDP	Total Hours
Labor Productivity	− 0.26 (.10)	− 0.33 (.08)
Total hours	1.48 (.10)	1
Consumption	0.71 (08)	0.43 (.06)
Wedge	− 3.16 (.31)	− 2.19 (.11)

Notes: Total hours and labor productivity is for private economy; GDP includes government sector. Consumption is nondurables and services. Sample covers 1987 to 2018. All series are logged and HP-filtered. The wedge assumes an IES of 0.5 and a Frisch of 1.0.

Cyclicality in Wedge versus Total Hours



Uses Frisch of one, IES of one-half

Boppart and Krusell Overview

- Standard Macro model assumes balanced growth path, with constant hours worked
  - But data show declining hours (will see figures)
  - Looks roughly like linear trend (constant negative growth rate) in Ln(hours)

- Is also consistent with higher hours worked in poorer countries (Bick et. al., will show below)

- Consider preferences that produce balanced growth with declining hours: requires stronger wealth effect on leisure than in KPR

Intuition for Preferences

In compact terms, one can describe the period utility function under KPR as a power function of $cv(h)$, where c is consumption and h hours worked and v is an arbitrary (decreasing) function. What we show in our main Theorem 1 is that the broader class has the same form: period utility is a power function of $cv(hc^{\frac{\nu}{1-\nu}})$, where $\nu < 1$ is the preference parameter that guides how fast hours shrink relative to productivity. In terms of gross rates, if productivity grows at rate γ, then hours grow at rate $\gamma^{-\nu}$, whereas consumption grows at $\gamma^{1-\nu}$. For $\nu > 0$, the factor $c^{\frac{\nu}{1-\nu}}$ captures the stronger income effect: as consumption grows, there is an added "penalty" to working (since v is decreasing). Our preference class obviously nests KPR: KPR corresponds to $\nu = 0$.

Little trend in U.S. hours post WWII

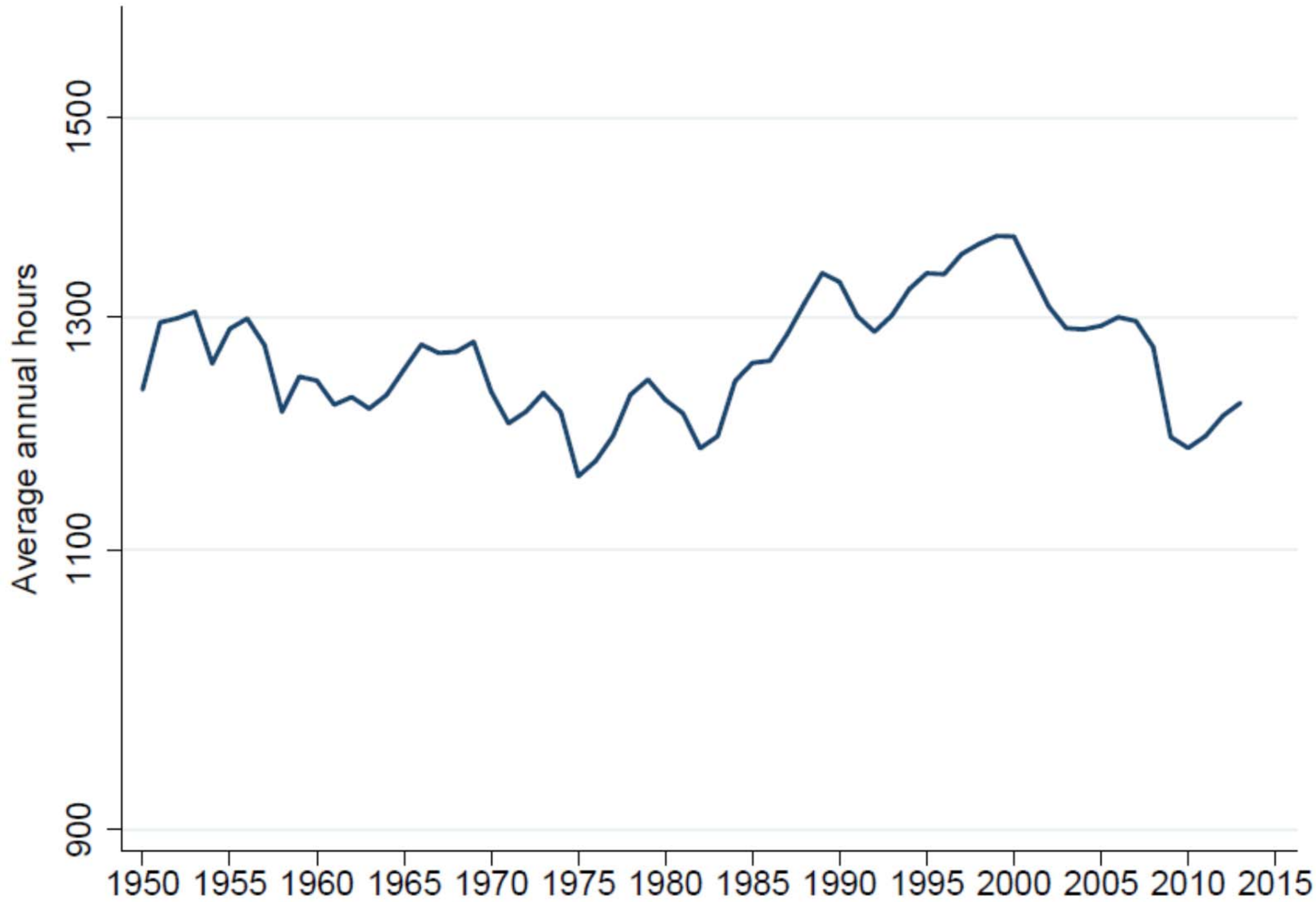
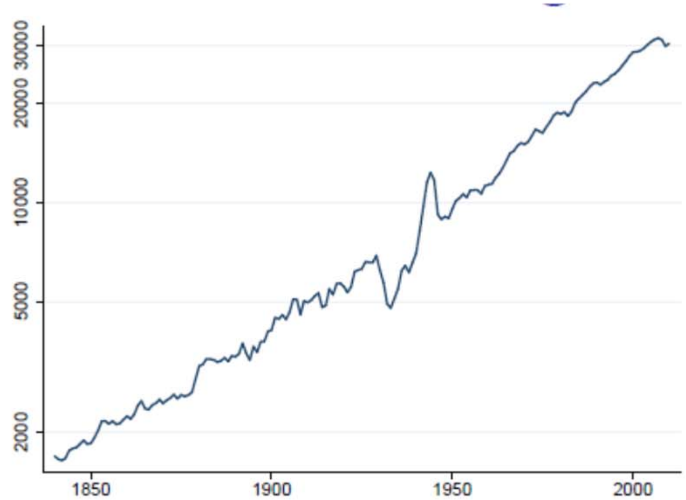


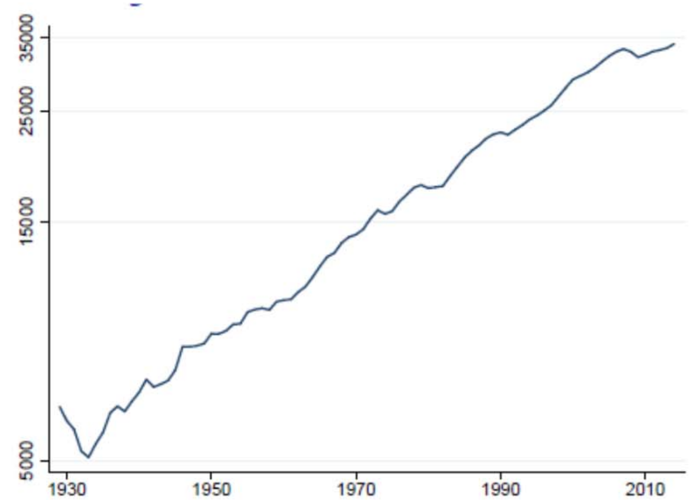
Figure: **U.S. average annual hours per capita aged 15–64, 1950–2013**

Notes: Source: GGDC Total Economy Database for total hours worked and OECD for the data on population aged 15–64. The figure is comparable to the ones in Rogerson (2006). Regressing the logarithm of hours worked on time gives an insignificant slope coefficient.

U.S. balanced growth stylized facts



(a) GDP per capita



(b) Consumption per capita

(c) Consumption-output ratio

(d) Capital-output ratio

But decline in many countries

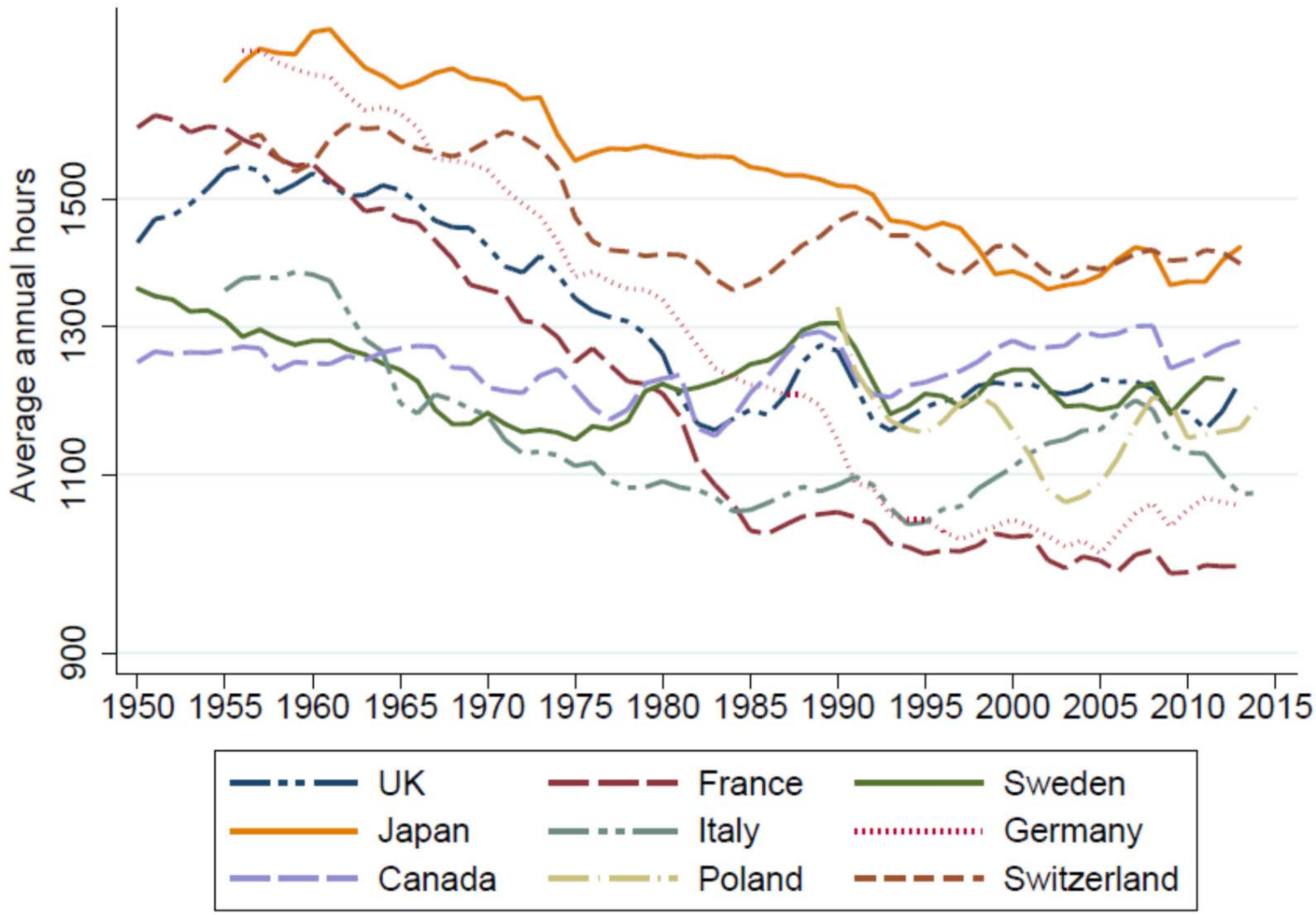


Figure: **Selected countries average annual hours per capita aged 15–64, 1950–2015**

Notes: Source: GGDC Total Economy Database for total hours worked and OECD for the data on population aged 15–64. The figure is comparable to the ones in Rogerson (2006). Regressing the logarithm of hours worked on time gives a slope coefficient of -0.00455.

Declined historically in U.S.

U.S. data including the pre-war period

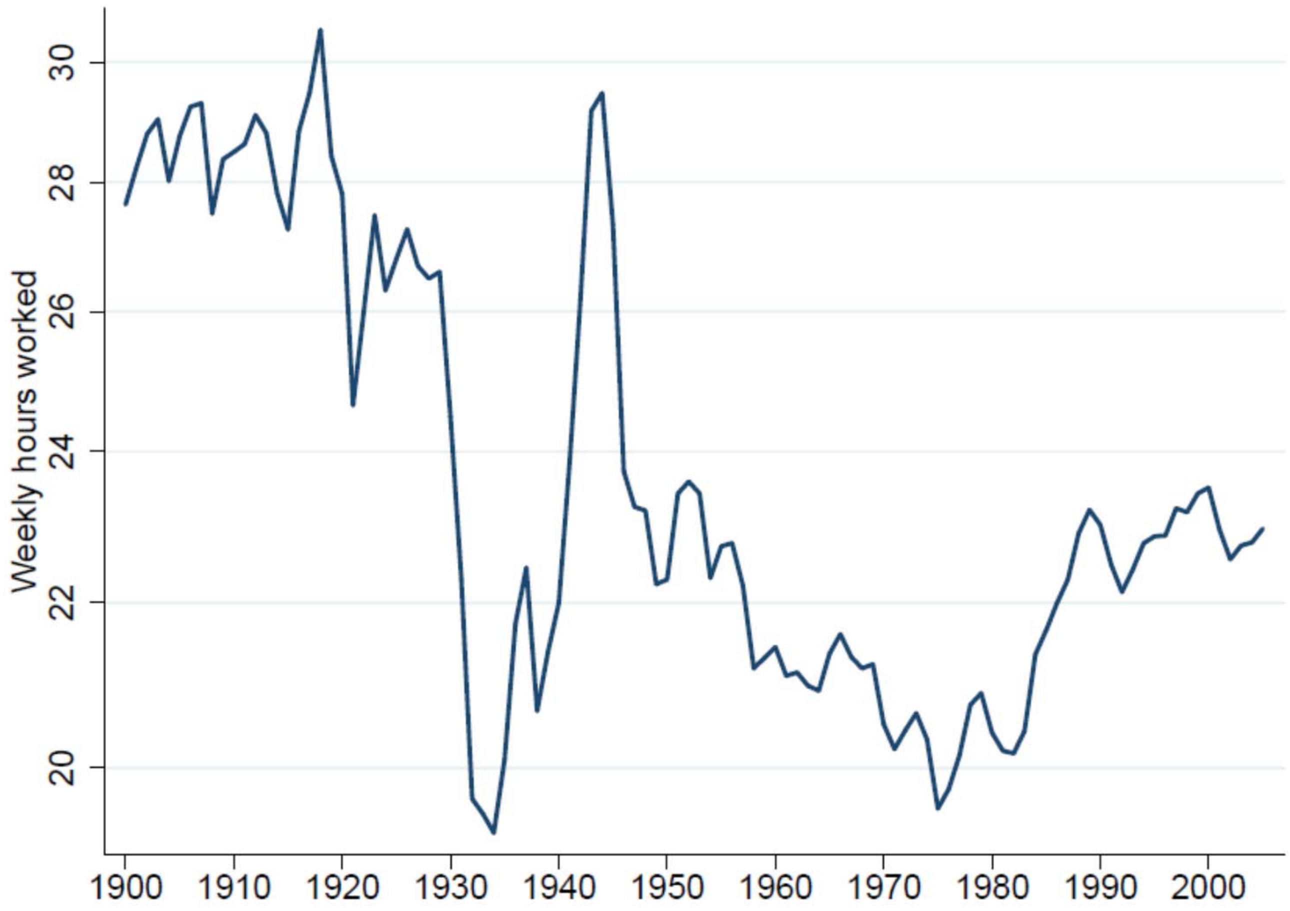
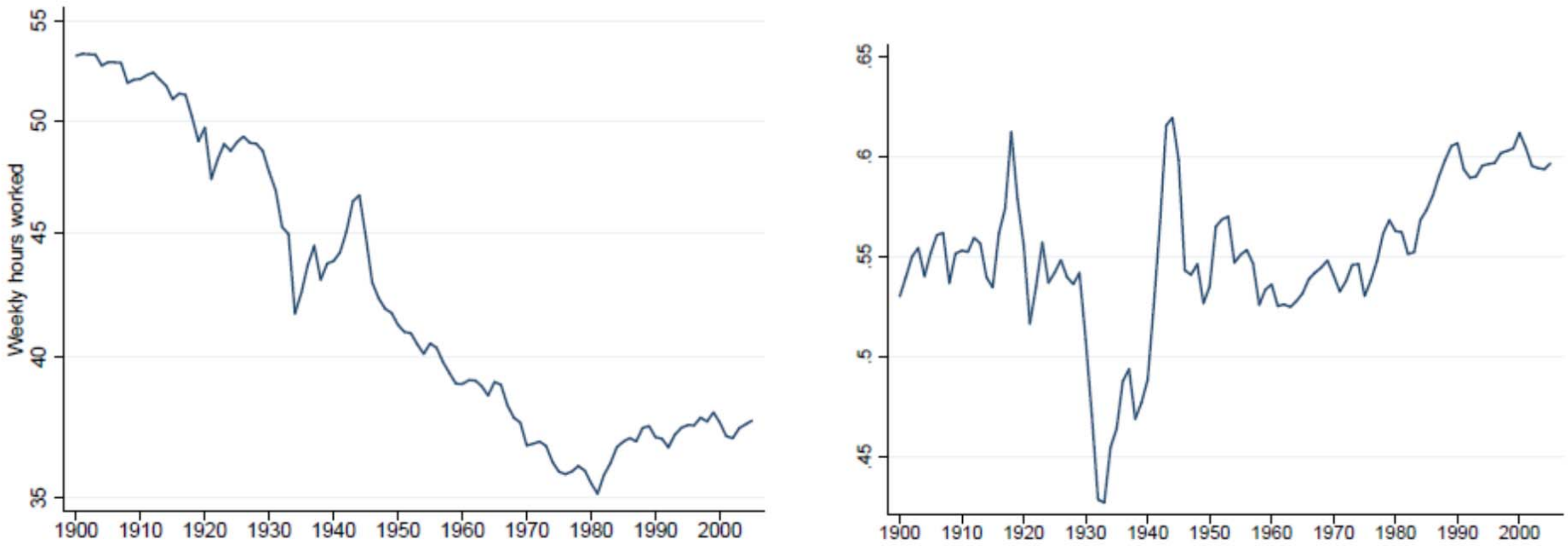


Figure: **Weekly hours worked per population aged 14+, 1900–2005**

Notes: Source: Ramey and Francis (2009). Regressing the logarithm of hours worked on time gives slope coefficient of -0.00285.

At intensive margin

Intensive and extensive margin over 100+ years



(a) Hours per worker

(b) Participation rate

Figure: Hours per worker and participation rate in the U.S.

Notes: The scale is logarithmic in the figure on hours worked per worker. Regressing the logarithm of hours worked per worker on time gives slope coefficient of -0.00418. Source: Ramey and Francis (2009).

U.S. workweek back to 1830

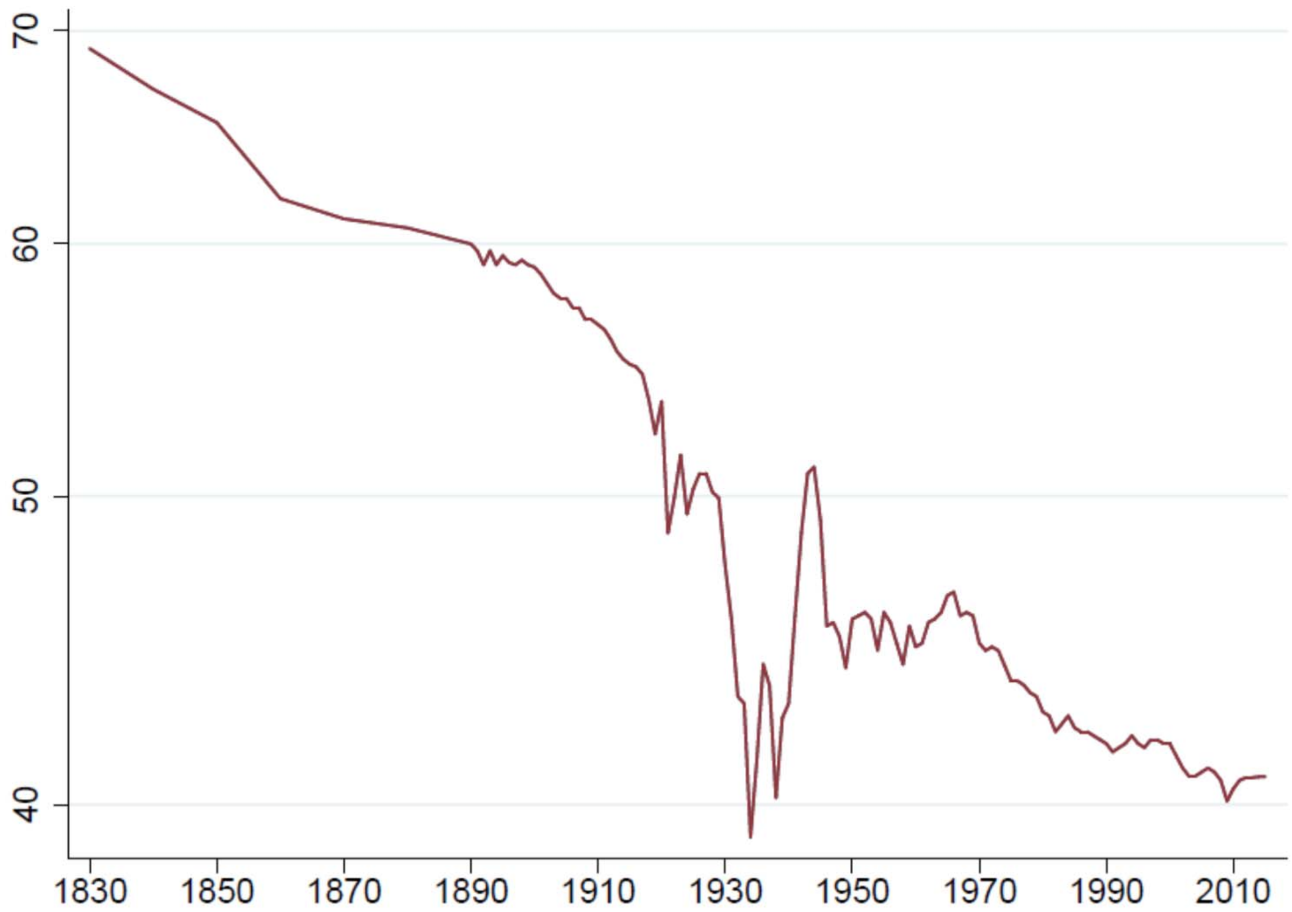


Figure: **U.S. weekly hours worked in nonfarm establishments 1830–2015**

Source: Average weekly hours data for 1830–80: Whaples (1990, Table 2.1). 1890-1970: Historical Statistics of the United States: Colonial Times to 1970 (Series D765 and D803). 1970–2015: Statistical Abstract of the United States the number for nonfarm establishments. This graph shows an updates series of the data in Greenwood and Vandenbroucke (2008). Regressing the log of hours on a constant and year gives a slope coefficient of -0.00315 in the full sample (and -0.00208 for the years 1970–2015).

Declined historically elsewhere

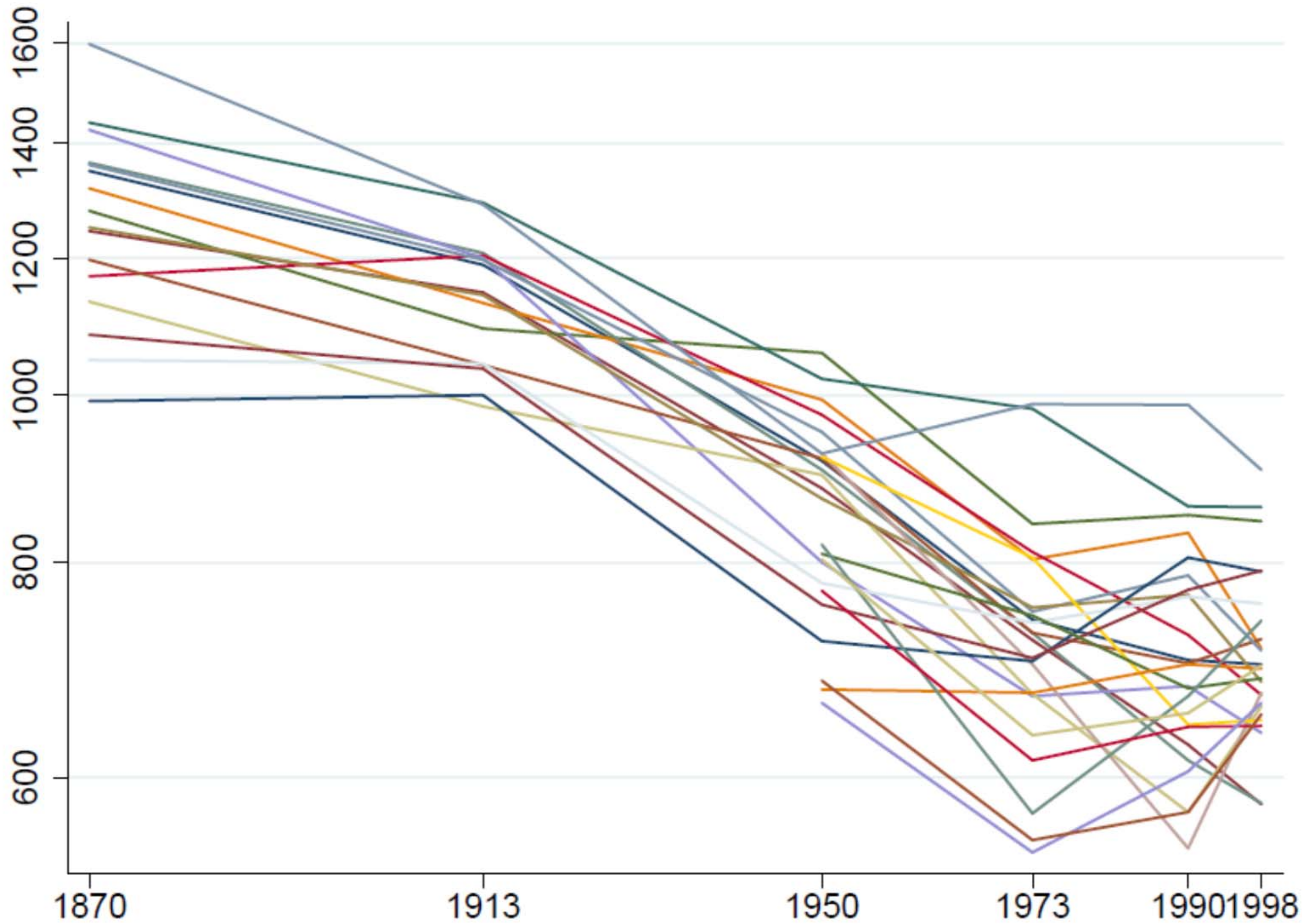


Figure: **Yearly hours worked per capita 1870–1998**

Source: Maddison (2001). The sample includes the following 25 countries: Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, United Kingdom, Ireland, Spain, Australia, Canada, United States, Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela, Japan. Regressing the log of hours on a country fixed effect and year gives a slope coefficient of -0.00462 in the full sample (and -0.00398 for the period 1950–1998).

So post WWII not representative

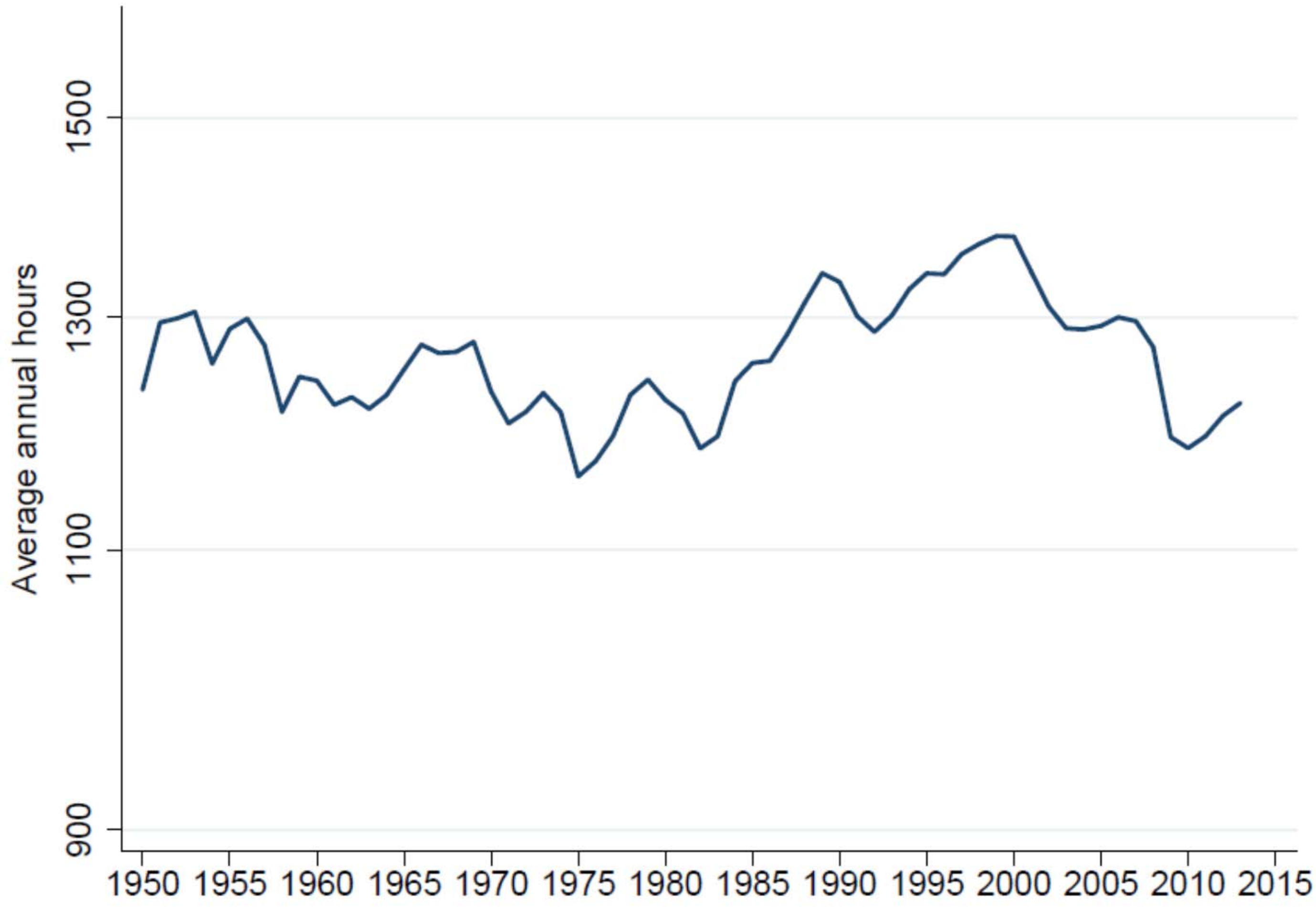


Figure: **U.S. average annual hours per capita aged 15–64, 1950–2013**

Notes: Source: GGDC Total Economy Database for total hours worked and OECD for the data on population aged 15–64. The figure is comparable to the ones in Rogerson (2006). Regressing the logarithm of hours worked on time gives an insignificant slope coefficient.

Important caveats

- **Leisure has notably increased (Aguiar & Hurst)**

Leisure since 1965, Aguiar & Hurst

Hours per Week Spent in Leisure for Full Sample, Men, and Women

Time-use category (hours per week)	Average hours per week spent in leisure					
	1965	1975	1985	1993	2003	Difference: 2003–1965
Panel 1: Full sample						
Leisure Measure 1	30.77	33.24	34.78	37.47	35.33	4.56
Leisure Measure 2	102.23	106.62	107.82	110.04	107.73	5.50
Leisure Measure 3	105.90	109.74	111.46	113.16	113.23	7.33
Leisure Measure 4	109.93	114.06	114.33	116.39	117.98	8.05
Panel 2: Men						
Leisure Measure 1	31.80	33.36	35.15	37.65	37.40	5.60
Leisure Measure 2	101.68	105.33	106.81	108.50	107.88	6.20
Leisure Measure 3	103.12	106.73	108.47	109.97	111.13	8.01
Leisure Measure 4	106.75	110.62	110.68	112.82	115.04	8.29
Panel 3: Women						
Leisure Measure 1	29.89	33.14	34.46	37.32	33.54	3.65
Leisure Measure 2	102.70	107.75	108.69	111.38	107.59	4.89
Leisure Measure 3	108.31	112.35	114.05	115.92	115.06	6.75
Leisure Measure 4	112.69	117.05	117.49	119.48	120.52	7.83

All means are calculated using fixed demographic weights, as described in the text. Leisure Measure 1 refers to the time individuals spent socializing, in passive leisure, in active leisure, volunteering, in pet care, and gardening. Leisure Measure 2 refers to the time individuals spent in Leisure Measure 1 plus time spent sleeping, eating, and in personal activities (excluding own medical care). Leisure Measure 3 includes Leisure Measure 2 plus time spent in child care. Leisure Measure 4 is defined as any time not allocated to market or nonmarket work. See Table IX and text for additional detail. The relevant sample sizes are as reported in Table II. The sample restrictions are described in the footnote to Table I.

Leisure since 1965, Aguiar & Hurst

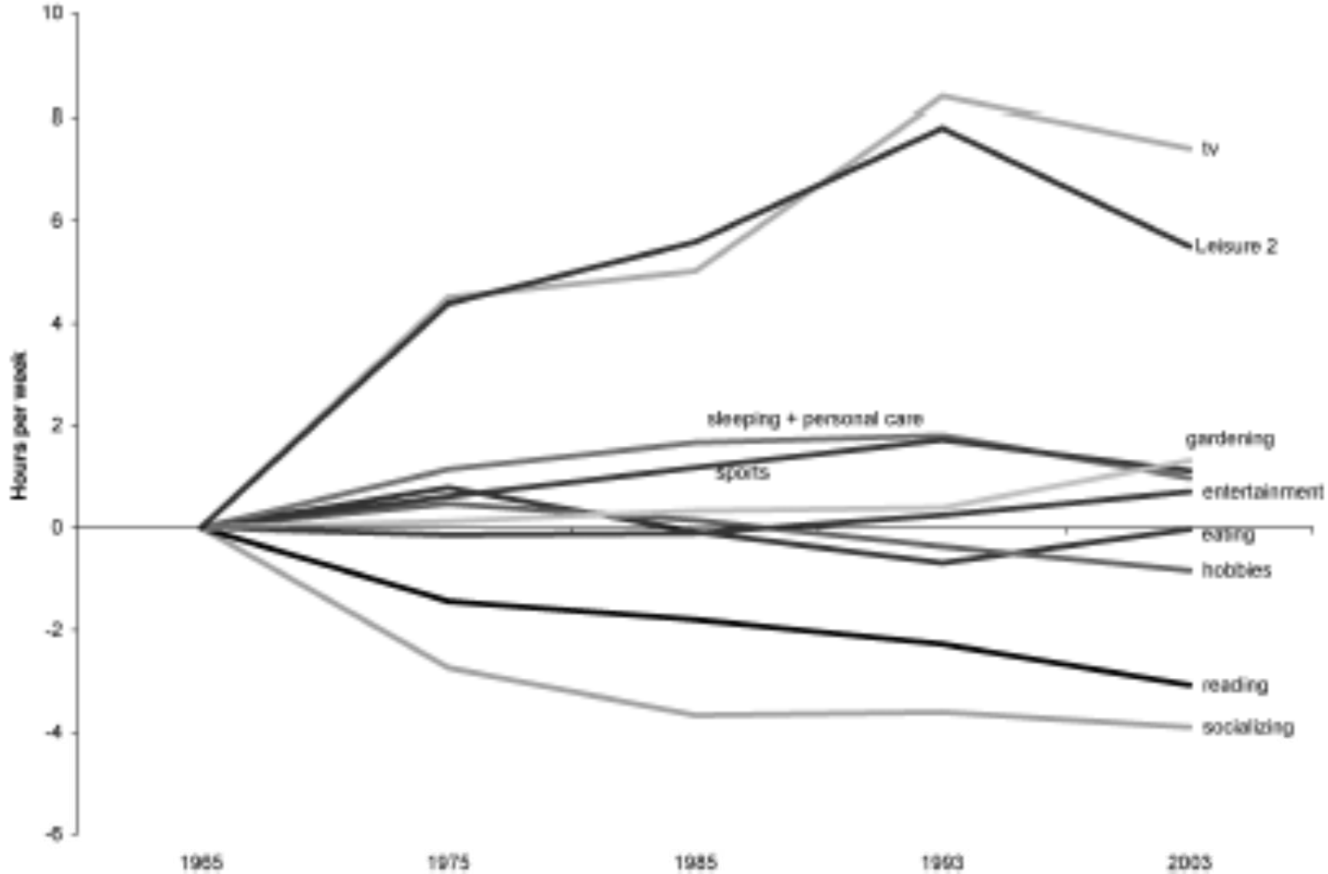


FIGURE I

Breakdown of Leisure by Activity, Deviations from 1965

This figure plots the evolution of the subcomponents of Leisure 2 for the full sample, represented as differences from each subcomponent's mean in 1965. All means are calculated using fixed demographic weights, as described in the text.

Rise in leisure inequality

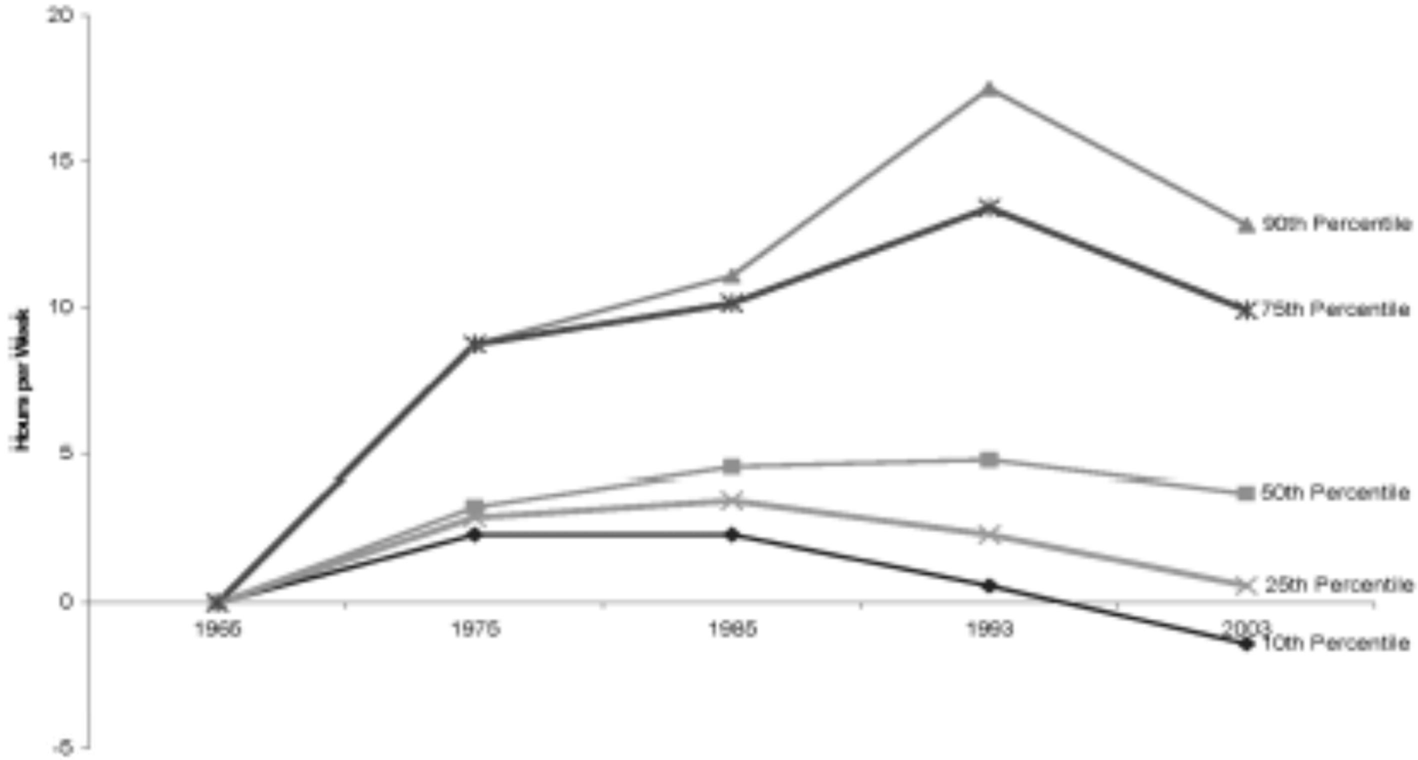


FIGURE II

Key Percentiles of Leisure 2 Distribution, Deviations from 1965

This figure plots the evolution of key percentiles of the cross-sectional distribution of Leisure 2 for the full sample, represented as differences from each percentile point's value in 1965. The percentile points represent the unconditional sample distribution in each year, unadjusted for demographic changes.

Leisure shifted to lower-waged workers

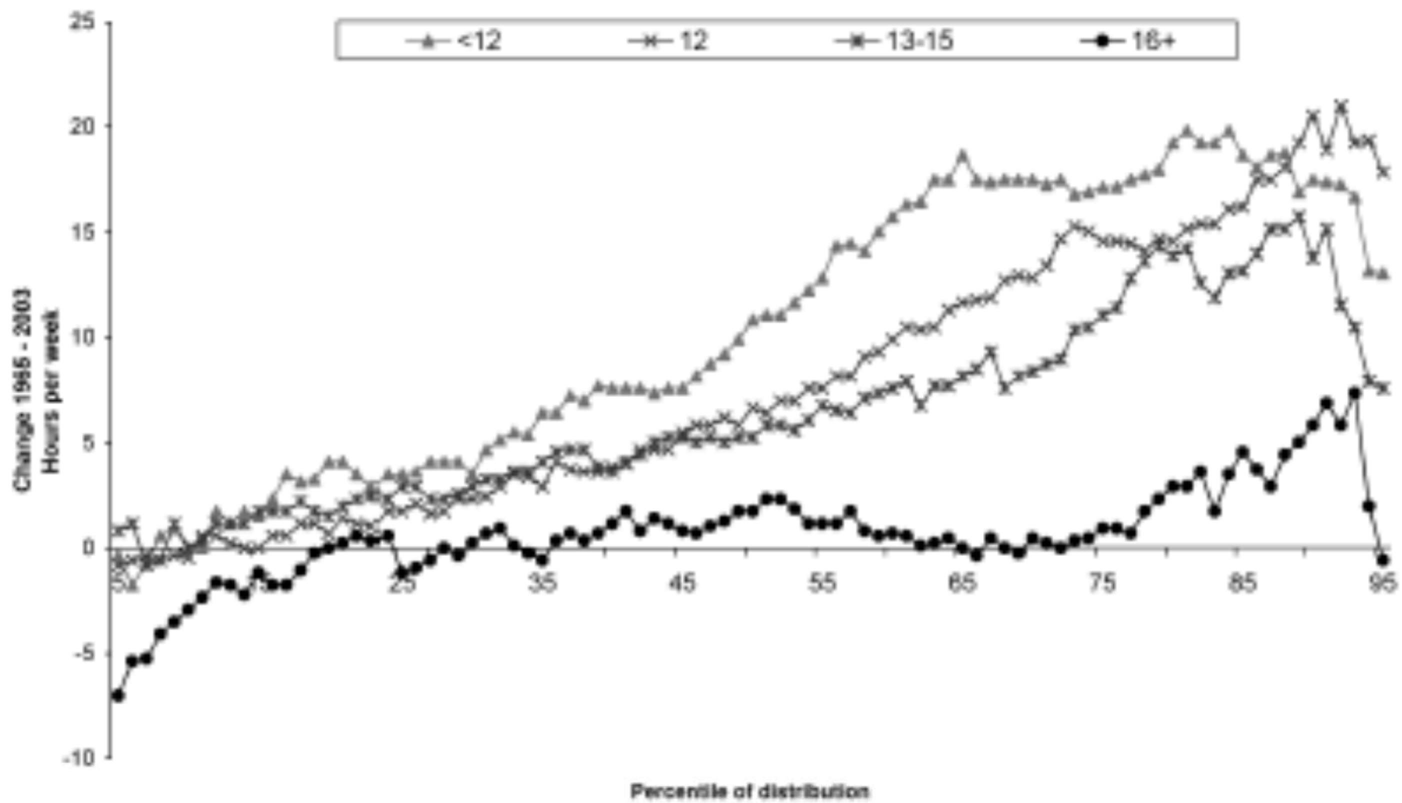


FIGURE IV

Change by Percentile Point for Leisure 2 by Educational Attainment 1965–2003

This figure plots the change at each percentile point of the Leisure 2 distribution between 1965 and 2003, broken down by educational attainment. The percentile points represent the unconditional distribution of the respective subsample in each year, unadjusted for demographic changes.

Important caveats

- **Leisure has notably increased (Aguiar & Hurst)**

- **Models abstract from a number of factors**
  - **Nature of work/leisure dramatically evolves**
  - **Innovations in home production—increased market labor**
  - **The variety of market goods evolves: encouraged market labor**
  - **Nature of leisure activities evolved—ambiguous effect**

Bick, et al., “How Do Hours worked vary with income?”

- **Compare employment rates and average hours across large set of countries—compared as of year 2000, for ages 25-54**

- **Focus on 48 core countries with similar samples/definitions**
  - **Workers working in sectors measured in GDP: includes agric. & self-employed, but not home sector**
  - **Respondents report actual hours worked over recent time period (last week, month); data collected over entire calendar year**

Bick, et al., Main findings

- Rich countries (top 3rd GDP) work 18.9 hours per week, compared to 28.5 in poor countries (bottom 3rd GDP), 40 percent difference in logs
  - Elasticity of hours wrt GDP/hour is -0.12
  - Employ. rates account for 3/4ths (same as for business cycles)
  - Expands welfare differences, about 40% in income units—high income/low factor 19 rather than 12 (nature of work also different)
- Within countries
  - Relative hours fall with relative wage in most countries, but in richest countries do not (in poorer countries fit relation across countries)
  - Is stronger for men--reflect lack of non-market info?

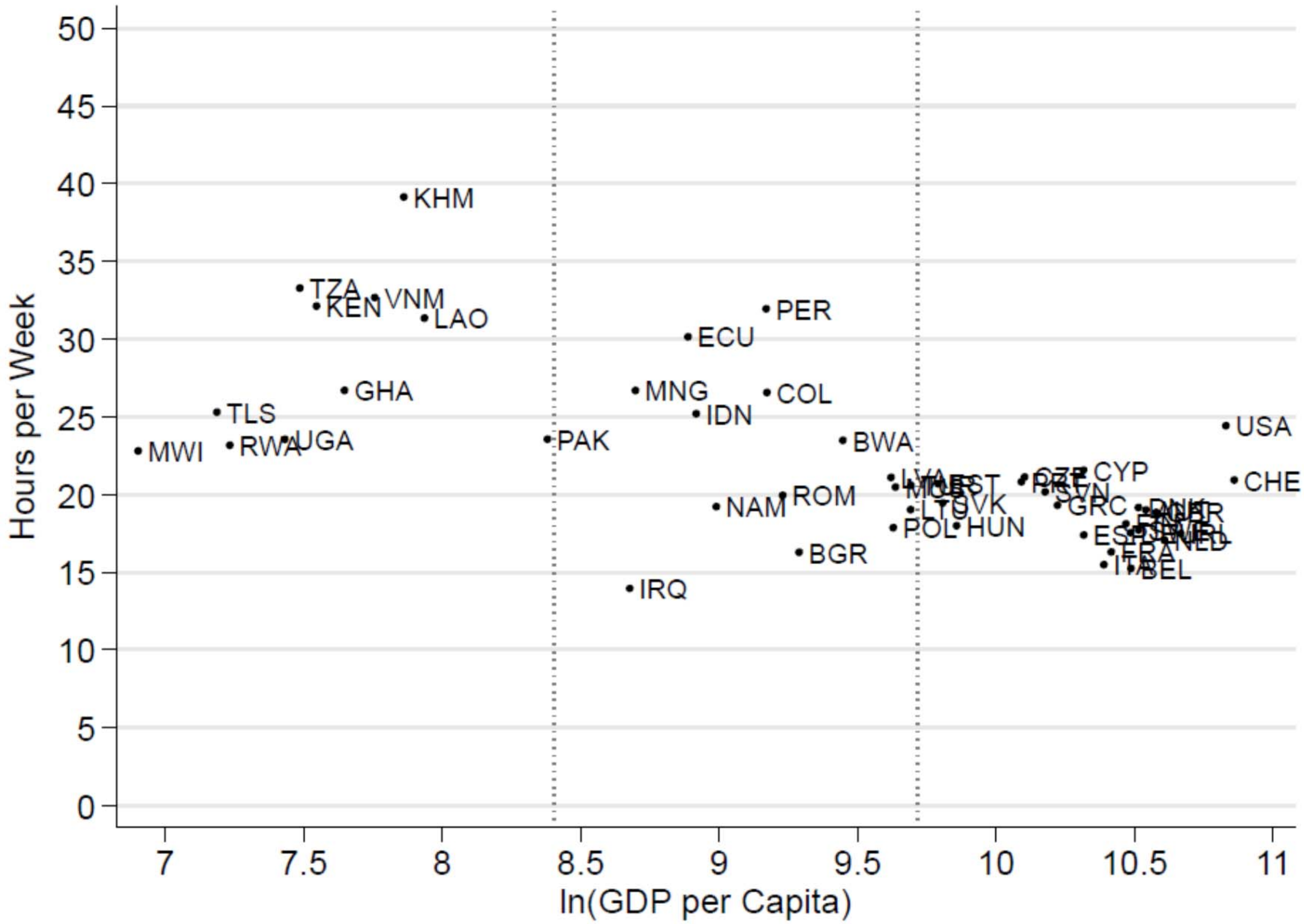
Main cross-section

Table 2: Employment Rates and Hours Per Employed

	Country Income Group		
	Low	Middle	High
Hours Per Adult	28.5	22.2	18.9
Employment Rate	75.3	53.7	54.9
Hours Per Worker	38.4	41.2	34.5

Main cross-section cont.

Figure 1: Average Hours Worked per Adult in Core Countries



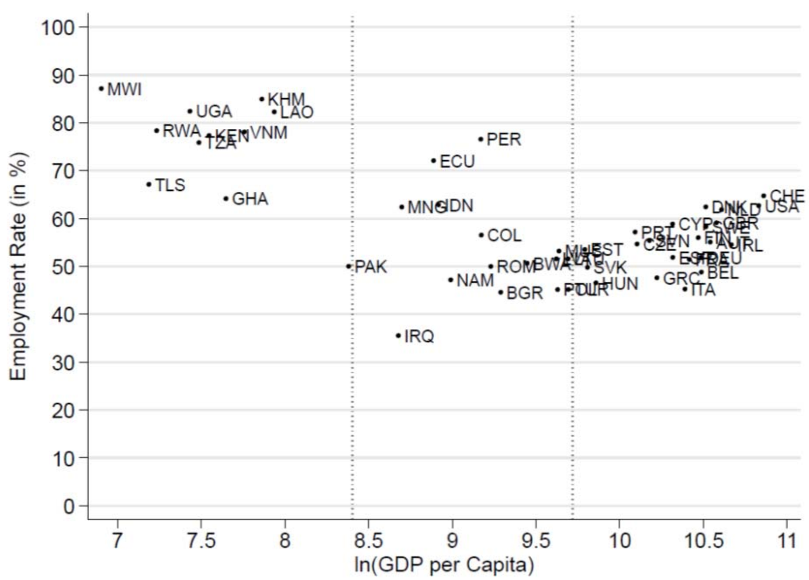
Holds controlling for gender, education

Sex	Country Income Group		
	Low	Middle	High
All	28.5	22.2	18.9
Women	24.4	16.3	14.6
Men	32.7	28.4	23.5

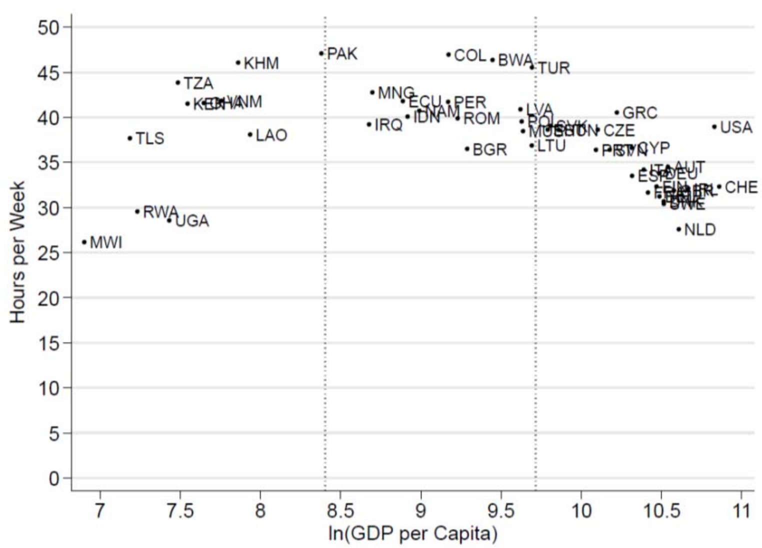
Education	Country Income Group		
	Low	Middle	High
All Ages	28.5	22.2	18.9
Ages 25+ (*Non-missing Educ.*)	33.0	25.7	20.7
Ages 25+			
Less than Secondary	31.8	19.8	12.2
Secondary Completed	37.3	29.3	23.4
More than Secondary	39.5	31.7	26.9

Employent versus workweek

(a) Employment Rate

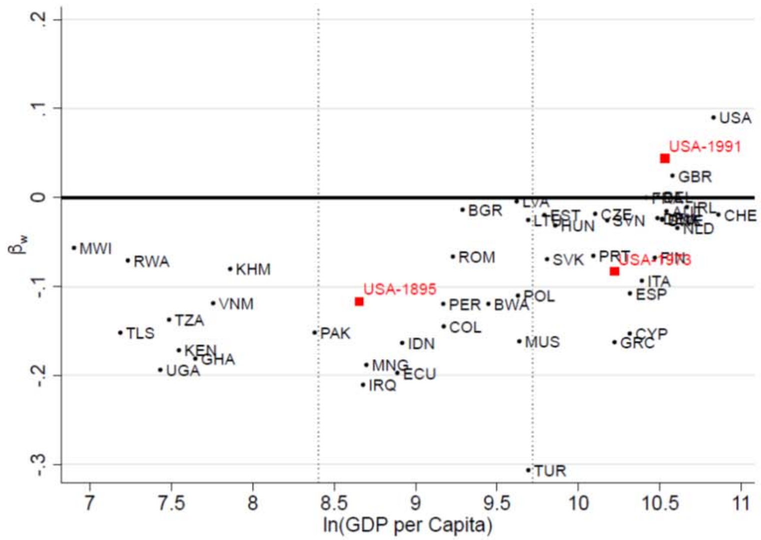


(b) Hours per Worker

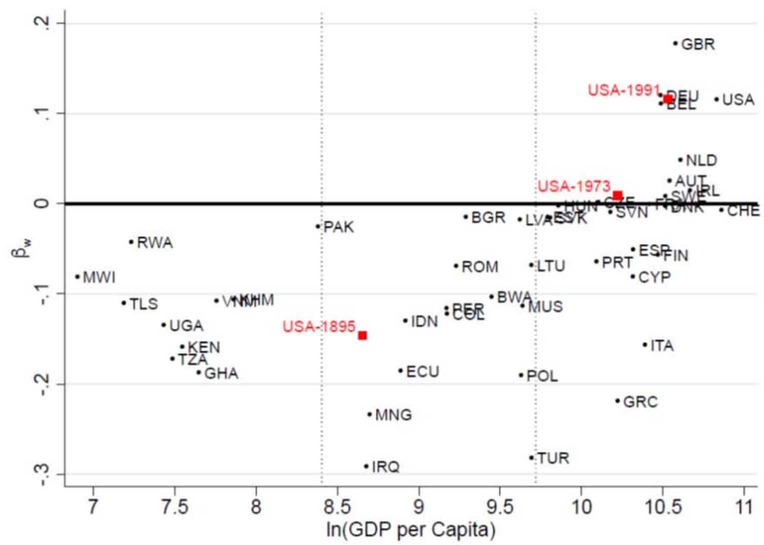


Within country patterns

(a) Men



(b) Women



Bick et al. (2019)

WHY ARE AVERAGE HOURS WORKED LOWER IN RICHER COUNTRIES?

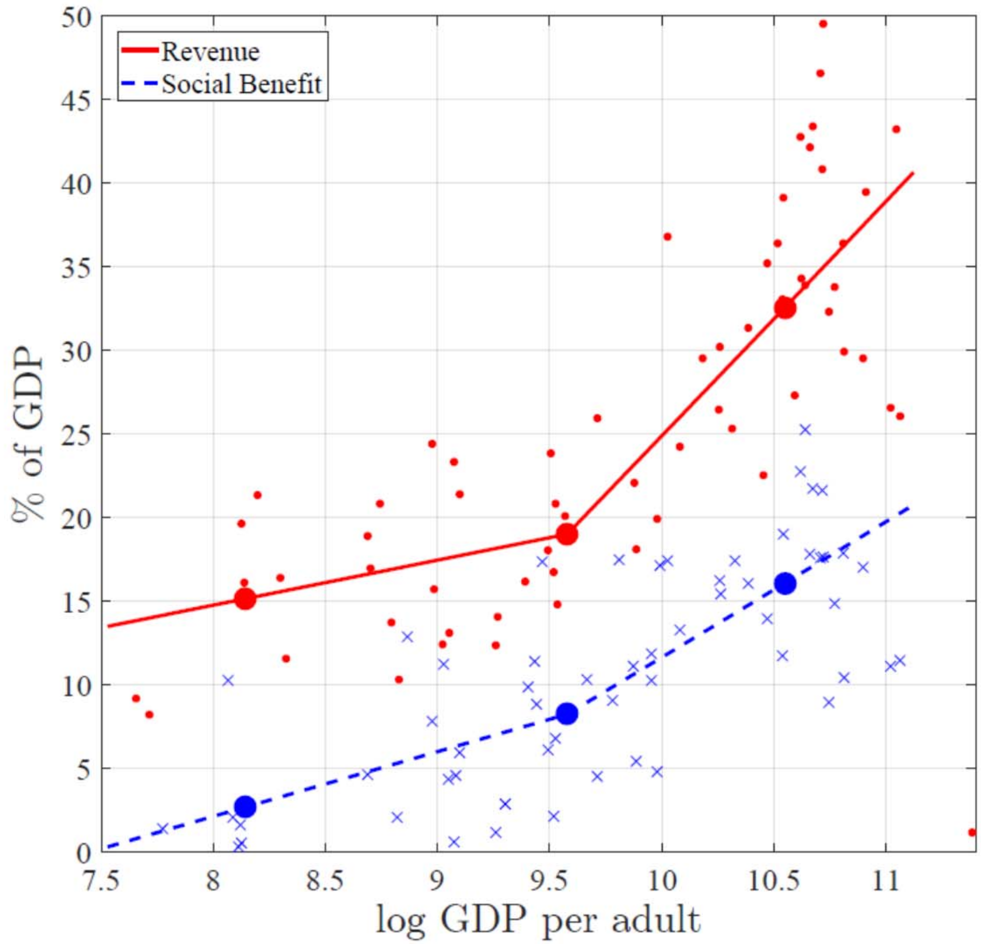
Alexander Bick
Nicola Fuchs-Schündeln
David Lagakos
Hitoshi Tsujiyama

Working Paper 26554
http://www.nber.org/papers/w26554

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
December 2019

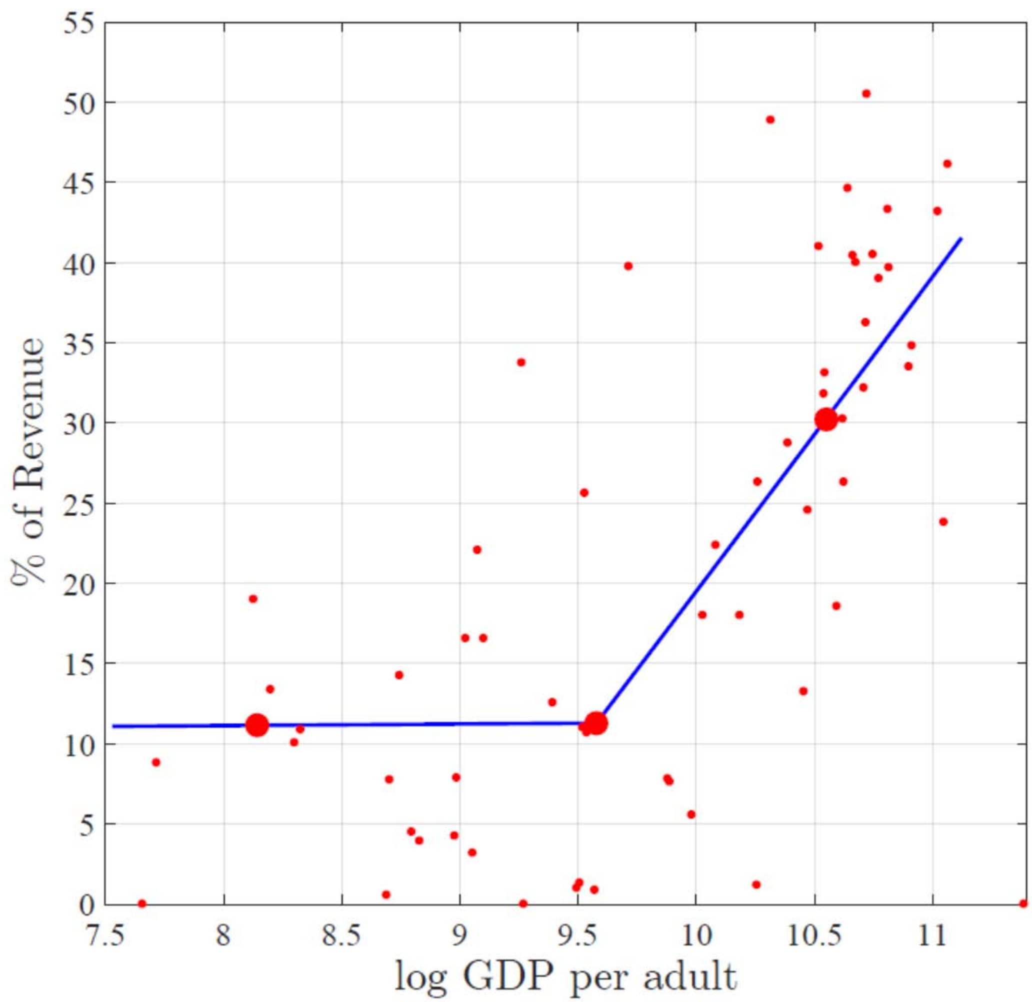
Bick et al. (2019), cont. (Wagner's Law)

(c) Government Revenue
and Social Benefits Relative to GDP



Bick et al. (2019), continued again

(b) Share of Government Revenues
Coming from Labor Income Taxation



Chang-Kim, with two-earner family

- **Allow for family**
- **Income processes assumed orthogonal**

$$U = \max_{\{c_t, h_{mt}, h_{ft}\}_{t=0}^{\infty}} E_0 \left\{ \sum_{t=0}^{\infty} \beta^t u(c_t, h_{mt}, h_{ft}) \right\}$$

with

(1) $$u(c_t, h_{mt}, h_{ft}) = 2\ln(0.5c_t) - B_m \frac{h_{mt}^{1+1/\gamma}}{1+1/\gamma} - B_f \frac{h_{ft}^{1+1/\gamma}}{1+1/\gamma}$$

(2)
$$V_{ee}(a, x_m, x_f; \lambda, \mu) = \max_{a' \in \mathcal{A}} \left\{ u(c, \bar{h}, \bar{h}) + \beta E\left[\max\left\{ V'_{ee}, V'_{en}, V'_{ne}, V'_{nn} \right\} \middle| x_m, x_f, \lambda \right] \right\}$$

subject to

$$c = w(x_m \bar{h} + x_f \bar{h}) + (1+r)a - a'$$

$$a' \geq \bar{a}$$

Chang & Kim parameters

TABLE 2

PARAMETERS OF THE BENCHMARK ECONOMY

Parameter	Description
$\alpha = 0.64$	Labor share in production function
$\beta = 0.9807392$	Discount factor
$\gamma = 0.4$	Intertemporal substitution elasticity
$B_m = 93.5$	Utility parameter for male
$B_f = 150.1$	Utility parameter for female
$\bar{h} = 1/3$	Amount of labor supply when working
$\rho_x = 0.948\ (0.925)$	Persistence of productivity x for male (female)
$\sigma_x = 0.269\ (0.319)$	Standard deviation of ϵ_x for male (female)
$\bar{a} = -4.0$	Borrowing constraint

Some steady-state features

LABOR-MARKET STEADY STATES

	CPS	Model I	Model II
Employment rates			
Male	77.33	77.34	77.36
Female	49.75	49.78	49.75
Aggregate	63.54	63.56	63.56
Fraction of households			
Both members working	43.87	45.35	45.83
Only male working	33.46	31.98	31.52
Only female working	5.88	4.42	3.92
Neither working	16.79	18.23	18.72

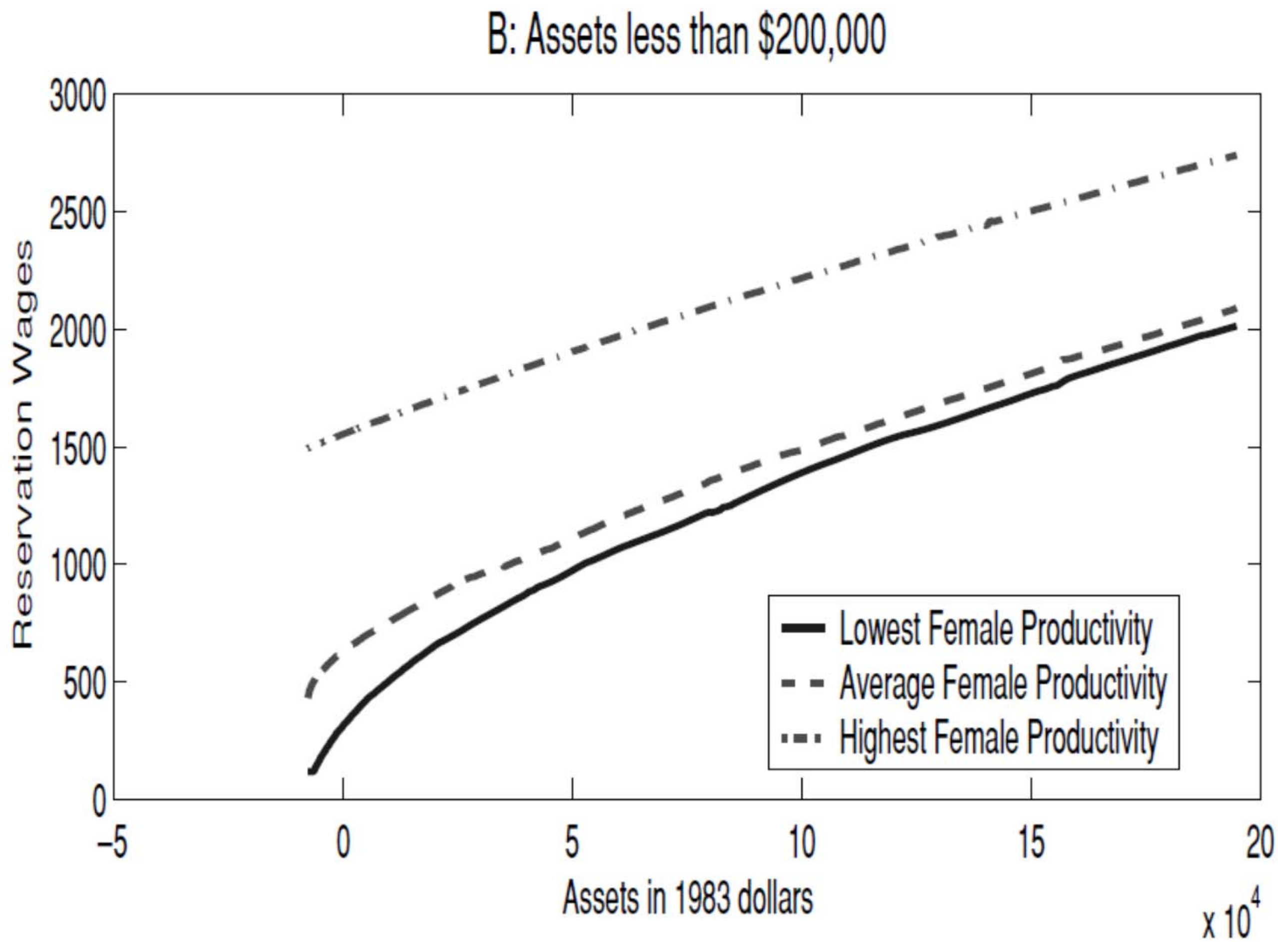
NOTE: All variables are percentages. The statistics for the CPS are annual averages of married households in the March Supplements for the period of 1968–2001.

GINI INDICES FOR WEALTH AND EARNINGS

	PSID	Model I	Model II
Wealth	0.76	0.64	0.61
Earnings	0.53	0.57	0.54

NOTE: The PSID statistics reflect the family wealth and earnings in the 1984 survey.

Reservation wages for men

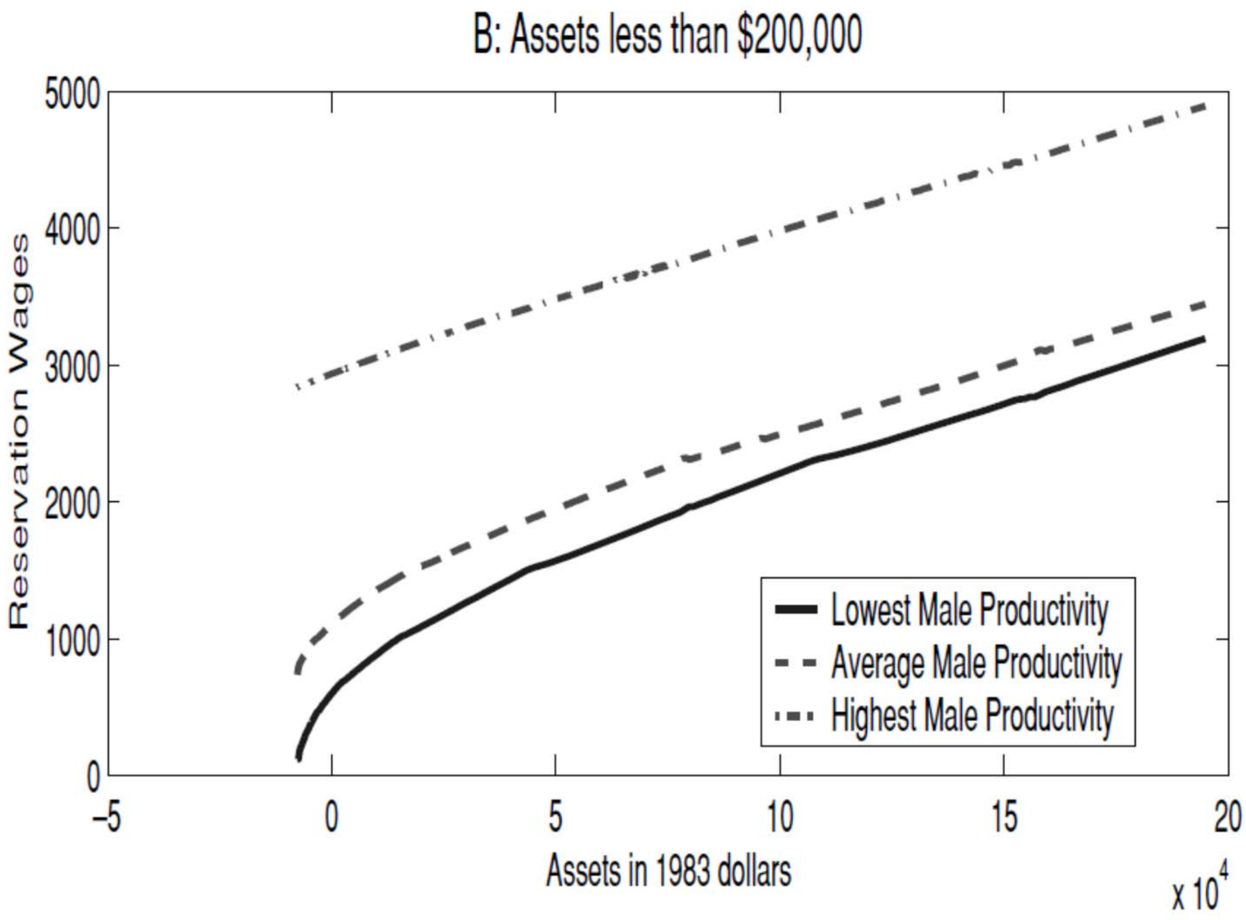


NOTES: The graphs denote the reservation-wage schedule of the three types of male worker (whose wife has the highest, average, and lowest productivity). Wages (quarterly earnings) and assets are in 1983 dollars.

FIGURE 3

RESERVATION-WAGE SCHEDULE OF MALE WORKERS: MODEL I

Reservation wages for women

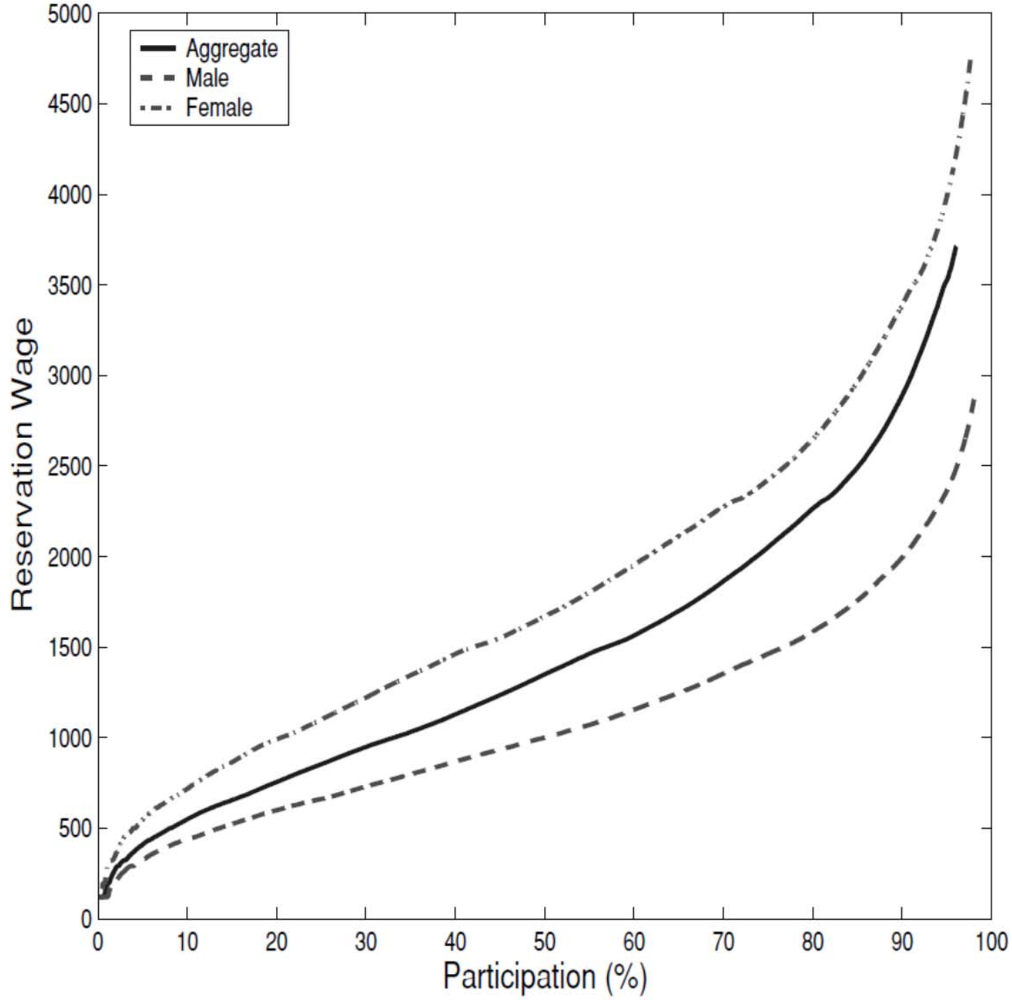


NOTES: The graphs denote the reservation-wage schedule of the three types of female worker (whose husband has the highest, average, and lowest productivity). Wages (quarterly earnings) and assets are in 1983 dollars.

FIGURE 4

RESERVATION-WAGE SCHEDULE OF FEMALE WORKERS: MODEL I

Reservation wage schedules



NOTES: The graph denotes the inverse cumulative distribution functions of reservation wages. Wages are quarterly earnings in 1983 dollars.

FIGURE 5

RESERVATION WAGES AND PARTICIPATION RATES: MODEL I

Implied Frisch Elasticities at Extensive Margin

IMPLIED ELASTICITY FROM THE STEADY-STATE RESERVATION-WAGE DISTRIBUTION

Model	Male	Female	Aggregate
Model I	0.84	1.36	0.94
Model II	0.96	1.71	1.12

NOTE: The numbers reflect the elasticity of the labor-market participation rate with respect to reservation wage (evaluated around the steady state) based on the steady-state reservation-wage distribution.

Adjusting wedge for heterogeneous workers

Assume:

- **75% of movements in total hours are via employment (data)**
- **"Marginal" workers less productive by one third (Barsky, Parker, Solon)**
  - **biases labor productivity countercyc: add back (3/4)*(1/3) = 1/4**
- **Leave workforce causes drop of one-sixth (16.7%) in consumption**
  - **biases consumption procyc: subtract back − (3/4)*(1/6) = 1/8**

Labor wedge “corrected” for heterog.

	Elasticity with respect to Total Hours:	
	Uncorrected	Corrected
Labor Productivity	− 0.33 (.08)	− 0.08
Total hours	1	1
Consumption	0.43 (.06)	0.30
Wedge	− 2.19 (.11)	− 1.68

Notes: Total hours and labor productivity is for private economy; Consumption is nondurables and services. Sample covers 1987 to 2018. All series are logged and HP-filtered. The wedge assumes an IES of 0.5 and a Frisch of 1.0. Correction assumes: (i) three-quarters of movements in total hours via employment; (ii) workers coming in and out of workforce cyclically are one-third less productive; (iii) consumption rises (fall) by one-sixth when enter (exit) workforce.

Park: “Consumption, Reservations Wages, and Aggregate Labor Supply

Uses empirical joint distribution of wages and consumption to estimate supply elasiticity

Key insight—consumption is sufficient statistic for wealth and future earnings

Reservation wage curve

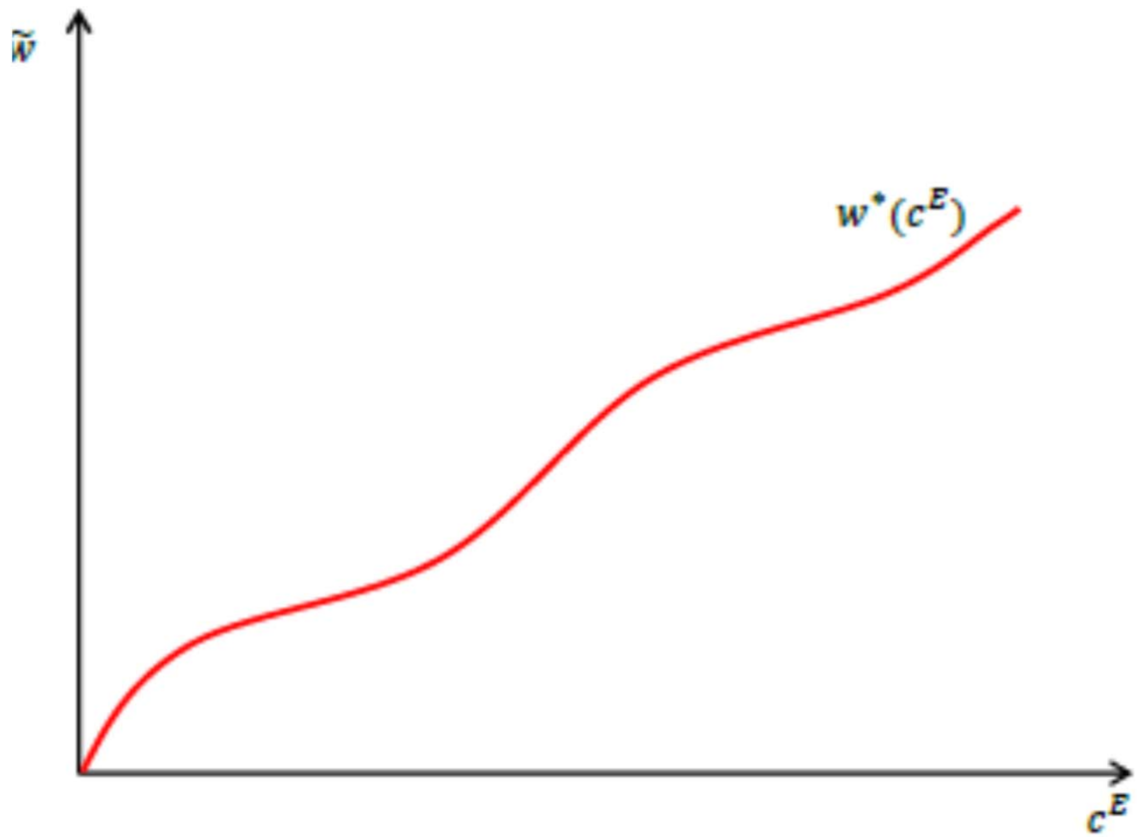


Figure 2: Reservation Wage Curve

Robustness of Conditioning on Consumption

The key result is that the reservation wage conditional on consumption is unique and independent of the state variables. Intuitively, individual saving decisions reflect their future expectations based on constraints they face, and these are all summarized in their consumption choices. Thus, given consumption and wage, the period utility cost of working determines whether they work or not.[9]

Within the class of models defined in equation (1), the reservation property conditional on consumption is robust to the following specification choices:

1. arbitrary heterogeneity in discount factors, borrowing constraints, and wage processes,
2. time horizon: infinite time versus life cycles,
3. flexibility of hours choices: both margins of labor supply versus indivisible labor,
4. separability between consumption and leisure in the period utility function,
5. two earner's problem when labor is indivisible.

Distributions

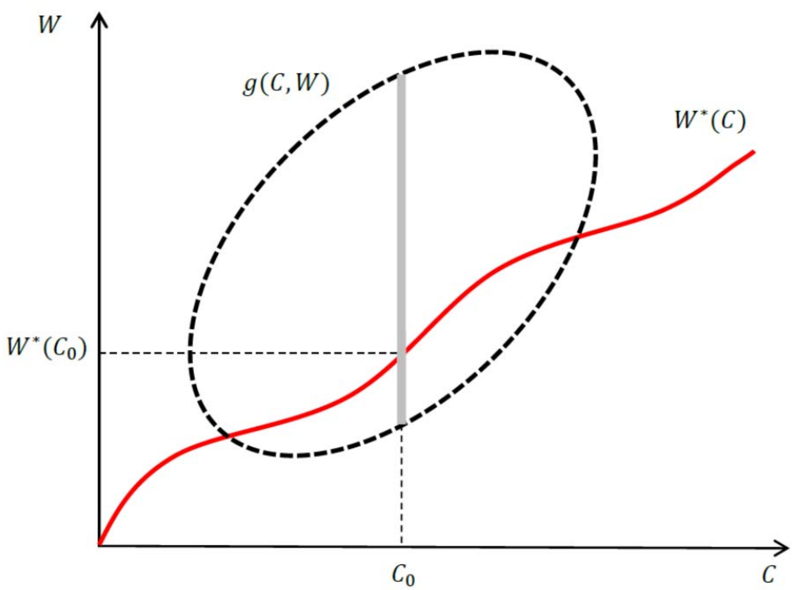


Figure 3: Population Joint Distribution and Employment Rate

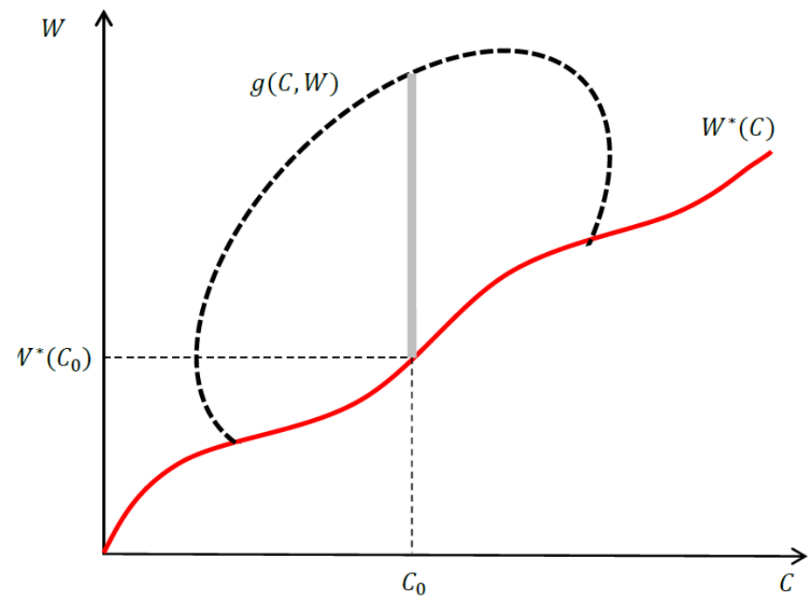


Figure 4: Observed Distribution of Workers

Observed wages at a particular consumption and the extensive Frisch

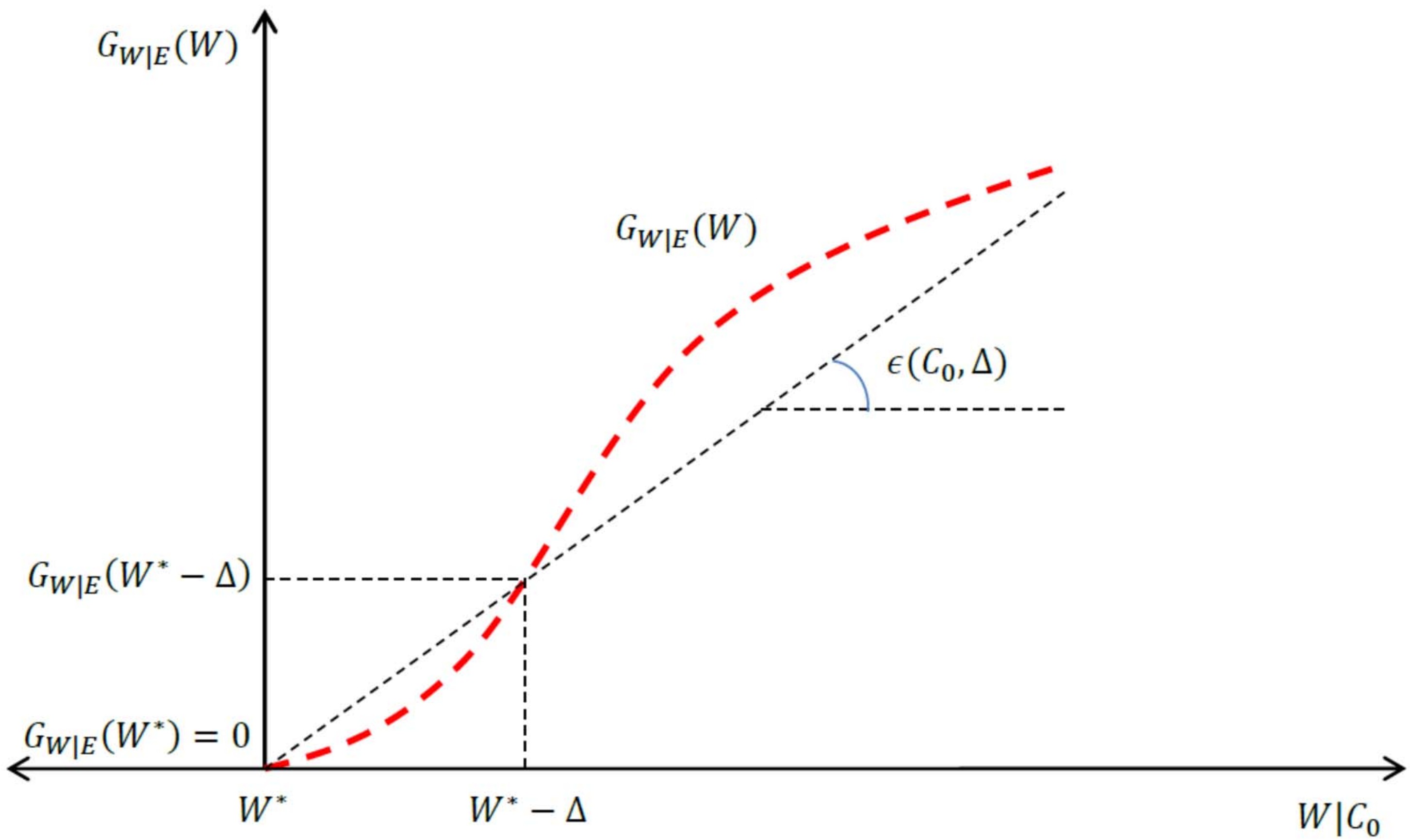


Figure 5: Conditional Distribution and Extensive Margin Frisch Elasticity

Allowing for measurement error

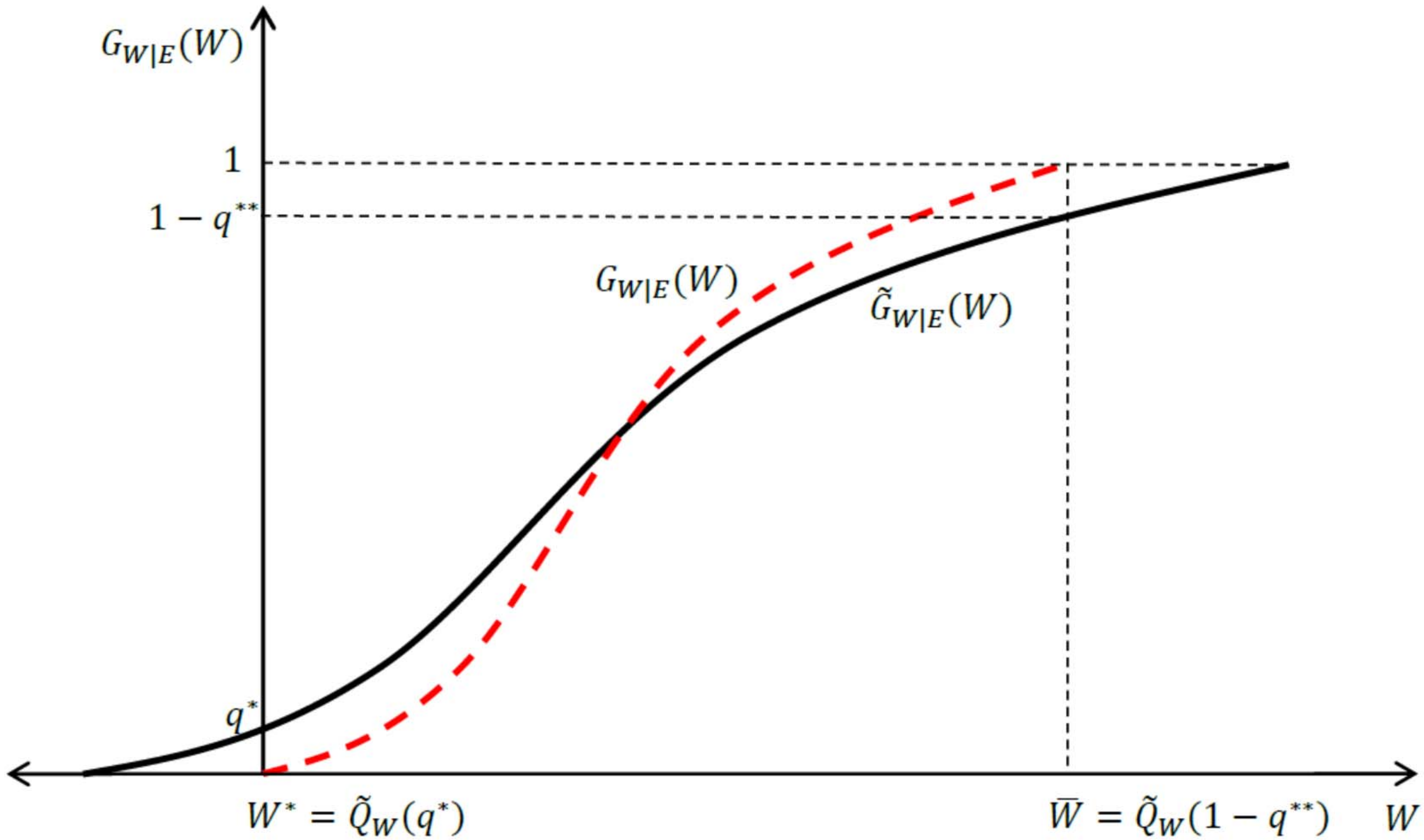


Figure 7: The Effects of Measurement Error on the Distribution

Results for extensive Frisch

		$q^* = q^{**}$				
		0.03	0.04	0.05	0.06	0.07
Aggregate		0.22	0.31	**0.40**	0.48	0.54
		(0.02)	(0.03)	(0.04)	(0.05)	(0.05)
Gender	Male	0.21	0.28	**0.34**	0.40	0.45
		(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
	Female	0.23	0.34	**0.52**	0.57	0.64
		(0.03)	(0.05)	(0.07)	(0.08)	(0.08)
Age	[25,34]	0.26	0.35	**0.43**	0.55	0.65
		(0.03)	(0.04)	(0.05)	(0.06)	(0.08)
	[35,54]	0.19	0.29	**0.39**	0.45	0.50
		(0.02)	(0.02)	(0.04)	(0.05)	(0.05)
	[55,65]	0.23	0.31	**0.41**	0.47	0.48
		(0.03)	(0.04)	(0.06)	(0.06)	(0.06)
Education	Non-college	0.25	0.35	**0.51**	0.57	0.64
		(0.03)	(0.04)	(0.06)	(0.07)	(0.06)
	College	0.16	0.23	**0.28**	0.34	0.40
		(0.01)	(0.02)	(0.02)	(0.03)	(0.03)
Race	White	0.20	0.28	**0.36**	0.44	0.52
		(0.01)	(0.02)	(0.03)	(0.04)	(0.04)
	Non-white	0.36	0.52	**0.61**	0.65	0.67
		(0.06)	(0.08)	(0.08)	(0.10)	(0.13)
Marital Status	Married	0.21	0.29	**0.36**	0.44	0.50
		(0.01)	(0.02)	(0.03)	(0.03)	(0.03)
	Single	0.25	0.38	**0.59**	0.65	0.68
		(0.06)	(0.08)	(0.11)	(0.10)	(0.12)

Krusell, Mukoyama, Rogerson and Sahin

- Look at Labor Supply Response to Cyclical Fluctuations

- Reflects both comparative advantage and search frictions
  - Unlike most DMP models, allow wealth effect

- Give rich depiction of labor flows
  - Job-to-job, exogenous and endogenous separations from employment
  - Endogenous search: transitions between employed, unemployed, OLF

- Movements between unemployed/OLF give insight into labor supply (i.e. substitution and wealth effects), not imposing competitive labor demand

Data: Stocks

Dataset: Current Population Survey 1978Q1-2012Q3.

	u	$lfpr$	E
$std(x)$	0.1170	0.0026	0.0099
$corrcoef(x, Y)$	-0.84	0.21	0.83
$corrcoef(x, x_{-1})$	0.93	0.69	0.92

- Unemployment rate is countercyclical.
- Labor force participation rate is weakly procyclical.
- Employment rate is procyclical.

Data: Averages of gross worker flows

Unadjusted Data				Abowd-Zellner Correction			
FROM		TO		FROM		TO	
	E	U	N		E	U	N
E	0.957	0.015	0.028	E	0.972	0.014	0.014
U	0.254	0.535	0.211	U	0.228	0.637	0.135
N	0.047	0.028	0.925	N	0.022	0.021	0.957

- Correcting for misreporting reduces flows between U and N, but there still are large flows.

Abowd-Zellner (1985) correction

$$\begin{bmatrix} \widehat{E} \\ \widehat{U} \\ \widehat{N} \end{bmatrix}_t = \underbrace{\begin{bmatrix} 1-\varepsilon_{EU}-\varepsilon_{EN} & \varepsilon_{UE} & \varepsilon_{NE} \\ \varepsilon_{EU} & 1-\varepsilon_{UE}-\varepsilon_{UN} & \varepsilon_{NU} \\ \varepsilon_{EN} & \varepsilon_{UN} & 1-\varepsilon_{NE}-\varepsilon_{NE} \end{bmatrix}}_{\mathbf{E}} \begin{bmatrix} E \\ U \\ N \end{bmatrix}_t$$

$$\widehat{UN}_t \approx (1-\varepsilon_{UN}-\varepsilon_{NU})\,UN_t + \varepsilon_{UN}UU_t + \varepsilon_{NU}NN_t, \text{ and}$$

$$\widehat{NU}_t \approx (1-\varepsilon_{UN}-\varepsilon_{NU})\,NU_t + \varepsilon_{UN}UU_t + \varepsilon_{NU}NN_t.$$

Abowd-Zellner cont.

$$\mathbf{N}_t = \begin{bmatrix} EE & UE & NE \\ EU & UU & NU \\ EN & UN & NN \end{bmatrix}_t$$

$$\mathbf{N}_t = \mathbf{E}^{-1}\widehat{\mathbf{N}}_t \left(\mathbf{E}^{-1}\right)'$$

Abowd-Zellner estimates

Table 1: Abowd and Zellner (1985) estimates of classification errors

Original	Status determined on reinterview		
interview status	Employed	Unemployed	Non-participant
Employed	98.78	1.91	0.50
Unemployed	0.18	88.57	0.29
Non-participant	1.03	9.52	99.21

Source: Abowd and Zellner (1985, Table 6).

Cyclicality of Flows

Unadjusted Data

	f_{EU}	f_{EN}	f_{UE}	f_{UN}	f_{NE}	f_{NU}
$std(x)$	0.075	0.033	0.077	0.053	0.041	0.064
$corrcoef(x, Y)$	−0.70	0.35	0.79	0.66	0.61	−0.70
$corrcoef(x, x_{-1})$	0.69	0.22	0.82	0.71	0.52	0.78

Abowd-Zellner Correction

	f_{EU}	f_{EN}	f_{UE}	f_{UN}	f_{NE}	f_{NU}
$std(x)$	0.089	0.083	0.088	0.106	0.103	0.072
$corrcoef(x, Y)$	−0.63	0.43	0.76	0.61	0.52	−0.23
$corrcoef(x, x_{-1})$	0.59	0.29	0.75	0.62	0.38	0.30

- EU and UE are intuitive, given that the labor demand (frictions from the worker's perspective) is cyclical.
- NE and NU can also be interpreted through the lens of labor market frictions.
- EN and UN are the least intuitive.

Model Overview

- Discrete-time, partial equilibrium model of consumer behavior
- Consumers make consumption/saving decision and labor supply decision.
- Frictional labor market: job offers come with some probability. There are exogenous separations.
- No insurance markets but can save (self-insure).
- Incorporates on-the-job search and realistic unemployment insurance system.

Unemployed vs. OLF

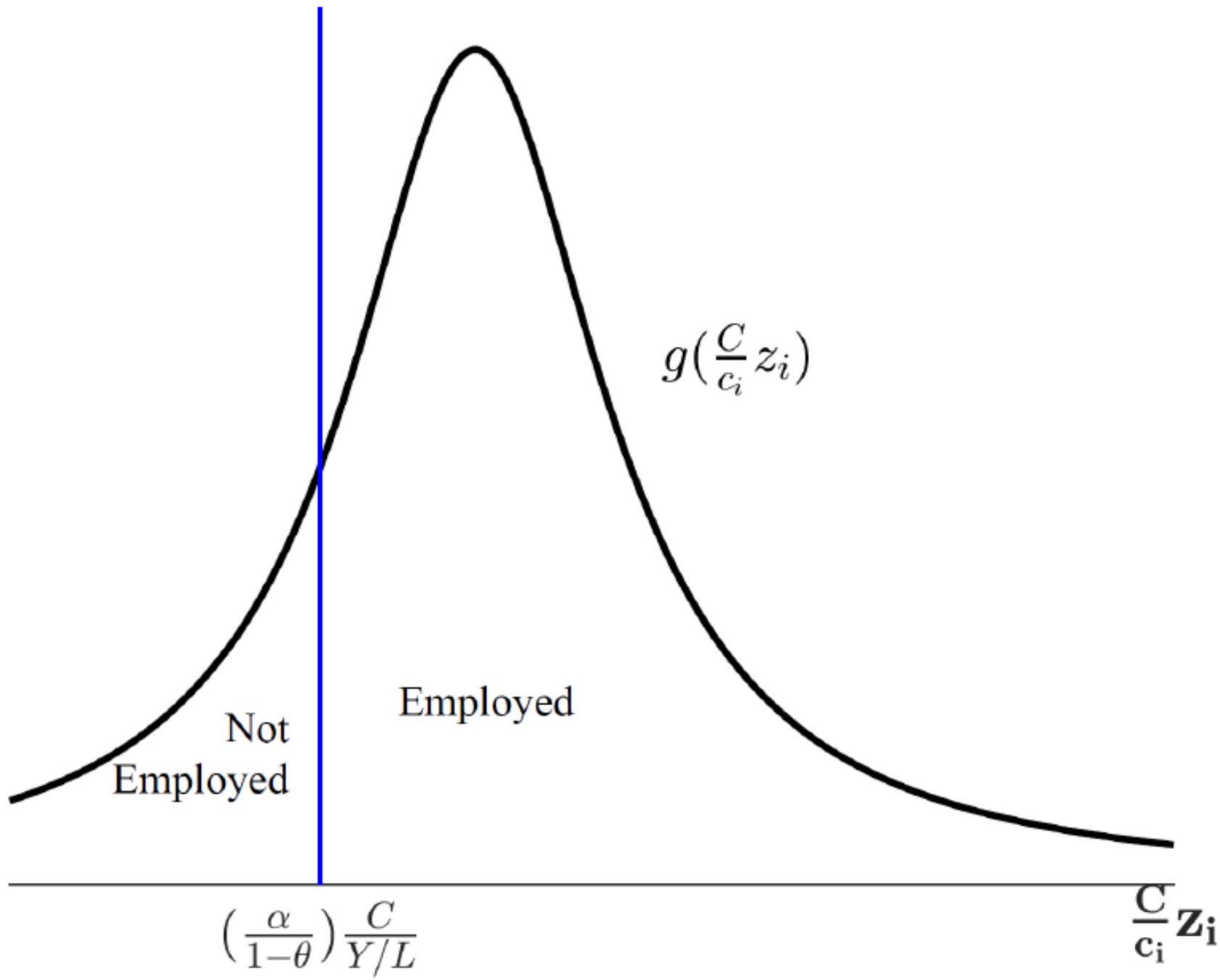
Employed: In the Current Population Survey (CPS), classified as employed if, during the survey reference week, they meet any of the following criteria:

- worked at least 1 hour as a paid employee
- worked at least 1 hour in their own business, profession, trade, or farm
- were temporarily absent from their job, business, or farm
- worked without pay for min. 15 hours in business/farm owned by member of family

Unemployed: In CPS, classified as unemployed if meet all of the following criteria:

- They were not employed during the survey reference week.
- They were available for work during the survey reference week, except for temporary illness.
- They made at least one specific, active effort to find a job during the 4-week period ending with the survey reference week OR they were temporarily laid off and expect to be recalled.
- *Classification as unemployed in no way depends upon a person's eligibility for, or receipt of, unemployment insurance benefits.*

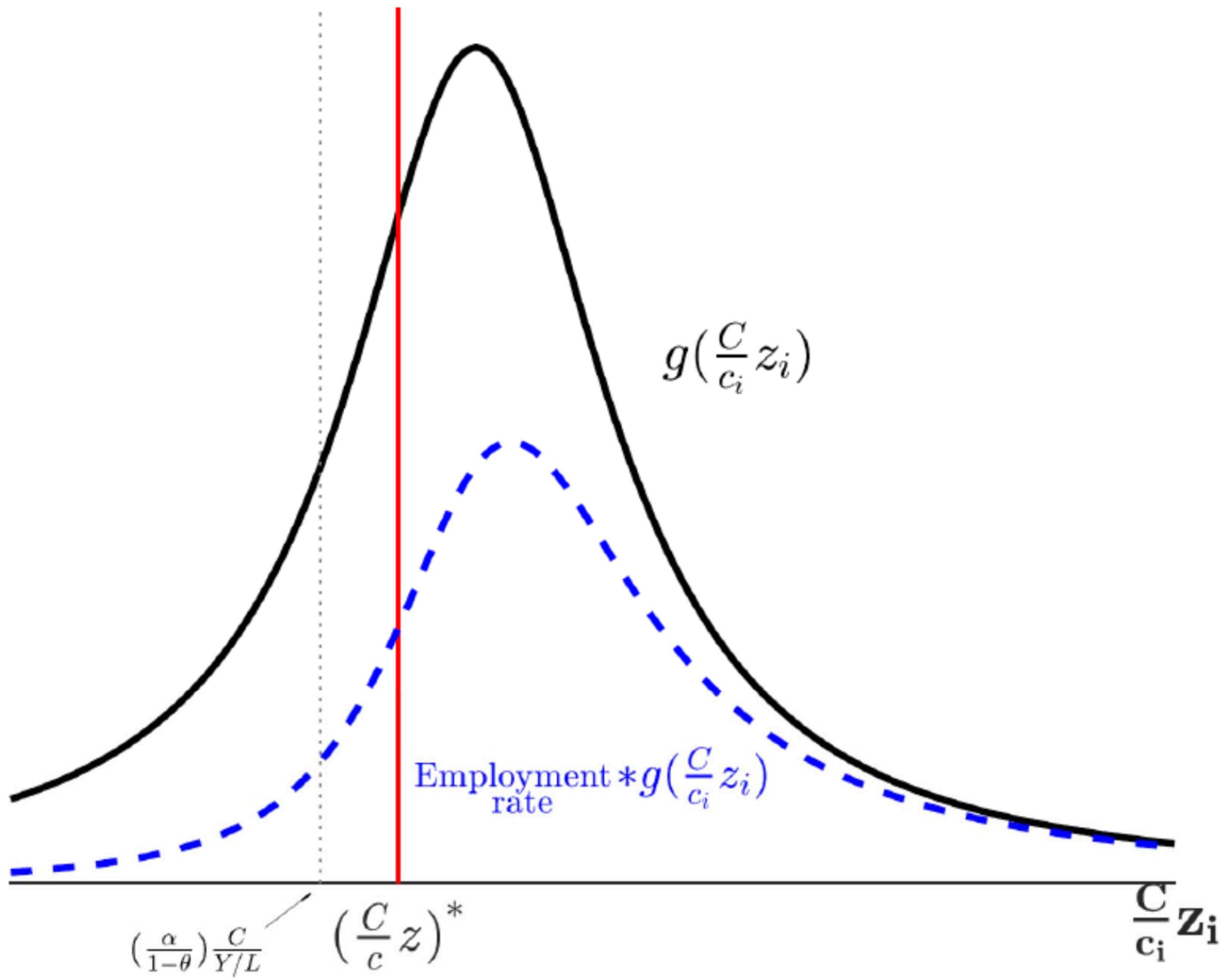
Ignore search frictions



Add rich set of frictions, choices governing flows

- Two exogenous flows: Exogenous job-to-job and exogenous separations
- Endogenous separations, endogenous take up of offers, endogenous search
- A number of qualitative predictions:
  - Separation rate decreasing in $\frac{w_i}{c_i}$
  - Probability unemployed versus OLF increasing in $\frac{w_i}{c_i}$
  - Probability transit unemployed to employed increasing in $\frac{w_i}{c_i}$
- $\frac{C}{Y/L}$ remains key statistic for judging cyclicality of endogenous choices

Comparative advantage Gets “smoothed” out



Comp. adv. still key to search/separation decisions

- Focus on search decision
  - Take perfect-insurance case: critical z^*, search if, only if, $z \geq z^*$
  - perturb z^* today and next period to hold matches constant going forward

    Net benefit (ignoring heterogeneity in match quality)

$$= -\gamma + (\lambda_u - \lambda_n)\left(\tfrac{z_i(1-\theta)Y}{L}\tfrac{1}{C} - \alpha + (1-\sigma)\beta\tfrac{\gamma}{(\lambda_u-\lambda_n)}\right)$$

$$\Rightarrow z^* = \left(\tfrac{\alpha}{1-\theta}\right)\tfrac{C}{Y/L}\left(1 + \tfrac{\gamma/\alpha}{(\lambda_u-\lambda_n)}\left(1-\beta(1-\sigma)\right)\right)$$

  - Threshold (as without frictions) dictated by statistic: $\frac{Y/L}{C} = \frac{(Y/E)(E/L)}{C}$