

Gendered change: 150 years of transformation in US hours

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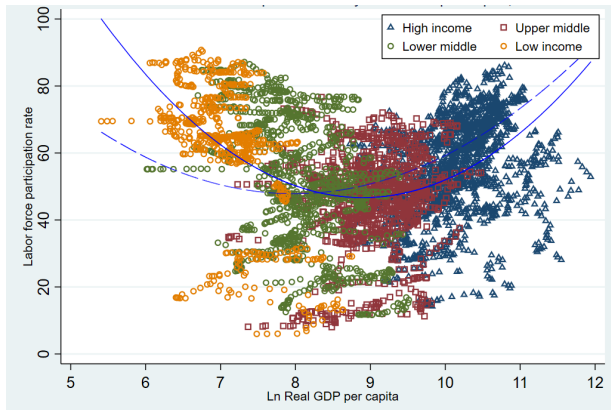
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Background and motivation

- ▶ High-income countries witnessed a rise in female employment and gender convergence in earnings since WW2
- ▶ But not a universal phenomenon
 - ▶ female employment has been falling during other time windows and/or in other countries
 - ▶ evidence that female employment declines at early stages of development and then rises at later stages, in sync with fall in agriculture and rise in services.

Female employment and development

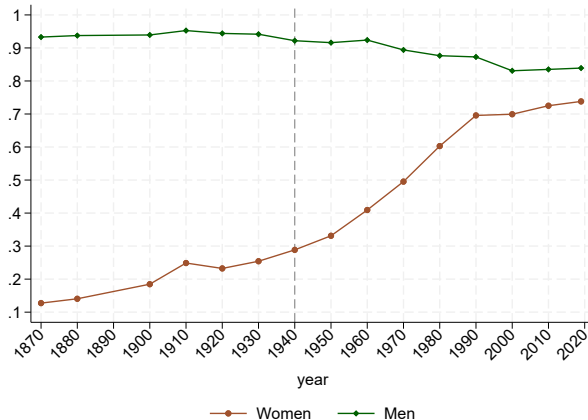


Age 15+, country FE, 1960-2017. Dinkelman and Ngai 2021

This paper

- ▶ Aim to understand various phases in the evolution of female and male employment through the lens of structural transformation
 - ▶ labor reallocation across agriculture, manufacturing and services
 - ▶ and marketization of home production
 - ▶ focus on unpaid family work
- ▶ Different sectors vary in productivity growth and female intensity
- ▶ US historical evidence, 1870-2019.

Male and Female Employment Rates, US Census



Individuals aged 18-64, US Census.
1940, change in definition: "gainful employment" to "ILO employment".

Our Approach

- ▶ Build consistent measure of market work by gender, US 1870-2019:
 - ▶ Extensive margin: persons in paid and unpaid market work.
 - ▶ Intensive margin: hours in paid and unpaid work.
 - Market work is U-shaped for women and declining for men.
- ▶ Unified framework for understanding these trends
 - ▶ Consumption complementarity, uneven productivity growth, and income effects
 - structural transformation and marketization.
 - ▶ Decline in agriculture → fall in market work.
 - ▶ Marketization of home services → increase in market work.
 - ▶ The gender impacts are induced by sector-specific gender intensity
 - ▶ Home services are female intensive → U-shape for women but not for men.

Related work

- ▶ **U-shape hypothesis** in Sinha (1965), Boserup (1970), Goldin (1986) et al
 - ▶ Mostly cross country evidence (Goldin 1995, Olivetti 2014, Doss et al 2023); except Goldin (1990) – based on revision of 1890 Census statistics.
 - ▶ We harmonize data sources for the earlier period, covering extensive and intensive margins of female work since 1880.
 - ▶ Formalize link between gender trends and the changing industry structure in a unified framework.
- ▶ **Interplay between women's work and rise in services** in more recent decades: Ngai and Petrongolo (2017), Rendall (2018), Bridgman et al (2018), Buera et al (2019).
 - ▶ We contribute perspective on the earlier period – valuable for understanding gender trends in economic history and shed light on the ongoing transition out of agriculture in developing world.

Data

Employment definitions and measurement

- ▶ ILO definition of employment covers *work for pay, profit or family gain in cash or kind* – i.e. including unpaid family workers. ILO Unpaid family work 1990-2019
- ▶ Measurement is not consistent over time and across countries (Durand 1975).
- ▶ U.S Census:
 - ▶ pre-1940: *gainful employment*; but with early (and inconsistent) attempts to capture some unpaid work when done “regularly” or “most of the time”
 - ▶ 1940–: *ILO employment*; but not entirely consistent over time and restrictive. Historical Statistics From Colonial Times to 1970, Ch. D and K
 - ▶ hired (paid) workers: if working any positive hours
 - ▶ unpaid workers: if working 15h+ per week
- ▶ Challenge: identifying unpaid family work when most widespread.

Undercount of female employment in the US

- ▶ Early Census instructions reflected social attitudes towards women's employment and unstructured/unpaid nature of female work in agriculture (Smuts 1960).

Example:

- ▶ 1890: about 40% population on farms
- ▶ about 4m white married women on farm
 - ▶ census reported about 23k in agricultural occupations.
- ▶ 1950: about 14% population on farm
 - ▶ nearly 200k as unpaid family laborers
- ▶ Also, 1888 Survey of 693 Farmers in Connecticut: in 94% of farms at least 1 female family member 'employed' (Carter et al 1993.)

Adjustment for unpaid employment - Extensive Margin

Ruggles (2015): importance of family enterprise in 19th century, through to mid-20th century.

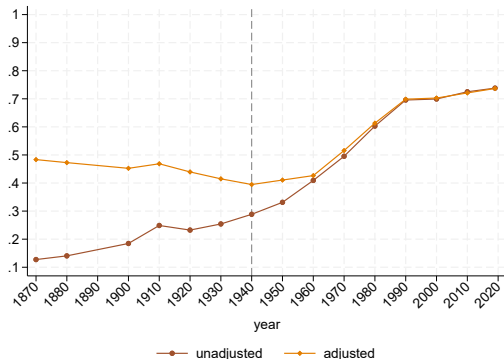
- ▶ “production was carried out by families”;
- ▶ “all family members that were old enough contributed to farm production.”
- ▶ Nonfarm family business: shoemakers, tailors, boarding etc.

Estimate unpaid employment using micro data at the household level:

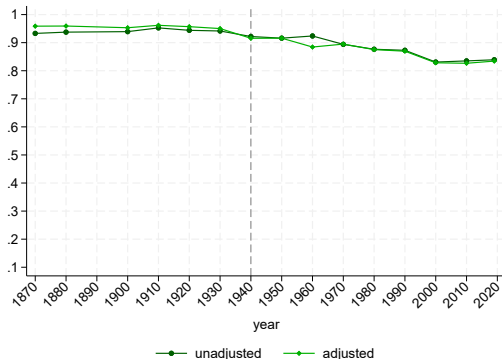
- ▶ Assign to labor force women on farms, whose head of household is farmer, whether or not they report an occupation.
- ▶ Method extended to non-farm families in which the head is self employed.

US Employment by gender, 1870-2019

Women



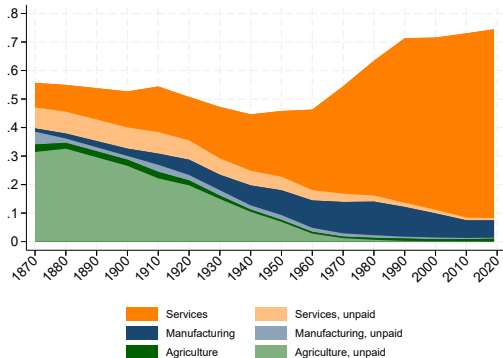
Men



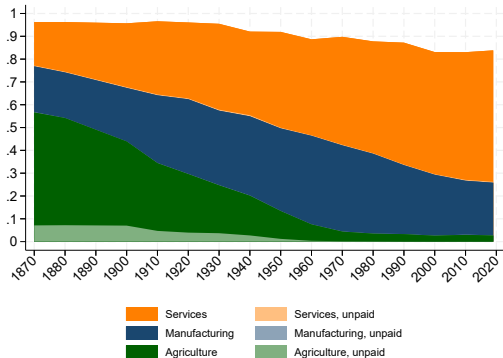
Note: Age 18-64, US Census.

Employment and Structural Transformation by Gender

Women



Men



Notes: US Census, age 18-64.

Market hours

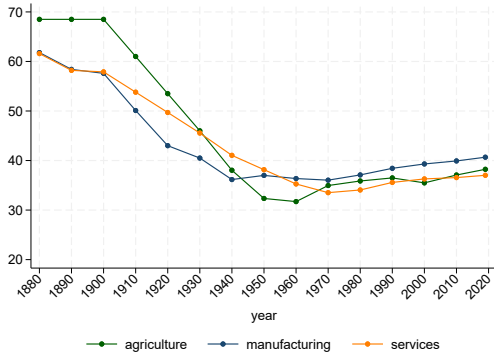
- ▶ Intensive margin relevant as hours per employed vary widely over time and across genders and sectors.
- ▶ Weekly hours fell substantially for all non-farm employees (Costa, 2000)
 - ▶ 1880s: 10 hours per day, 6 days a week;
 - ▶ 1940: 8 hours per day, 5 days a week
 - ▶ Post 1940: further reductions via paid holidays, etc.
- ▶ Unpaid hours on farm shorter than paid hours (Surveys of farmers; Time-use studies).
 - ▶ 1870: Farm laborers worked 10-14h per day, 6 days a week.
 - ▶ 1920s: Homemakers on farm spent 10-15h per week in unpaid agricultural work

Paid hours: sources

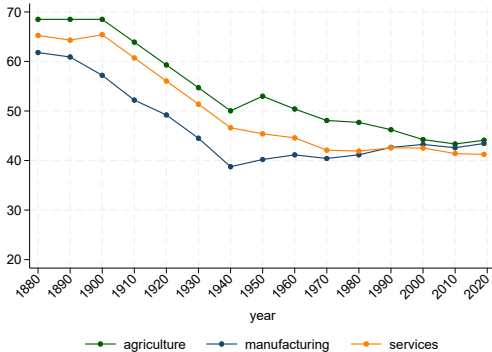
- ▶ **Historical Statistics of the US, 1860-1930**
 - ▶ Drawing from: Census of Manufacturers, Weeks Report, Aldrich Report, series produced by E Jones, A Rees and J Owen (Whaples, 1990)
 - ▶ good coverage for manufacturing; by gender from 1914
- ▶ **Historical Labor Statistics Project, 1884-1901** at U California (Carter et al 1991)
 - ▶ Drawing from Surveys of Workers by several state bureaus
 - ▶ Complete dataset: about 100,000 workers in 14 states
Our sample: 52.5k men and 25.5k women in 12 states
 - ▶ Cover all 3 sectors, but thin on agriculture
- ▶ **Women Working project, 1920s and 1930s**
(Harvard University Library's Open Collections Program)
 - ▶ 20-30 studies (mostly firm surveys), little info on men
- ▶ **1940—: US Census**

Paid hours per employed

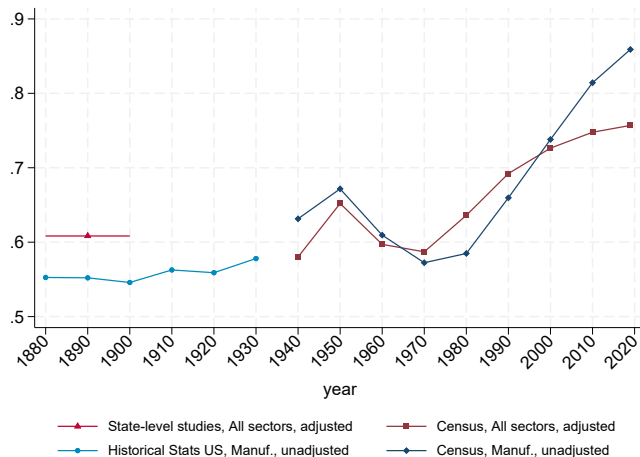
Women



Men



Wage ratio

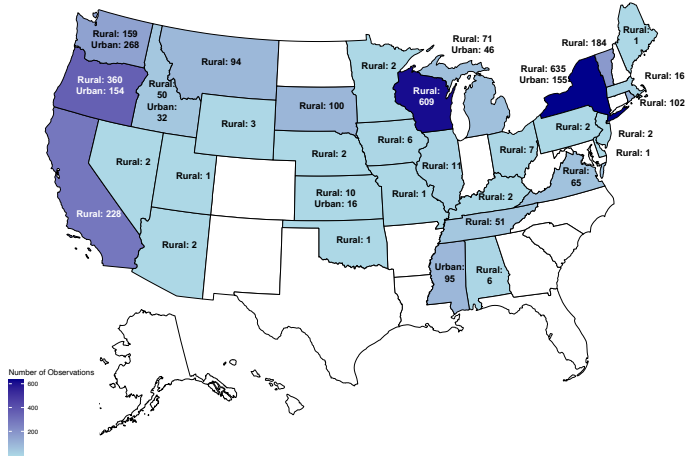


Unpaid hours: sources

Purnell Diaries; 1920s-1950s

- ▶ The 1925 Purnell Act provided funds for a nationally representative study of "The Present Use of Time by Homemaker", conducted by US Dept of Agriculture.
- ▶ Survey replicated across several state-level agricultural stations
- ▶ Combined sample of about 4,000 women across 35 states, 1924-53.

Geographic distribution of USDA TU Studies, 1924–1953



Number of individual observations by state and rural/urban status.

A 1929 TU diary

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF HOME ECONOMICS
WASHINGTON, D. C.

DAILY TIME RECORD OF HOMEMAKER

Name Mr. John Doe

Address R. F. D. #1

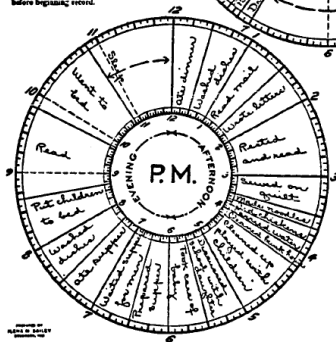
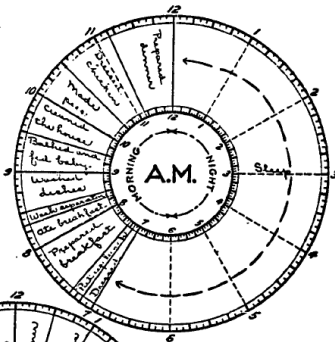
Boysen, Mont.

Day of week Monday

Date Feb. 9, 1929

Early small space between the hours on the "clock" represents five minutes. Begin this day's record by drawing a line on "A. M. clock" from outer to inner circles at time of arising. At end of time given to the next activity draw another line, and in space between lines describe this activity. Continue in this way changing to "P. M. clock" at noon and accounting for all of the 24 hours of the day.

Read separate "Instructions" carefully before beginning record.

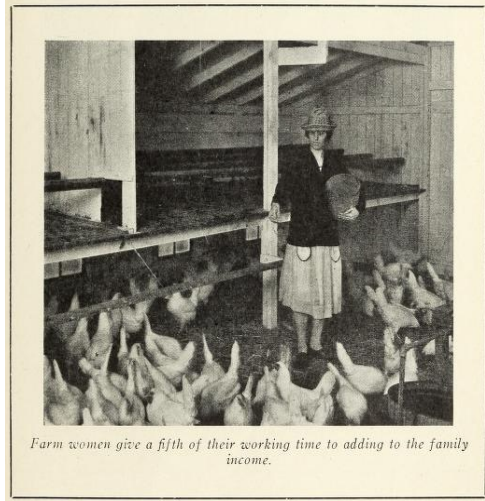


NUMBER OF PERSONS

	At meals (including babies not fed)			
	Breakfast	Lunch	Dinner	Tea or supper
Family	5	5	5	5
Guests				
Neighbors and friends				
Household help				
From table	1	1	1	1
TOTAL	6	6	6	6

NOTES

Example of homemakers tasks



Source: Wilson (1929), Oregon.

Participation of Farm Homemakers to Farm Activities

Study	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Overall %Helped	Hours	%Helped	Hours	Spring %Work 15+	Hours	Obs.	Year	State
<i>1920s</i>									
USDA (1944)		9.0					559	1924-28	USA
GH2016 subset of USDA (1944)	92	7.8	98	13.9	39	27.1	348		
Wilson (1929)	97	11.3	99	13.9	26.7	24.9	288	1926-27	Oregon
Crawford (1927)		9.7					49	1927	Idaho
Kneeland (1929)		11.2					700	1928	USA
Arnquist and Roberts (1929) ^a		9.9		15.1			137	1929	Washington
<i>1930s and 1940s</i>									
Richardson (1933)	95	8.8	95	10.3	27	23.9	92	1929-31	Montana
Wasson (1930)	99	11.5		14			100	1930	South Dakota
Kneeland (1932)		9.2					642	1932	USA
Warren (1940)			80	6.8			497	1936	New York
Muse (1946) ^b			77	12	26	26.4	183	1943	Vermont
<i>1950s</i>									
Wiegand (1954)		58	7		20		95	1952	New York
Cowles and Dietz (1956)		8					85	1953	Wisconsin

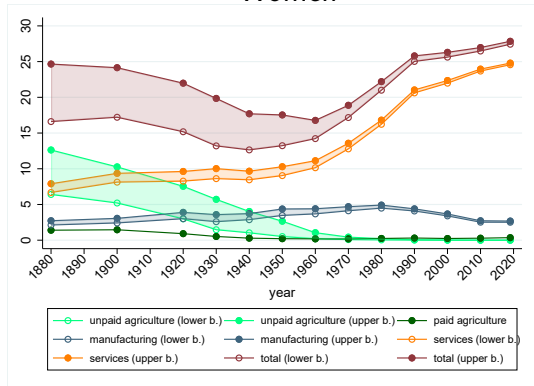
Descriptive summary of Purnell Time-Use Diaries for farm homemakers. Households surveyed in the USDA (1944) study are from 15 states, with the largest numbers residing in California, Michigan, New York and Massachusetts. GH2016 denotes the subsample of USDA (1944) used in Gershuny and Harms (2016). ^a“Spring” denotes the time period from April 1st to October 31st. ^bData refer to Summer.

Lower and upper bounds for unpaid market hours

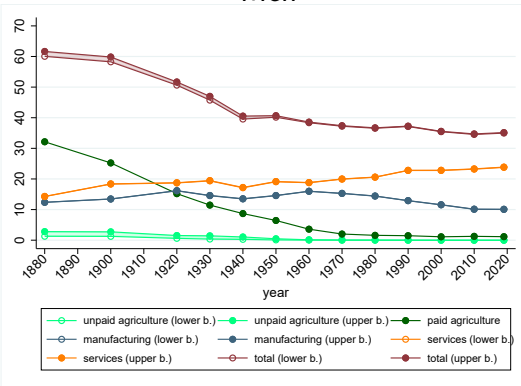
- ▶ Purnell Diaries: Hours spent by homemakers in farm work are **15** in 1920-30s; **12** in 1940s; **7.5** in 1950s.
- ▶ **Lower bound?**
 - ▶ Educated middle-class women over-represented
 - ▶ Homemakers less likely to be surveyed when busiest with farm work
 - ▶ Hours do not include time to cater for farm laborers/lodgers
- ▶ **What is a realistic upper bound?**
 - ▶ US Census from 1940–: unpaid women in agriculture work on average **32.7h** in 1940 and 1950 ($\approx 93\%$ of paid hours)
- ▶ Show hours range between lower and upper bound, and extrapolate backwards

Market hours per person (extensive & intensive margins)

Women



Men



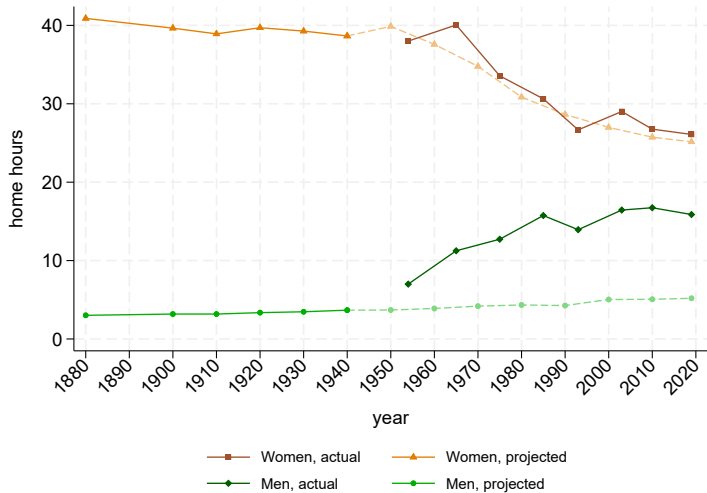
Home production hours

- ▶ producing goods and services for *own use* (→ not for the market).
- ▶ enjoy the *output* not time spent (→ not leisure).

Sources

- ▶ Harmonized Time Use Surveys for 1965–
- ▶ Purnell Diaries for 1920s-1950s
 - ▶ Extrapolated backwards using projections by demographic group (gender, employment status, rural/urban), as in Ramey (2009).

Home production hours



Source: Purnell Diaries; US Census.

Summary of evidence 1880-2019

- ▶ U-shape in female employment, with 1940 as the turning point.
- ▶ Shallow, asymmetric U-shape in female hours: flat or slightly falling hours until 1950, then rising.
- ▶ Male hours and employment falling throughout.
- ▶ Gender convergence in home hours.
- ▶ Wage ratio essentially constant until about 1970, then rising.

Model

The model economy: Building blocks

- ▶ **Households** derive utility from consumption of agriculture, manufacturing, service and leisure
 - ▶ gross complements in utility (Baumol's relative price effects)
 - ▶ subsistence requirement on agricultural consumption (Engel's income effects)
- ▶ 3 market sectors: **agriculture, manufacturing, services**
 - ▶ productivity growth: $\text{agr} > \text{man} > \text{serv}$
 - ▶ female intensity: $\text{serv} > \text{agr}, \text{man}$
- ▶ **Family farms** are part of the agriculture sector.
 - ▶ Output sold to market; part of GDP.
- ▶ **Home production** makes close substitutes to market services; for own use.
 - ▶ Slower productivity growth than the service sector.

Firms

- Production function for the representative firm:

$$Y_j = A_j N_j, \quad N_j = \left[\xi_j l_{fj}^{\frac{\eta-1}{\eta}} + (1 - \xi_j) l_{mj}^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}; \quad j = a, m, s$$

- A_j : sector-specific productivity, growing at γ_j
 - ξ_j : sector-specific gender weight
- Competitive labor markets and perfect mobility:

$$w \equiv \frac{w_f}{w_m} = \frac{\xi_j}{1 - \xi_j} \left(\frac{l_{mj}}{l_{fj}} \right)^{1/\eta}; \quad j = a, m, s$$

Households (I)

- Utility: consumption (a, m, z) and leisure (l)

$$U(c_a, c_m, c_z, c_l) = \ln c + \phi \ln c_l,$$

$$c = \left[\omega_a (c_a - \bar{c})^{\frac{\varepsilon-1}{\varepsilon}} + \omega_m c_m^{\frac{\varepsilon-1}{\varepsilon}} + \omega_z c_z^{\frac{\varepsilon-1}{\varepsilon}} \right]^{\frac{\varepsilon}{\varepsilon-1}}$$

with $\varepsilon < 1$ and $\bar{c} > 0$.

- Services: produced at home or purchased from the market:

$$c_z = \left[\psi c_s^{\frac{\sigma-1}{\sigma}} + (1 - \psi) c_h^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}$$

with $\sigma > 1$.

Households (II)

- ▶ Allocate time to market **work**, **home production** and **leisure**.
- ▶ Home production:

$$c_h = Y_h = A_h N_h, \quad N_h = \left[\xi_h l_{fh}^{\frac{\eta-1}{\eta}} + (1 - \xi_h) l_{mh}^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}$$

- ▶ Leisure compound N_l is a function of male and female leisure:

$$c_l = N_l, \quad N_l = \left[\xi_l l_{fl}^{\frac{\eta_l-1}{\eta_l}} + (1 - \xi_l) l_{ml}^{\frac{\eta_l-1}{\eta_l}} \right]^{\frac{\eta_l}{\eta_l-1}}$$

with $\eta_l < 1$.

- ▶ Budget constraint:

$$\sum_{i=a,m,s} p_i c_i \leq w_m (L_m - l_{mh} - l_{ml}) + w_f (L_f - l_{fh} - l_{fl})$$

Assumptions

► Comparative advantages

- $(\xi_s, \xi_h) > (\xi_a, \xi_m)$: service production more intensive in female labor than agriculture and manufacturing.

► Uneven productivity growth

- $\gamma_s > \gamma_h$: productivity growth faster in market than home services.
- $(\gamma_a, \gamma_m) > \gamma_s$: productivity growth is slowest in services

Marketization

- Relative expenditures: market vs home services

$$E_{sh} = \left(\frac{A_s}{A_h} \right)^{\sigma-1} \left[\left(\frac{\xi_h}{\xi_s} \right)^\eta \frac{I_h(w)}{I_s(w)} \right]^{\frac{\sigma-1}{\eta-1}} \left(\frac{1-\psi}{\psi} \right)^\sigma$$

- Labor allocation:

$$\frac{l_{fs}}{l_{fh}} = \left(\frac{A_s}{A_h} \right)^{\sigma-1} \left(\frac{\xi_s}{\xi_h} \right)^{\frac{(\sigma-1)\eta}{\eta-1}} \left[\frac{I_h(w)}{I_s(w)} \right]^{\frac{\sigma-\eta}{\eta-1}} \left(\frac{1-\psi}{\psi} \right)^\sigma$$

Structural transformation

- Agriculture vs (total) Services

$$E_{az} = \frac{\left(1 + \frac{1}{E_{sh}}\right)^{(1-\varepsilon)}}{1 - \bar{c}/y_a} \left(\frac{A_a}{A_s}\right)^{\varepsilon-1} \left[\left(\frac{\xi_a}{\xi_s}\right)^\eta \frac{I_s(w)}{I_a(w)} \right]^{\frac{\varepsilon-1}{\eta-1}} \left(\frac{\omega_a}{\omega_z}\right)^\varepsilon \psi^{\frac{\sigma(\varepsilon-1)}{1-\sigma}}$$

- Manufacturing vs Services

$$E_{ms} = \left(\frac{A_m}{A_s}\right)^{\varepsilon-1} \left[\left(\frac{\xi_m}{\xi_s}\right)^\eta \frac{I_s(w)}{I_m(w)} \right]^{\frac{\varepsilon-1}{\eta-1}} \left(\frac{1}{E_{sh}} + 1\right)^{\frac{\sigma-\varepsilon}{\sigma-1}} \left(\frac{\omega_m}{\omega_z}\right)^\varepsilon \psi^{\frac{\sigma(1-\varepsilon)}{1-\sigma}}$$

Total work vs leisure

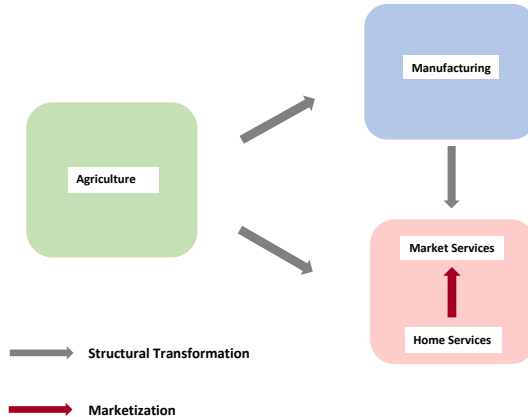
- Equilibrium reduces to 3 equations solving for female leisure time l_{fl}/L_f , agriculture output y_a and gender wage ratio w .

$$\frac{l_{fl}}{L_f} = \frac{l_l(w)}{l(w) \left[\frac{E_{ml}(w)}{(1-\bar{c}/y_a)\bar{E}_{ma}(w)} + \sum_{i \neq a} E_{il}(w) \right]}.$$

where l_l and l are both function of gender wage ratio.

- Income effect on leisure (total work) through subsistence consumption.

Predicted reallocation of working hours



Note: Total working hours is falling and leisure is rising.

Phase 1: Structural Transformation and Decline in Agriculture

- ▶ 19th century; large agricultural sector.
- ▶ Structural transformation dominates marketization
 $\gamma_a > (\gamma_s, \gamma_h)$, \bar{c}/y_a large; $\gamma_s - \gamma_h > 0$ but small.
- ▶ → Agriculture declines, services expand (home & market), leisure increases.
→ market hours fall.
- ▶ Both male and female hours decline.
- ▶ Interplay between agriculture and services delivers declining market hours.
- ▶ Role of manufacturing depends on differential $\gamma_a - \gamma_m$.

Phase 2: Marketization and Rise in Services

- ▶ Mid-20th century, the share of agriculture is small and subsistence consumption less relevant (\bar{c}/y_a small).
- ▶ Structural transformation limited to reallocation from manufacturing to services.
- ▶ Large service share, strong marketization.
→ market services rise and home production falls.
- ▶ Market services are intensive in female labor.
→ rise in female market hours.
- ▶ Manufacturing is intensive in male labor.
→ male hours fall, reflecting deindustrialization.

Uneven productivity growth and gender specialization: may induce U-shape in female hours and monotonically declining male hours.

Quantitative illustration

Quantitative illustration of model properties

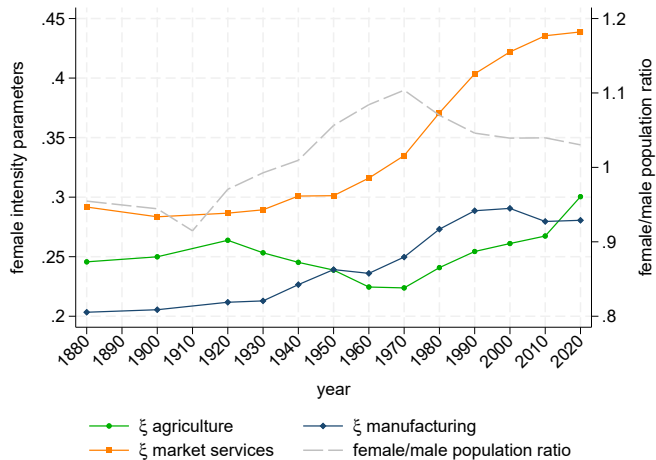
Dynamics of market hours by gender driven by:

- ① Structural transformation and marketization .
- ② Gender-specific demand shifts (ξ_a, ξ_m, ξ_s) :
 - ▶ Gender 'biased' technological changes.
 - ▶ Within-sector compositional change (eg disappearance of family farms).
 - ▶ Evolution in gender norms or policies regarding female work.
- ③ Gender-specific population changes L_f/L_m .

Calibration

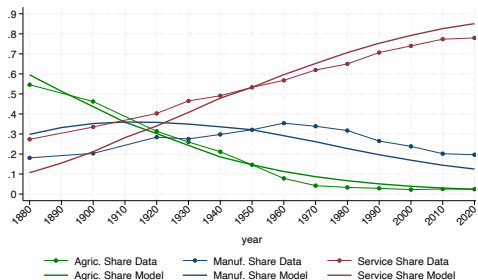
- ▶ Borrow elasticity parameters (η, σ, ϵ) from existing literature
- ▶ Productivity growth rates γ_j from available data
- ▶ Match time allocation and wage ratio in period $T = 1950$: pin down gender-specific demand $\{\xi_{aT}, \xi_{mT}, \xi_{sT}, \xi_h, \xi_l\}$; preference parameter ϕ ; productivity terms $\{A_{shT}, A_{msT}, A_{maT}\}$
- ▶ Assess the model's quantitative performance based on predictions for $t \neq 1950$:
 - ▶ Productivity growth implies values for $\{A_{sht}, A_{mst}, A_{mat}\}$
 - ▶ Gender-specific demand ξ_{jt} from FOC and gender-specific population L_f/L_m from data
- ▶ Set the strength of the income effect \bar{c} to match the agriculture employment share in 2019.

Gender-specific factors

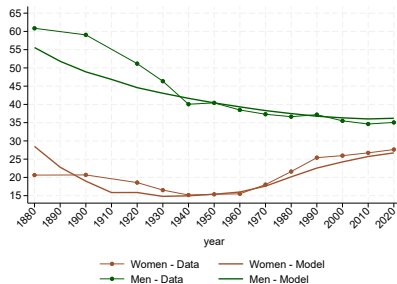


Structural Transformation and Market Hours by Gender

Structural Transformation



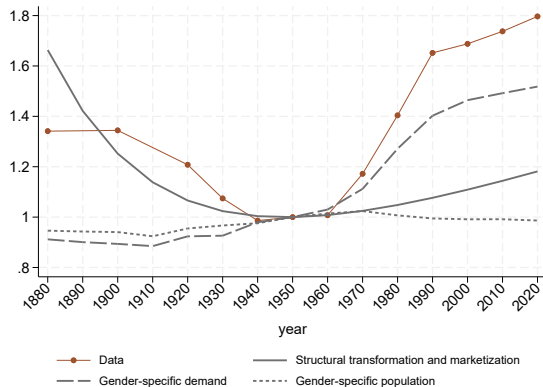
Market Hours by Gender



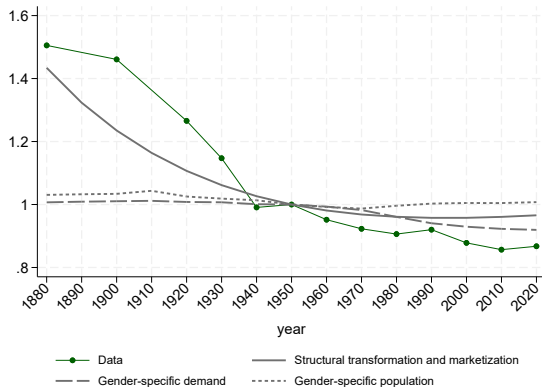
Market hours: decomposition of various forces

(all normalized to 1950)

Women

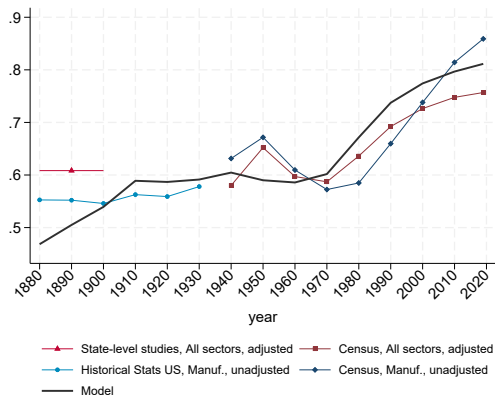


Men

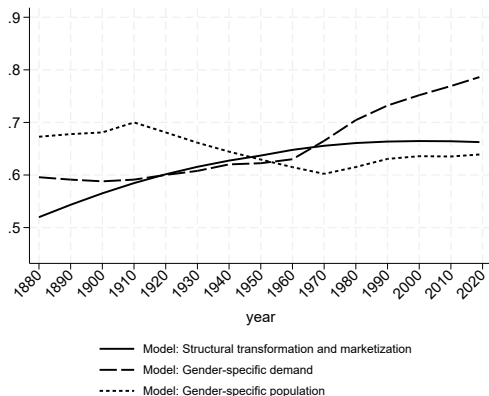


Predicted wage ratio

Model prediction



Decomposition



Pre-1950 Productivity Growth

Baseline uses constant growth: 1950-2020 values (3.6%, 2.5%, 1.4%, 0.6%).

- ▶ For manufacturing and services up to 1900:
 - ▶ Gallman (1960) for manufacturing and Gallman and Weiss (1969) for services.
 - ▶ Productivity growth 1880-1900: 2.6% for manufacturing and 1.1% for services.
- ▶ Farm data from Kendrick (1961): agriculture productivity growth at 2.0%.
 - ▶ Lower agriculture productivity growth relative to manufacturing linked to the observed relative farm prices (fell after 1930s).
 - ▶ Rise in agricultural productivity growth can reflect decline of family farm. Family Farms
- ▶ Higher home productivity growth for pre-1950.
 - ▶ Bridgman (2016) estimates home productivity at 2.1% for 1929-1950.
 - ▶ Improvement in home technology (Greenwood et al 2005 and Vidart 2023).

Main Lesson from Varying Productivity Growth

- ▶ Slower agricultural productivity growth and weaker marketization forces imply smaller decline in agriculture and market hours.
- ▶ Allowing additional income effects through a preference shift $\uparrow \omega_m/\omega_s$ to match the decline in agriculture implies similar decline in market hours as the baseline.
 - ▶ Comin et al (2021) changes in ω_j in the CES can capture the income effect in a more general non-homothetic CES utility function.

→ The decline in agricultural share is the key for the decline in market hours.

Conclusions

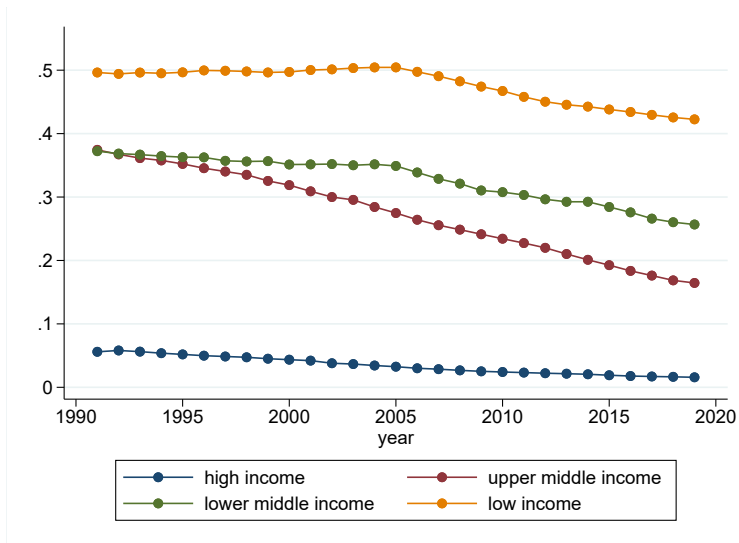
- ▶ Female employment declines at early stages of development, and then rises again
 - in sync with decline in agriculture and rise in services
- ▶ Male employment declines throughout
 - in sync with decline in agriculture and manufacturing
- ▶ Build a measure of male and female work during 1880-2019 in the US
 - ▶ *Early stage*
Structural transformation: shrinking agriculture and rising services, home production and leisure
Male and female work decline
 - ▶ *Later stage*
Reallocation from manufacturing to services & marketization of home services
Female work increases and male work declines

Lessons from the historical perspective

- ▶ Measuring unpaid work in family farms crucial to accurately capture women's contribution to the economy in predominantly agricultural societies
- ▶ Underlying patterns of labor reallocation offer insights into long-run trends in hours *and* into experiences of developing countries during recent decades.
- ▶ Several developing countries currently going through phases of declining agriculture
- ▶ Early stages of this transition are often accompanied by a decline in and female participation (e.g. China and India).
- ▶ Analysis highlights mechanisms that would facilitate the transition to rising female participation through structural transformation
 - ▶ technology adoption in agriculture and market services, removal of institutional and/or cultural barriers to the marketization of home services, etc

Additional Slides

Unpaid family workers as % of employment [back](#)



Notes: groups according to GNI pc. Source: WDI & ILO.

Importance of unpaid market work

Distinction between unpaid market work and home production/leisure:

- ▶ Measurement:
 - ▶ Characterize female employment and gender gaps
 - ▶ Avoid mis-measurement of agricultural productivity
 - ▶ Understand structural transformation
- ▶ Long-term developments
 - ▶ Skill accumulation and networks
 - ▶ Work in family farm more conducive than home production to female emancipation and evolution of gender norms
(Gasson et al 2008, Alesina et al 2013)

Historical Statistics Chapter D and K

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Text: D 11-110

LABOR FORCE, WAGES, A

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K 154-181

those who did any work for pay or profit, or worked without pay for 15 hours or more on a family farm or business; or (2) "With a job but not at work"—those who did not work a were not looking for work but had a job or business from which they were temporarily absent because of vacation, illness, industrial dispute, bad weather, or layoff with definite instructions to return to work within 30 days of layoff. Also included are persons who had new jobs but had not yet started to work.

b. *Unemployed*.—Unemployed persons include those who did not work at all during the survey week, and who were looking for work. Also included as unemployed are persons who would have been looking for work except that (1) they were temporarily ill, (2) they expected to return to a job from which they had been laid off for an indefinite period, or (3) they believed no work was available in their line of work in the community. During the 1940-43 period persons at work on or assigned to public emergency work projects were also included among the unemployed.

c. *Labor Force*.—The *civilian labor force* comprises the total of all civilians classified as employed or unemployed in accordance with the criteria described above. Figures on the *net strength* of the armed forces are added to the civilian labor force to obtain the *total labor force*.

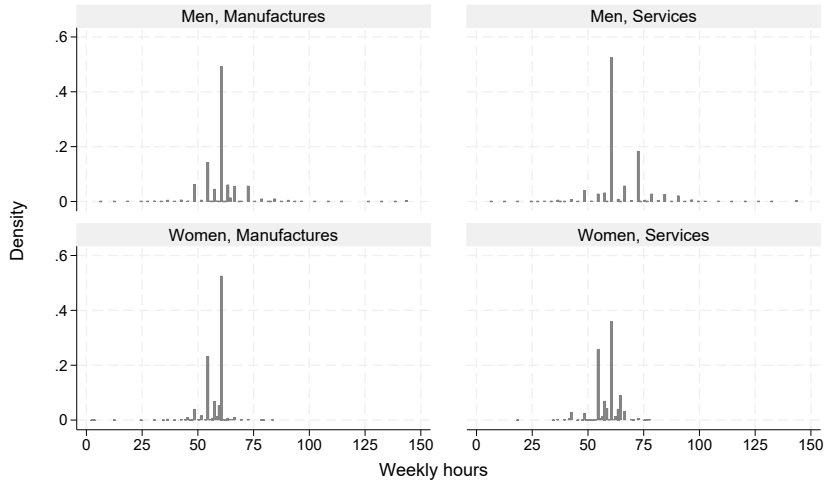
d. *Not in labor force*.—All persons 14 years of age and over who are not classified as employed or unemployed are defined as "not in the labor force." This group largely consists of persons engaged in own home housework, persons in school, retired persons, those permanently unable or too old to work, seasonal workers for whom the survey week fell in an "off" season, and the voluntarily idle. Persons doing only incidental unpaid family work (less than 15 hours) are also classified as not in the labor force.

was For detailed descriptions of farm employment concepts, see *Major of Statistical Series of the U.S. Department of Agriculture, Agriculture the Handbook No. 365, vol. 7, pp. 7-12. See source publications for de- regional, State, and monthly data.*

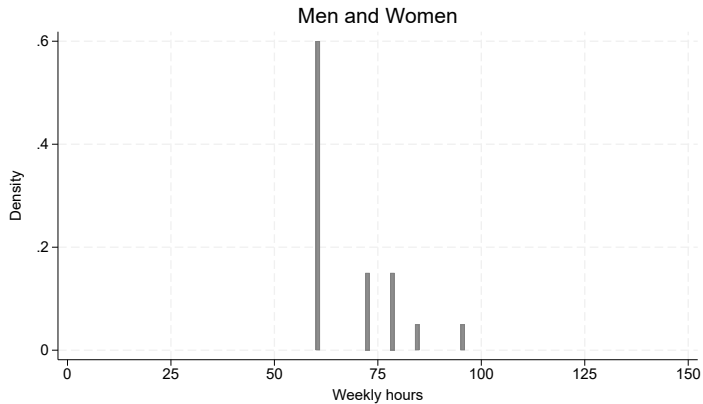
ave These data are based on (1) data from the census of population used as benchmarks for 1910, 1920, and 1930, and data from the census of agriculture used for 1940, 1950, 1954, and 1959; (2) nationwide annual sample surveys made by SRS since 1965; (3) estimates of farm employment from nationwide enumerative sample surveys made at intervals during 1945-1948, together with historical data on the seasonal distributions of man-hour labor requirements in farm production, used to develop measures of seasonal variation; (4) returns from the crop reporters of the monthly mailed questionnaire on employment on farms, available since 1925; and (5) annual estimates of the number of farms by States and regions used to expand "adjusted" average employment per farm to obtain regional and national estimates of total farm employment and of the family and hired worker components of the total.

unt Family workers include working farm operators, plus members of of their families who did unpaid farmwork or chores for 15 hours or 35, more during the survey week. All persons working one hour or ul- more during the survey week for pay at farmwork or chores are ces classified as hired farmworkers. Members of the operator's family red receiving wages for work on their farms are counted as hired workers.

Hours distribution, 1884-1901



Hours distribution, agriculture, 1884-1901



Wage Regressions, 1884-1901 (HSUS)

Table 1: Wage regressions, 1884-1901.

	(1)	(2)	(3)	(4)
Sectors:	All	Man+Serv	All	Man+Serv
Female	-0.884 (0.0552)	-0.606 (0.0329)	-0.511 (0.0309)	-0.497 (0.0283)
Skilled manual			0.201 (0.0246)	0.223 (0.0269)
Clerical			0.245 (0.0441)	0.272 (0.0472)
Professional			0.619 (0.0618)	0.633 (0.0617)
Other controls	study FE	study FE age, age ²	study FE age, age ²	study FE
Observations	55611	45776	52004	44751
Adj. R^2	0.562	0.441	0.605	0.522

Notes. The sample includes individuals aged 18-64 with non missing information on weekly wages. The dependent variable is log weekly wages. The omitted occupation category is “unskilled manual”. Source: HLSP, 1884-1901.

Calibrated parameters

<i>Model free parameters</i>		
Parameters	Values	Source
$\gamma_a, \gamma_m, \gamma_s$	3.6%, 2.5%, 1.4%	BEA for 1950-2020
γ_h	0.6%	Bridgman et al. (2022) for 1950-2020
σ	2	Various estimates in Aguiar et al. (2012)
ϵ	0.002	Herrendorf et al. (2013)
η, η_l	2, 0.2	Ngai and Petrongolo (2017)
L_{ft}/L_{mt}	Figure 8	Census data
<i>Calibrated parameters</i>		
Parameters	Values	Target
$A_{aT}L_{fT}$	1	Normalization
ϕ	1.07	Relative hours in leisure/manufacturing in 1950
ξ_h, ξ_l	0.60, 0.28	Wage and hours ratio in home and leisure in 1950
\hat{A}_{maT}	0.31	Hours ratio in manufacturing/agriculture in 1950
\hat{A}_{msT}	6.73	Hours ratio in manufacturing/services in 1950
\hat{A}_{shT}	1.02	Hours ratio in market services/home in 1950
\bar{c}	0.016	Employment share in agriculture in 2019
$\xi_{at}, \xi_{mt}, \xi_{st}$	Figure 8	Equilibrium condition (10)

Family farms

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- ▶ Once hours in family farms are accounted for as employment, family farms do not play a distinct role in model – simply part of market hours.
- ▶ However, decline in family farm sector may affect overall productivity growth in agriculture and speed up structural transformation.
- ▶ Extension with distinct family farm sector:
 - ▶ Family farms and large-scale agriculture produce good substitutes, but family farms have slower productivity growth
 - modernization of family farms (similar to marketization of home production)
 - rising agriculture productivity growth