Understanding the Gender Division of Work across Countries

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This paper

1. How does work differ across countries?

→ New facts on gender division of market and non-market work.

2. Accounting framework

→ Income effects, spousal income, norms, discrimination, labor productivity ...

3. Study drivers of changes in hours worked

→ Cross-country and country studies (USA, TZA, IND, FRA)

1. How does work differ across countries?

Market work

- Higher in poor countries (Bick, Fuchs-Schündeln and Lagakos 2018).
- More female market work in HIC
- Less male market work in HIC (Aguiar et al. 2021)

Non-market work

- More home production in poor countries (Bridgman et al. 2018).

Know less about

- Types of non-market work: care and domestic work → Total work.
- Gender division
- Whole country income distribution.

→ We fill these gaps thanks to an extensive data harmonization exercise.

2. What determines choices of work and its gender division?

- **Culture:** Fernandez, Fogli and Olivetti (2004) and Fernandez (2013)
- **Bargaining power:** marriage laws - Chiappori, Fortin and Lacroix (2002) & Greewood, Guner, Kocharkov & Santos (2016).
- **Parenting style:** Doepke and Zilibotti (2019)
- **Income:** labor market discrimination & occupational preferences - Hsieh, Hurst, Jones and Klenow (2019), Chiplunkar and Kleineberg (2022)
- **Marketization of services:** Ngai & Petrongolo (2017)
- **Home production:** technology - Greenwood, Seshadri and Yorukoglu (2005)

$\rightarrow$ *"Little to no work explores the ability of such models to account for heterogeneity in women's rights in the entire cross-section of countries."* Tertilt, Doepke, Hannusch and Montenbruck (2022)

3. Accounting framework and decomposition exercise.

- Model of household allocation of work.
  - Framework that accounts for a rich set of channels.
  - Wages (own + spouse), disutilities of work, productivity of non-market work and bargaining.

- Direct and transparent identification of each parameter.
  - By gender and marital status.
  - Calibration to 30 countries.

- Use model as an accounting framework

Data

Data

We leverage two micro datasets that we built:

1. Harmonized World Time Use Survey (HWTUS)

2. Harmonized World Labour Force Survey (HWLFS)

Data: Harmonized World Time Use Survey (HWTUS)

Individual level information

- household roster
- demographic
- education
- 24 hour diary data.

Coverage

- 137 surveys from 42 countries.
- $1,500 (TZA 2006) - $100,000 (LUX 2015)

Data sources

- MTUS and CTUR.
- Time use surveys and household surveys from NSO.

Data: Harmonized World Labour Force Survey (HWLFS)

Individual level information

- household roster
- demographic
- education
- employment status, jobs and wages

Coverage:

- 1'748 country-year surveys
- 105 countries
- $302 (SOM 2016) - $115,000 (LUX 2020)

Data sources:

- Nests traditional data sources (IPUMS Intl., IPUMS-US historical and EU-LFS).
- Household and labour force surveys from NSO and World Bank

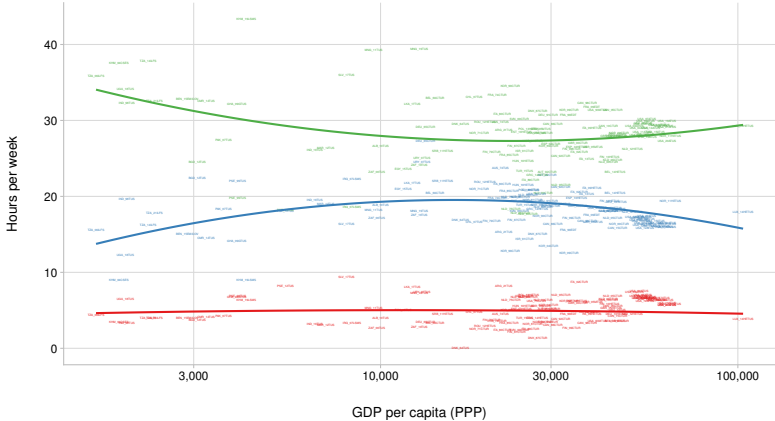
Data: Measurement

Activity	Type of work	Definition	ICATUS	SNA
Work		Activities that can be delegated to a third party		
	Market	- Production of goods and services destined to the market	1	Y
		- Production of goods for own final use.	2	Y
		Activities to produce services for own final use:		
	Services	- Domestic services	3	N
	Care	- Household and family members.	4	N
		- Others (incl. volunteering and community work).	5	N
Education		Education and related activities.	6	
Leisure		Socializing, community participation and religious practice.	7	
		Culture, leisure, mass-media and sports practices	8	
Self-care		Activities for self-care and maintenance (sleep, food, cleaning).	9	

Table: ICATUS activity classification - 1 digit.

Weekly hours spent on market, domestic and care work per capita

Working age population



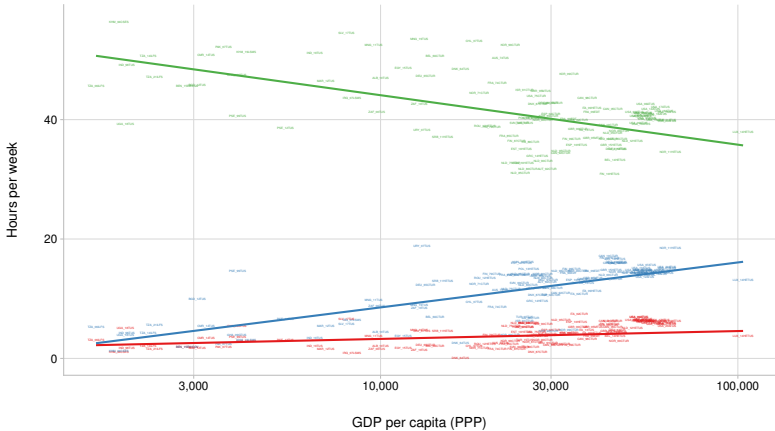
Quadratic fit, shaded area marks the 95% confidence interval

Working age population. Activity groups are aggregated based on the ICATUS 2016 one–digit codes [market = 1&2, services = 3, care = 4&5]. Minimum sample size for each activity group is 30.

▸ All men ▸ All women

Weekly hours spent on market, domestic and care work per capita

Married males

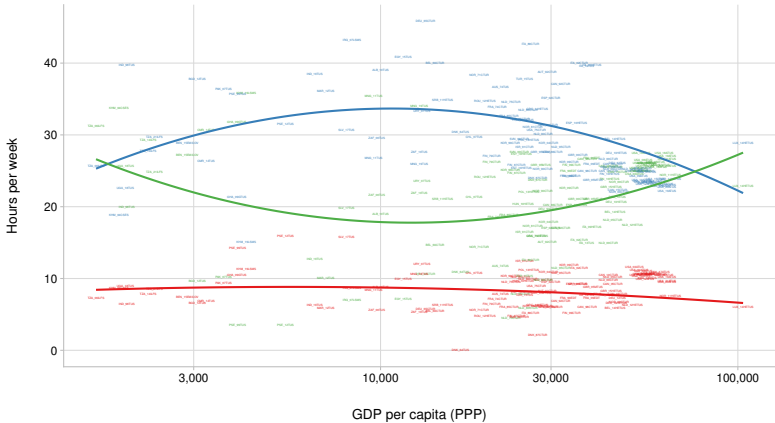


Male, married working age population. Activity groups are aggregated based on the ICATUS 2016 one–digit codes [market = 1&2, services = 3, care = 4&5]. Minimum sample size for each activity group is 30.

All men | All women

Weekly hours spent on market, domestic and care work per capita

Married females



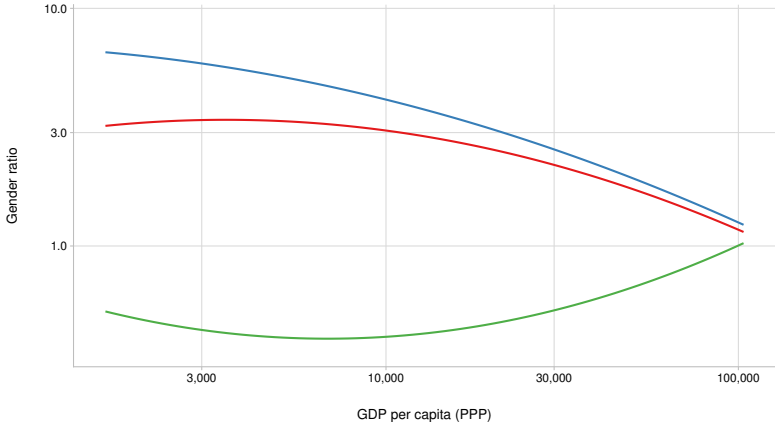
Quadratic fit, shaded area marks the 95% confidence interval

Female, married working age population. Activity groups are aggregated based on the ICATUS 2016 one–digit codes [market = 1&2, services = 3, care = 4&5]. Minimum sample size for each activity group is 30.

▸ All men ▸ All women

Gender ratio of hours spent on market, domestic and care work

Working age population



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Working age population. Activity groups are aggregated based on the ICATUS 2016 one-digit codes [market = 1&2, services = 3, care = 4&5]. Minimum sample size for each activity group is 30.

▸ All men ▸ All women

Facts on work across countries: Summary

Fact 1: U-shape pattern of **women** market work with country income level.

Fact 2: Hump shape of **women** domestic work with country income level.

Fact 3: **Men** in rich countries do less market than in poor countries.

Fact 4: **Men** in rich countries do more care and service work than in poor countries.

What determines these patterns?

Model

Model: Markets, Technology and Budget Constraints

- Two types of households: married and single.
- Three goods: market good (c_m), domestic good/service (c_d) and care services (c_c)
- Three activities: market (L_m), domestic (L_d) and care (L_c)
- Home technology: $y_i = z_i L_i$, where $i = c, d$.

Model: Preferences and budget constraints

Individual preferences:

$$u = \frac{C^{1-\sigma}}{1-\sigma} - D_m \frac{L_m^{1+\frac{1}{\phi}}}{1+\frac{1}{\phi}} - D_d \frac{L_d^{1+\frac{1}{\phi}}}{1+\frac{1}{\phi}} - D_c \frac{L_c^{1+\frac{1}{\phi}}}{1+\frac{1}{\phi}}.$$

$$C = \left[c_m^{\frac{\varepsilon-1}{\varepsilon}} + B_d c_d^{\frac{\varepsilon-1}{\varepsilon}} + B_c c_c^{\frac{\varepsilon-1}{\varepsilon}} \right]^{\frac{\varepsilon}{\varepsilon-1}}$$

Utility of couples:

$$U = \lambda u^m + (1-\lambda) u^f$$

Budget constraints of couples:

$$P(c_m^m + c_m^f) = w^m L_m^m + w^f L_m^f$$
$$c_i^m + c_i^f = z_i (L_i^f + L_i^m) \quad i = \{c, d\}$$

▸ FOCs

Model: Allocation

Derived individual utility:

$$u^g = \frac{1}{1-\sigma}\left[c_m^{\frac{\varepsilon-1}{\varepsilon}} + B_d\left(z_d L_d^g\right)^{\frac{\varepsilon-1}{\varepsilon}} + B_c\left(z_c L_c^g\right)^{\frac{\varepsilon-1}{\varepsilon}}\right]^{\frac{\varepsilon(1-\sigma)}{\varepsilon-1}} - D_m\frac{L_m^{1+\frac{1}{\phi}}}{1+\frac{1}{\phi}} - D_d\frac{L_d^{1+\frac{1}{\phi}}}{1+\frac{1}{\phi}} - D_c\frac{L_c^{1+\frac{1}{\phi}}}{1+\frac{1}{\phi}}.$$

- **Production efficiency**: $\omega_i = B_i z_i^{1-\frac{1}{\varepsilon}}$ where $i = \{c, d\}$
- Separating z_i from B_i is not feasible without observing c_i.
- Equilibrium allocation depends only on ω_i.

▸ FOCs

Model: Allocation: Within household division of work

Care/Domestic hours, men vs women

$$\frac{L_i^f}{L_i^m} = \left(\frac{D_i^m}{D_i^f} \frac{\lambda}{1-\lambda} \right)^{\phi}$$

Market hours, men vs women

$$\frac{L_m^f}{L_m^m} = \left(\frac{w^f}{w^m} \frac{D_m^m}{D_m^f} \frac{\lambda}{1-\lambda} \right)^{\phi}$$

▸ FOCs

Model: Allocation: Time spent across work types

Care hours vs Market hours, men vs women

$$\left(\frac{L_m^m}{L_c^m}\right)^{\frac{1}{\phi}} = \left(\frac{L_m^f}{L_c^f}\right)^{-\frac{1}{\varepsilon}} \frac{1}{\omega_c}\frac{D_c^m}{D_m^m}\left(\frac{1}{P}\frac{w^m\Delta_m + w^f}{\Delta_c + 1}\right)^{-\frac{1}{\varepsilon}} \frac{w^m}{P}$$

Domestic hours vs Market hours, men vs women

$$\left(\frac{L_m^m}{L_d^m}\right)^{\frac{1}{\phi}} = \left(\frac{L_m^f}{L_d^f}\right)^{-\frac{1}{\varepsilon}} \frac{1}{\omega_d}\frac{D_d^m}{D_m^m}\left(\frac{1}{P}\frac{w^m\Delta_m + w^f}{\Delta_d + 1}\right)^{-\frac{1}{\varepsilon}} \frac{w^m}{P}$$

▸ FOCs

Model: Allocation: Levels

Market hours worked

$$L_m^{f\,\sigma+\frac{1}{\phi}} = \frac{1}{D_m^f}(1-\Lambda)^{-\sigma}(\Omega(\omega_c;\omega_d)\Theta_c^f)^{\frac{1-\sigma\varepsilon}{\varepsilon}}\left(\frac{w^m\Delta_m + w^f}{P}\right)^{-\frac{1}{\varepsilon}}\frac{w^f}{P}.$$

$$L_m^{m\sigma+\frac{1}{\phi}} = \frac{1}{D_m^m}\left(\frac{\Lambda}{\Delta_m}\right)^{-\sigma}(\Omega(\omega_c;\omega_d)\Theta_c^f)^{\frac{1-\sigma\varepsilon}{\varepsilon}}\left(\frac{w^m\Delta_m + w^f}{P}\right)^{-\frac{1}{\varepsilon}}\frac{w^m}{P}.$$

where Δ_i are gender ratios of time worked in activity i.

Determinants:

- Own + spousal wage
- Disutility of market work
- Consumption level $\Omega(\omega_c, \omega_d)$
- Share of consumption $(1-\Lambda)$

▸ Consumption allocation

Calibration

Calibration:

- Data
  - Use HWLFS to measure L_m^g, w^g
  - Use HWTUS to measure L_d^g, L_c^g

- Model
  - 9 parameters $(\omega_c, \omega_d, D_m^g, D_d^g, D_c^g, \lambda)$
  - Allocation consists of 6 equations.

- Impose structure on D.

Ass 1: Common disutility of care work $(D_c^f = D_c^m)$

Ass 2: Assume $D_c^m = D^m$

Ass 3: Assume $\frac{D_d^f + D_d^m}{2} = D^m$

▸ Step 1 ▸ Step 2 ▸ Step 3 ▸ Step 4

Calibration:

- Set parameters $\varepsilon = 2$ as in Aguiar, Hurst and Karabarbounis (2012)

- External calibration of elasticity (σ, ϕ).
  - Choose σ such that D^m is constant in the US time series (1975-2018).
  - We get σ=1.28, ϕ=0.6.
  - In line with Blundell, Pistaferri and Saporta-Eksten (2016).

- Internal calibration parameters
  1. All country years λ κ δ ω_c ω_d
  2. US time series (1975-2013) λ κ δ

Results

Results

Fact 1: U-shape pattern of **women** market work with country income level.

1. Drop in women market hours L_m^f
2. Increase in women market hours L_m^f

Fact 2: Hump shape of **women** domestic work with country income level.

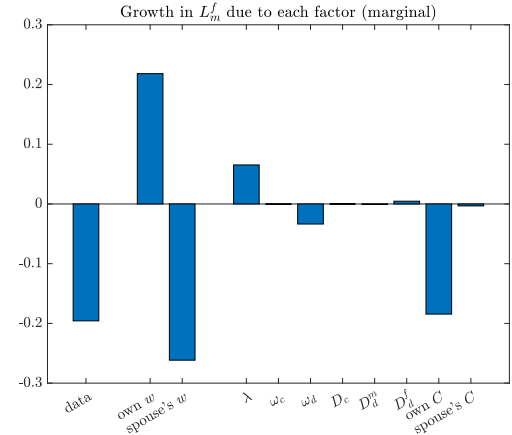
1. Increase in women domestic hours L_d^f
2. Decrease in women domestic hours L_d^f

Fact 3: **Men** in rich countries do less market work than in poor countries.

Fact 4: **Men** in rich countries do more care and service work than in poor countries.

Results: summary

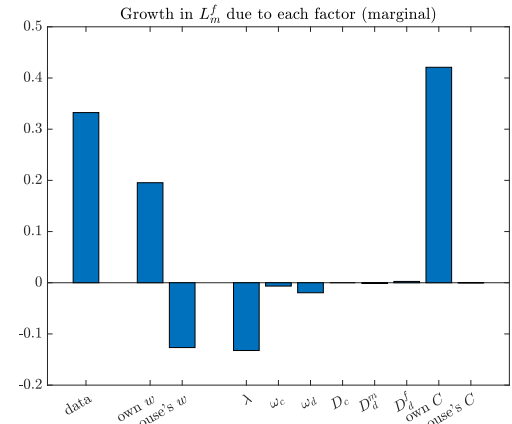
Understanding fact 1.1 : ↓ Market hours of married female L_m^f



▸ Results: overview ▸ Results: summary

- Data: 20 pp drop
- Own wage : IE $<$ SE
- Offset by income effect from spousal wage.
- Disutility of market work.

Understanding fact 1.2 : ↑ Market hours of married female L_m^f



▸ Results: overview ▸ Results: summary

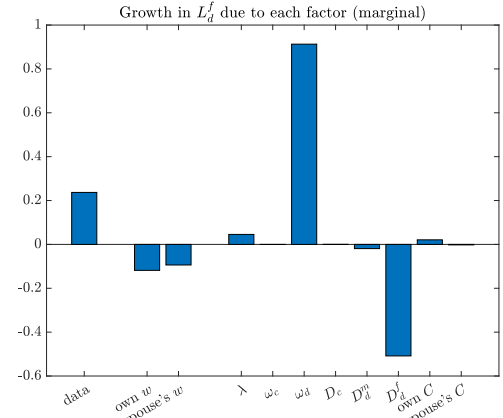
- Data: 32pp increase.

- Wages → small net increase in L_m^f.
- Higher bargaining power λ lowers L_m^f.

⇒ Changes in wages and λ imply *lower* L_m^f.

⇒ Lower C^f explains rise in L_m^f.

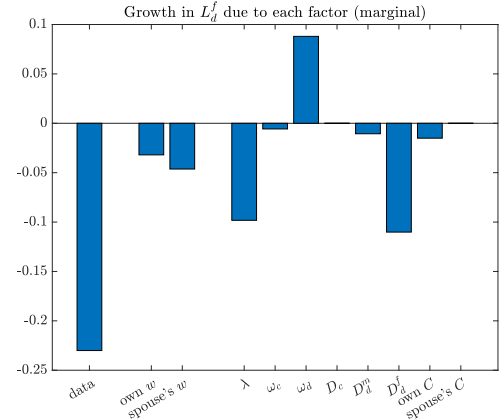
Understanding fact 2.1 : ↑ Domestic hours of married female L_d^f



▸ Results: overview ▸ Results: summary

- Data: 22 pp increase
- Higher female wages reduce female domestic hours by 12%
- Higher productive efficiency of domestic services (ω_d)
- Greater disutility of female domestic work (D_d^f)

Understanding fact 2.2 : ↓ Domestic hours of married female L_d^f

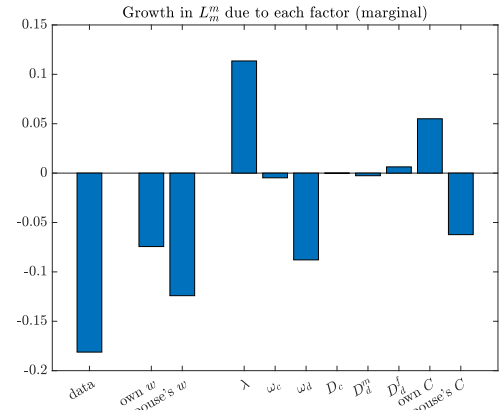


▸ Results: overview ▸ Results: summary

- Data: 23pp drop.

- Higher bargaining power (λ)
- Decrease in rel. disutility of domestic work D_d^f
- Offset by increase productive efficiency of domestic work (ω_d)

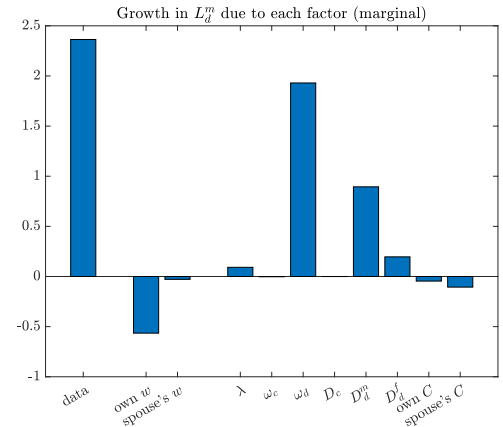
Understanding fact 3: ↓ Market hours of married males L_m^m



▸ Results: overview ▸ Results: summary

- Data: 18pp drop.
- Own wage (IE>SE)
- Offsetting effect due to loss in bargaining power (λ)
- Increase in productivity of domestic services (ω_d) enhances reallocation of time away from market.

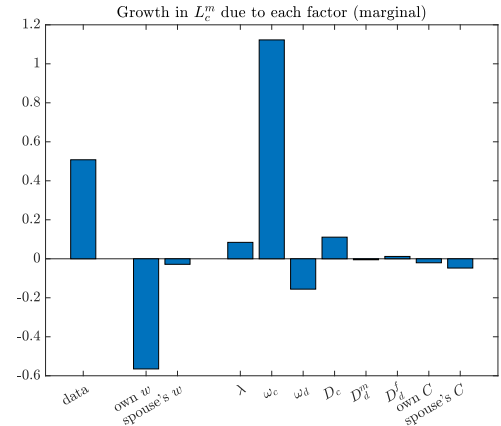
Understanding fact 4.1: ↑ Domestic hours of married males L_d^m



▸ Results: overview ▸ Results: summary

- Data: 250pp increase.
- Increase in productive efficiency of domestic work (ω_d).
- Lower disutility of domestic work for men.
- Contribution of higher wage.

Understanding fact 4.2 : ↑ Care hours of married males L_c^m



▸ Results: overview ▸ Results: summary

- Data: 50pp increase
- Household productivity for care work.
- Change in wages

Results: Summary

Fact 1: U-shape pattern of **women** market work with country income level.

1. Drop in women market hours $L_m^f \leftarrow$ **Spousal wage**
2. Increase in women market hours $L_m^f \leftarrow$ **Disutility of women market work**

Fact 2: Hump-shape pattern of **women** domestic work with country income level.

1. Increase in women domestic hours $L_d^f \leftarrow$ **Productivity of domestic services**
2. Decrease in women domestic hours $L_d^f \leftarrow$ **Bargaining power**

Fact 3: **Men** in rich countries do less market work than in poor countries.

1. Decrease in male market hours $L_m^m \leftarrow$ **Income effects (own + spouse).**

Fact 4: **Men** in rich countries do more domestic and care work than in poor countries.

1. Increase in male domestic hours $L_d^m \leftarrow$ **Productivity of domestic work**
2. Increase in male care hours $L_c^m \leftarrow$ **Productivity of care work**

Conclusion

- New facts on gender division of work across countries
- Develop of model of household labor supply
- Use model to disentangle channels that drive these patterns.
- Future work:
  - Correlate estimated parameters with value surveys/religion/laws.
  - Country experiences (TZA, IND, KHM, PSE, FRA)

Appendix

US parameter estimates: utility weights

Care hours, male vs female:

$$\left(\frac{L_c^f}{L_c^m}\right)^{\frac{1}{\phi}} = \frac{\lambda}{1-\lambda}$$

	1975	2003	2008	2013
L_c^f/L_c^m	2	1.76	1.66	1.56
λ	0.85	0.80	0.78	0.75

Back

US parameter estimates: relative disutility of domestic services

Domestic service hours, male vs female:

$$\left(\frac{L_d^f}{L_d^m}\right)^{\frac{1}{\phi}} = \frac{D_d^m}{D_d^f}\frac{\lambda}{(1-\lambda)}$$

	1975	2003	2008	2013
L_c^f/L_c^m	2	1.76	1.66	1.56
$\boldsymbol{\lambda}$	0.85	0.80	0.78	0.75
L_d^f/L_d^m	2.54	1.58	1.57	1.54
$\boldsymbol{D_d^f/D_d^m}$	0.55	1.29	1.15	1.04

Back

US parameter estimates: relative disutility of market work

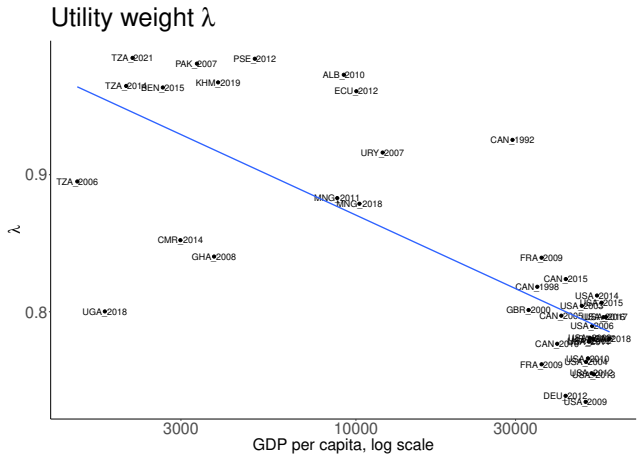
Market hours, male vs female:

$$\frac{C^f}{C^m} = \frac{\lambda}{1-\lambda}\left(\frac{L_m^m}{L_m^f}\right)^{\frac{1}{\phi}} \frac{w^f h^f}{w^m h^m}$$

	1975	2003	2008	2013
L_c^f/L_c^m	2	1.76	1.66	1.56
$\boldsymbol{\lambda}$	0.85	0.80	0.78	0.75
L_d^f/L_d^m	2.54	1.58	1.57	1.54
$\boldsymbol{D_d^f/D_d^m}$	0.55	1.29	1.15	1.04
w_m^f/w_m^m	0.54	0.64	0.65	0.68
L_m^f/L_m^m	0.46	0.63	0.65	0.66
$\boldsymbol{C^f/C^m}$	20.92	8.28	6.79	5.93

Back

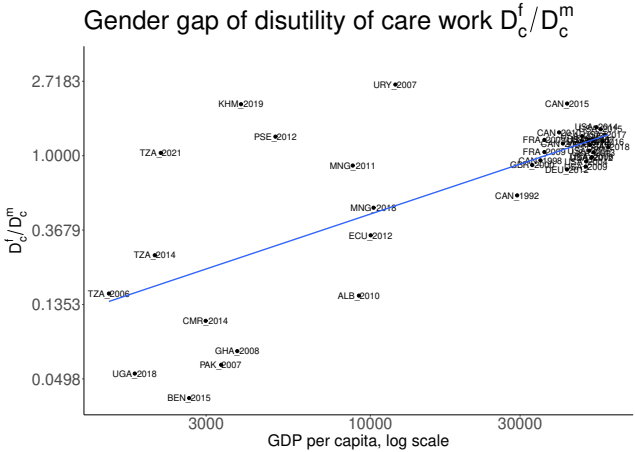
Cross-country parameter estimates: Utility weight λ



Drop in $\dfrac{L_c^f}{L_c^m}$ across countries $\Rightarrow$ lower λ.

Back

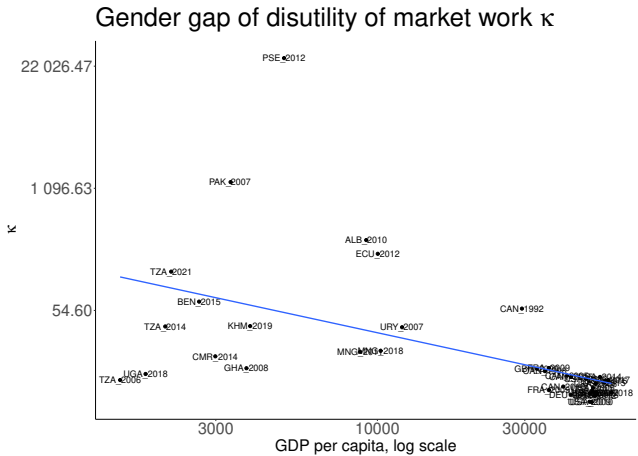
Cross-country parameter estimates: Rel. disutility of domestic work D_c^f / D_c^m



Greater gap for $\frac{L_d^f}{L_d^m} \Rightarrow$ higher δ.

Back

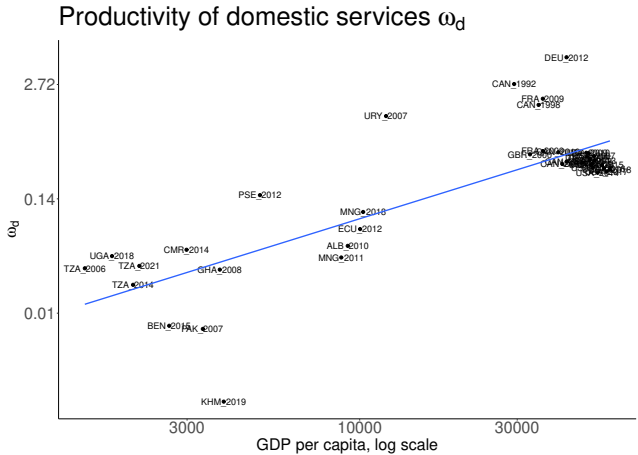
Cross-country parameter estimates: Rel. disutility of market work κ



Greater κ in LICs needed to explain market work patterns (given wages and care work).

Back

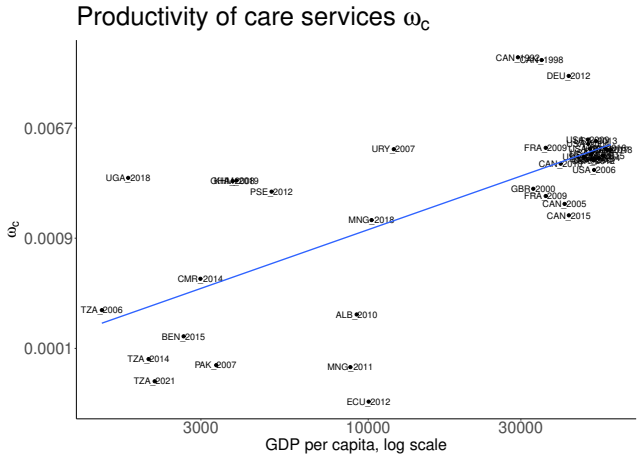
Cross-country parameter estimates: Valuation/productivity of domestic services ω_d



Greater valuation/productivity of domestic services required to explain higher home hours in HICs, despite higher wages.

Back

Cross-country parameter estimates: Valuation/productivity of care services ω_c

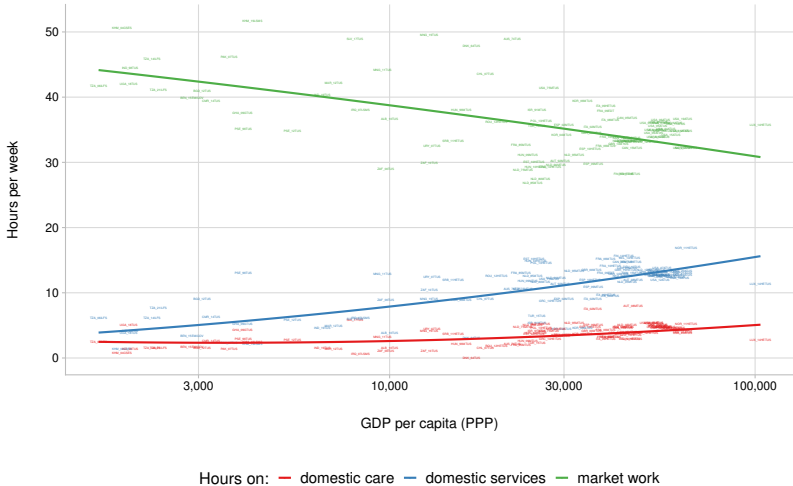


Greater valuation/productivity of care services required to explain higher home hours in HICs, despite higher wages.

Back

Weekly hours spent on market, domestic and care work per capita

Males



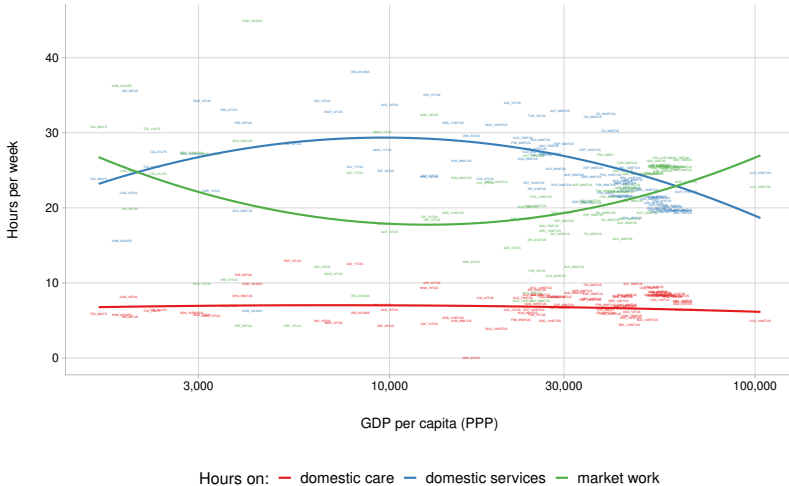
Quadratic fit, shaded area marks the 95% confidence interval

Male working age population. Activity groups are aggregated based on the ICATUS 2016 one-digit codes [market = 1&2, services = 3, care = 4&5]. Minimum sample size for each activity group is 30.

Back

Weekly hours spent on market, domestic and care work per capita

Females



Quadratic fit, shaded area marks the 95% confidence interval

Female working age population. Activity groups are aggregated based on the ICATUS 2016 one–digit codes [market = 1&2, services = 3, care = 4&5]. Minimum sample size for each activity group is 30.

Back

Appendix model: : Consumption allocation

Ratio of consumption FOCs across genders:

$$\frac{\lambda}{1-\lambda}\left(\frac{c^m}{c^f}\right)^{\frac{1-\sigma\varepsilon}{\varepsilon}}\left(\frac{c_m^m}{c_m^f}\right)^{-\frac{1}{\varepsilon}}=1$$
$$\frac{\lambda}{1-\lambda}\left(\frac{c^m}{c^f}\right)^{\frac{1-\sigma\varepsilon}{\varepsilon}}\left(\frac{c_i^m}{c_i^f}\right)^{-\frac{1}{\varepsilon}}=1$$

This implies that

$$\frac{c_m^m}{c_m^f}=\frac{c_i^m}{c_i^f}.$$

Married individuals consume the same share of each good. Let $\Lambda \equiv c_m^m/c_m$, such that: $c_c^m = \Lambda c_c$ and $c_d^m = \Lambda c_d$.

Back

Appendix model: First order conditions

Consumption:

$$c_m^g: \quad \lambda^g c^{g\frac{1-\sigma\varepsilon}{\varepsilon}} c_m^{g-\frac{1}{\varepsilon}} = \mu_m P$$
$$c_i^g: \quad B_i \lambda^g c^{g\frac{1-\sigma\varepsilon}{\varepsilon}} c_i^{g-\frac{1}{\varepsilon}} = \mu_i$$

Hours worked:

$$L_m^g: \quad D_m^g \lambda^g L_m^{g\frac{1}{\phi}} = w^g \mu_m$$
$$L_i^g: \quad D_i^g \lambda^g L_i^{g\frac{1}{\phi}} = z_i \mu_i$$

where $g = \{m, f\}$, $\lambda^m = \lambda$, $\lambda^f = 1 - \lambda$ and $i = \{c, d\}$

Back

Appendix model: Identification

Step 1: Assume common disutility of care work ($D_c^f = D_c^m$)

$$\frac{L_c^f}{L_c^m} = \left(\frac{D_c^m}{D_c^f}\frac{\lambda}{1-\lambda}\right)^{\phi} \quad \rightarrow \quad \lambda = \frac{\left(\frac{L_c^f}{L_c^m}\right)^{1/\phi}}{1+\left(\frac{L_c^f}{L_c^m}\right)^{1/\phi}}$$

$\rightarrow$ Gender ratio of L_c reveals utility weights $\boldsymbol{\lambda}$.

Back

Appendix model: Identification

Step 2:

$$\frac{L_d^f}{L_d^m} = \left(\frac{D_d^m}{D_d^f}\frac{\lambda}{1-\lambda}\right)^{\phi} \quad \rightarrow \quad \frac{D_d^m}{D_d^f} = \left(\frac{L_c^m}{L_c^f}\frac{L_d^f}{L_d^m}\right)^{\frac{1}{\phi}} \equiv \frac{1}{\delta}$$

$\rightarrow$ Ratio of L_d reveals gender gap of disutility of domestic work $\boldsymbol{\delta}$.

$\rightarrow$ Member who does less domestic relative to care work has a higher disutility.

Back

Appendix model: Identification

Step 3: Use FOCs for market work to get relative disutilities from market work:

$$\kappa \equiv \frac{D_m^f}{D_m^m} = \left(\frac{L_c^f}{L_c^m} \frac{L_m^m}{L_m^f} \right)^{\frac{1}{\phi}} \frac{w^f}{w^m}.$$

$\rightarrow$ Gender wage gap pins down the gender gap of disutility of market work.

Back

Appendix model: Identification

Step 4: Assume $D_c^m = C^m$ and $\frac{D_d^f + D_d^m}{2} = C^m$

$$\omega_c = \left(\frac{L_m^m}{L_c^m}\right)^{-\frac{1}{\phi}} \left(\frac{L_m^f}{L_c^f}\right)^{-\frac{1}{\varepsilon}} \left(\frac{1}{P}\frac{w^m\Delta_m + w^f}{\Delta_c + 1}\right)^{-\frac{1}{\varepsilon}} \frac{w^m}{P}$$

$$\omega_d = \left(\frac{L_m^m}{L_d^m}\right)^{-\frac{1}{\phi}} \left(\frac{L_m^f}{L_d^f}\right)^{-\frac{1}{\varepsilon}} \frac{2}{1+\delta} \left(\frac{1}{P}\frac{w^m\Delta_m + w^f}{\Delta_d + 1}\right)^{-\frac{1}{\varepsilon}} \frac{w^m}{P}$$

where $\Delta_m, \Delta_d, \Delta_c$ are gender ratios of work time, and $\frac{D_d^m}{C^m} = \frac{2}{1+\delta}$

Step 5: Level equation for market hours reveals C^m:

$$C^m = L_m^{m-\frac{1}{\phi}} (\Lambda\Omega(\omega_d, \omega_c) L_c^f)^{\frac{1-\sigma\varepsilon}{\varepsilon}} \left(\Lambda L_m^f \frac{(w^m\Delta_m + w^f)}{P}\right)^{-\frac{1}{\varepsilon}} \frac{w^m}{P}$$

Back