Intra-Household Decisions and Labor Market Outcomes - Evidence from Shared Parental Leave

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Mend the Gender Gap Workshop 2025

Motivation

- Gender wage gap is one of most salient labor market phenomena. ▸ OECD ▸ OECD (percentile)
  - This gap also widens with age. ▸ Evidence ▸ Data
  - Many possible causes: occupation choice, discrimination, **childbirth**

- After childbirth, women's wages fall when men's wages increase.
  - **Child penalty**. ▸ Evidence
  - Unequal division of childcare duties.
  - Time spent in childcare leads to depreciation of human capital.

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- Governments have tried to address this by adjusting leave.
  - Shared leave vs. extended leave for both parents.
  - Allocation of leave is result of **intra-household decision-making**.

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How does intra-household decision-making shape the effect of shared parental leave?

This Paper

Shock: introduction of shared parental leave in Portugal.

- Before: long maternity leave and short paternity leave.
- After: households chooses how to allocate leave.

Data: matched employer-employee data set.

- Universe of Portuguese workers.
- Data on all births with some information on characteristics of parents.
- Build synthetic households.

Model: model of household decision-making.

- Household chooses allocation of leave.
- Longer leave $\implies$ human capital $\downarrow$.
- Bargaining vs. maximizing HH income.

Preview of Results

1. Shared parental leave reduces gender wage gap.
   - In 2008–2012, women's monthly wages increase by 1.2 percent relative to men.
2. Fall in gender gap more pronounced for women with high labor income share.
3. Model suggests bargaining is not the driving force.
   - HH is more concerned with maximizing available income.

Literature Review

Child penalty and gender wage gap: Bertrand-Goldin-Katz (2010), Goldin (2014), Kleven (2022), Kleven-Landais-Leite Mariante (2023), Kleven-Landais-Søgaard (2019), Angelov-Johansson-Lindahl (2016)

- Bring in household decision-making.

Maternity leave policies: Baker-Gruber-Milligan (2008), Lefebvre-Merrigan (2008), González (2013), Havnes-Mogstad (2011) Krapf-Roth-Slotwinski (2020), Lim-Duletzki (2023)

- Highlight role of intra-household decision-making.
- Can rationalize mixed results.

Intra-household bargaining: Becker (1973), Barro and Becker (1988, 1989), Chiappori (1988, 1992), Doepke and Kindermann (2019)

- Highlight additional channel driving intra-household inequality.

Institutional Background

Shared parental leave in Portugal

Before 2009: maternal leave & paternal leave.

- Women may take up to 90 days of maternal leave.
- Men are entitled to 10 days of maternal leave.

After 2009: shared parental leave.

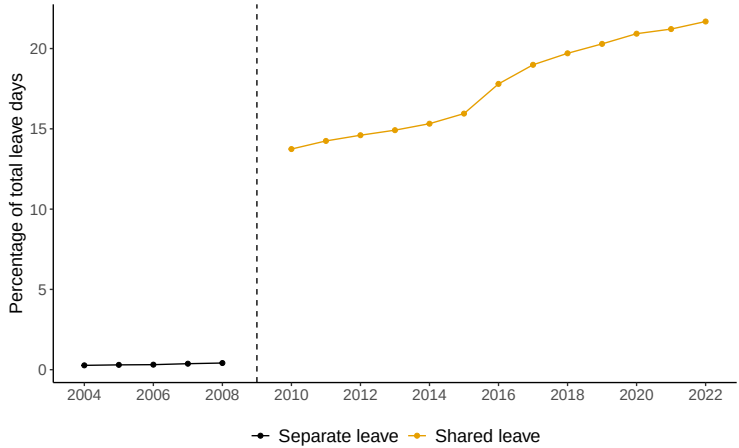
- Household is entitled to 120 days of leave.
- Allocation of leave across household members is a decision of the household.

Childcare in Portugal is expensive $\implies$ strong incentive to use leave.

▸ Data

- Also, heterogeneity across households.

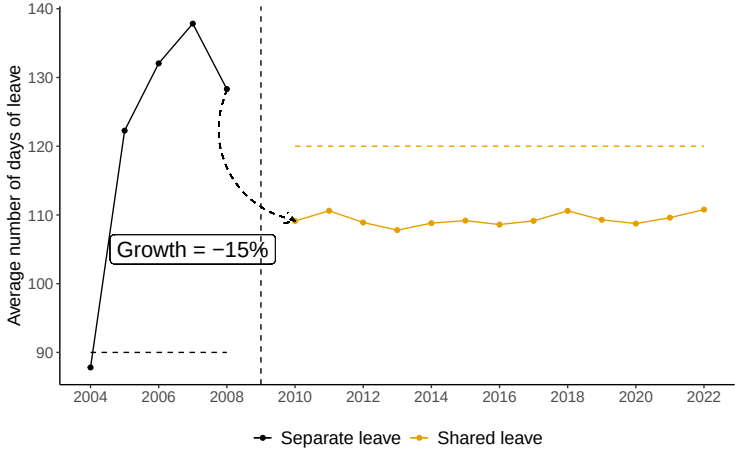
Share of men taking parental leave increases



- Goes from 13% in 2010 to over 20% in 2022.

ESS

Average number of leave days taken by women decreases



- Before 2009, constraint on days was binding.
- After 2009, constraint for women is not binding $\Longrightarrow$ not driven by preferences. ▸ Total

Data

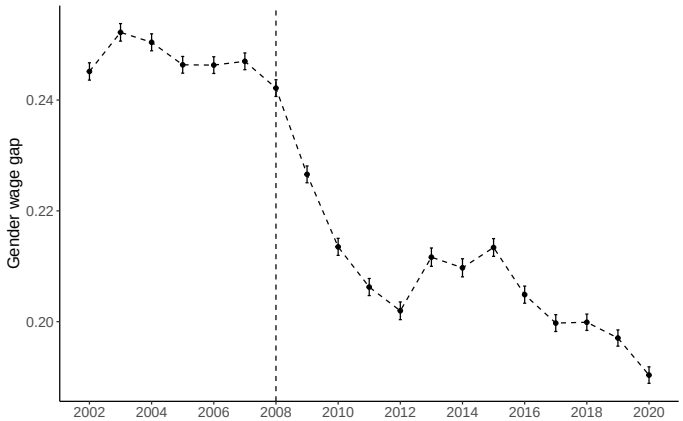
Matched employer-employee data: most Portuguese workers in 2003–2012.

- Around 4 million workers. ▸ Table ▸ Women
- Wages, hours, occupation, hierarchical position.
- Age, gender, educational attainment.

Data on births: all births in Portugal in 2003–2012.

- Around 2 million births. ▸ Births
- Observe age, occupation, region and educational attainment of parents.
- Can create synthetic households. ▸ Algorithm ▸ Group size ▸ Comparison

Gender wage gap declines with the introduction of shared parental leave



Wage gap is computed with education FE, occupation FE, 3rd degree polynominal on age, and a 3rd degree polynominal on tenure.

▸ Age

Model

Why do we need a model?

Shared parental leave changes intra-household decision-making.

Two possible effects:

Bargaining channel: women now have more bargaining power.

- Can change labor supply decisions.

Household income channel: HH can now choose labor supply optimally.

- Removes one constraint.

Setup

Consider a household with two members $i = \{m, f\}$.

- Stork shock: HH has a child.
- Must spend 1 unit of time with child.
- Chooses allocation of leave across individuals.

How does leave work?

- Benefits: preferences for time with child.
- Costs: depreciates human capital.

Problem of household

$$\max_{c_m, c_f, \delta} \mu \left[u(c_m) + \alpha_m v(1-\delta) \right] + (1-\mu) \left[u(c_f) + \alpha_f v(\delta) \right]$$

s.to

$$c_f + c_m = (1+\gamma)\mathcal{W}$$

$$\mathcal{W} \equiv H(w_m, 1-\delta) + H(w_f, \delta)$$

$$u(c_m) + \alpha_m v(1-\delta) \geq u(c_m^s) + \alpha_m v(1-\delta^s)$$

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- Benefits of childcare δ: $\alpha_m, \alpha_f \geq 0$.
- Costs of childcare δ: $H(\cdot, \cdot)$.
  - $H_1 > 0, H_2 < 0$.
- P.C. $\implies$ individuals care about their human capital.

Bargaining power does not matter for allocation of childcare

Proposition. Suppose γ is large and $\alpha_m = 0$. Then, the optimal choice $\delta^\star$ is not a function of bargaining weights μ.

- Men don't care about children while women view consumption and childcare as substitutes.
- Leave will depend on human capital and α_f.
- If $\alpha_m > 0$, then $\delta^\star$ is lower.

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Trade-off between preferences and HH income:

- $\delta^\star$ increases with α_f.
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Trade-off between preferences and HH income:

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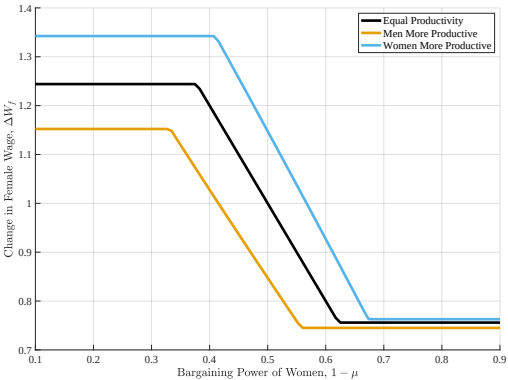
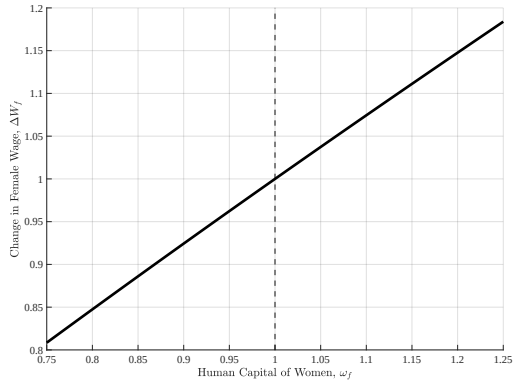
$\implies$ Model predicts the **household income** mechanism should dominate.

Shared parental leave increases wages for high-productivity women





- Bargaining power has opposite implications.

▸ Childcare

Effect on wage gender gap

Empirical strategy

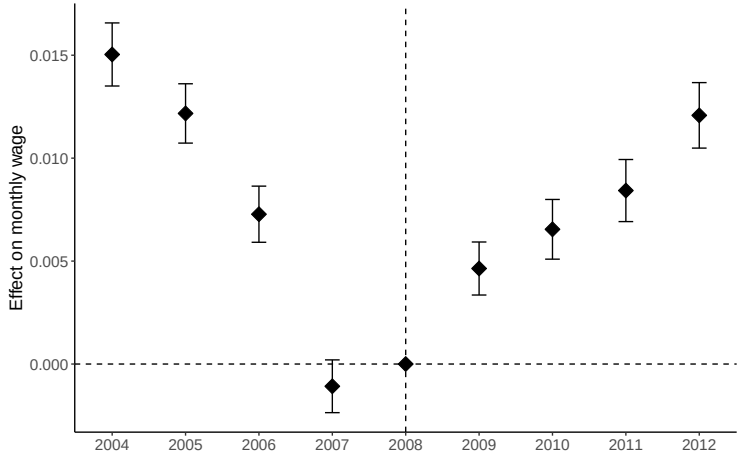
Object of interest is **gender gap** - DiD.

- Men vs. women.
- Post shared parental leave vs. before.

$$\log w_{it} = \mu_i + \lambda_{o(i),t} + \beta X_{it} + \sum_{m=-4, m\neq -1}^{4} \gamma_m \cdot \mathbf{1}\{m = t - 2009\} \cdot \mathbf{1}\{i \in \text{Female}\} + \varepsilon_{it}$$

- Worker and occupation-time FE.
- Controls: 3rd degree polynomial on wage and tenure.
- Robust to FE structure.

Gender gap decreases after introduction of shared parental leave



- Relative wages of women increase by over 1%.
- Explains around 1/2 of wage changes.

▸ Households
▸ Hours ▸ Hourly wage

What do the pretrends mean?

1. Pretrends present in all subgroups. ▸ Position ▸ Education ▸ Occupation ▸ CEM
2. Not driven by migration. ▸ Emigrants
3. Not driven by specific sectors. ▸ Sector ▸ Construction

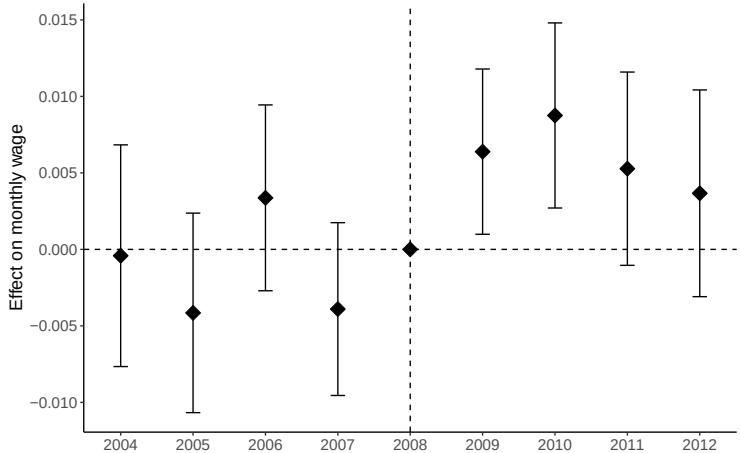
$\Longrightarrow$ Must be driven by common trend in gender gaps.

- Usual solution is to detrend the data. ▸ Detrending

Alternative: triple difference.

- Compare primary earners with non-primary earners.
- Primary earner = share of household income > 0.5. ▸ Distribution ▸ IDEF ▸ ESS

Increase in wages driven by women with high labor income share



- No pretrends (consistent with existence of common trend).

What drives the changes in wages?

Our hypothesis: **childcare**.

▸ Child penalty

- Time invested in childcare leads to depreciation of human capital.
- If women take on all childcare duties, gender gap widens.

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1. **Bargaining:** women with high bargaining power can take a smaller leave.
   - Consistent with triple difference.
   - Not consistent with model.

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1. **Bargaining:** women with high bargaining power can take a smaller leave.
   - Consistent with triple difference.
   - Not consistent with model.
2. **Household income:** HH is just maximizing income.
   - Before 2009, HH faced a constraint.
   - Once constraint is relaxed, HH chooses leave to maximize available resources.
   - Also consistent with triple difference.

Conclusion

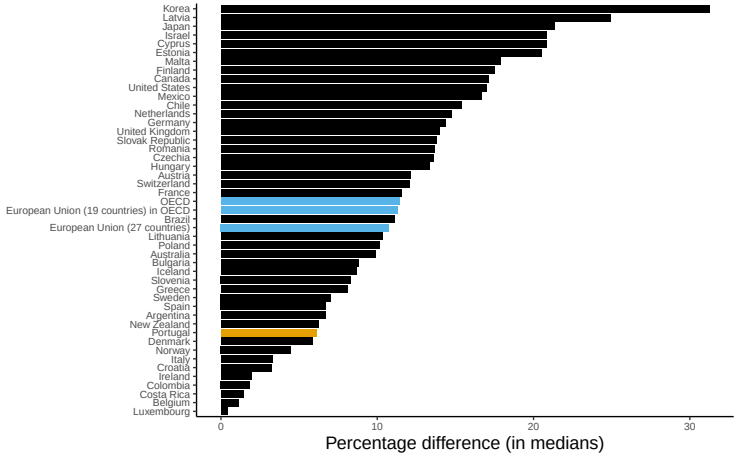
1. Shared parental leave reduces gender wage gap.
   - In 2008–2012, women's monthly wages increase by 1.2 percent relative to men.
2. Fall in gender gap more pronounced for women with high labor income share.
3. Model suggests bargaining is not the driving force.
   - HH is more concerned with maximizing available income.

Policy implication: shared leave vs. equal leave.

- Depends on distribution of HH income and female share.

Thank you!

Gender wage gap across countries



Gender wage gap is computed as the percentage difference in median wages. Data comes from the OECD and is relative to 2022

Back

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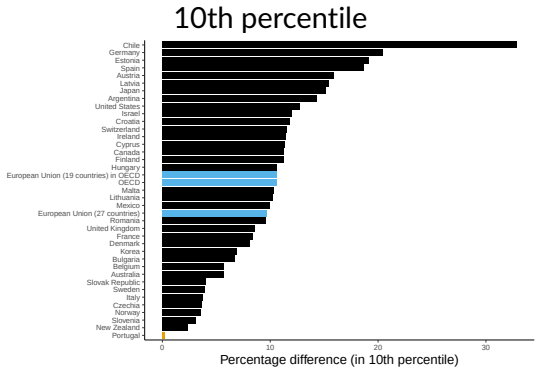

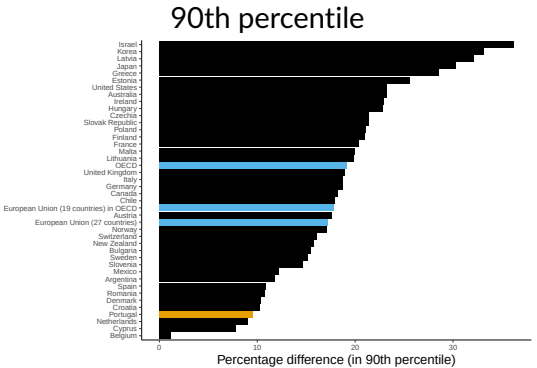

Gender wage gap is computed as the percentage difference in the percentile of wages. Data comes from the OECD and is relative to 2022

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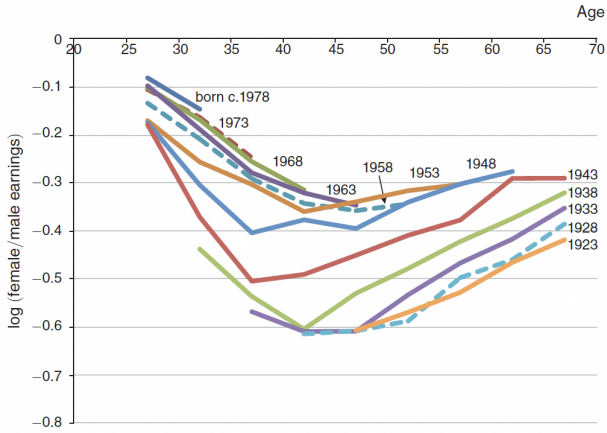
Gender wage gap widens with age



Source: Goldin (2014)

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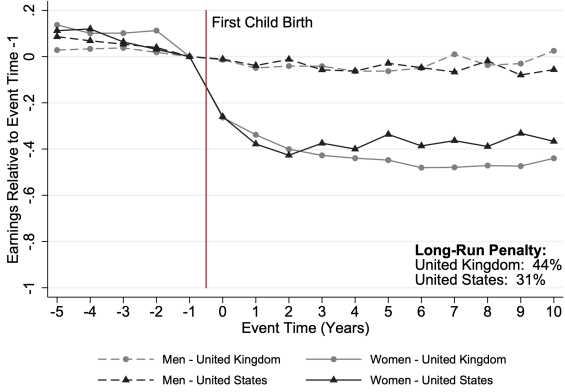
After birth of child, women's wages decline



Source: Kleven, Landais, Posch, Steinhauer, and Sweimüller (2019)

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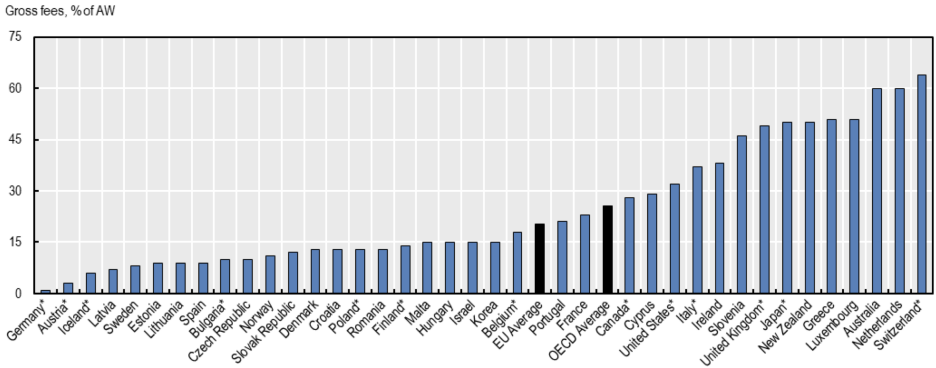
Portugal has high gross childcare costs



Calculations are based on a couple where both individuals are employed. The household has two children aged 2 and 3. The calculations use the OECD's Tax Benefit Database for 2021.

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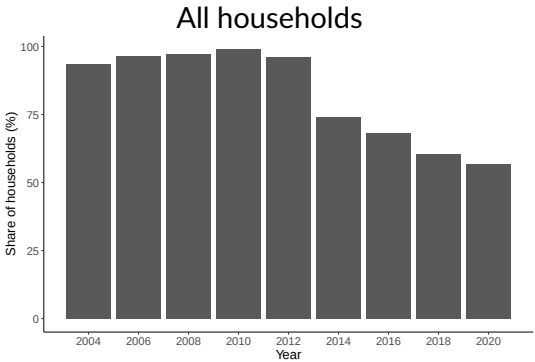
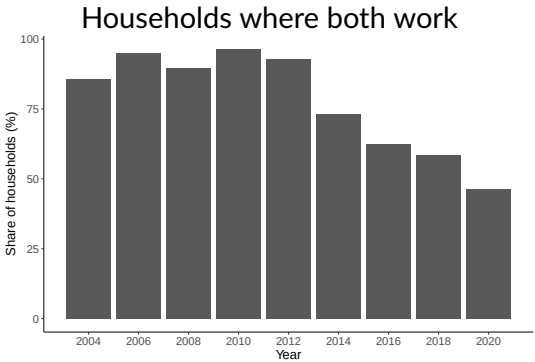
Share of households in which men do not take up childcare duties





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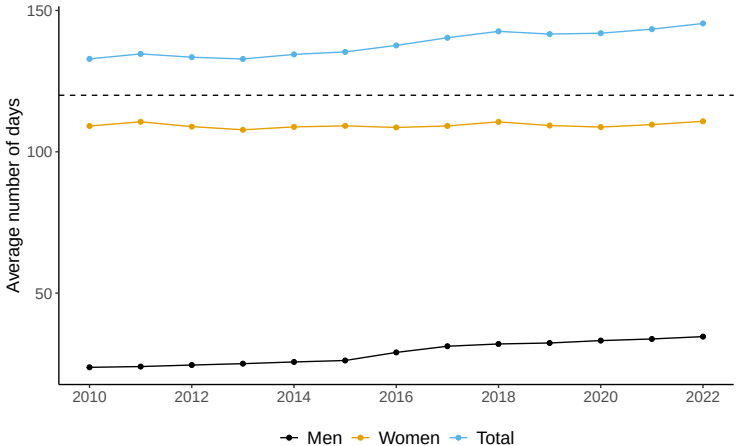
Women are not taking the entirety of the leave period



- Men + women are taking in excess of 120 days.

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Summary statistics

	All workers	Men	Women	Difference
Hours (regular)	160	160	160	0.00
Hours (total)	167	168	166	-1.56***
Monthly wage	925.76	1,030.48	771.67	-258.82***
Hourly wage	5.66	6.27	4.77	-1.50***
Age	37.8	38	37	-1.25***
Tenure (in years)	6.3	6.4	6.2	-2.70***
Has a college degree	0.09	0.08	0.11	0.03***
Is a manager	0.08	0.09	0.07	-0.02***
Observations	2,224,348	1,324,330	900,018	

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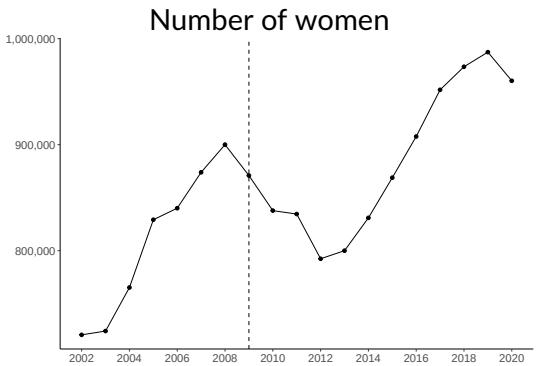
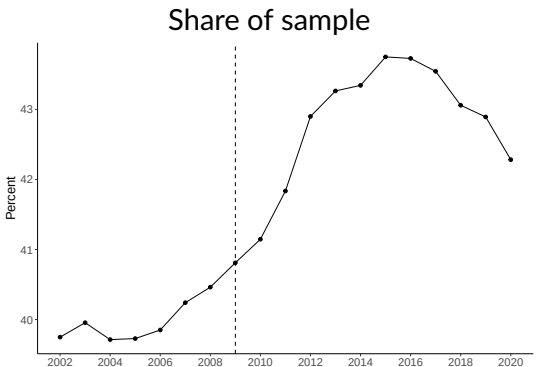
Number of women in sample





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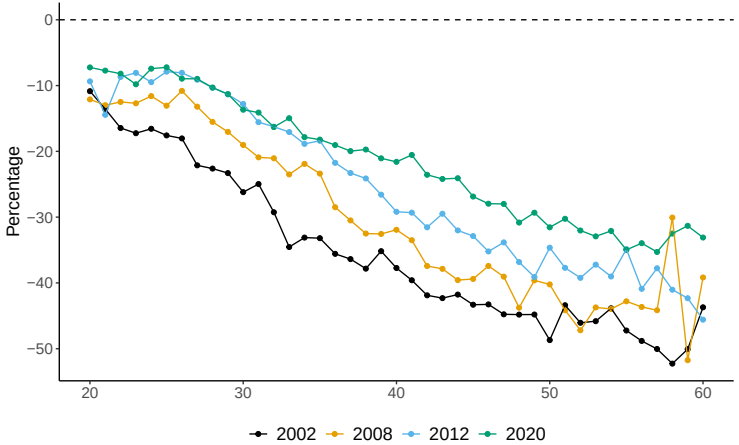
Gender gap widens with age



Each point represents the unconditional percentage difference between the average wage of men and women with that age.

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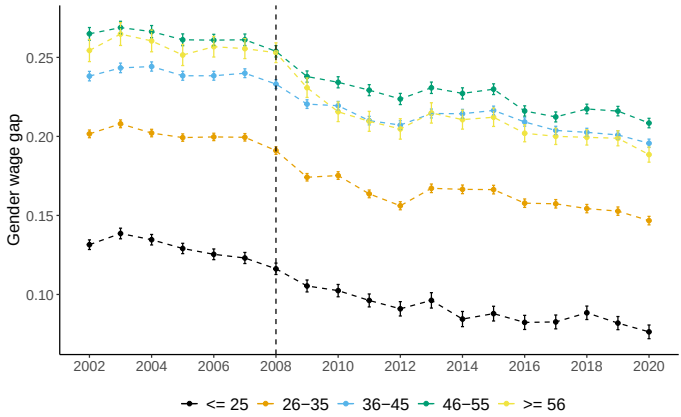
Gender wage across age bins



Wage gap is computed with education FE, occupation FE, 3rd degree polynominal on age, and a 3rd degree polynominal on tenure.

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Statistical matching

- Consider a worker i which belongs to group $g \in \mathcal{G}$.
- Group: age x gender x education x region x occupation.

Probability of having a child:

$$\mathbb{P}\left(\text{Having a child}\right) = \frac{\#\text{Births in group } g}{\#\text{Workers in group } g}$$

where we use the labor data to compute the denominator.

Income of partner: let $\tilde{g} \in \mathcal{G}$ denote the potential group of the partner.

1. Compute the average wage for each $\tilde{g}$ using the labor data.
2. Using births data, compute the number of partners in each group $\tilde{g}$, conditional on g.
3. Income of partner is the weighted average across all groups $\tilde{g}$.

Income of household: observed wage + estimated wage of partner.

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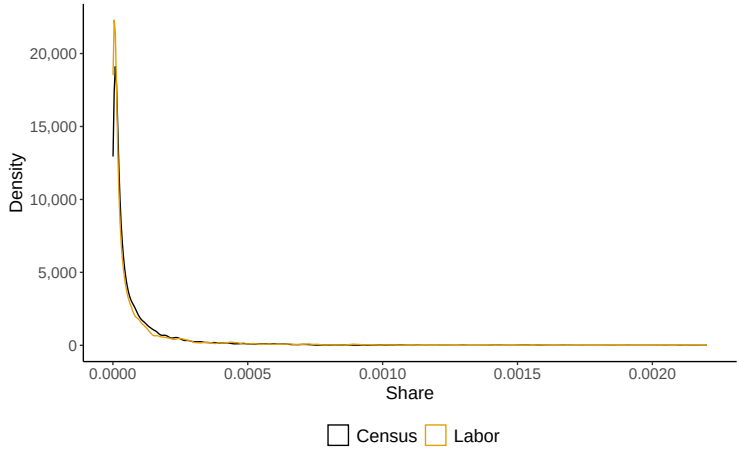
Groups are small in both our data and Census



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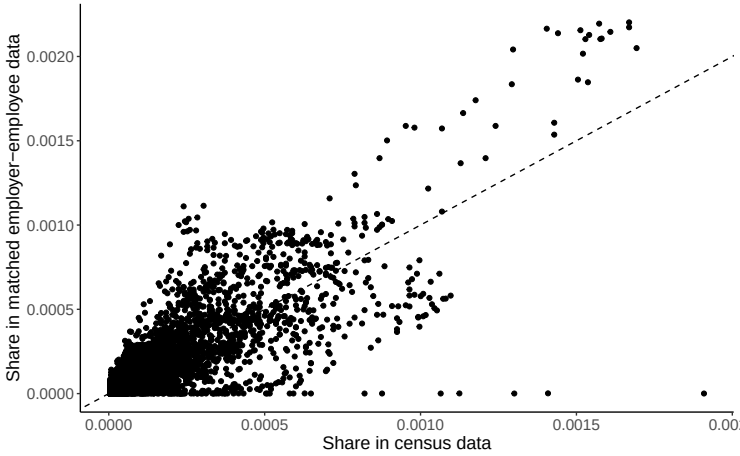
Group size is similar between our data and Census



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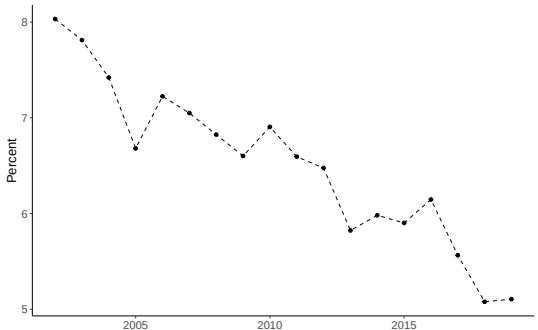
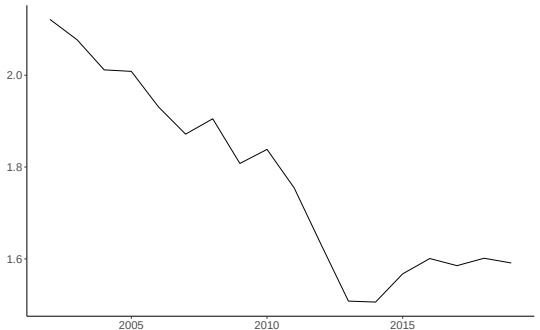
Probability of having a child is similar between our data and aggregate data

Synthetic households



Aggregate data



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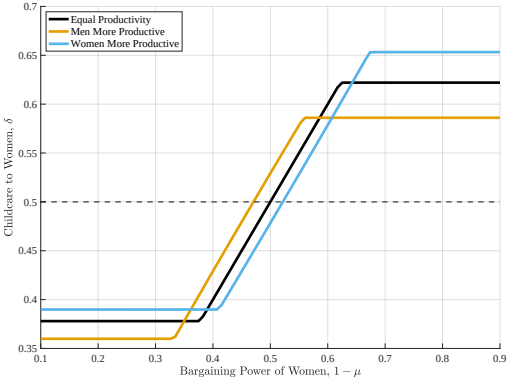
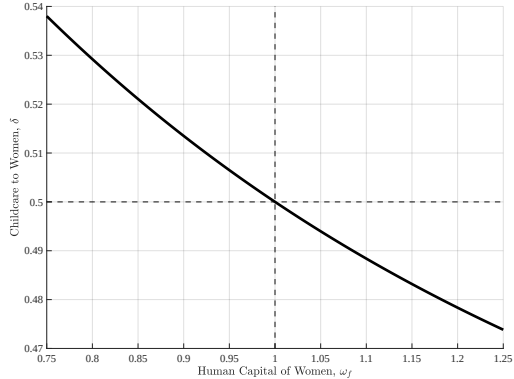
Chilcare to women increases with bargaining power





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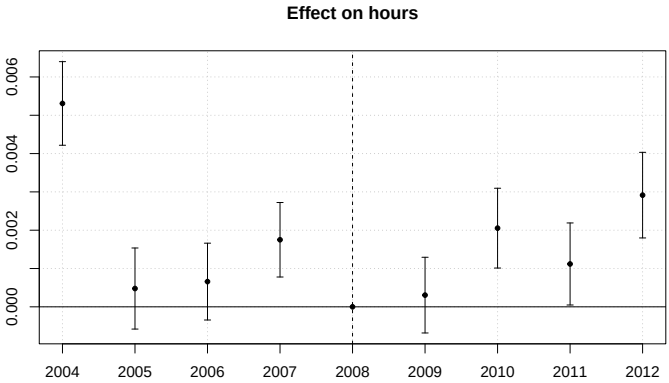
Effects on hours are not economically significant



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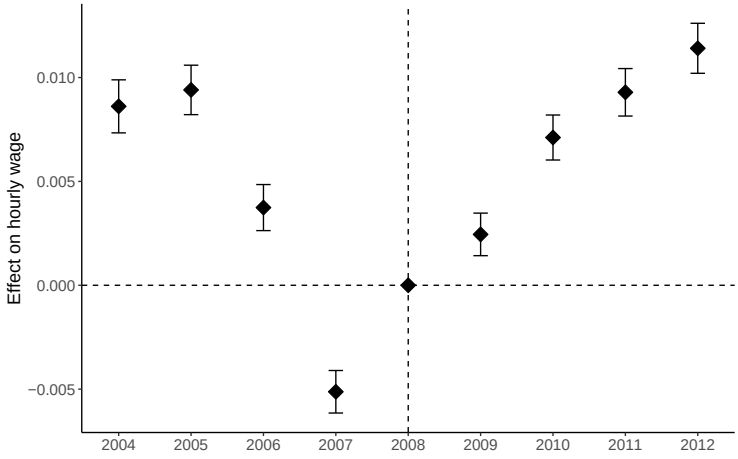
Effects on monthly and hourly wages are identical



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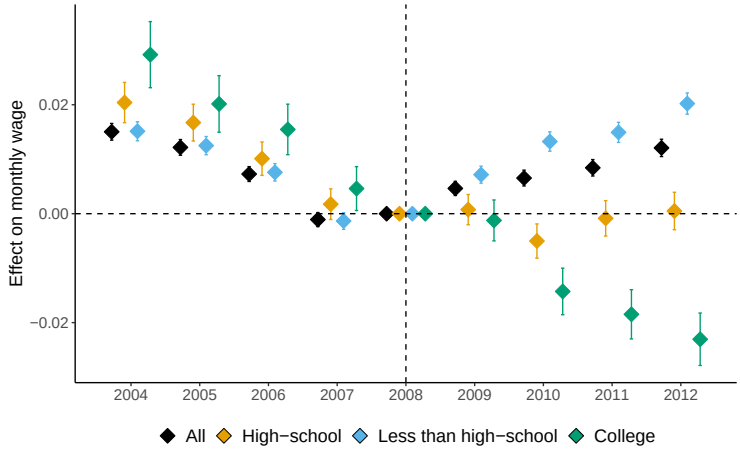
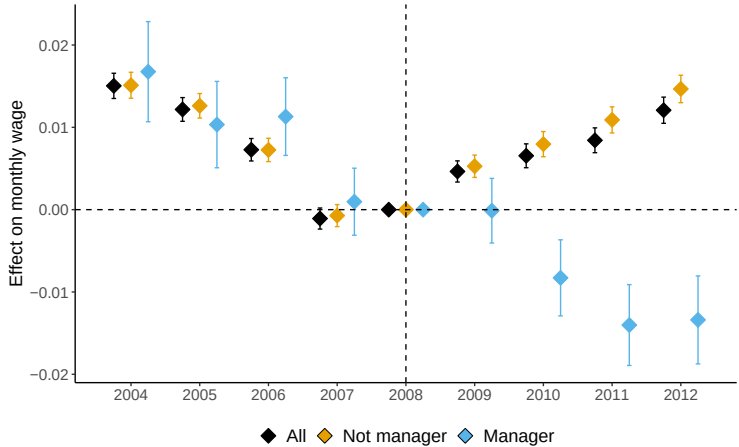
Decomposition across education groups



- Pretrends are not driven by educational attainment

Back

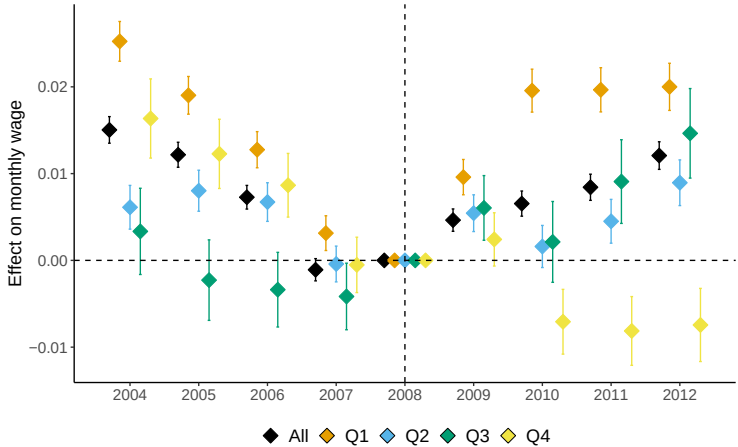
Decomposition across hierarchical positions



- Pretrends are not driven by hierarchical positions

Back

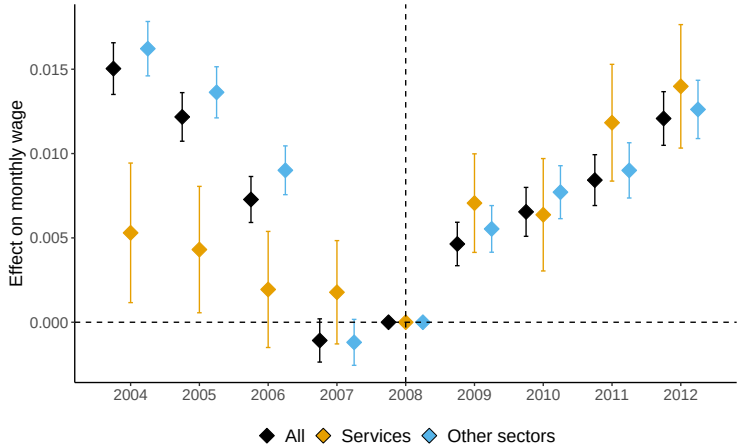
Decomposition across occupations



- Pretrends are not driven by heterogeneity across occupations

Back

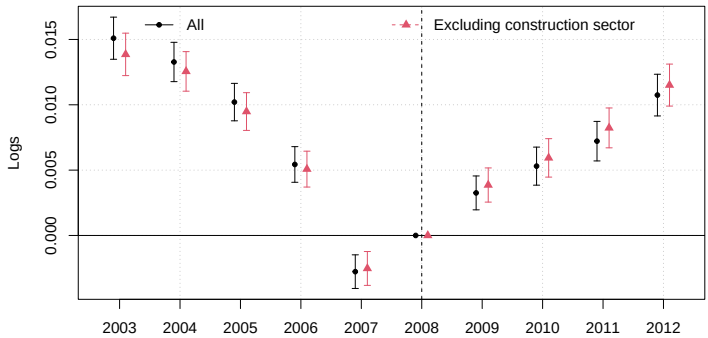
Decomposition across sectors



- Pretrends are not driven by heterogeneity across sectors

Back

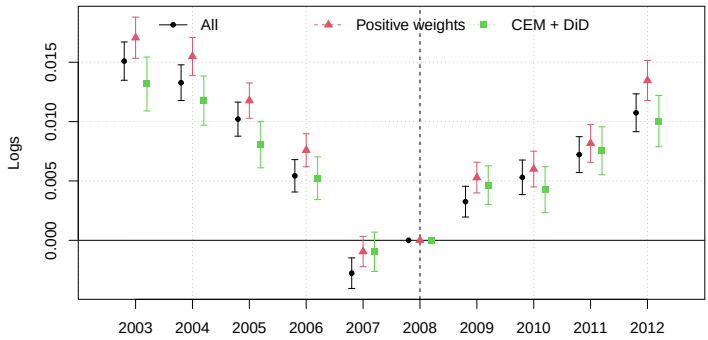
Results don’t change if we exclude the construction sector



- Pretrends are not driven by heterogeneity across sectors

Back

Coarsened exact matching and DiD



- Matching on age, occupation x manager, region, education, and tenure

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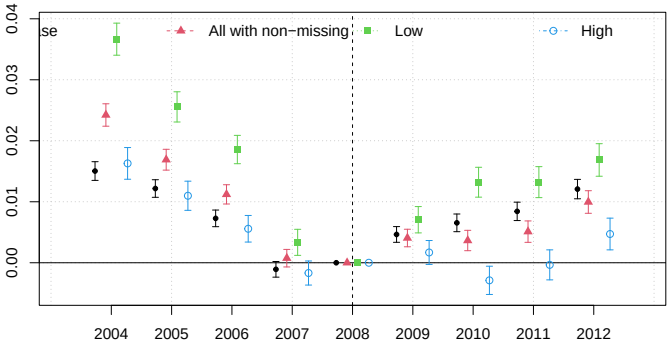
Decomposition across households



- Poorer households observe larger decline in gender gap.

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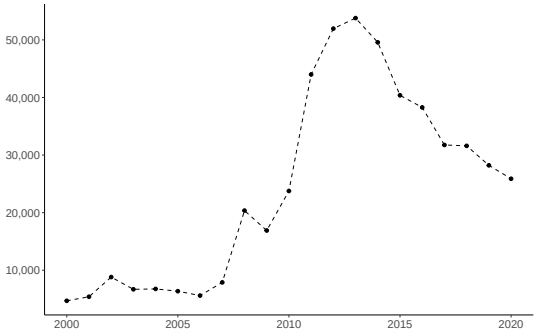
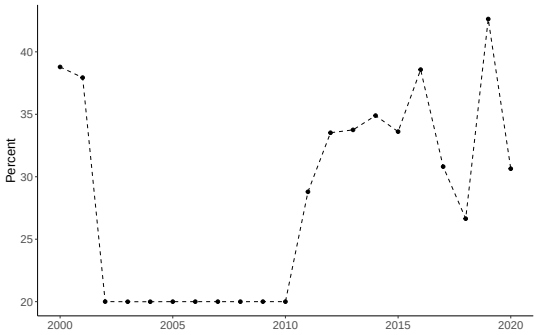
Share of women in emigrants does not change before 2009

Number of emigrants

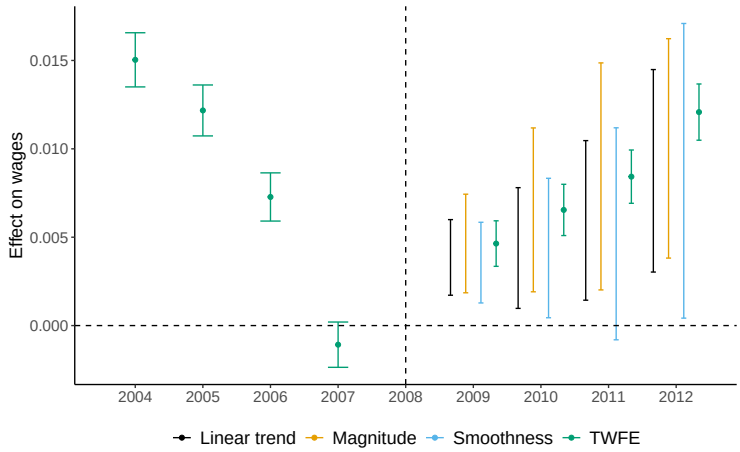


Share of women



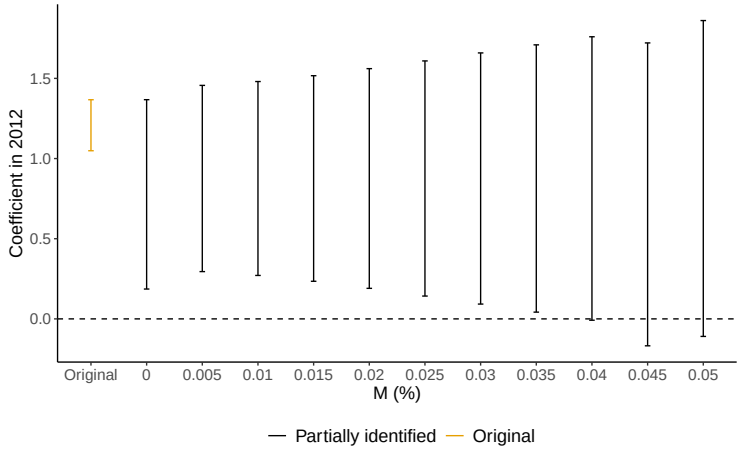
Back

Decrease in wage gender gap is robust across methods



- In all methods, wages of women increase after parental leave. Back Smoothness Magnitude

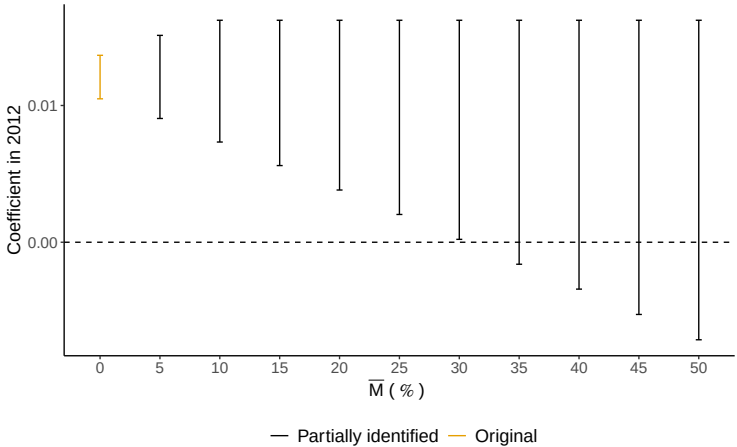
Treatment effects with smoothness restrictions



- Even with changes in first difference, wages of women still increases.

Back

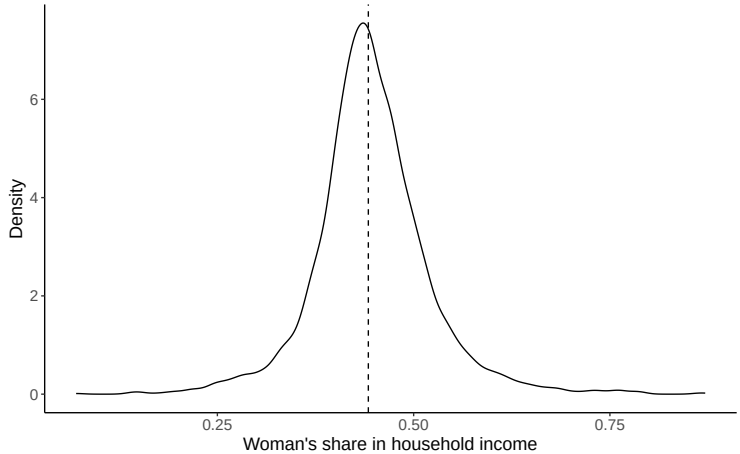
Treatment effects with magnitude restrictions



- Even with large nontreatment differences, wages still increase.

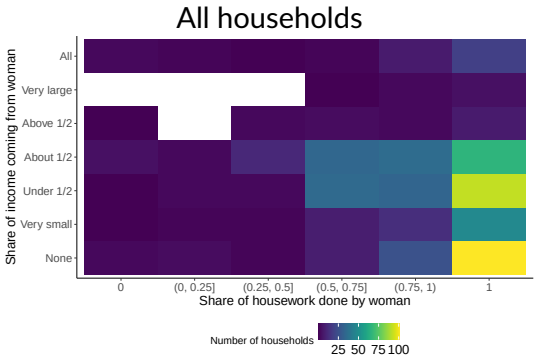
Back

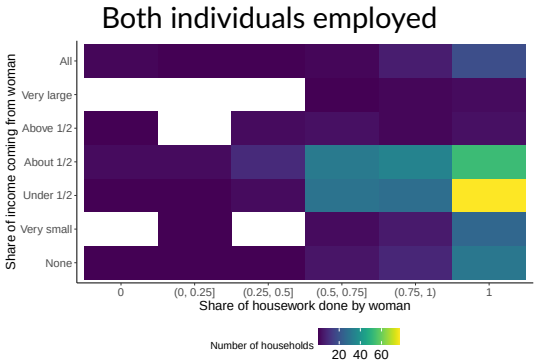
On average, women make up less than 50% of household labor income



Back

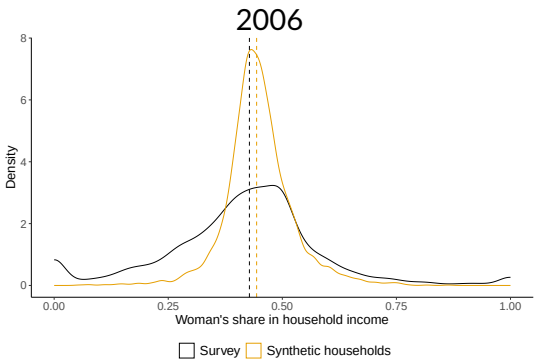
Negative correlation between labor share and childcare share

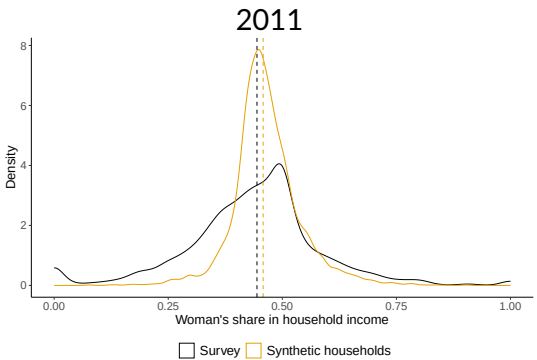




Back

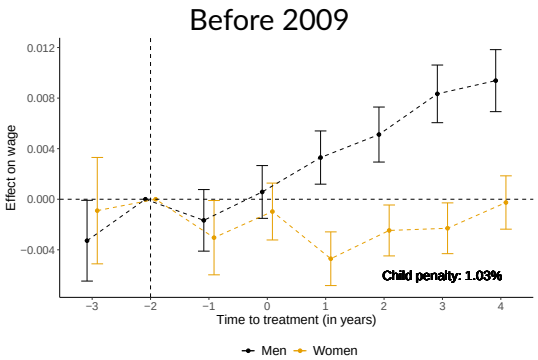
Labor share distribution is similar to survey

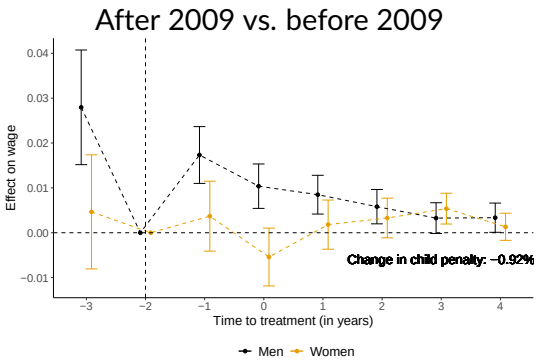




Back

Child penalty in wages is eliminated by introduction of shared parental leave





▸ Back ▸ Regression ▸ Hours ▸ Employment ▸ Robustness

Estimating the child penalty

For each gender, we estimate

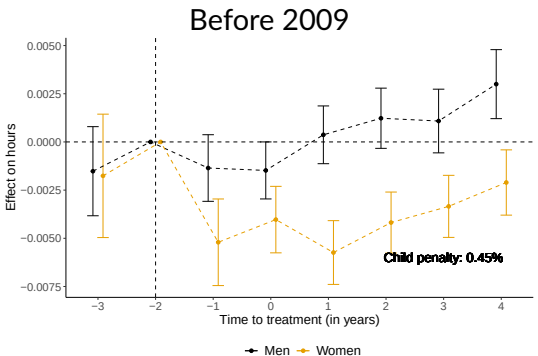
$$Y_{it} = \mu_i^g + \lambda_{o(i),t}^g + \beta^g X_{it} + \sum_{m \neq -2} \gamma_m^g \times \mathbf{1}\{t - E_i = m\}$$
$$+ \sum_{m \neq -2} \delta_m^g \times \mathbf{1}\{t - E_i = m\} \times \mathbf{1}\{t \geq 2009\} + \varepsilon_{it}^g$$

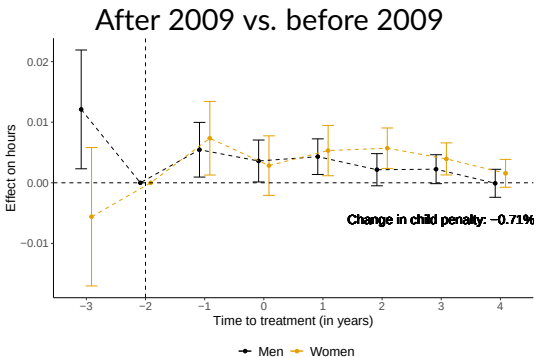
and then compute

$$\text{Child penalty}(Y) = \sum_{m \geq 0} (\gamma_m^{\text{women}} - \gamma_m^{\text{men}}) - \sum_{m < 0} (\gamma_m^{\text{women}} - \gamma_m^{\text{men}})$$
$$\Delta\text{Child penalty}(Y) = \sum_{m \geq 0} (\delta_m^{\text{women}} - \delta_m^{\text{men}}) - \sum_{m < 0} (\delta_m^{\text{women}} - \delta_m^{\text{men}})$$

Back

Child penalty in hours is eliminated by introduction of shared parental leave





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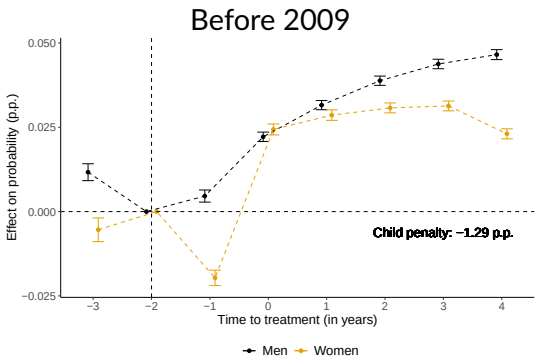
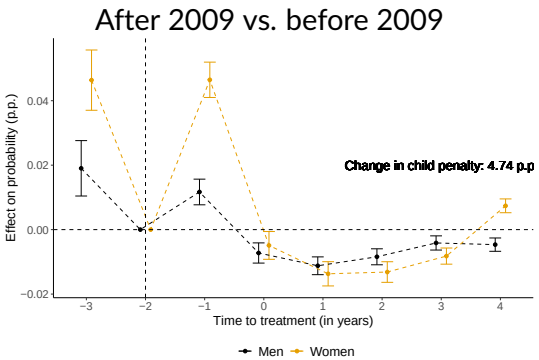
Child penalty in employment is eliminated by introduction of shared parental leave





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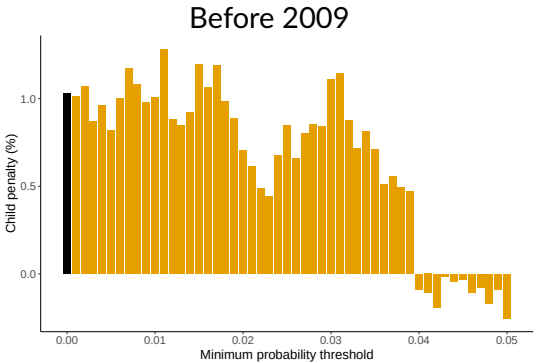
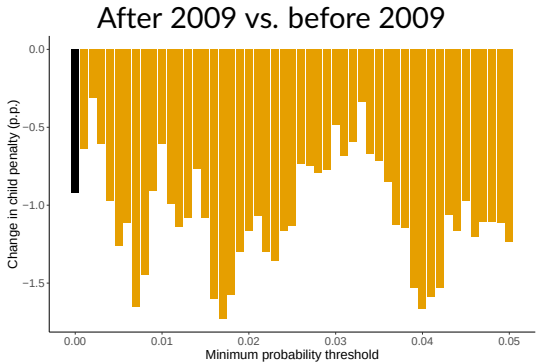
Results are robust to changes in the minimum probability threshold





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