Gender Differences in Job Search: Trading off Commute against Wage

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Summer Reading Group

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Presentation Overview

Research Question

- Several mechanism have been used to explain the persistence of gender gap in wages.
  - Time flexibility (Bertrand, Goldin, and Katz 2020; Goldin 2014)
  - Child penalty (Adda, Dustmann, and Stevens 2017; Kleven, Landais and Søgaard 2019)
  - **Willingness to commute**

- This paper: How much are men and women willing to trade in terms of wage for a shorter commute?

  $\Rightarrow$ Does this gender differences in commute preferences help explain the gender wage gap?

- Commute valuation identified from choice experiments and elicitation of preferences for commute and wage from administrative data.

Preview of Results

- Document differences in the reservation wage and maximum acceptable commute.
- The gender gap in the maximum acceptable commute is 14% on average.
  - 8% for single individuals without children.
  - 24% for married individuals with children.
  - Translate to women getting paid lower wages and having shorter commute upon reemployment.
- Parameter for willingness to pay (WTP) for shorter commute is higher for women.
- Find that gender differences in commute valuation can account for 14% of the gender gap in residualized wages.
- Gender gaps in commute primarily driven by supply-side considerations.

Data

- French public employment service (Pôle emploi) 2016 – 2019.
- Vacancy level data: Location, wage, occupation, and posting characteristics.
- Application level data: Who applied to which job and when.
- Outcome: Shortlisting and hiring decisions.
- Job Seeker Characteristics: Gender, age, education, work history, address $\Rightarrow$ commute distance computed.

Stylized Facts

- Women are less demanding than men on wage dimension but more demanding on commute dimension.
- Women and men have same propensity to search for a job in the same occupation.
  - Women have higher propensity to look for a part time job than men by 6.5 pp.
- Suggests that gender gaps in realized job outcomes are partly driven by labor supply.
- Probability of women finding a job within two years is 2.4 pp lower than that of men.
- Women state preference for shorter commute on top of preference for part-time jobs.

Stylized Facts - Family/Age Structure

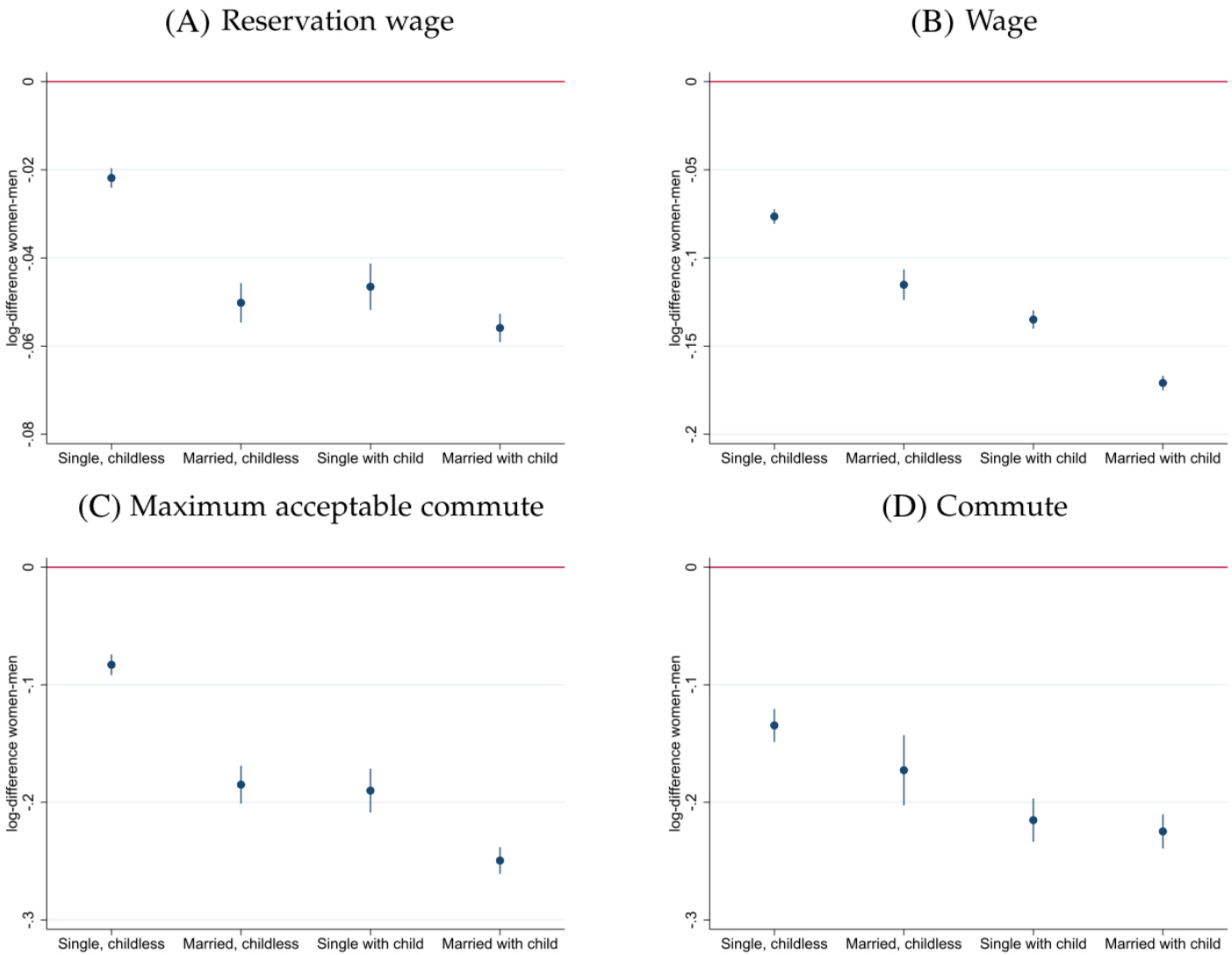


Figure: Gender Gaps Grow with Family Size

Stylized Facts - Family/Age Structure

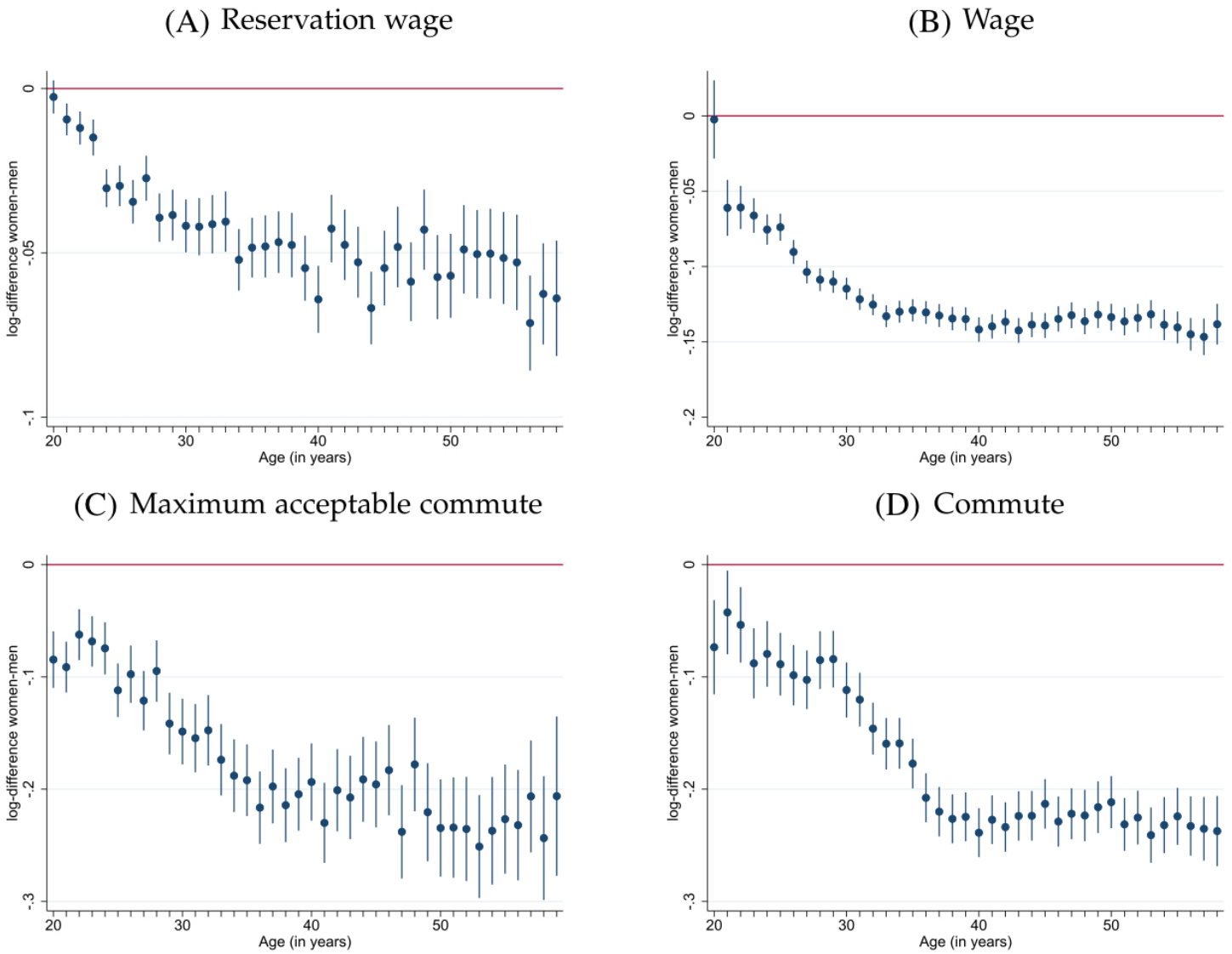


Figure: Gender Gaps Grow with Age

Model Setup

- Random job search model where commute matters. (Van den Berg and Gorter 1997)

  $\Rightarrow$ Yields reservation wage curve by gender that gives for every commute the lowest wage that the job seeker is willing to accept

- Use acceptance frontier to identify the reservation wage curve.

- Estimate the willingess to pay (WTP) for shorter commute for women and men

  $\Rightarrow$ Identification of WTP relies on assumptions of how declared search criteria should be interpreted.

Random Job Search Model

- Instantaneous utility of being employed: $u(W, \tau) = \overbrace{\log W}^{w} - \alpha\tau$

  $\Rightarrow \alpha$ measures the willingness to pay for a shorter commute, τ is commute.
- Job matches destroyed at exogenous rate q. Unemployed workers receive flow utility b and draw job offers at rate λ from cumulative distribution H.
- Unemployment value U:

$$rU = b + \frac{\lambda}{r+q} \int_0^\infty \int_0^\infty 1_{\{w-\alpha\tau > rU\}} (w - \alpha\tau - rU) dH(w, \tau)$$

- Job seekers accept all jobs that are such that $w - \alpha\tau > rU$
- Allows us to define a reservation log-wage curve: $\phi(\tau) = \phi(0) + \alpha\tau$

  $\Rightarrow$ Identifying the reservation curve yields the willingness to pay for a shorter commute.
- The intercept of the reservation wage curve solves:

$$\phi(0) = b + \frac{\lambda}{r+q} \int_0^\infty \int_{\phi(0)+\alpha\tau}^\infty (w - \phi(0) - \alpha\tau)\, dH(w, \tau)$$

Identification of Commute Valuation

- Commute valuation is identified from the joint distributions of the reservation wage and commute and of the accepted wage and commute.
- While PES data provides both the the reservation wage (ϕ) and maximum acceptable commute (τ), they are not explicitly linked to each other.

Interpretation 1:

- The reported pair (τ^*, ϕ^*) lies on the same reservation wage curve:

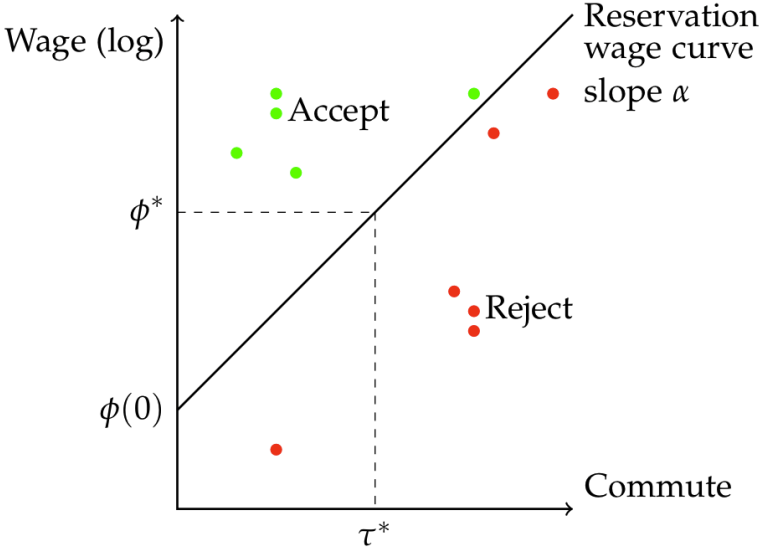
$$\phi^* = \phi(0) + \alpha\tau^*$$

Interpretation 2:

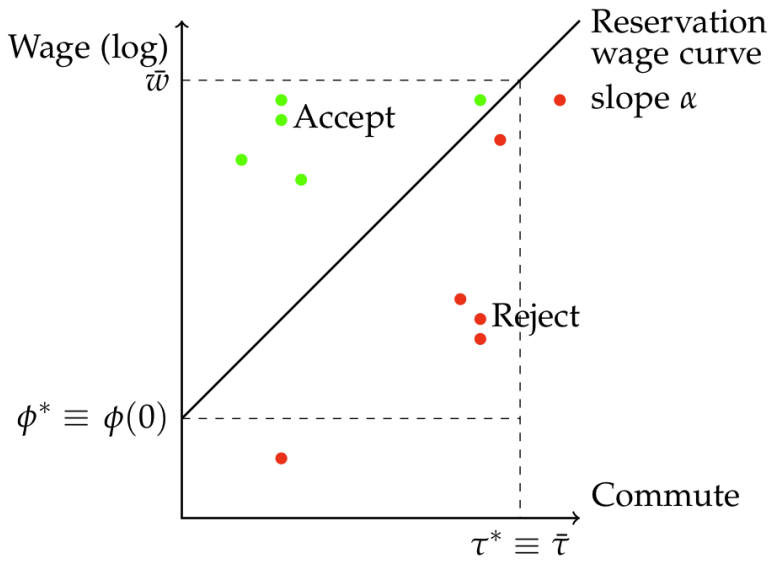
- $\phi^* = \phi(0)$ — reservation wage for a zero commute.
- $\tau^* = \phi^{-1}(\bar{w})$ — commute distance acceptable for highest wage $\bar{w}$.
- Suggests jobseekers avoid bundles close to both ϕ^* and τ^*.

Interpretations

(a) Interpretation 1



(b) Interpretation 2



Identification - Empirical Evidence

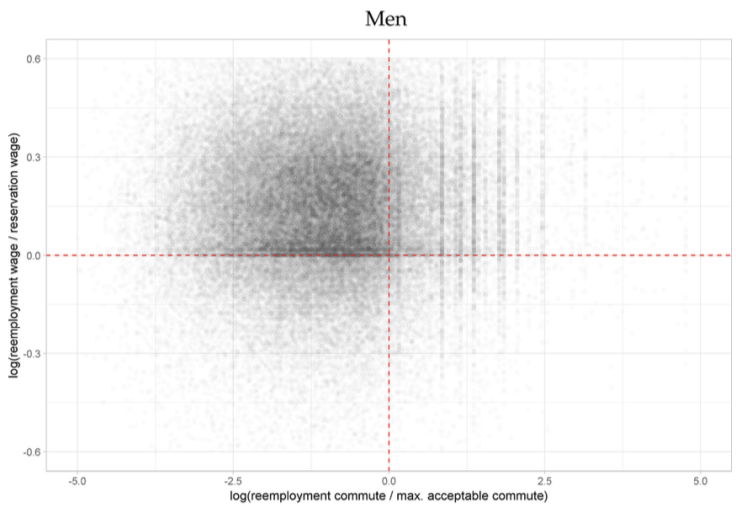


Figure: Characteristics of Next Job Relative to Search Criteria for Men

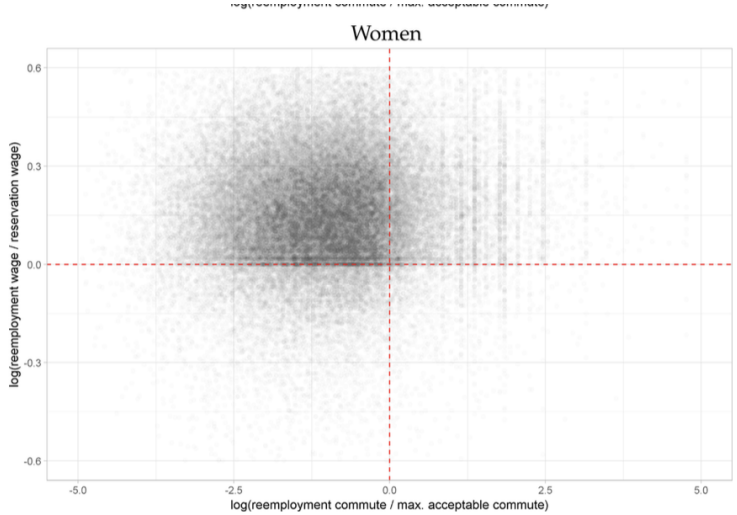


Figure: Characteristics of Next Job Relative to Search Criteria for Women

- Most accepted jobs lie in the upper-left quadrant: jobs that are better-paid and closer to home than reservation levels.
- Interpretation 2 would predict mass in the bottom-right corner (jobs just above reservation wage and just below commute limit) $\Rightarrow$ **this is not observed**.
- The absence of this mass supports Interpretation 1 $\Rightarrow$ where reservation wage and commute jointly lie on the same frontier.

Identification

- **Anchor the reservation curve:** Assume reservation curve passes through the reported point (τ^*, ϕ^*)
- **Rotate and test potential curves:** For each worker, rotate candidate reservation curves through (τ^*, ϕ^*) for different values of α.
- Choose α that minimizes violations (accepted jobs below the curve)

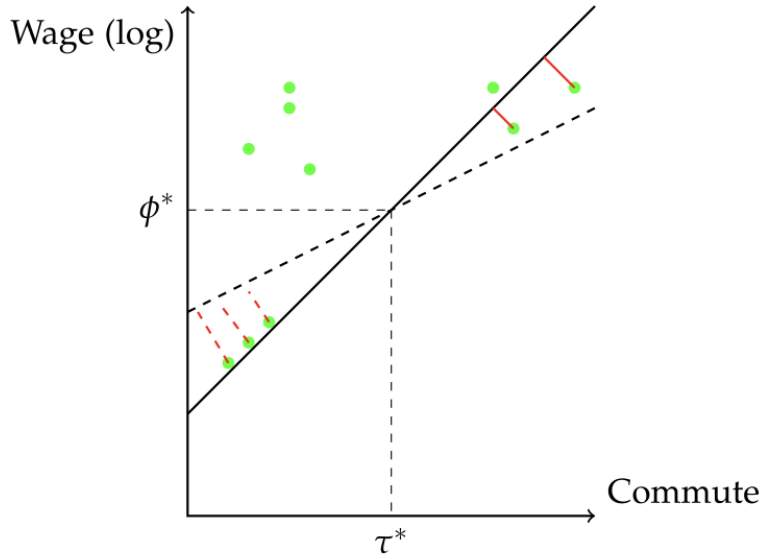


Figure VI: Estimation strategy in wage–commute space

Estimation

Formal Estimator:

$$\hat{\alpha} = \arg\min_{\alpha} \sum_{i \in \mathcal{B}_\alpha} p_i \left(d_{\alpha, \tau_i^*, \phi_i^*}(\tau_i, w_i) \right)^2$$

- $\mathcal{B}_\alpha$: Set of accepted jobs below the candidate reservation curve

$$\mathcal{B}_\alpha = \{ i \mid w_i < \phi_i^* + \alpha(\tau_i - \tau_i^*) \}$$

- $d(\cdot)$: Euclidean distance to the curve
- p_i: Inverse probability weights to balance covariates $\Rightarrow$ Isolates gender differences in preferences

- Using a logit model, where X_i includes worker traits, job history and location/industry fixed effects

$$\hat{p}(X_i) = P(\text{Female} = 1 | X_i)$$

- Then weights for males are calculated $\Rightarrow$ Men with traits common in women get higher weight.

$$p_i = \frac{\hat{p}(X_i)}{1 - \hat{p}(X_i)}$$

Commute Valuation Estimates

ELASTICITY OF WAGE WITH RESPECT TO COMMUTE ALONG THE RESERVATION WAGE CURVE

		Without children		With children	
	All	Single	Married	Single	Married
	(1)	(2)	(3)	(4)	(5)
Women	0.148***	0.141***	0.165***	0.148***	0.156***
	(0.0045)	(0.0061)	(0.015)	(0.013)	(0.010)
Men	0.121***	0.111***	0.126***	0.114***	0.141***
	(0.0046)	(0.0053)	(0.014)	(0.013)	(0.010)
Gender gap	0.027***	0.031***	0.039*	0.034*	0.015
	(0.0073)	(0.0072)	(0.020)	(0.018)	(0.015)
Obs.	75,071	38,593	8,670	6,756	21,074

- Women have a **22%** higher willingness to pay for a shorter commute.
- For men 12% wage increase needed to double commuting distance.
- One extra kilometer = €13/month.
- Value of time: €0.59 for 3.4 mins = €0.17/min; hourly wage €13.2 $\Rightarrow$ value $\approx$ **0.8× hourly wage**.
- For women:$\Rightarrow$ value **0.98× hourly wage**.
- In line with literature estimates (20%–100% of hourly wages).

Robustness Checks

Robustness Checks

- Including minimum wage worker $\Rightarrow$ lowers the gender gap in elasticity (only 10% significance)
- Across all specification checks results remain robust and gender gap persists.

Alternative Interpretations

- Similar results under alternative interpretations:
  - Interpretation 2 $\Rightarrow$ gap = 23.8%
  - Interpretation 2 bis $\Rightarrow$ gap = 15.1%

Why accepted jobs fall below reservation curve?

- Measurement error: Robust to added noise
- Nonstationarity: Weak effect with longer unemployment
- Omitted amenities: Jobs may offer nonwage perks

Important Note on Identification:

- α (commute valuation) is separately identified from other parameters.
- Gender differences in α remain valid even if men and women face different job offer distributions.

Commute Preferences and the Gender Wage Gap

Counterfactual Simulation

- Set $\alpha^{\text{women}} = \alpha^{\text{men}}$ (lower α^{women} by 18.2%)
- **Effects:**
  - Rotation of reservation curve $\Rightarrow$ accept longer commutes.
  - Shift upward in reservation wage $\Rightarrow$ accept higher wages.
- **Main Results:**
  - 13.8% of the residualized wage gap is explained by gender differences in commute valuation.
  - More than 100% of the observed gender commute gap is explained.

Application Data

Empirical Question: Do women avoid applying to distant jobs more than men?

Data: Application records matched with job vacancy locations and worker characteristics.

Empirical Strategy: Estimate a conditional logit model:

$$P(A_{ij} = 1 \mid Commute_{ij}, a_j, Female_i, X_i) = \frac{\exp\left(\beta \log Commute_{ij} + \delta \cdot Female_i \cdot \log Commute_{ij} + a_j \cdot Female_i + \beta X_i\right)}{1 + \exp\left(\beta \log Commute_{ij} + \delta \cdot Female_i \cdot \log Commute_{ij} + a_j \cdot Female_i + \beta X_i\right)}$$

- A_{ij}: Worker i's application to vacancy j
- δ: Differential sensitivity to commute distance for women
- a_j: Vacancy fixed effects
- X_i: Worker controls

Conditional Logit Estimates

Key Results

- $\delta < 0$ and significant $\Rightarrow$ Women are more sensitive to commute distance than men.
- Strong aversion to longer commutes for all workers & women are even less likely to apply to distant jobs.
- Women have a commute valuation that is 14% to 23% larger than men.
- Supports structural model findings based on accepted job offers.

Robustness:

- Controls for worker characteristics, vacancy fixed effects.
- Similar patterns across subsamples (e.g., single parents, full-time workers).

Labor Demand Side

Empirical Question: Do firms lower their hiring of women compared to men when applicants live further away?

- The gender difference in the marginal effect of a 10km commute increase is never greater than 0.08 p.p across specifications.
- Supports interpretation that the gender gap in commute arises from job seeker preferences.

Conclusion

- There is significant gender differences in job seekers' search criteria.

  $\Rightarrow$ Women have lower reservation wage and higher willingness to pay for shorter commute.

- With job search model, gender differences in commute valuation can account for around 14% of the residualized gender gap.

- These differences in search criteria are not driven by labor demand.

- Technological progress and public policies on urban planning can decrease gender wage gap.