

Explaining the Fall in Female Labor Supply in Urban China

Pengzhan Qian

Queen Mary University of London

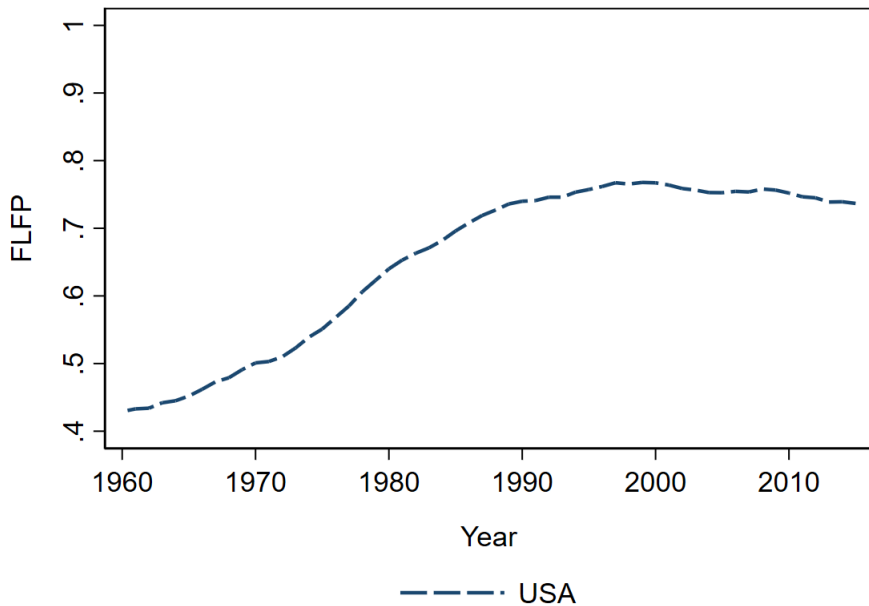
EEA 2023

- Female labor force participation rate (FLFP) is a key indicator of gender equality.

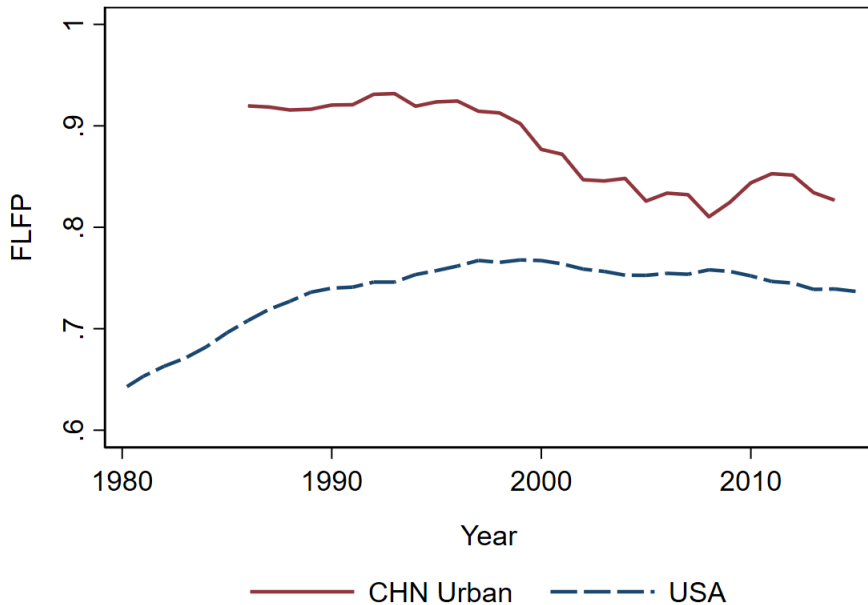
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 - E.g. 20-40% of the economic growth in the U.S. between 1960 and 2010 can be attributed to the increased FLFP (Hsieh et al., [2019](#)).

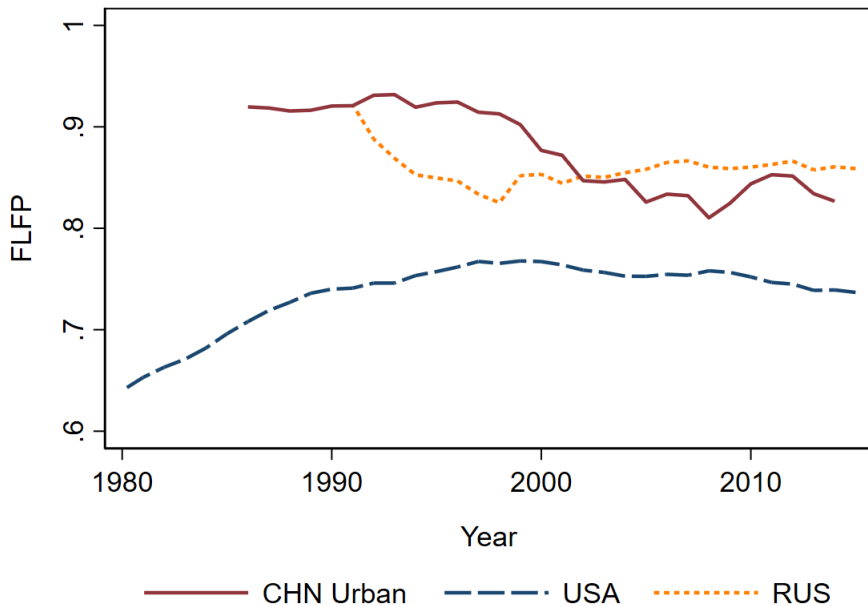
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- Occurred when the real earnings increased substantially, which should increase FLFP.
- Occurred in urban/industrialized area, cannot fit the “U” shape theory of female labor supply (FLFP would increase in urban areas as the service sector develops).
- After the COVID: FLFP declined in many countries and not fully recovered (Goldin, [2022](#); Bluedorn et al., [2023](#)).

This Paper

- Research question: Why did FLFP decline in urban China?
- Fact: The fall is driven by differences in FLFP of married women without college education *across cohorts*.
- Approach: Evaluate the importance of multiple channels with a household life-cycle model to explain the difference in FLFP across cohorts.

Outline

- Motivation
- Related Literature
- Data and Background
- Potential Channels
- Model and Estimation
- Counterfactual Studies

Data and Background

- Urban Household Survey (UHS): large-scale, cross-section official survey.
- Focus on:
 - 1950-1970 cohorts: data is available from 1986-2014.
 - age 25-54: women retire at 50-55 in China.
 - married women: 87% of women of studied cohorts were married.

Marriage

- Education attainments:

Education	Definition	Population Share	
		1950 Cohort	1970 Cohort
High	\geq college	11%	40%
Medium	senior high school	37%	25%
Low	\leq junior high school	52%	36%

Basic Fact: FLFP declined in urban China.

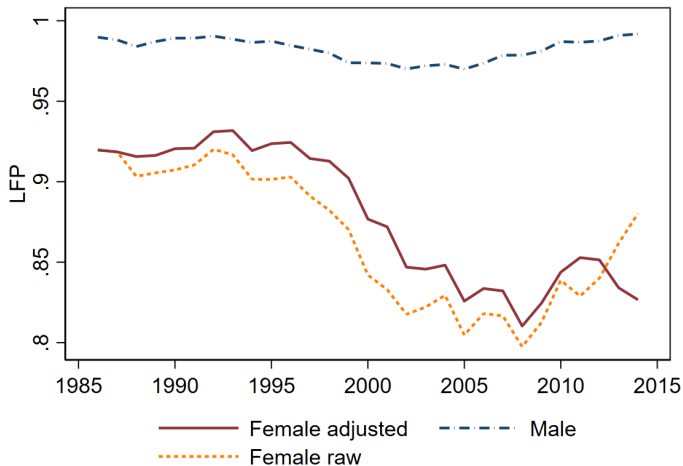
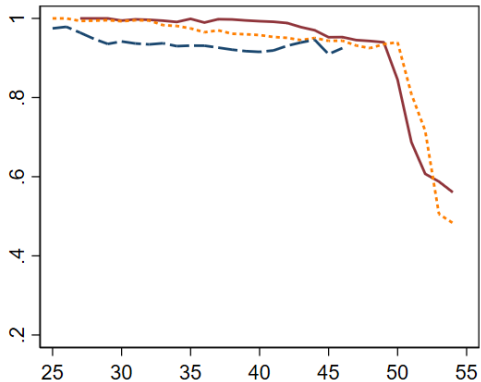
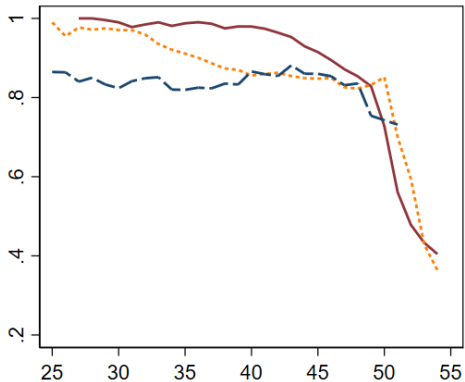


Figure: LFP in UHS data, adjusted for a mass layoff around 2000 and delayed retirement after 2010. **SOE Layoff** **Delayed Retirement** **Migration**

Driven by low and medium-educated women.



— 1950 Cohort ····· 1960 Cohort - - - 1970 Cohort

Market Channel: Real earnings increased significantly ...

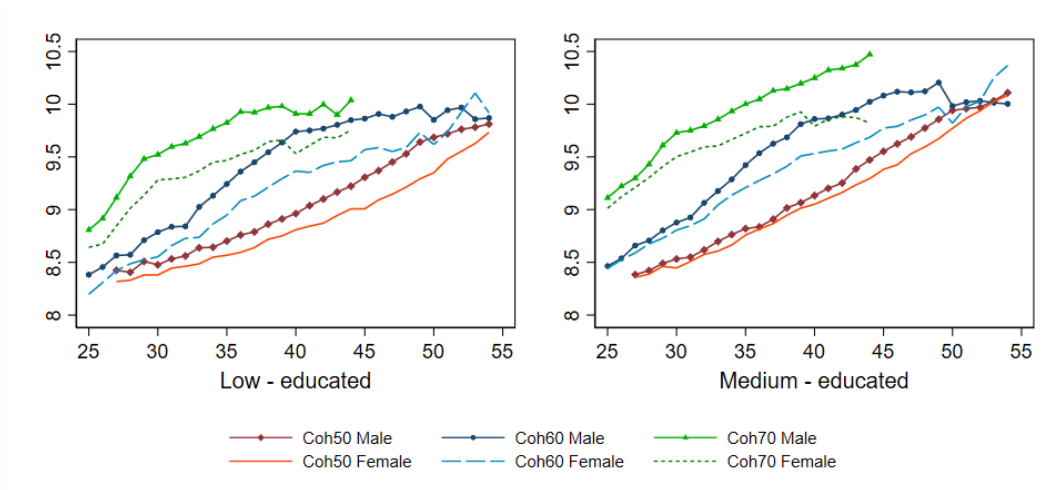


Figure: $\ln(\text{annual earnings})$ of low and medium-educated people (in 2009 price).

Market Channel: ...the gender pay gap also widened.

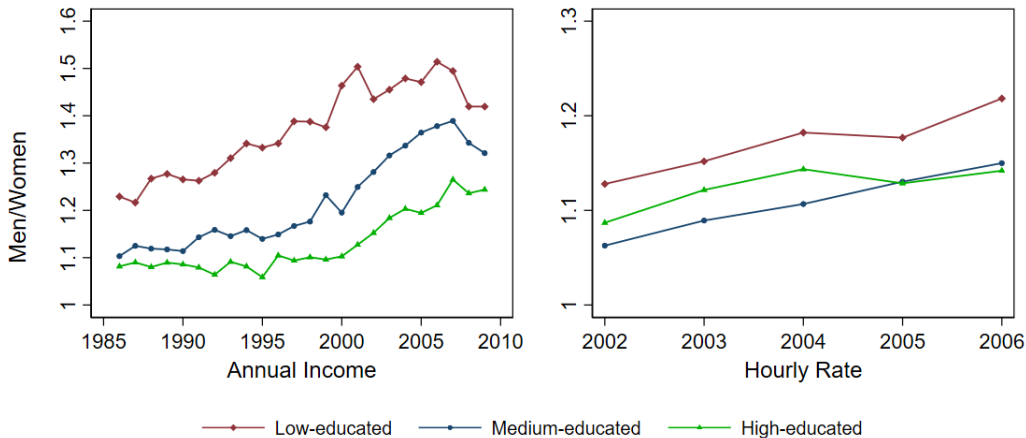


Figure: Gender pay gap across years by education groups. Note: The hourly rate is only available between 2002 and 2006.

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 - Childcare cost/Household expenditure increases from 3% to 9%.
 - May reduce FLFP.
- Decreased fertility rate.
 - The 1950 cohort was not covered by the “one-child policy” and the younger cohorts were fully covered.
 - May increase FLFP.

In and not in the model

- In the model:
 - Gender-specific earning process.
 - Change in marriage, fertility rate, childcare cost.
- Not in the model:
 - Time investment on children (high-educated women **do not exit the market**).
 - Changes in hours (no hour data).

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- In each period, a shock of productivity ϵ is realized and the woman chooses whether to work. If she works, she accumulates experience (S). If she doesn't work, her experience depreciates by δ .
- Her annual earnings follows a Mincer-type equation:

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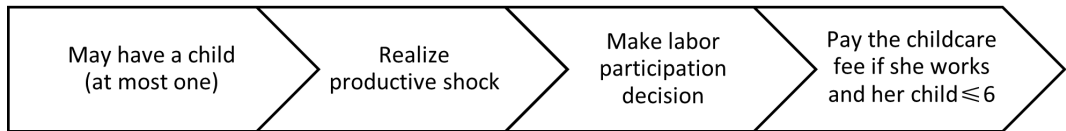
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- No saving in the current version. The woman tries to maximize her lifetime utility.

Summary of the Timeline



Estimation of Parameters

External Estimated	Values or Sources
Risk Aversion Parameter (ρ)	1.5
Discount Factor (β)	0.98
Men's earnings parameters ($\tilde{b}_0, \tilde{b}_1, \tilde{b}_2$)	Data (estimated by OLS)
Assortative marriage, Fertility rate, Childcare cost	Data

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Internal Estimated	Target Moment
Women's earnings parameters (b_0, b_1, b_2)	average FLFP and earnings
Depreciation rate (δ)	
Variance in potential earnings (σ)	
Preference parameters (γ_1, γ_2)	Jointly estimated across cohorts

Validity of the Model

- Compare the elasticity of labor supply in the model (change earnings level b_0, \tilde{b}_0) and data (estimate by a probit regression).

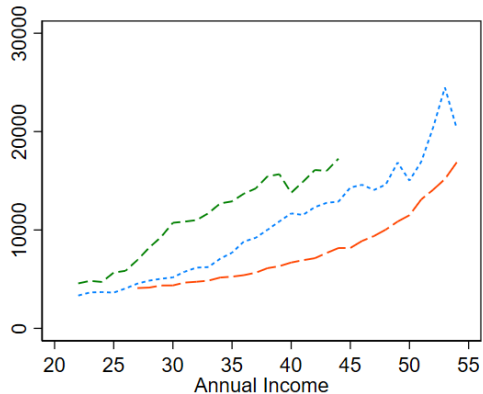
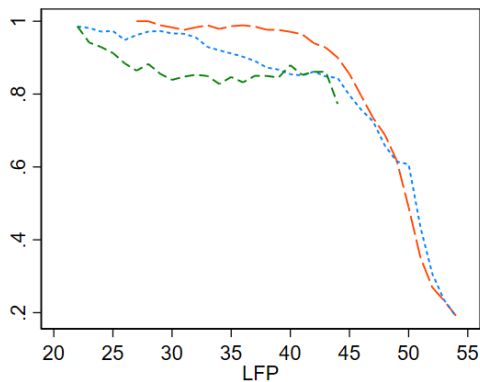
Age group	Own Elasticity			Cross Elasticity		
	Model	Data 95% C.I.	Within	Model	Data 95% C.I.	Within
Panel A: low-educated						
25-54	0.47	[0.13, 1.08]	yes	-0.21	[-0.54, -0.13]	yes
25-34	0.21	[0.24, 1.33]		-0.07	[-0.73, -0.17]	
35-44	0.47	[0.16, 0.70]	yes	-0.18	[-0.38, -0.12]	yes
45-54	0.74	[-1.18, 1.42]	N/A	-0.39	[-0.68, 0.42]	N/A
Panel B: medium-educated						
25-54	0.14	[0.04, 0.16]	yes	-0.10	[-0.10, -0.04]	yes
25-34	0.09	[0.06, 0.19]	yes	-0.07	[-0.13, -0.05]	yes
35-44	0.16	[0.11, 0.22]	yes	-0.10	[-0.14, -0.08]	yes
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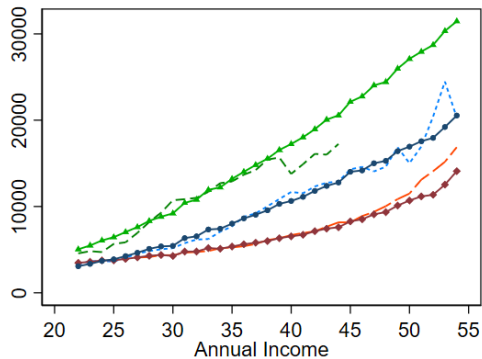
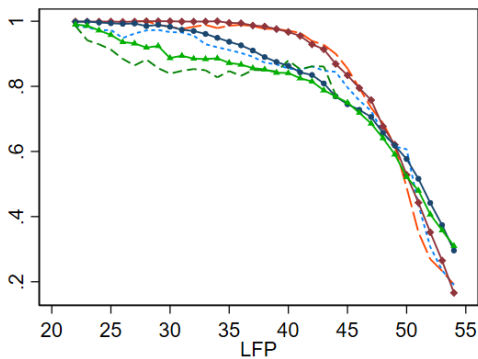
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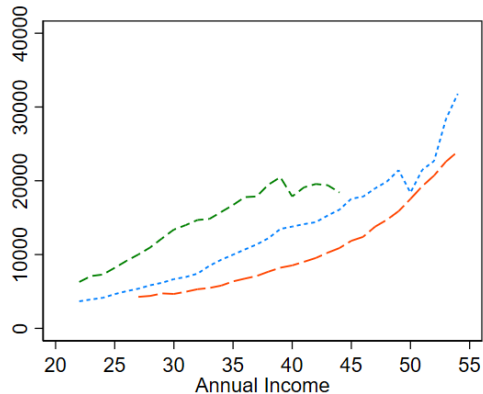
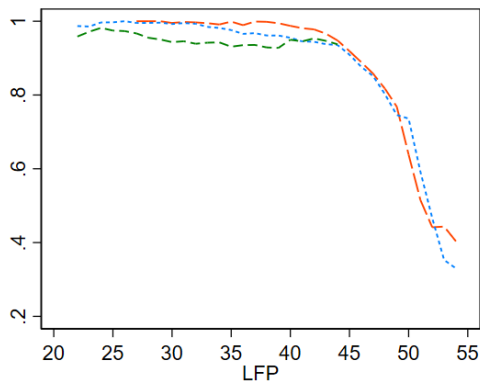
— Coh50 Data ··· Coh60 Data - - - Coh70 Data

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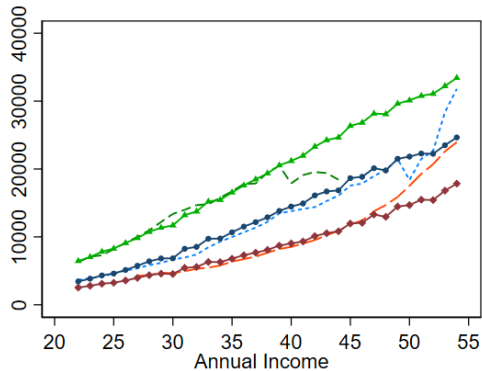
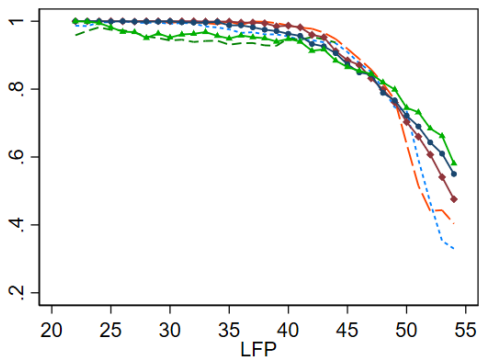
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—●— Coh50 Sim —●— Coh60 Sim —●— Coh70 Sim

Fit of the Model (medium-educated)



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Fit of the Model (medium-educated)



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Counterfactual Study

- Why FLFP has declined across cohorts?

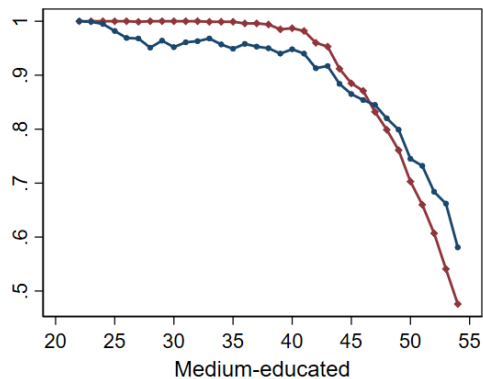
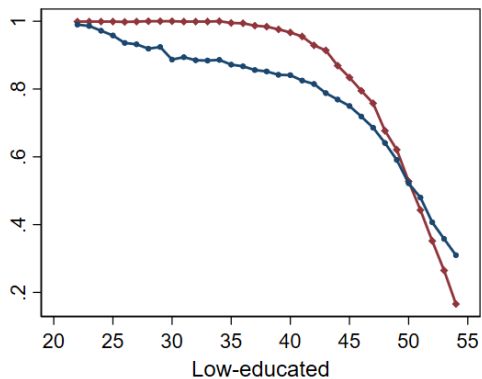
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- Why FLFP has declined across cohorts?
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 - “How much can changes in couples’ earnings explain the declined FLFP?”

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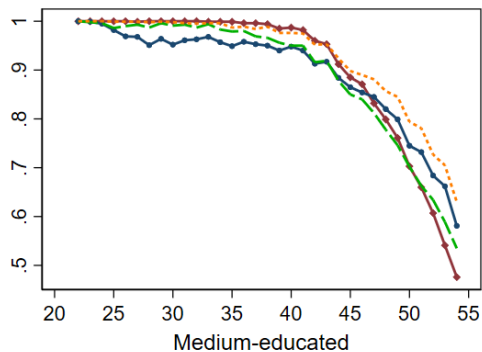
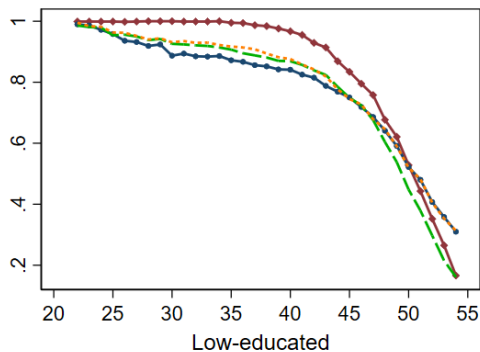
- Why FLFP has declined across cohorts?
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 - “How much can changes in couples’ earnings explain the declined FLFP?”
- A partial equilibrium effect. But given the Δ FLFP and cohort population share, this two cohorts counterfactual study would increase total labor supply by at most 3% — potential general equilibrium effect would be small.

Counterfactual Study



—●— L50 —●— L70

Counterfactual Study: Earnings related parameters



—●— L50 —●— L70
- - - L50': couple's income - - - L50': couple's income + $\delta + \sigma$

Summary of Counterfactual Studies

	Low-educated		Medium-educated	
	Cohort 50-60	Cohort 50-70	Cohort 50-60	Cohort 50-70
Total Change	-4.8%	-8.9%	-0.8%	-2.7%

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gap in return	1.9%	-17.1%	-3.2%	-45.9%
gap in wage	-4.5%	9.8%	4.2%	44.0%

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Panel B:				
Couple's Earnings $+\delta+\sigma$	-2.7%	-6.4%	-0.7%	0.5%

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Panel B:				
Couple's Earnings $+\delta+\sigma$	-2.7%	-6.4%	-0.7%	0.5%
Panel C:				
Family Structures	-2.1%	-2.5%	-0.1%	-3.3%
assortative marriage	0.1%	1.1%	-0.3%	-0.4%
fertility rate	0.3%	0.8%	0.0%	0.1%
childcare cost	-2.4%	-4.4%	0.2%	-2.8%

Conclusion

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- Counterfactual study:
 - The widened gender pay gap explains 70% ~ 80% of changes in FLFP between cohort 1950 and cohort 1970.
 - This 2-cohorts difference explains 40-50% of the declined FLFP between 1989-2009. Decomposition
 - Changes in family structures have significant and heterogeneous effects.

Gender pay gap: still remains a puzzle.

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- Looking for your comments and suggestions!
 - E-mail: p.qian@qmul.ac.uk
 - Twitter: @Pengzhan_Econ

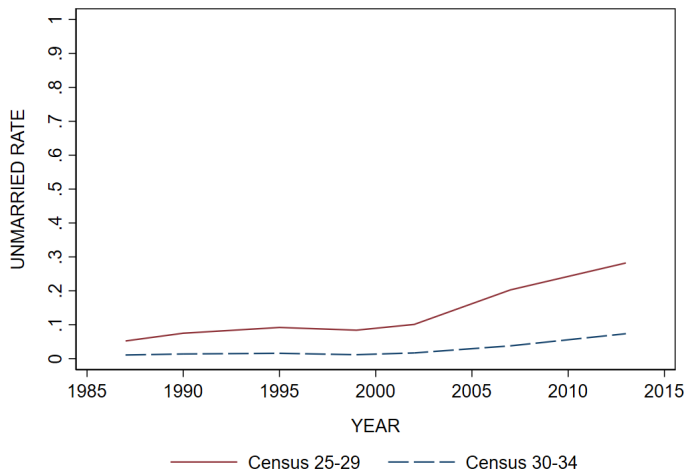


Figure: Never married rate in urban China.

[Back](#)

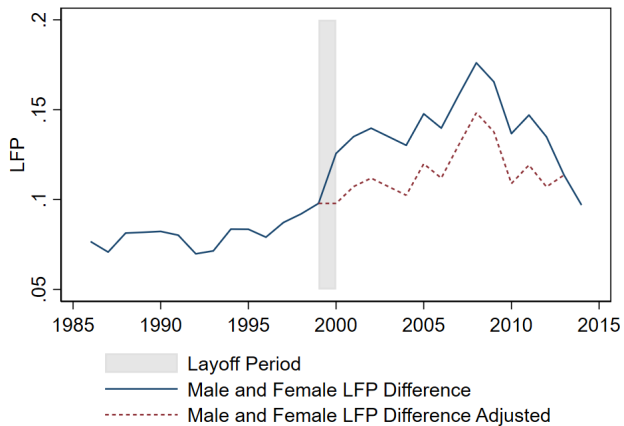


Figure: Adjust FLFP due to the SOE layoff.

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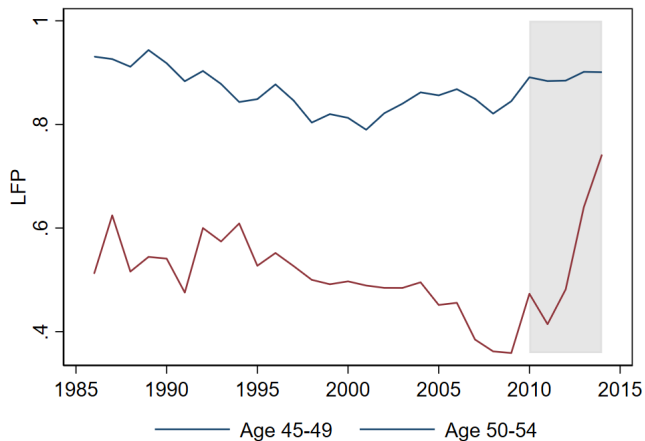


Figure: FLFP of Age 45-49 and 50-54. Note: FLFP of age 50-54 has increased significantly since 2010. [Back](#)

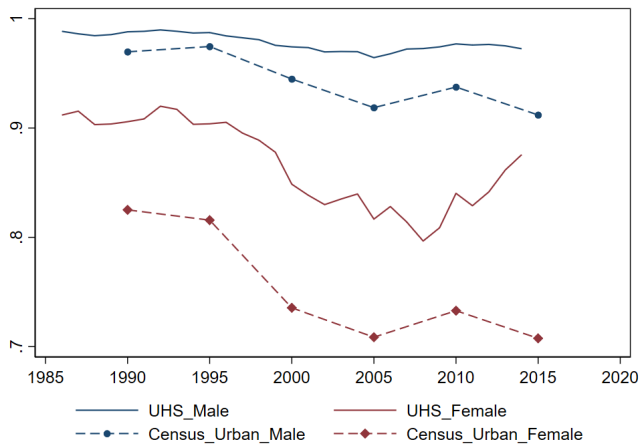


Figure: LFP (age 50-54) in UHS and Census. Note: UHS only includes permanent residents while the census includes both permanent residents and immigrants. [Back](#)

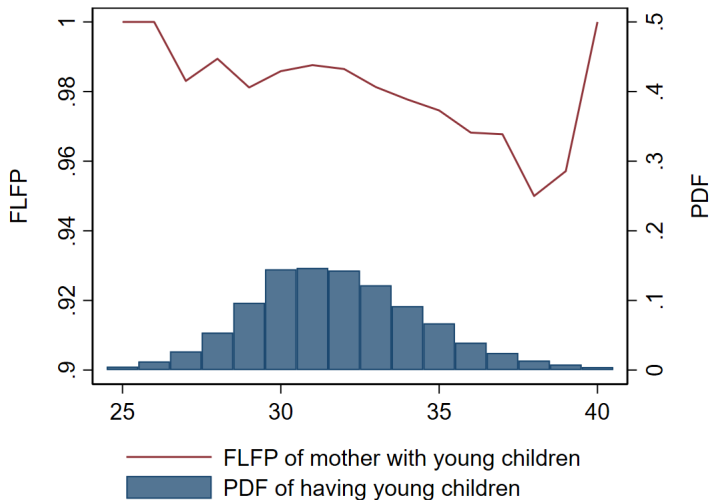


Figure: FLFP of high-educated mother in cohort 1970 with young children (age ≤ 6) and probability density function (PDF) of having young children. Note: FLFP does not decline much when most high-educated women have young children. [Back](#)

- Measuring assortative marriage is more difficult than it seems.
- Chiappori, Costa Dias, and Meghir (2020) propose a model-based measurement: separable extreme value. [Back](#)

F\M	E1 (n)	E2 (1-n)
E1 (m)	r	$m-r$
E2 (1-m)	$n-r$	$1-n-m+r$

$$\begin{aligned}
 I_{SEV} &= \ln \left[\frac{r(1+r-m-n)}{(n-r)(m-r)} \right] \\
 I_L &= \frac{r}{mn} \\
 I_{WS} &= \frac{r^2}{mn} + \frac{(1+r-m-n)^2}{(1-m)(1-n)}
 \end{aligned} \tag{1}$$

