



Gender Inequality in Working from Home during the COVID-19 pandemic

Author: Mingjie (Jessica) Zhong

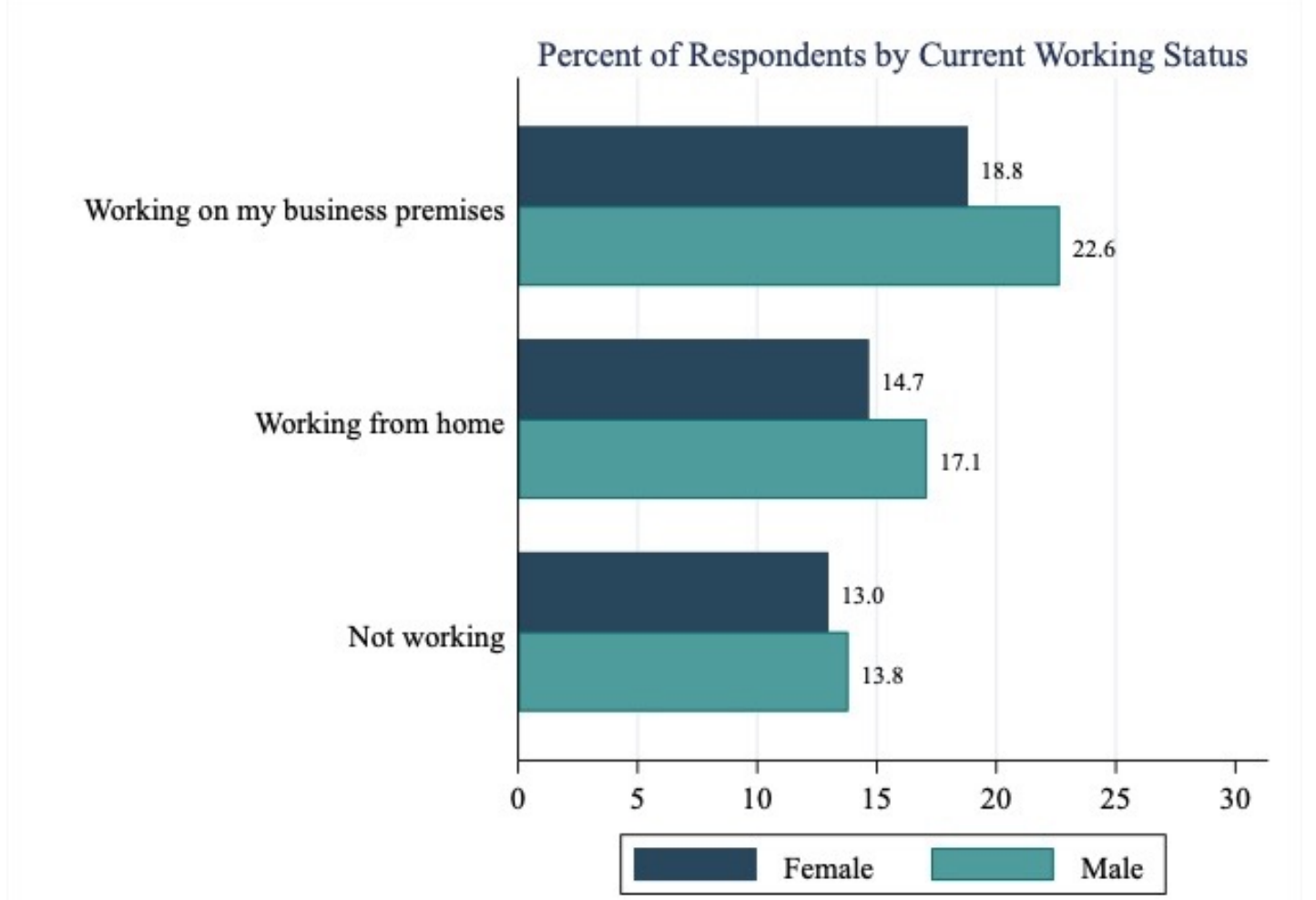
Advisors: Nicole Fortin and David Green

Research Question

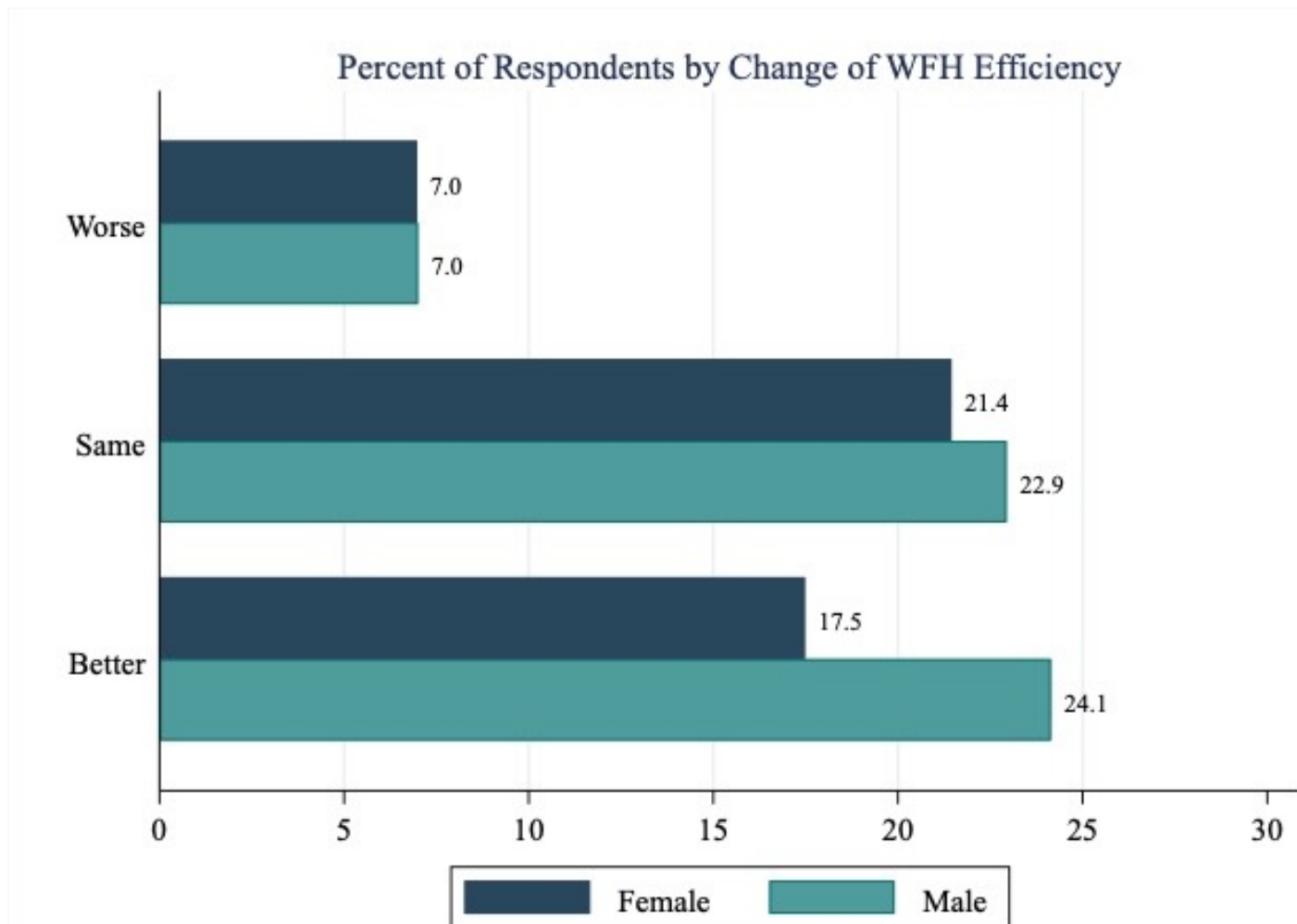
How does living with children affect men and women’s efficiency of working from home?

Introduction

- One of the most obvious impacts of COVID-19 on the labor force is the dramatic increase in employees working remotely.
- As many nations placed lockdown orders during the COVID-19 pandemic, K-12 schools temporarily shut down, and children’s education was relocated to the internet.
- As a result, working parents who work from home must also care for their children during office hours.
- Previous literature provided evidence from survey data as well, suggesting a decrease in academic productivity in the scope of US and Europe-based academic researchers. The decrease is particularly larger for female researchers (Myers et al., 2020).



Approximately 30 percent of U.S population indicate that they are currently working from home (WFH). The following estimation of WFH efficiency focuses on this group of individuals.



Data Source

1. Work efficiency: The Survey of Working Arrangements and Attitudes (SWAA)

- Target population: U.S residents, 20 to 64 years old, annual income at least \$20,000 in 2019
- Cross-sectional data with more than 52,000 survey responses in total collected between May 2020 and September 2021

2. School closure index: The Oxford Covid-19 Government Response Tracker (OxCGRt)

- Recording several common policies on a scale to reflect the extent of U.S government action

Summary Statistics of Relative Efficiency

Percent difference between WFH productivity during COVID and on business premises before COVID	Mean		(SE)	Percent difference between WFH productivity during COVID and on business premises before COVID	Mean		(SE)
Overall	5.8		(0.1)				
Women	5.4		(0.1)	Ann. Earnings of \$20 to \$50K	4.4		(0.2)
Men	6.1		(0.1)	Ann. Earnings of \$50 to \$100K	5.9		(0.2)
				Ann. Earnings of \$100 to \$150K	9.1		(0.2)
Age 20 to 29	6.4		(0.2)	Ann. Earnings of over \$150K	11.9		(0.2)
Age 30 to 39	7.2		(0.2)				
Age 40 to 49	5.9		(0.2)	Goods-producing sectors	5.4		(0.2)
Age 50 to 64	3.6		(0.2)	Service sectors	5.9		(0.1)
Less than high school	2.7		(1.1)	No children	4.7		(0.2)
High school	4.3		(0.3)	Living with children under 18	7.0		(0.1)
1 to 3 years of college	5.3		(0.2)				
4 year college degree	6.3		(0.2)	Living with adults	5.9		(0.3)
Graduate degree	7.2		(0.2)	Not living with adults	5.6		(0.1)

Gender Difference in Relative WFH Efficiency				
	Female		Male	
	Mean	(SE)	Mean	(SE)
No children	5.2	(0.2)	4.3	(0.2)
Has children under 18	5.8	(0.2)	7.9	(0.1)
Not living with adults	5.6	(0.4)	5.7	(0.4)
Living with adults	5.4	(0.2)	6.2	(0.1)

Time Spent on Childcare Each Week Before and After COVID by Gender				
	Female		Male	
	Mean	(SE)	Mean	(SE)
Before COVID	21.2	(0.5)	14.4	(0.3)
After COVID	25.1	(0.6)	16.5	(0.3)

Methodology – OLS and IV

OLS Regression

$$Efficiency_i = \beta_0 + \beta_1 Female_i + \beta_2 Children_i + \beta_3 Female \times Children_i + \beta_4 X_i + \gamma_i + \delta_i + \theta_i + \varepsilon_i$$

Efficiency_i: the responses from survey question "How efficient are you WFH during COVID, relative to on business premises before COVID (%)"

Female_i: dummy variable (1 the gender is female)

Children_i: dummy variable (1 living with children under 18)

X_i: control variables (years of education, log(income), Joe Biden vote share, and internet quality)

γ_i, δ_i, θ_i: survey wave fixed effects, age bin fixed effects, and work industry fixed effects

ε_i: error term

IV Regression

Why? The impact of children on work efficiency depends on the degree to which schools, workplace, and public events closed.

First-stage:

$$\widehat{Children}_i = \alpha_0 + \alpha_1 PublicEventsClose_i + \alpha_2 X_i + \gamma_i + \delta_i + \theta_i + u_i$$

PublicEventsClose_i: record cancelling public events

0 – no measures

1 – recommend cancelling

2 – require cancelling

Second-stage:

$$Efficiency_i = \beta_0 + \beta_1 Female_i + \beta_2 \widehat{Children}_i + \beta_3 Female \times \widehat{Children}_i + \beta_4 X_i + \gamma_i + \delta_i + \theta_i + \varepsilon_i$$

Estimation Results - OLS

The Impact of Living with Children on WFH Efficiency							
Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Relative efficiency of WFH during COVID vs. on business premises before COVID (%)						
1 Female	-0.547** (0.252)	0.900** (0.373)	1.023*** (0.374)	1.036*** (0.374)	1.085*** (0.370)	1.359*** (0.366)	1.727*** (0.370)
1 Has children	2.308*** (0.253)	3.677*** (0.365)	2.851*** (0.366)	2.831*** (0.366)	2.809*** (0.363)	2.323*** (0.376)	2.033*** (0.376)
1 Famle*1 Has children		-2.974*** (0.502)	-2.290*** (0.502)	-2.250*** (0.503)	-2.225*** (0.499)	-2.367*** (0.497)	-1.989*** (0.495)
Years of education			0.232*** (0.066)	0.227*** (0.066)	0.181*** (0.066)	0.174*** (0.066)	0.237*** (0.067)
log(income)			2.438*** (0.207)	2.394*** (0.208)	2.149*** (0.207)	2.664*** (0.209)	2.193*** (0.212)
Joe Biden vote share				2.569* (1.376)	2.203 (1.362)	1.394 (1.359)	1.059 (1.348)
Internet quality					15.504*** (1.071)	15.594*** (1.070)	14.726*** (1.066)
Survey wave F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Agebin F.E.						Yes	Yes
Industry F.E.							Yes
Observations	33535	33535	33535	33535	33535	33535	33507
R-squared	0.017	0.019	0.029	0.030	0.043	0.050	0.067

Notes: Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01.

Estimation Results - IV

First-stage IV regression Results	
Explanatory Variable	Whether or not living with children
Cancel Public Events	0.0297*** (0.007)
Controls and Fixed Effects	Yes
Cragg-Donald Wald F-statistic	37.255
Number of observations	33507

Notes: Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01.

Selection of Instrument: The impact of children on WFH efficiency depends on the degree to which public events closed.

The higher the level of public events closure, the greater the impact from living with children.

The Comparison of OLS and IV Regression Results		
Dependent Variable: Relative efficiency of WFH during COVID vs. on business premises before COVID (%)		
	(1) OLS results	(2) IV results
1 Female	1.727*** (0.370)	1.689*** (0.261)
1 Has children	2.033*** (0.376)	2.219*** (0.262)
1 Famle*1 Has children	-1.989*** (0.495)	-2.172*** (0.371)
Other controls and fixed effects	Yes	Yes
Observations	33507	33507
R-squared	0.067	0.028

Notes: Standard errors in parentheses * p<0.1 ** p<0.05 *** p<0.01.

OLS and IV results are consistent. Estimation results are robust.

Conclusion

In the case of no children, women are slightly more productive (1.7%) more productive than men.

In the case of living with children, men with children increase their productivity by 2%, while women remain the same.

Gender differences in WFH efficiency between males and females are eliminated when they both live with children under 18.

Future Research

To collect data of marital status

To study if there are differences in productivity between single and married individuals