

COVID-19, Childcare and Women's Labor Supply

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Motivation

- The COVID-19 pandemic caused not only a massive health crisis but also a large and immediate negative shock on labor market.
- The negative impact of the COVID-19 on labor supply was expected to be larger for women than for men because sectors with high female employment shares such as service sector were severely affected and the increased childcare burden would disproportionately fall to women (Alon et al., 2020a; Alon et al., 2020b).

Related Literature

- Empirical evidence from the U.S. and European countries supports the expectation that the labor market shock due to the COVID-19 outbreak was harder for women than for men (Adams-Prassl et al., 2020; Farré et al., 2020; Montenovolo et al., 2020; Collins et al., 2020).
- Sevilla and Smith (2020), Del Boca et al. (2020) and Zamarro and Prados (2020) confirm that women bear the majority of the extra burden in childcare and housework due to the COVID-19.
- Russell and Sun (2020) and Heggeness (2020) both document that the negative impact of the COVID-19 on labor supply is larger for women with young children than for women without young children in the U.S.

What We do/ What We find

- We focus on the impact of the COVID-19 on female labor supply in South Korea.
- We examine whether the magnitude of the negative shock on labor supply due to the COVID-19 varied with caregiving burden within female workers.
- We exploit the fact that the first wave of COVID-19 outbreak in Korea hit harder for Daegu and a neighboring province of Daegu, Gyeongsangbuk-do (Gyeongbuk, henceforth) than for other regions.
- Utilizing the Local Area Labour Force Survey, we identify the impact of the first wave of the COVID-19 outbreak on labor supply and explore the heterogeneity of the impact within gender using information regarding the age of the youngest child in the household.

What We do/ What We find (contd.)

- The COVID-19 hit harder on labor supply of women with young children than that of women without young children.
- However, we do not find any difference between the effects of COVID-19 for male workers with young children and that for male workers without young children.
- Although we remain agnostic about the underlying reasons for the heterogeneity in the labor supply response within female, our analysis implies that burden of caregiving might have driven our result.

The 1st Wave of the COVID-19 in Korea

- The first wave of the COVID-19 in South Korea was mostly concentrated in the Daegu-Gyeongbuk area.
- The first confirmed case of COVID-19 in South Korea was a 35-year-old Chinese woman reported on January 20th.
- Only 30 confirmed cases were reported until February 18, 2020.
- The situation changed rapidly on February 18 when the 31st case was confirmed in Daegu, a member of a religious organization called “Shincheonji”.
- Some people infected with the COVID-19 including the 31st case attended a largescale religious gathering of “Shincheonji” in Daegu, and that created a regional disparity in the degree of the exposure to the COVID-19.

The 1st Wave of the COVID-19 in Korea (contd.)

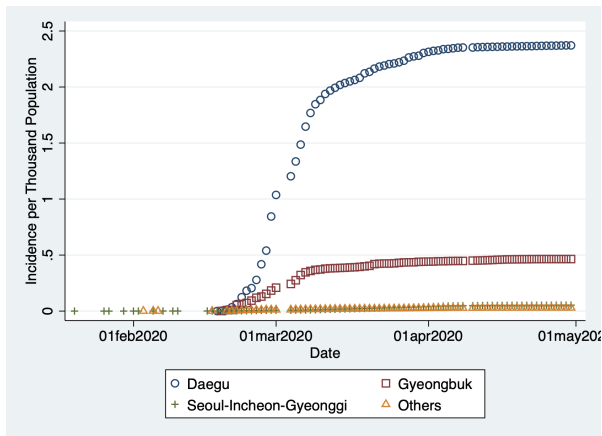


Figure: COVID-19 Infections per Thousand Population, Jan. 2020 - Apr. 2020

The 1st Wave of the COVID-19 in Korea (contd.)

- We believe that the concentration of the confirmed cases in Daegu-Gyeongbuk during the first wave was an idiosyncratic event and the disproportional degrees of exposure to the COVID-19 are arguably exogenous.
- Prior to the first outbreak, Daegu and Gyeongbuk did not exhibit particularly different trends in the number of confirmed cases compared to other regions. There were no time-varying region-specific characteristics of Daegu and Gyeongbuk that made the regions particularly vulnerable to the COVID-19.
- Moreover, other economic activities such as the share of national GDP and employment have been stable in recent years (Aum et al., 2020).

The 1st Wave of the COVID-19 in Korea (contd.)

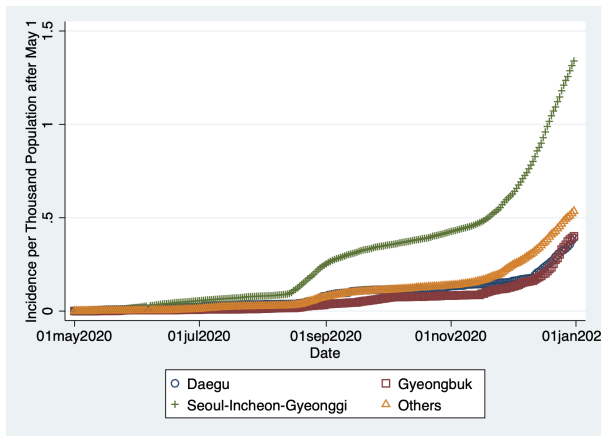


Figure: COVID-19 Infections per Thousand Population Excluding cases before May

Local Area Labour Force Survey (LALFS)

- The LALFS is collected in every April and October by the Statistics Korea
- Each wave of the survey is based on household members aged 15 or over from approximately 200,000 representative sample of households, approximately 400,000 respondents.
- The survey mainly focuses on the economic activity of respondents such as their employment status and weekly working hours.
- It also contains respondents' socio-demographic information such as age, sex, education level, marital status and location of residency.

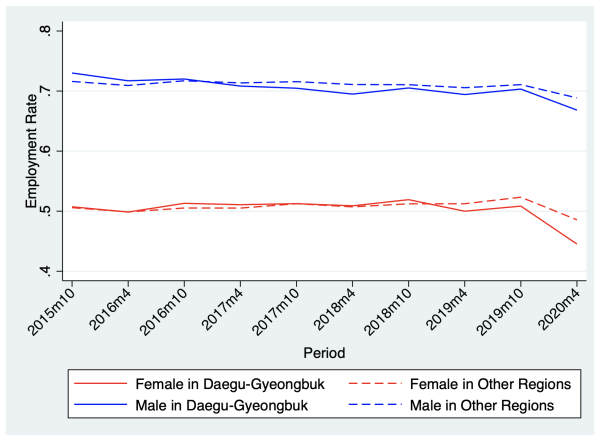
Local Area Labour Force Survey (LALFS) (contd.)

- Advantages in using the LALFS
 - It includes female sample regardless of their status of economic activity
 - It also contains information on the age of the youngest child, which reflects the level of childcare burden to each household.
- Data Period: from October 2015 until April 2020

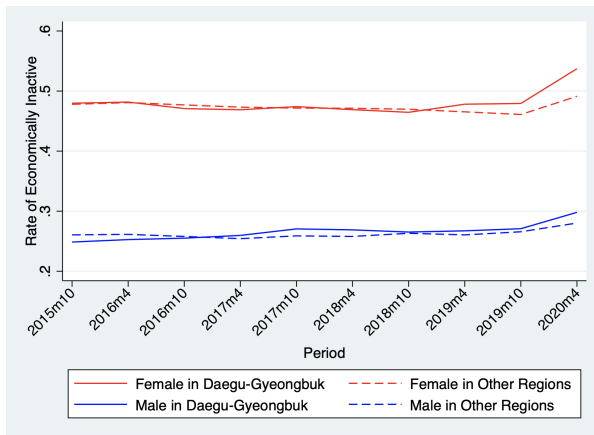
Dependent variables

- a dummy variable indicating whether a respondent is employed,
- a dummy variable indicating whether a respondent is economically inactive,
- hours of working in a week.

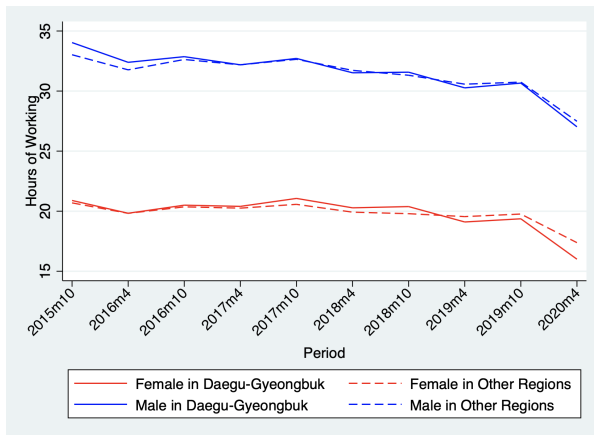
Dependent variables (contd.)



Dependent variables (contd.)



Dependent variables (contd.)



Measure for childcare burden

- We cannot directly measure the childcare responsibility of each respondent.
- We use information on whether a respondent has young children who needs substantial care in the absence of caregiving facilities.
- *AY7*: An indicator variable taking one if a respondent has a child with age seven or less in order to reflect the childcare burden of the respondent using the information about the age of the youngest child.

Summary Statistics

Table: Summary Statistics

| | Mean | SD | Mean | SD |
|---|------------------------|--------|----------------------|--------|
| Variable | (1) | (2) | (3) | (4) |
| | Panel A: Female | | Panel B: Male | |
| Daegu-Gyeongbuk (DG) | 0.100 | 0.301 | 0.100 | 0.300 |
| Employed | 0.506 | 0.500 | 0.709 | 0.454 |
| Economically Inactive | 0.474 | 0.499 | 0.262 | 0.44 |
| Hours of working | 19.809 | 21.748 | 31.414 | 22.476 |
| Age | 47.185 | 18.318 | 45.436 | 17.137 |
| Have children under 18 | 0.226 | 0.418 | 0.233 | 0.423 |
| The youngest child is 7 years old or younger. (AY7) | 0.109 | 0.311 | 0.118 | 0.323 |
| | N=2043351 | | N=1803755 | |

Empirical Strategy

- We exploit a regional disparity in the number of confirmed cases of the COVID-19 in the spring 2020, and compare the changes in the dependent variables before and after the COVID-19 outbreak in Daegu-Gyeongbuk area with that in other regions of Korea.
- We examine whether the negative labor market shock in Daegu-Gyeongbuk due to impact of the COVID-19, was larger for women with young children than women without young children.

Empirical Strategy (contd.)

● Estimating equation:

$$Y_{idt} = \beta Post_t \cdot DG_d \cdot AY7_{it} + \gamma Post_t \cdot DG_d + \delta Post_t \cdot AY7_{it} + \eta DG_d \cdot AY7_{it} + X_{idt} \Theta + \lambda_d + \mu_t + \epsilon_{idt} \quad (1)$$

- Y_{idt} : outcome variable for an individual i residing in a province d at the time of survey t
- $Post_t$: an indicator taking one if t is the time after the COVID-19 outbreak
- DG_d : an indicator taking one if the location of residency d is Daegu or Gyeongbuk.
- $AY7_{it}$: an indicator taking one if i 's youngest child at t is seven years old or younger.
- X_{idt} : various individual characteristics including $AY7_{it}$, age, age squared, marital status, education level and the number of children under 18
- λ_d and μ_t : province-fixed and time-fixed effects
- ϵ_{idt} is clustered at the region (province) level

Empirical Strategy (contd.)

- β : the difference in the impact between females with and without young children
- γ : the impact of the COVID-19 on labor supply among female without young children
- Note that the total effect of the COVID-19 outbreak on labor force from both the nationwide negative shocks and the stagnated local economic activities could be different from our estimate because our estimate is based on the comparison between Daegu-Gyeongbuk region with other regions in Korea, before and during the COVID-19 outbreak in the spring 2020.

Main Result: Female

| Dependent Variable | (1) Employed | (2) Inactive | (3) Working Hours, in log |
|------------------------|-----------------------|----------------------|---------------------------------|
| <i>Post · DG · AY7</i> | -0.0385*** (.0074) | 0.0342*** (.0087) | -0.138*** (.0281) |
| <i>Post · DG</i> | -0.0300** (.0121) | 0.0341** (.0149) | -0.105** (.0481) |
| adj. R-sq | 0.164 | 0.176 | 0.178 |
| N | 2043351 | 2043351 | 2043351 |

Main Result: Male

| Dependent Variable | (1) Employed | (2) Inactive | (3) Working Hours, in log |
|------------------------|-----------------------|----------------------|---------------------------------|
| <i>Post · DG · AY7</i> | 0.00672 (.004) | -0.00647 (.0041) | 0.0163 (.0257) |
| <i>Post · DG</i> | -0.0188*** (.0032) | 0.0175*** (.0048) | -0.0651*** (.0148) |
| adj. R-sq | 0.357 | 0.375 | 0.378 |
| N | 1803755 | 1803755 | 1803755 |

Using the Ranges of Age of the Youngest Child

| Dependent Variable | (1) Employed | (2) Inactive | (3) Working Hours, in log |
|------------------------------------|-----------------------|----------------------|---------------------------------|
| <i>Post · DG</i> | -0.0313*** (.01) | 0.0353** (.0126) | -0.109** (.0407) |
| <i>Post · DG · 1(0 ≤ AY ≤ 7)</i> | -0.0371*** (.0076) | 0.0330*** (.0071) | -0.134*** (.0273) |
| <i>Post · DG · 1(8 ≤ AY ≤ 12)</i> | 0.0111 (.0275) | -0.00722 (.0251) | 0.0390 (.0952) |
| <i>Post · DG · 1(13 ≤ AY ≤ 18)</i> | 0.0132 (.0138) | -0.0150 (.0159) | 0.0368 (.0436) |
| Adj. R-sq | 0.164 | 0.176 | 0.178 |
| N | 2043351 | 2043351 | 2043351 |

Robustness Checks

- We include region-specific linear trends.
- We adopt alternative age cutoffs for the youngest child.
- We employ a restricted sample with a narrower age range.
- Use an alternative measure for the degree of COVID-19 exposure.

Robustness Checks: Region-specific linear trends

| Dependent Variable | (1) Employed | (2) Inactive | (3) Working Hours, in log |
|---|-----------------------|----------------------|---------------------------------|
| Panel A: Include Region-specific Linear Trends | | | |
| <i>Post · DG · AY7</i> | -0.0387*** (.0075) | 0.0346*** (.0088) | -0.139*** (.0283) |
| <i>Post · DG</i> | -0.0250* (.0125) | 0.0295** (.0134) | -0.0921 (.0531) |
| Adjusted R2 | 0.164 | 0.176 | 0.178 |
| N | 2043351 | 2043351 | 2043351 |

Robustness Checks: Alternative Age Cutoffs

| Dependent Variable | (1) Employed | (2) Inactive | (3) Working Hours, in log |
|--|-----------------------|----------------------|------------------------------|
| Panel B: Adopt AY6 instead of AY7 | | | |
| <i>Post · DG · AY6</i> | -0.0309*** (.0081) | 0.0253* (.0128) | -0.105*** (.0335) |
| <i>Post · DG</i> | -0.0310** (.0125) | 0.0352** (.0152) | -0.109** (.0493) |
| adj.R-sq | 0.164 | 0.177 | 0.179 |
| Panel C: Adopt AY8 instead of AY7 | | | |
| <i>Post · DG · AY8</i> | -0.0324*** (.0056) | 0.0292*** (.0085) | -0.118*** (.0229) |
| <i>Post · DG</i> | -0.0300** (.0123) | 0.0341** (.0152) | -0.105** (.0488) |
| adj.R-sq | 0.164 | 0.176 | 0.178 |

Robustness Checks: Alternative Sample

| Dependent Variable | (1) Employed | (2) Inactive | (3) Working Hours, in log |
|--|-----------------------|----------------------|------------------------------|
| Panel D: Females aged between 25 and 45 | | | |
| <i>Post · DG · AY7</i> | -0.0241*** (.0063) | 0.0256*** (.0087) | -0.0847*** (.025) |
| <i>Post · DG</i> | -0.0429*** (.0125) | 0.0410** (.0155) | -0.152** (.053) |
| adj. R-sq | 0.090 | 0.112 | 0.096 |
| N | 481185 | 481185 | 481185 |

Robustness Checks: Alternative Measure for COVID-19 Exposure

| Dependent Variable | (1) Employed | (2) Inactive | (3) Working Hours, in log |
|--|-----------------------|----------------------|------------------------------|
| Panel E: COVID-19 infection per thousand population instead of DG | | | |
| <i>Post · Infection · AY7</i> | -0.0189*** (.0043) | 0.0140** (.0049) | -0.0667*** (.0166) |
| <i>Post · Infection</i> | -0.0207*** (.0014) | 0.0240*** (.0019) | -0.0756*** (.0057) |
| adj. R-sq | 0.164 | 0.176 | 0.178 |
| N | 2043351 | 2043351 | 2043351 |

Conclusion

- In this paper, we extend our understanding on the negative impact of the COVID-19 on labor supply by examining the heterogeneity in the impact among female workers.
- By exploiting the large discrepancy in the number of confirmed cases across regions in the first wave, we analyze the impact of the COVID-19 using the Local Area Labour Force Survey (LALFS).
- Compared to women without young children, women with young children are less likely to be employed, and work for fewer hours during the first wave of the outbreak in South Korea.

Conclusion (contd.)

- We do not, however, find the similar pattern among men. That is, the negative shock on the labor supply of male workers with young children did not differ from that of male workers without young children.
- The differential effects of the COVID-19 on labor supply suggest that mothers with young children decreased their labor supply as women take the lion's share of childcare responsibility.
- Combined with the persistence of labor force participation (Clark and Summers, 1982), our findings imply the pandemic could exacerbate the existing gender gap in labor market participation through the different childcare burden.

THANK YOU

Reference

- Adams-Prassl, A., Boneva, T., Golin, M., and Rauh, C. (2020). Inequality in the impact of the coronavirus shock: Evidence from real time surveys. *Journal of Public Economics* 189: 104245.
- Alon, Titan, Matthias Doepke, Jane Olmstead-Rumsey, and Michèle Tertilt. (2020a). The impact of COVID-19 on gender equality. NBER Working Paper 26947.
- Alon, T., Doepke, M., Rumsey-Olmstead, J., and Tertilt, M. (2020b). This time it's different: The role of women's employment in a pandemic recession. NBER Working Paper 27660.
- Aum, S., Lee, S.Y., and Shin, Y. (2020b). COVID-19 Doesn't Need Lockdowns to Destroy Jobs: The Effect of Local Outbreaks in Korea. NBER Working Paper 27908.
- Clark, Kim B. and Summers, Lawrence H., (1982). Labour Force Participation: Timing and Persistence, *The Review of Economic Studies*, 49(5), 825-844.
- Collins, C., Landivar, L. C., Ruppanner, L., and Scarborough, W. J. (2020). COVID-19 and the gender gap in work hours. *Gender, Work and Organization*: 1-12.
- Del Boca, D., Oggero, N., Profeta, P., and Rossi, M. (2020). Women's and men's work, housework and childcare, before and during COVID-19. *Review of Economics of the Household*, 18, 1001–1017.
- Farré, L., Fawaz, Y., Gonzalez, L., and Graves, J. (2020). How the COVID-19 lockdown affected gender inequality in paid and unpaid work in Spain. IZA Discussion Paper No. 13434, July 2020.
- Heggeness, M. L. (2020). Estimating the immediate impact of the COVID-19 shock on parental attachment to the labor market and the double bind of mothers. *Review of Economics of the Household*, Forthcoming.

Reference (contd.)

- Kalenkoski, C. M., and Pabilonia, S. W. (2020). Initial impact of the COVID-19 pandemic on the employment and hours of self-employed coupled and single workers by gender and parental Status. IZA Discussion Paper No. 13443,
- Montenovo, L., Jiang, X., Rojas, F. L., Schmutte, I. M., Simon, K. I., Weinberg, B. A., et al. (2020). Determinants of disparities in covid-19 job losses. NBER Working Paper 27132.
- Russell, L., and Sun, C. (2020), The Effect of Mandatory Child Care Center Closures on Women's Labor Market Outcomes During the COVID-19 Pandemic, *COVID Economics* 62: 124-154.
- Sevilla, A., and Smith, S. (2020). Baby steps: The gender division of childcare during the COVID-19 pandemic. *Oxford Review of Economic Policy* 36(S1): S169-S186.
- Zamarro, G., and Prados, M.J. (2021) Gender differences in couples' division of childcare, work and mental health during COVID-19. *Review of Economics of the Household*, Forthcoming.