The Effects of Public Social Infrastructure and Gender Equality on Output and Employment: The case of South Korea

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Outline

• Global Gender Gap Index of the World Economic Forum:
  • South Korea is one of the lowest ranked countries in terms of “Economic Participation and Opportunity” (124th out of 149 countries) in 2018.
  • Average wages of women in South Korea are on average 36.7% lower than average male wages (in 2012)

• Public spending in social infrastructure (education, childcare, health and social care) and narrowing gender pay gaps on aggregate output and employment of men and women for the case of South Korea

• Post Keynesian/Kaleckian Feminist model
• Estimation results
Literature review

- Stronger positive effect of public spending in social care and education on female employment as well as total employment compared to public investment in physical infrastructure (Antonopoulos et al., 2010; Ilkkaracan, Kim and Kaya, 2015; Ilkkaracan and Kim, 2018; De Henau et al., 2016; Onaran, Oyvat and Fotopoulou, 2019a).

- A larger share of women’s income compared to that of men’s => Increased spending on needs of the household, children’s education and wellbeing (Blumberg, 1991; Antonopoulos et al, 2010; Pahl, 2000; Vogler and Pahl, 1994; Lundeberg et al. 1997; Cappellini, Marilli and Parsons, 2014; Onaran, Oyvat and Fotopoulou; 2019a)

- Also previous empirical work find:
  - Gender pay gaps increased exports by lowering unit labour costs (Seguino, 1997); increased growth in nine Asian economies (Seguino, 2000), reduced aggregate output in the UK (Onaran, Oyvat and Fotopoulou; 2019a)
  - South Korea is a wage-led economy (Onaran and Stockhammer, 2005; Onaran and Galanis, 2014; Oyvat, Elgin and Öztunalı, 2018)
Post-Keynesian/Kaleckian feminist model (Onaran, Oyvat and Fotopoulou; 2019b)

• Sectors of the economy
  – social: health, social care, education, child care (H)
  – Physical (rest of the economy, N)
  – unpaid domestic care sector (reproductive)

• Two classes: capitalist and workers; different gender (female and male)
  – Wage income by male and female workers, and capital income

• Hourly male wages are higher than hourly female wages in both H and N sector in South Korea (calculations based on World Klems, 2019)

• Share of female employment in H \( (\beta_t^H) \) is greater than the share of female employment in N \( (\beta_t^N) \) in all years except the few years in the pre-1977 period. The gap is between \( \beta_t^H \) and \( \beta_t^N \) widened over time
Post-Keynesian/Kaleckian feminist model (Onaran, Oyvat and Fotopoulou; 2019b)

- Consumption in H & N ($C_H$ and $C_N$) functions of:
  - after-tax female & male wage & profit income

- Private Investment function of:
  - after-tax profit share (+), output (+), public debt/GDP (-)

- The profit share in N ($\pi$)↓ if $w$ of men or women in N ↑ and also depends on productivity ($T$) in N

- Exports: function of profit share (+), $Y_{world}$(+), exchange rates
- Imports: function of profit share (-), $Y_N$ (+), exchange rates
Post-Keynesian/Kaleckian feminist model (Onaran, Oyvat and Fotopoulou; 2019b)

- Unpaid domestic care: function of per capita $G_H$ (-) and employment of female and male in N (-)

- Productivity (output/hour):
- Endogenous in the medium-run in the rest of the economy; function of
  - wages (+), output (+), public investment (+), $C_H$ (+), unpaid care (+)
The short-run impact of an increase in the share of public social infrastructure expenditure in GDP on total output.
The medium-run impact of an increase in the share of public social infrastructure expenditure in GDP on total output

Share of public social expenditures in GDP in the previous period

Public social expenditures in the previous period

Labour productivity in N sector

Female and male employment in N sector

Total tax payments

Total wage payments in N sector

Total profits in N sector

Households' total consumption (social and non-social)

TOTAL OUTPUT IN N SECTOR

TOTAL OUTPUT (SUM OF N AND H SECTORS)

Public debt as a share of GDP in the previous period

Public debt as a share of GDP in the current period

Profit share

Imports

Exports

Private investment in N sector

Public social expenditures in the current period

Government's consumption expenditures and investments other than social investments
The impact of an increase in share of public social infrastructure expenditure as a share of GDP on total employment in the short-run and in the next period.
Estimation methodology

• Vector autoregression (VAR) analysis to test the impact of...
• Total social infrastructure expenditure, wages and closing the gender pay gap on output and employment of men and women
• For South Korea, using World Klems data for 1970-2012

• Focus only on non-agricultural output and employment to reduce biases due to transformation from the subsistence to capitalist sector.
Vector autoregression (VAR) analysis

\[ AX_t = A_0 + A_1 X_{t-1} + A_1 X_{t-2} + e_t \]

\[
X_t = \begin{bmatrix}
\Delta \log(Y^H_t) \\
\Delta \log(E^F_t) \\
\Delta \log(E^M_t) \\
\Delta \log(w^F_t) \\
\Delta \log(w^M_t) \\
\Delta \log(Y_t)
\end{bmatrix}
\]

\[
\begin{pmatrix}
1 & 0 & 0 & 0 & 0 & 0 \\
a_{21} & 1 & 0 & 0 & 0 & 0 \\
a_{31} & a_{32} & 1 & 0 & 0 & 0 \\
a_{41} & a_{42} & a_{43} & 1 & 0 & 0 \\
a_{51} & a_{52} & a_{53} & a_{54} & 1 & 0 \\
a_{61} & a_{62} & a_{63} & a_{64} & a_{65} & 1
\end{pmatrix}
\begin{pmatrix}
u_1 \\
u_2 \\
u_3 \\
u_4 \\
u_5 \\
u_6
\end{pmatrix} =
\begin{pmatrix}
e_1 \\
e_2 \\
e_3 \\
e_4 \\
e_5 \\
e_6
\end{pmatrix}
\]

- Change in the logarithms of
- Total social expenditure \(Y^H = G^H + C^H\) female employment \(E^F\), male employment \(E^M\), average female wage rate \(w^F\), average male wage rate \(w^M\), real value added \(Y\) (all in the non-agricultural sector) and \(e_t\) are structural shocks.
Vector autoregression (VAR) analysis

• The restrictions imply that the causal ordering in our models is

\[ \Delta \log(Y_t^H) \rightarrow \Delta \log(E_t^F) \rightarrow \Delta \log(E_t^M) \rightarrow \Delta \log(w_t^F) \rightarrow \Delta \log(w_t^M) \rightarrow \Delta \log(Y_t) \]

• and

• A causal effect from right to left only exists through the effects of the lags of the variables on the right rather than a contemporaneous effect
Cumulative orthogonalized impulse response functions (IRF) (Specification 1: 
\[ \Delta \log(Y_t^H) \rightarrow \Delta \log(E_t^F) \rightarrow \Delta \log(E_t^M) \rightarrow \Delta \log(w_t^F) \rightarrow \Delta \log(w_t^M) \rightarrow \Delta \log(Y_t) \] 

Accumulated response of \( \Delta \log(Y) \) to one S.D. change in \( \Delta \log(Y_H) \)

Accumulated response of \( \Delta \log(E_F) \) to one S.D. change in \( \Delta \log(Y_H) \)

Accumulated response of \( \Delta \log(E_M) \) to one S.D. change in \( \Delta \log(Y_H) \)
Cumulative orthogonalized impulse response functions (IRF) 
(Specification 1: $\Delta \log(Y_t^H) \rightarrow \Delta \log(E_t^F) \rightarrow \Delta \log(E_t^M) \rightarrow \Delta \log(w_t^F)$
$\rightarrow \Delta \log w_t^M \rightarrow \Delta \log Y_t$)
Vector autoregression (VAR) analysis

- We also conducted the specification with the following causal ordering
- Specification 2:
  \[ \Delta \log(Y_t^H) \rightarrow \Delta \log(E_t^F) \rightarrow \Delta \log(E_t^M) \rightarrow \Delta \log(w_t^F) \rightarrow \Delta \log(w_t) \rightarrow \Delta \log(Y_t) \rightarrow \Delta \log(E_t^M) \rightarrow \Delta \log(E_t^F) \]
- where \( w_t \) is average wage, and \( \omega_t^F \) is ratio of average female wages to average male wage
Cumulative orthogonalized impulse response functions (IRF)
(Specification 2: $\Delta \log(Y_t^H) \rightarrow \Delta \log(E_t^F) \rightarrow \Delta \log(E_t^M) \rightarrow \Delta \log\omega_t^F \rightarrow \Delta \log\omega_t \rightarrow \Delta \log Y_t \rightarrow \Delta \log(E_t^M) \rightarrow \Delta \log(E_t^F)$)

Accumulated response of $\Delta \log(Y)$ to one S.D. change in $\Delta \log(Y_H)$

Accumulated response of $\Delta \log(E_F)$ to one S.D. change in $\Delta \log(Y_H)$

Accumulated response of $\Delta \log(E_M)$ to one S.D. change in $\Delta \log(Y_H)$
Cumulative orthogonalized impulse response functions (IRF)
(Specification 2: $\Delta \log(Y_t^H) \rightarrow \Delta \log(E_t^F) \rightarrow \Delta \log(E_t^M) \rightarrow \Delta \log \omega_t^F \rightarrow \Delta \log w_t \rightarrow \Delta \log Y_t \rightarrow \Delta \log(E_t^M) \rightarrow \Delta \log(E_t^F)$)
Vector autoregression (VAR) analysis

- Also we conducted following specifications considering public social expenditures could also increase with the closing gender wage gap.

- Specification 3.
  \[ \Delta \log(Y_t^H) \rightarrow \Delta \log w_t^F \rightarrow \Delta \log w_t^M \rightarrow \Delta \log Y_t \rightarrow \Delta \log (E_t^M) \rightarrow \Delta \log (E_t^F) \]

- Specification 4.
  \[ \Delta \log(Y_t^H) \rightarrow \Delta \log \omega_t^F \rightarrow \Delta \log w_t \rightarrow \Delta \log Y_t \rightarrow \Delta \log (E_t^M) \rightarrow \Delta \log (E_t^F) \]
The cumulative impact of a 1% increase in social expenditure ($YH$) on aggregate non-agricultural output ($Y$) in South Korea.
The cumulative impact of 1% increase in social expenditure ($Y_H$) on female employment ($E_F$) and male employment ($E_M$) in South Korea.
Conclusions

• Higher social infrastructure => Increase aggregate output, female and male employment both in the short-run and medium-run

• The positive effects of higher public spending in education, childcare, health and social care due to higher demand and productivity appear to offset any potentially negative impact due to possibly higher borrowing.

• Higher social expenditure => Led to productivity gains

• South Korean economy is wage-led and female-led/gender equality-led in the short-run (No significant effects of wages on aggregate output in the medium-run)