The impact of the SSPs on the Labor Productivity from a Gender perspective

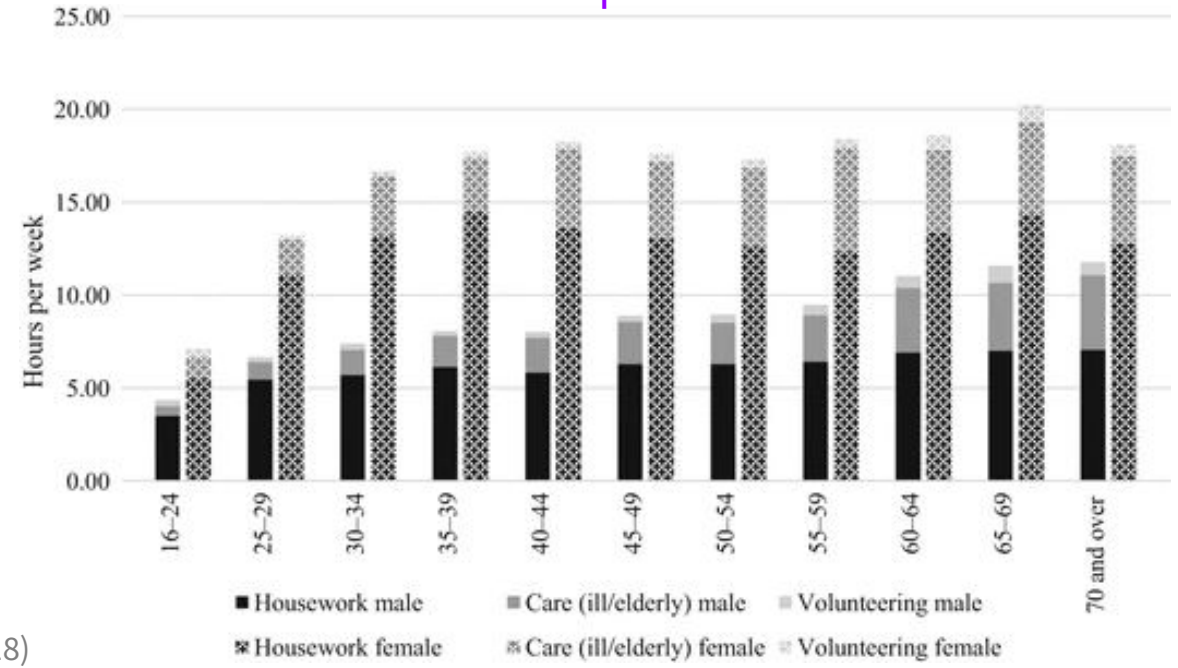
Group Work, PRISMA Summer School 2025

Group Members: Nayeli Liprandi Cortes, Gabriele Mansi, Clàudia Rodés-Bachs, Aiswarya Thazhissery Pavanan

Motivations

- Gender inequality rarely accounted in IAMs

Unpaid work

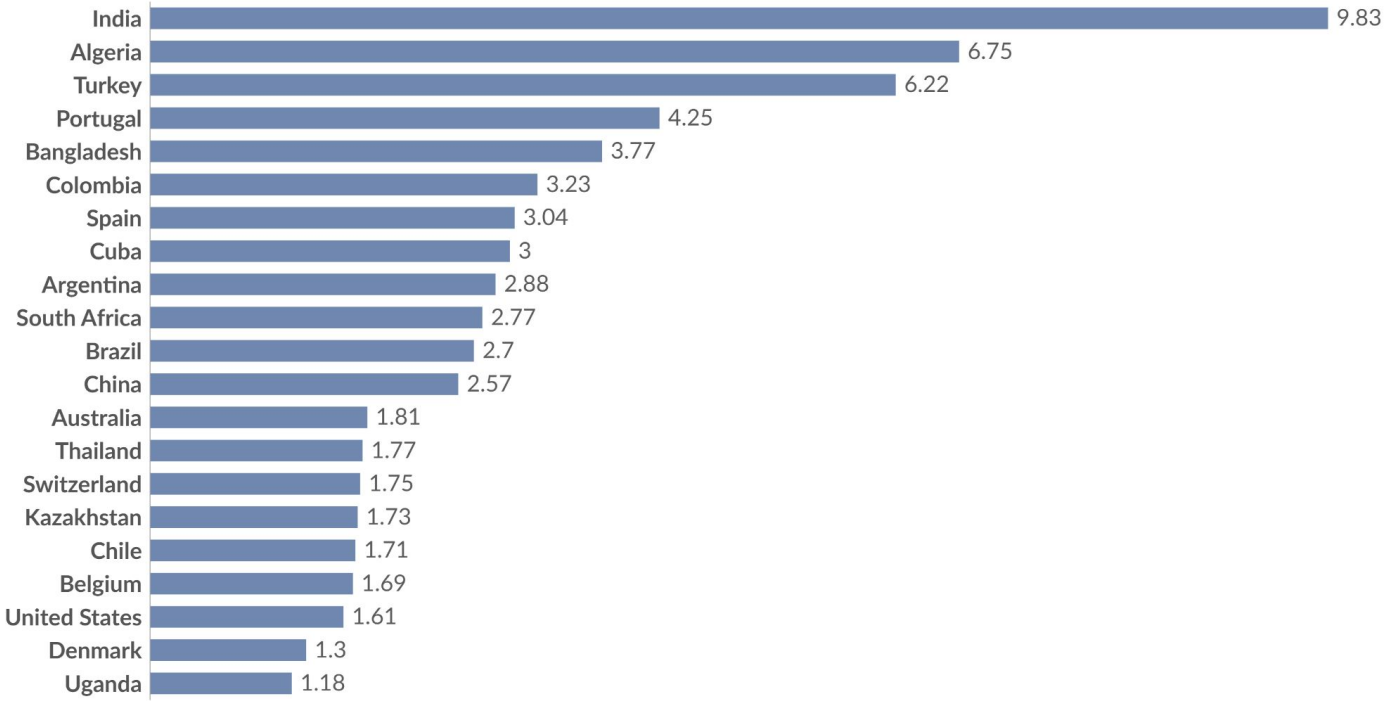


Wheatley, et al. (2018)

Female-to-male ratio of time devoted to unpaid care work, 2014

Our World in Data

Female to male ratio of time devoted to unpaid care work. Unpaid care work refers to all unpaid services provided within a household for its members, including care of persons, housework and voluntary community work.



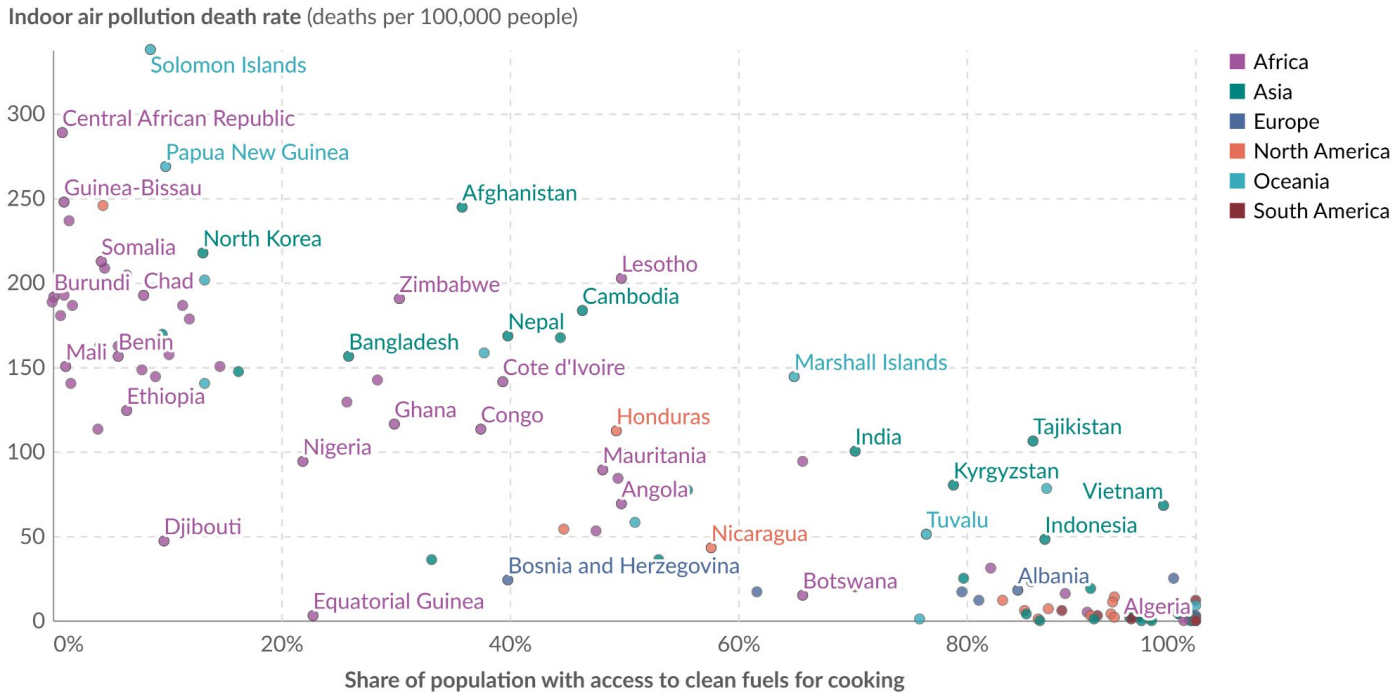
Data source: OECD Gender, Institutions and Development Database (2014)

OurWorldinData.org/women-in-the-labor-force-determinants | CC BY

Indoor air pollution death rate vs. access to clean fuels for cooking, 2021

Our World in Data

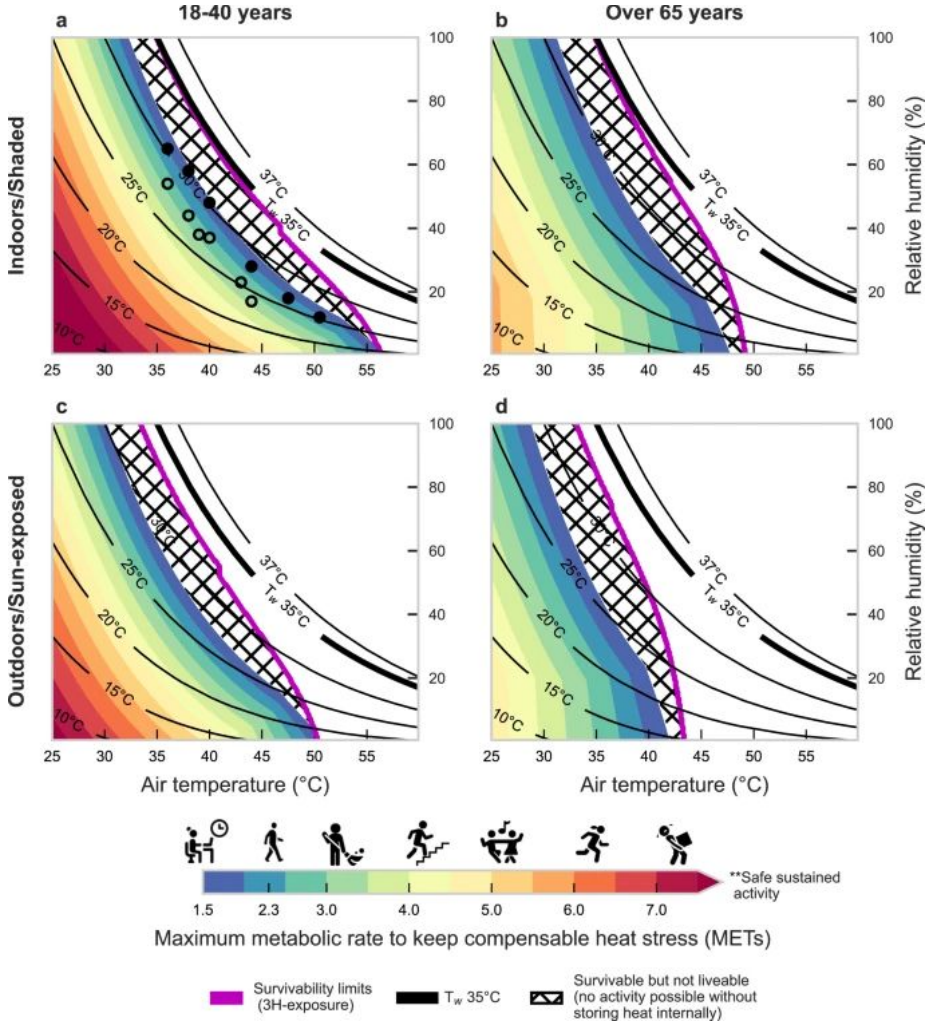
Indoor air pollution death rates, measured per 100,000 individuals versus the share of the population with access to clean fuels and technologies for cooking.



Data source: IHME, Global Burden of Disease (2024); World Health Organization - Global Health Observatory (2025)

OurWorldinData.org/indoor-air-pollution | CC BY

Heat and mortality

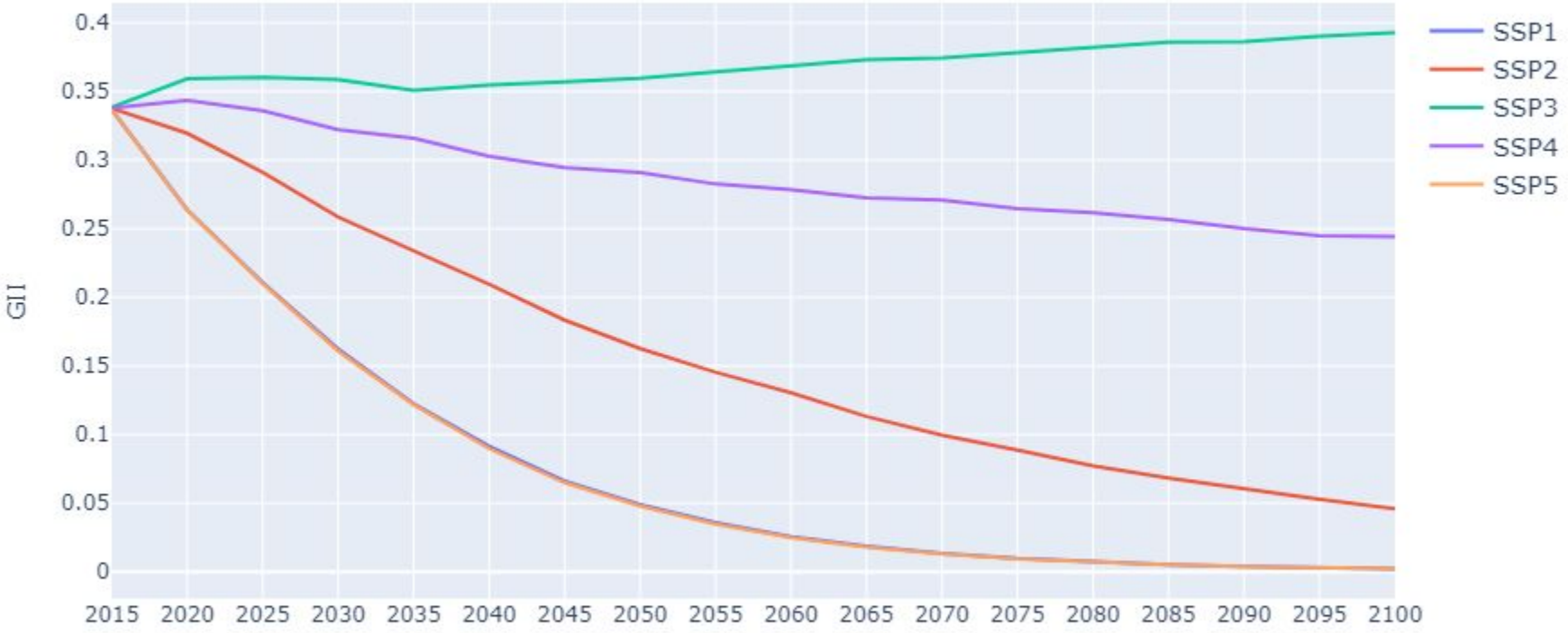


Vanos, et al. (2023)

Implementation

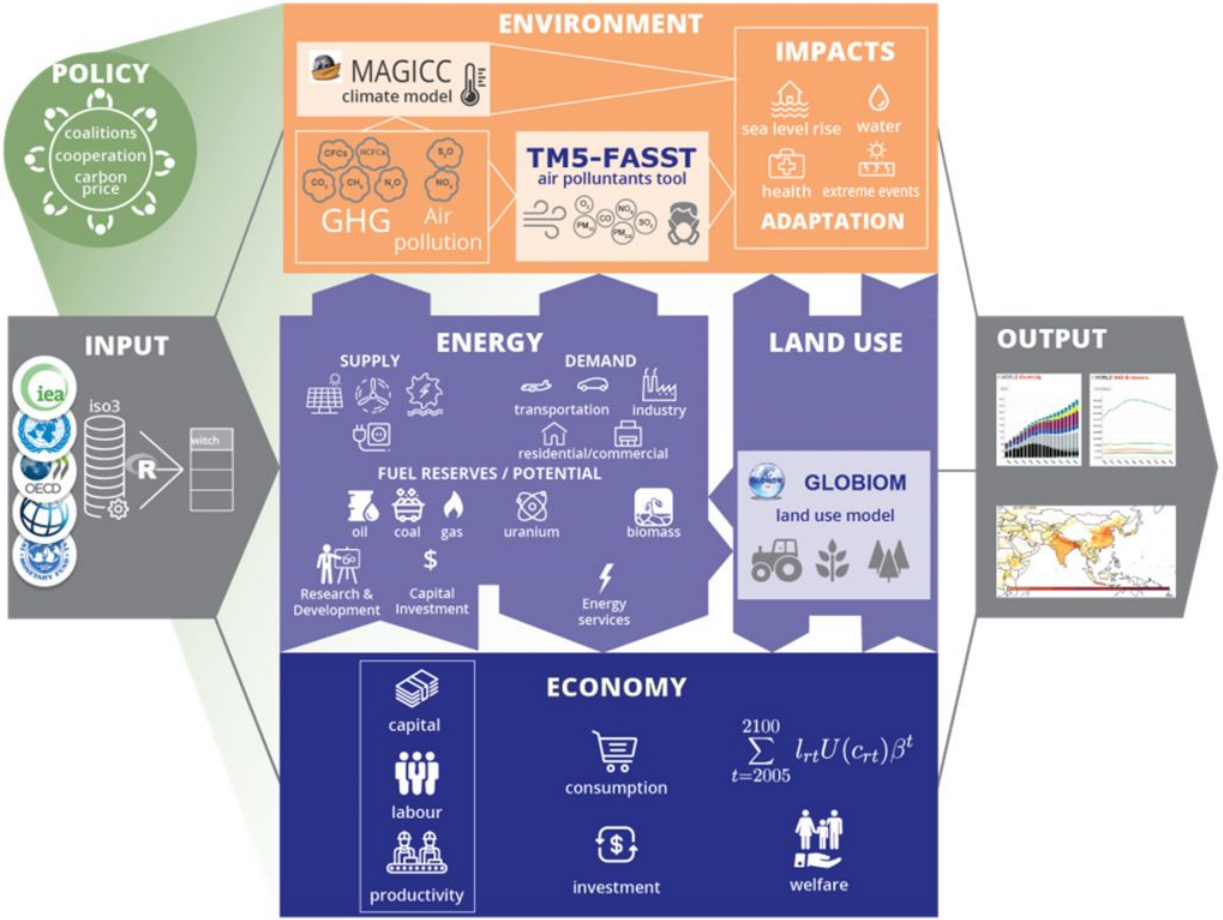
Gender inequality: four stories

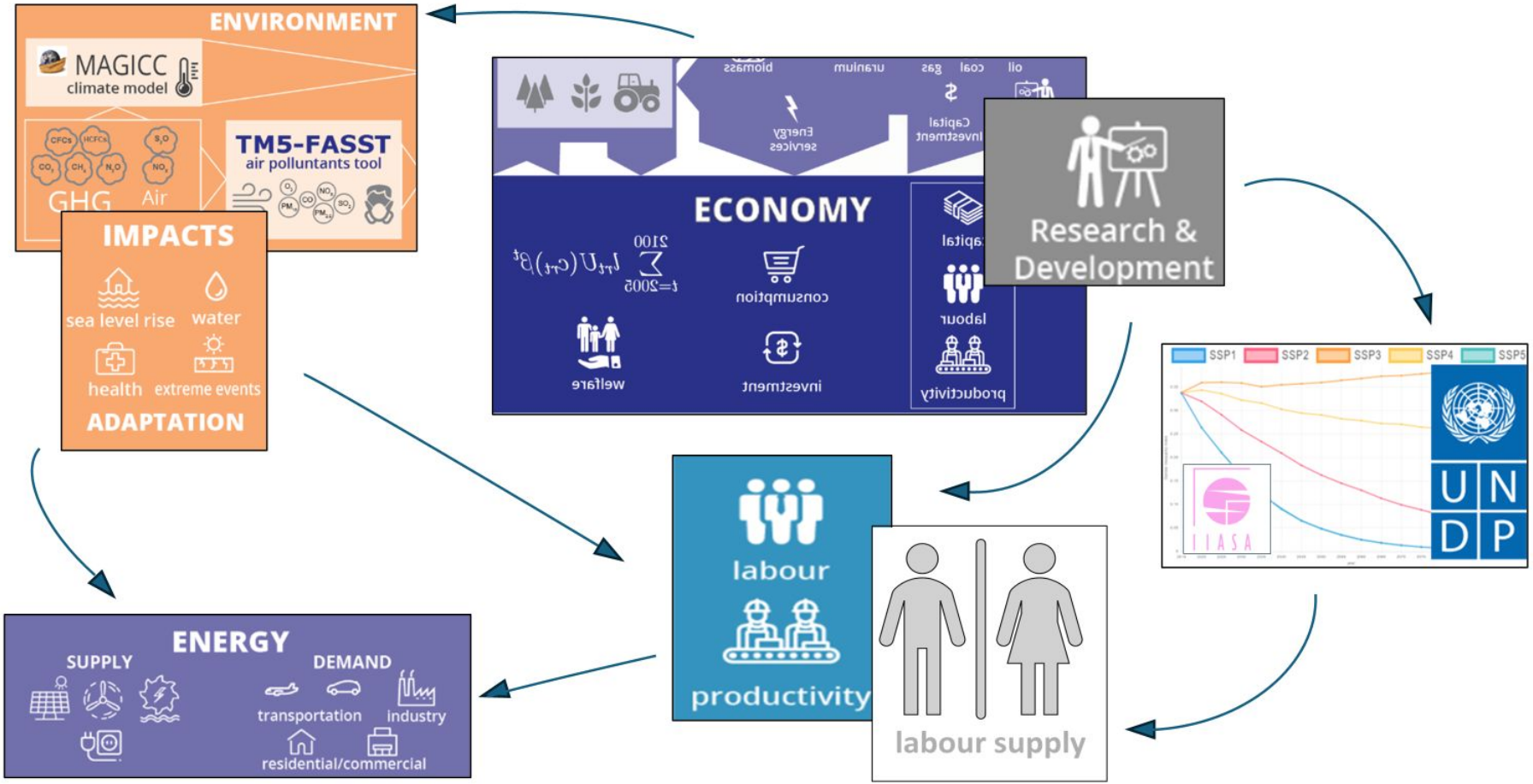
High development scenarios (SSP1 and SSP5) lead to reduction in inequalities while regional rivalry SSP3 scenario increases it.

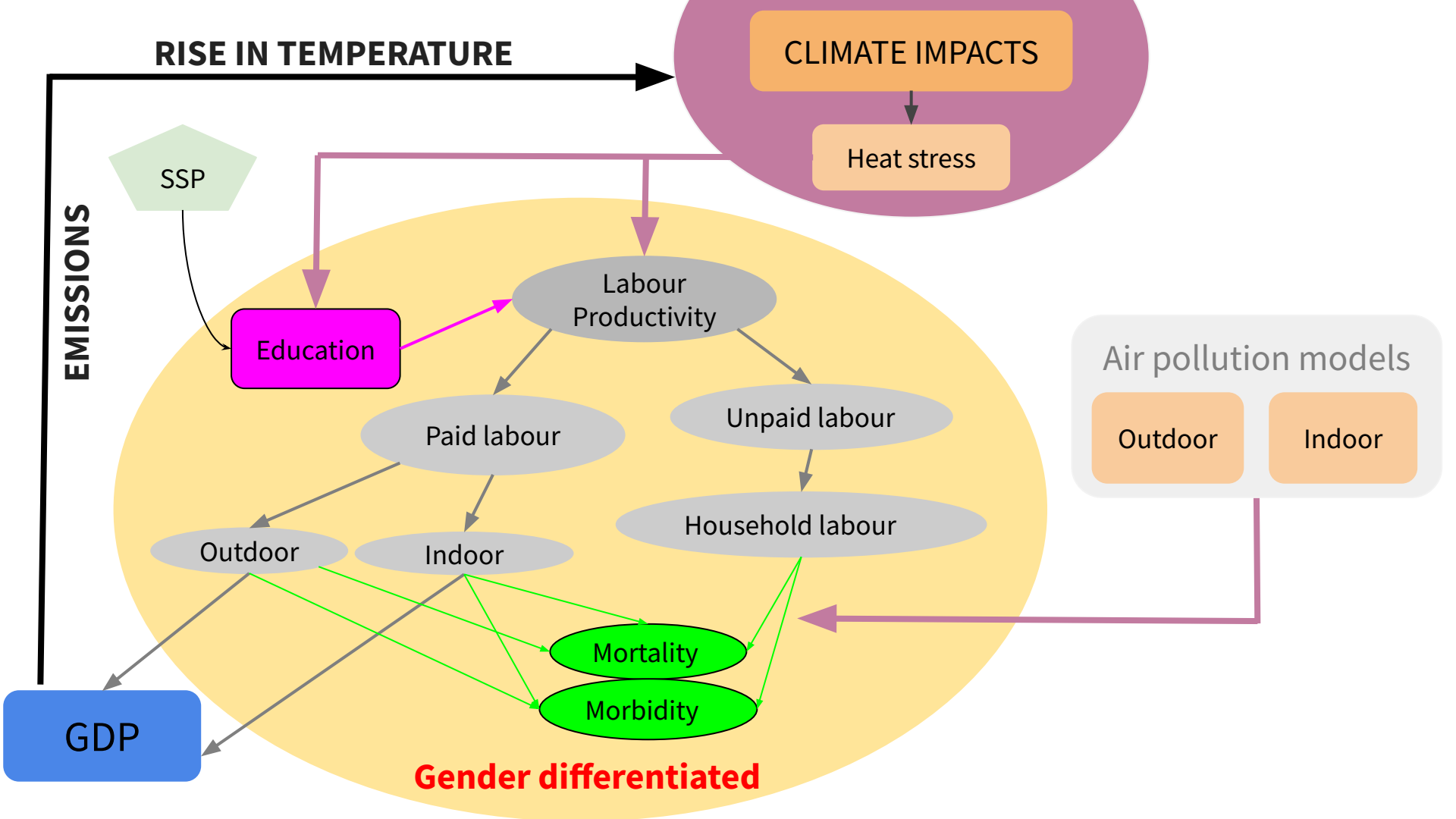


Andrijevic, et al. (2020)

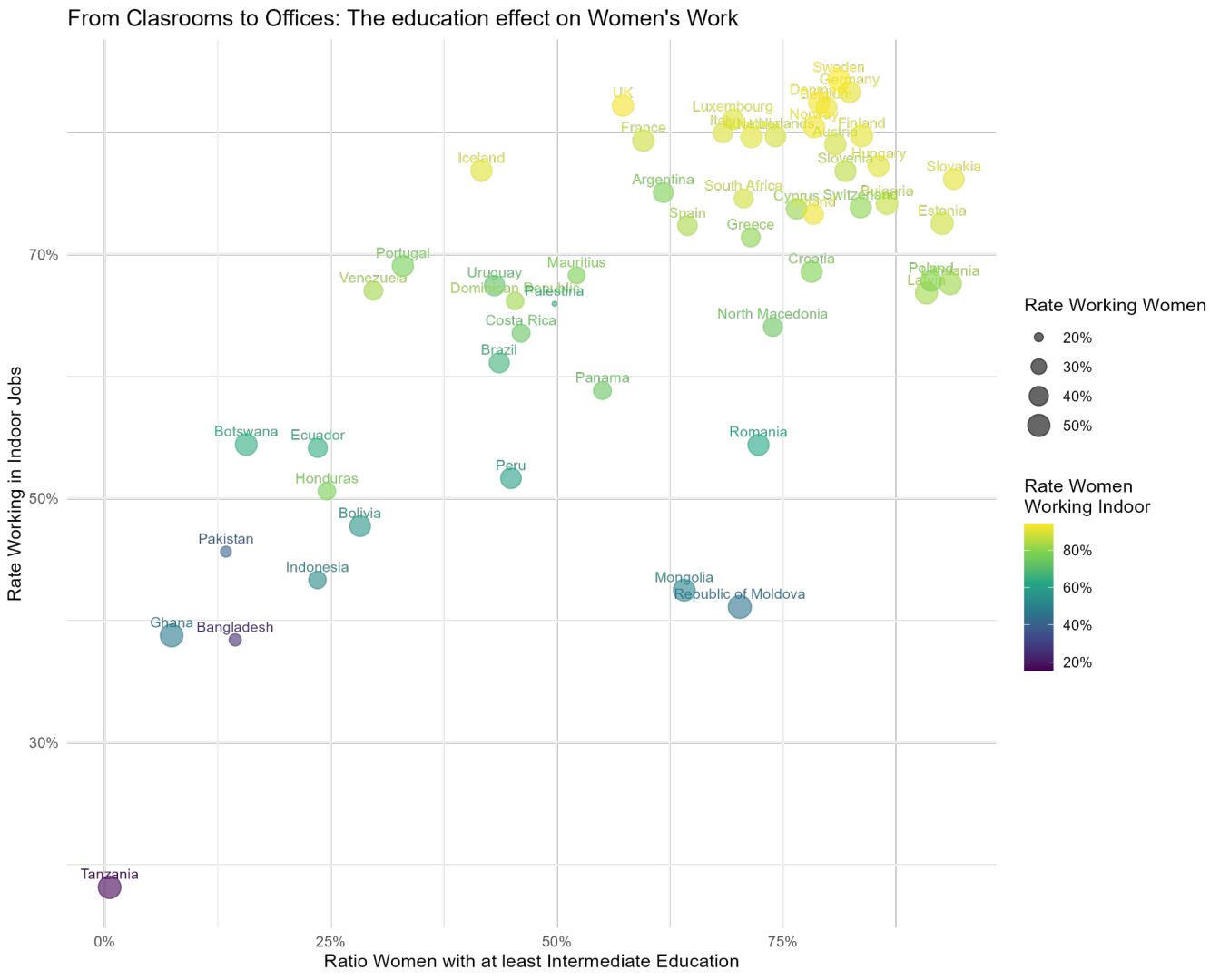
The IAM model

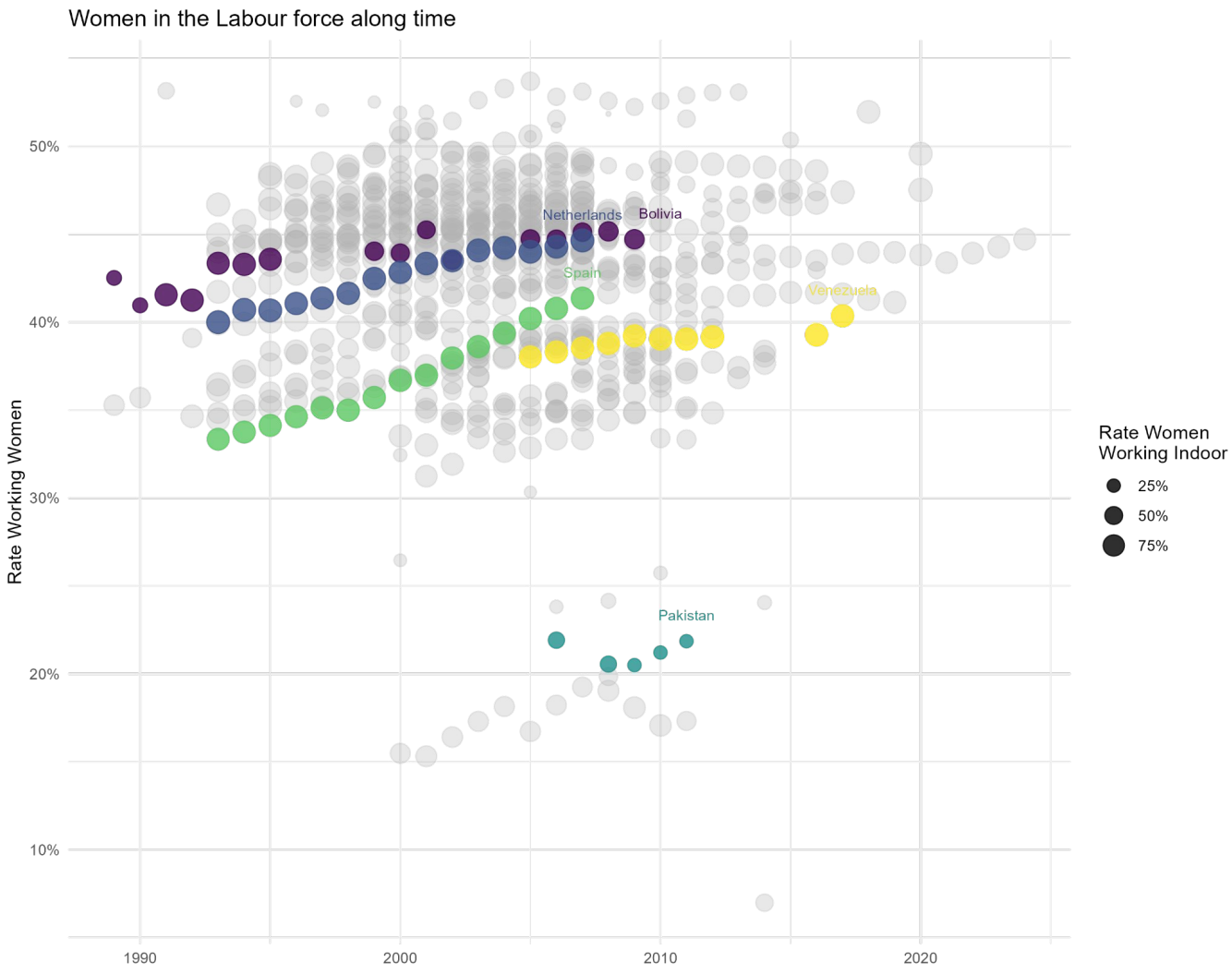


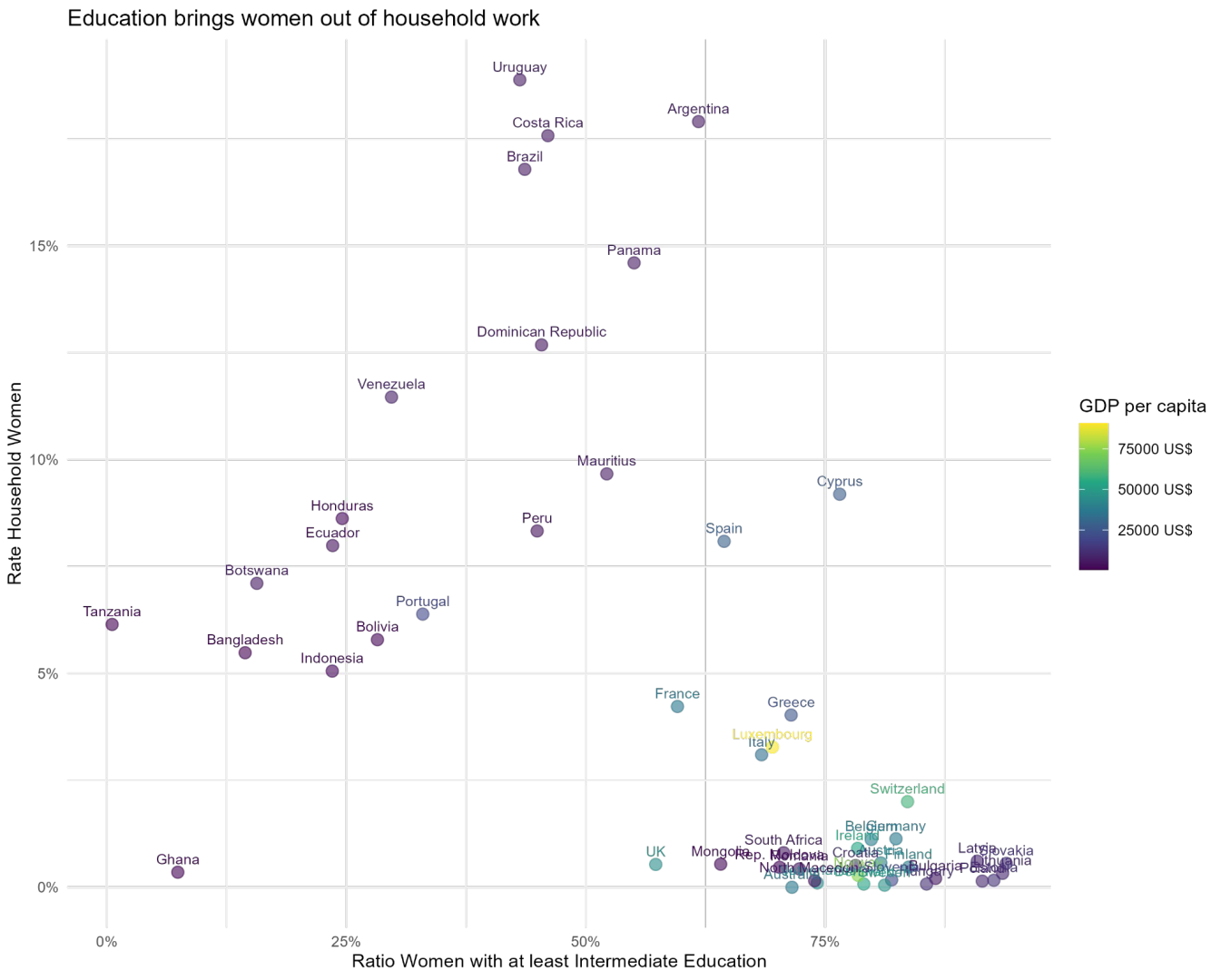

ENVIRONMENT
MAGICC
climate model
GHG
Air
TM5-FASST
air polluntants tool
IMPACTS
sea level rise
water
health
extreme events
ADAPTATION
ECONOMY
consumption
investment
welfare
productivity
Research &
Development
SSP1
SSP2
SSP3
SSP4
SSP5
IIASA
UNDP
labour
productivity
labour supply
ENERGY
SUPPLY
DEMAND
transportation
industry
residential/commercial


RISE IN TEMPERATURE
CLIMATE IMPACTS
Heat stress
SSP
EMISSIONS
Education
Labour Productivity
Paid labour
Unpaid labour
Household labour
Outdoor
Indoor
Air pollution models
Outdoor
Indoor
Mortality
Morbidity
GDP
Gender differentiated

Preliminary results

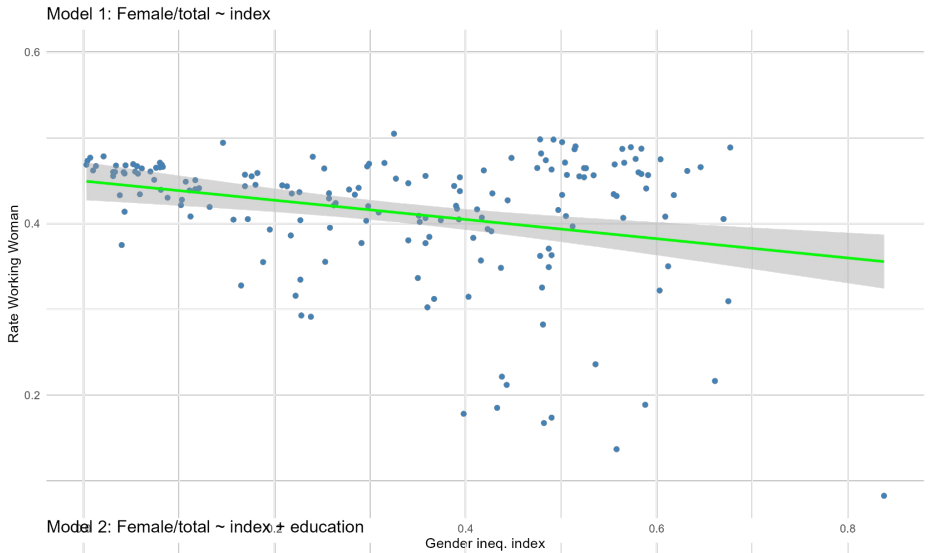

From Clasrooms to Offices: The education effect on Women's Work
Rate Working in Indoor Jobs
70%
50%
30%
0%
25%
50%
75%
Ratio Women with at least Intermediate Education
Sweden
Germany
Denmark
UK
Luxembourg
Italy
Netherlands
Norway
Finland
France
Austria
Iceland
Slovenia
Hungary
Slovakia
Argentina
South Africa
Cyprus
Switzerland
Bulgaria
Spain
Greece
Estonia
Portugal
Mauritius
Croatia
Poland
Venezuela
Uruguay
Dominican Republic
Palestina
Latvia
Lithuania
North Macedonia
Costa Rica
Brazil
Panama
Botswana
Ecuador
Romania
Peru
Honduras
Bolivia
Pakistan
Indonesia
Mongolia
Republic of Moldova
Ghana
Bangladesh
Tanzania
Rate Working Women
20%
30%
40%
50%
Rate Women Working Indoor
80%
60%
40%
20%

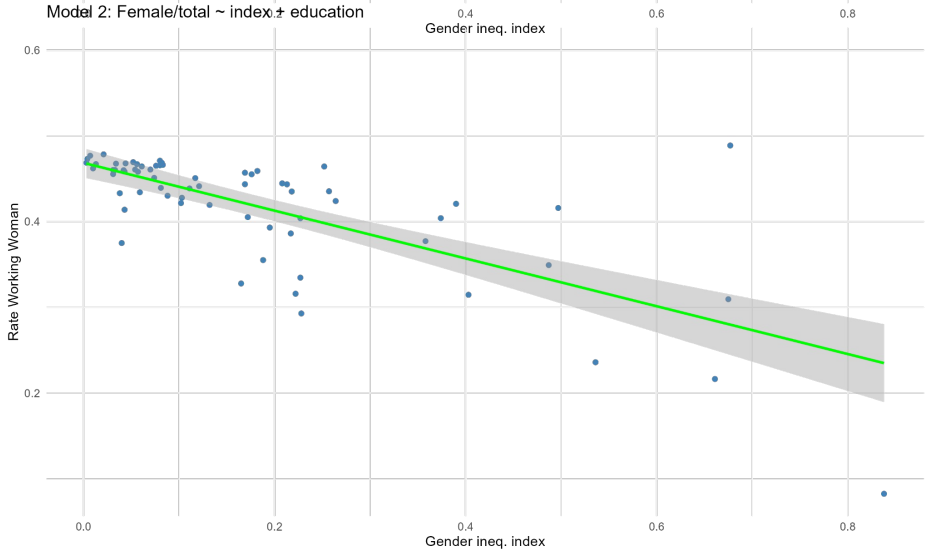

Women in the Labour force along time
Rate Working Women
50%
40%
30%
20%
10%
1990
2000
2010
2020
Netherlands
Bolivia
Spain
Venezuela
Pakistan
Rate Women Working Indoor
25%
50%
75%


Education brings women out of household work
Uruguay
Argentina
Costa Rica
Brazil
Panama
Dominican Republic
Venezuela
Mauritius
Cyprus
Honduras
Ecuador
Peru
Spain
Botswana
Portugal
Tanzania
Bolivia
Bangladesh
Indonesia
France
Greece
Luxembourg
Italy
Switzerland
Germany
Ireland
South Africa
Ghana
UK
Mongolia
Croatia
Finland
Latvia
Slovakia
Lithuania
Bulgaria
Poland
Hungary
15%
10%
5%
0%
0%
25%
50%
75%
Rate Household Women
Ratio Women with at least Intermediate Education
GDP per capita
75000 US$
50000 US$
25000 US$

MODEL 1 <- lm(`M/F` ~ index, data = data)
Coefficient for index: **1.7013** ($p < 0.001$)
1-unit increase in index is associated with a **1.70-unit increase** in the M/F ratio.
Statistically significant at the 0.1% level.
Intercept: **1.0377** (baseline M/F ratio when index = 0).
Model Fit:
R^2 = 0.096: Only **9.6%** of the variation in M/F ratio is explained by index.
Residual standard error = 1.029: High variability in predictions.
Interpretation: Without accounting for education, higher index values are strongly linked to a higher male-to-female ratio (M/F).However, the low R^2 suggests other unmeasured factors influence the M/F ratio.

MODEL 2 <- lm(`M/F` ~ index + education, data = data_with_edu)
Coefficient for index: **5.1275** ($p < 0.001$)
1-unit increase in index is associated with a **5.13-unit increase** in M/F ratio.
The effect size **tripled** compared to Model 1, suggesting education was masking the true relationship.
Coefficient for education: **0.000194** ($p = 0.141$)
Education has a small, **non-significant positive effect** on M/F ratio.
Model Fit:
R^2 = 0.408: **40.8%** of M/F ratio variation is explained by index and education.
Residual standard error = 0.9957: Slightly better fit than Model 1.





	Model 1	Model 2	Model 3
Index	-0.112***	-0.273***	
	(0.029)	(0.044)	
Education		0.000	0.000***
		(0.000)	(0.000)
Intercept	0.450***	0.465***	0.377***
	(0.011)	(0.017)	(0.012)
Num.Obs.	171	67	67
R2	0.080	0.519	0.231
R2 Adj.	0.075	0.504	0.219
F	14.757	34.587	19.488

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

References

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Data sources: https://ilostat.ilo.org/topics/employment/ & https://hdr.undp.org/data-center/thematic-composite-indices/gender-inequality-index#/indicies/GII

Let’s connect!

https://github.com/klau506/PRISMA-Gender-Prj