

Mother education and children's well-being: Evidence from four Pacific countries

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Workshop on the Microeconomics of Development in the Pacific

14 February 2023



Australian
National
University | Research
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Motivation

- Pacific countries: archipelagic small economies that are vulnerable to frequent natural disasters.
 - Investing in physical capital yields low to modest economic returns (Utz , 2021)
 - More and better investment in people are keys to sustainable growth (the Human Capital Project, the World Bank).
- Evidence across developing countries shows investing on early childhood development is a foundation of human capital accumulation (Daelmans et al., 2017).
- Positive association between women's empowerment and the well-being of families, including children (Duflo, 2012).
 - Improving women's education leads to better quality child care (Chen and Li, 2009)
 - Improved bargaining power within household leads to better resource allocation toward children (Doss, 2013)
- Limited studies on maternal education, child well-being in Pacific countries
 - Data availability issues

Context

Pacific countries, as represented by our four countries of study, possess unique challenges and opportunities:

- Majority of female in countries of study has access to secondary education (World Development Indicator).
- Pacific children, compared to other developing countries in the regions, has a higher likelihood to suffer from nutritional problems such as obesity (UNICEF, 2017).
- High gender-based violence (World Bank, 2021).
- Cohabitation with extended families: potential informal child care support, knowledge spill-overs but also resource competition (UNFPA, 2014).
- Public provision varies both in quantity and quality.

This paper

Questions:

- Does a mother's education have a positive association with the improvement of children's well-being?
- What is the mechanism behind the improvement of child well-being if any?

Data and sample

- 6th round of Multiple Indicator Clustering Survey (MICS).
- Countries of study: Tonga, Kiribati, Samoa, and Tuvalu.
- Children aged 0-4 years old.

Outcomes

- Stunting incidence, overweight incidence and ECDI score.

Strategy

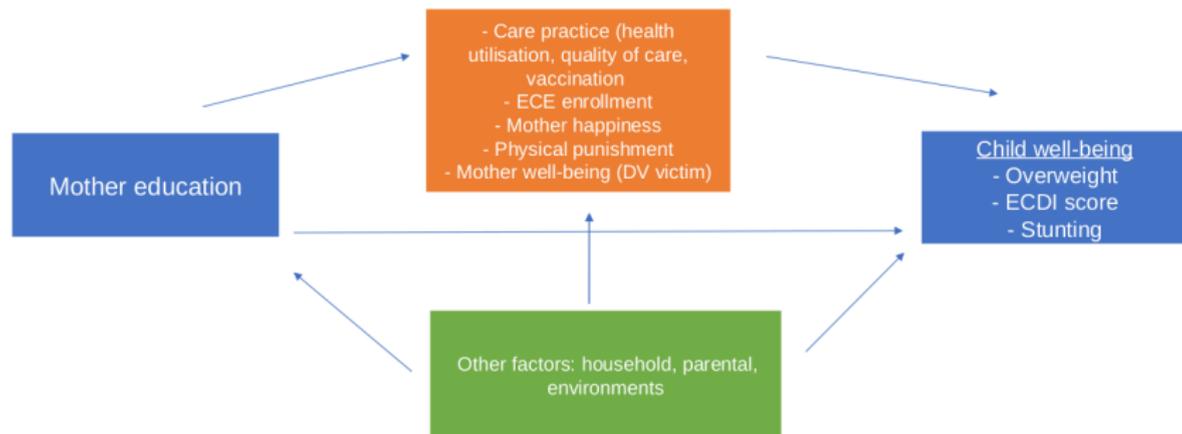
- Non-causal linear estimate using OLS.
- Mother's years of schooling on RHS.
- Identifying the mediating factors.

Results highlights

- Additional years of maternal education have a negative association to stunting.
[▶▶ to Figure](#)
- However, it has a positive association with the likelihood of children being obese and score of ECDI. [▶▶ to Figure](#)
- Maternal education indirectly affects these outcomes through better caring practices and the higher likelihood of enrolment in early childhood education (ECE). [▶▶ to Figure](#)

Framework

- Nurture over nature (Glewwe 1999; Chen and Li, 2009; Rubio-Codina et al., 2019; Currie and Moretti, 2003).
- Mediating factors (Cuartas, 2022).



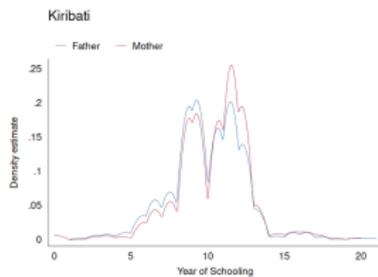
Data

- The 6th round of The Multiple Indicator Cluster Surveys (MICS) was conducted between 2019 and 2020.
- Four countries in the Pacific regions: Tonga, Kiribati, Samoa, and Tuvalu.
- Sample restriction: Children aged 0 to 4 years old who live in the same household as their mother. Total 6,714.
- Survey collects rich information on child well-being:
 - Nutritional status: incidence of stunting or overweight (WHO standard).
 - Child developmental score (ECDI): simple average of 10 binary questions that cover learning, cognitive, social and emotional, and physical development.
- The survey collects potential mediating variables: Care practice (activities with kids combined with vaccination and public health utilisation), ECE enrollment, domestic violence, physical punishment and overall life satisfaction.

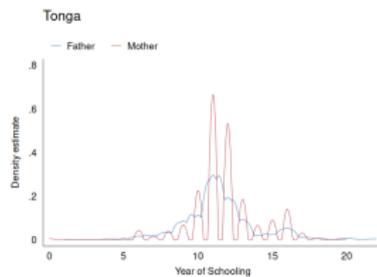
Summary statistics

	KIR	TON	TUV	WSM	Total
<i>Child characteristics</i>					
Total child sample	2179	1347	501	2687	6714
Stunted (=1)	0.137 (0.344)	0.0141 (0.118)	0.0415 (0.200)	0.0429 (0.203)	0.0665 (0.249)
Overweight (=1)	0.0170 (0.129)	0.130 (0.336)	0.0428 (0.203)	0.0742 (0.262)	0.0661 (0.249)
ECDI - overall	0.774 (0.152)	0.733 (0.181)	0.657 (0.157)	0.670 (0.228)	0.717 (0.197)
Cronbach's alpha	0.462	0.558	0.323	0.673	0.555
<i>Parents characteristics</i>					
Mother's age	31.24 (8.188)	33.07 (8.936)	32.86 (10.21)	32.10 (9.232)	32.07 (8.943)
Mother's year of schooling	10.25 (2.567)	11.40 (2.357)	12.14 (2.905)	12.46 (2.271)	11.50 (2.616)
Father's year of schooling	6.947 (5.011)	7.045 (5.711)	7.232 (6.167)	8.297 (5.914)	7.527 (5.646)
Live in urban area (=1)	0.528 (0.499)	0.211 (0.408)	0.650 (0.478)	0.162 (0.368)	0.326 (0.469)
Live with extended family (=1)	0.724 (0.447)	0.620 (0.486)	0.882 (0.323)	0.784 (0.411)	0.738 (0.440)

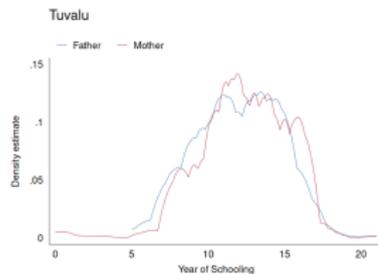
Descriptive: Mother education by country



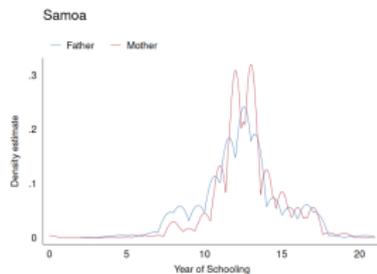
(A)



(B)

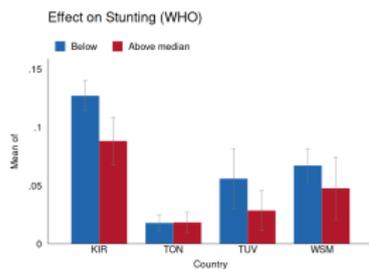


(C)

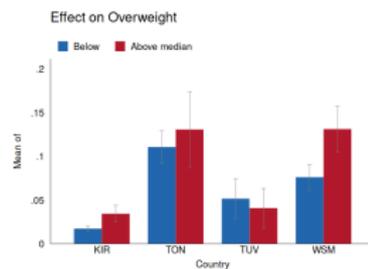


(D)

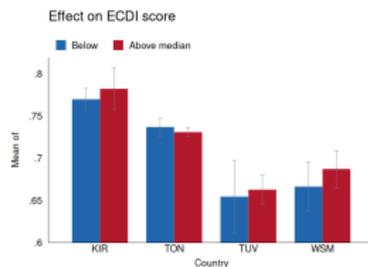
Descriptive: Mother education and outcome



(A)



(B)



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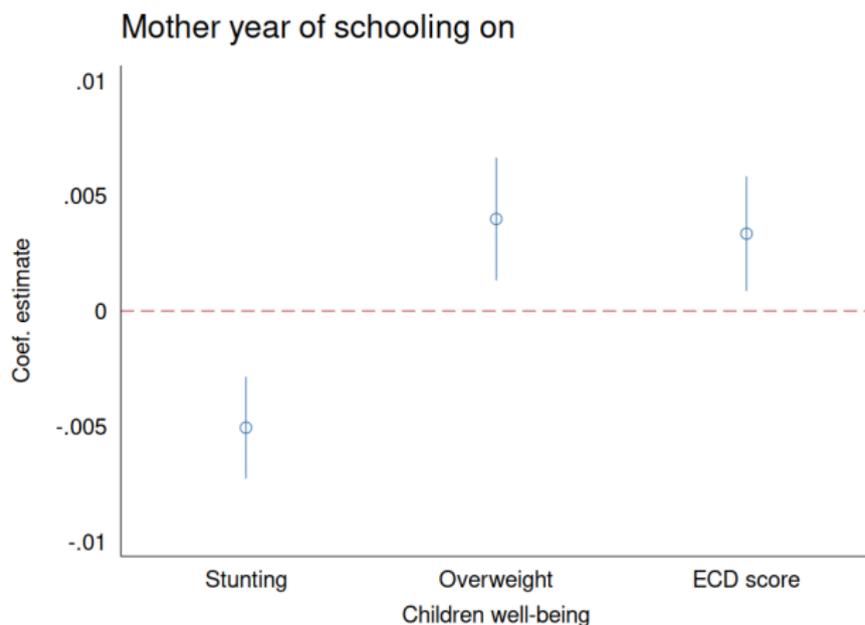
Main strategy

Non-causal linear estimation approach:

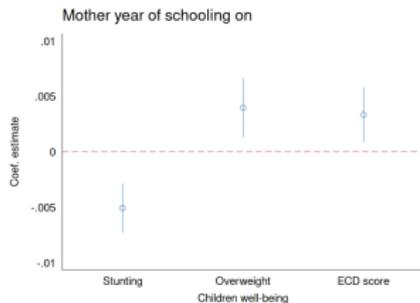
$$Y_{i,h,r,c} = \alpha_0 + \alpha_1 \text{MotherYoS}_{h,r,c} + \alpha^k X_{i,h,r,c} + \kappa_c + \epsilon_{i,h,r,c} \quad (1)$$

- Outcome Y of children i of household h in region r of country c .
- *MotherYoS* is actual years of schooling considering the highest education level and highest grade attended.
 - Education decision is endogenous.
- Control variables: children's age, mother's age, father's age, father's year of schooling, urban dummy, index of household assets, an indicator of living with extended family and dummy variable of the father of does not cohabitate at the time of the survey.
- Country fixed effect.
- Standard error clustered at regional level.

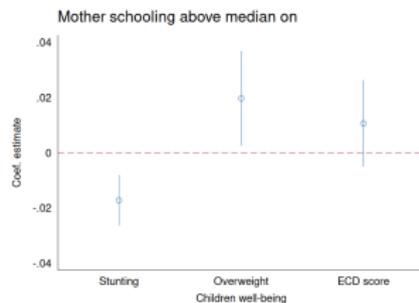
Results: Mother education and children well-being



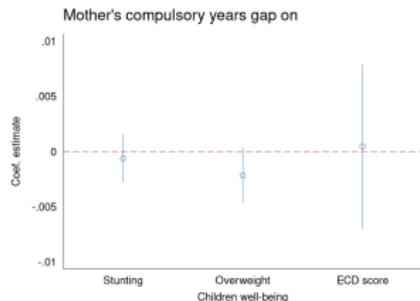
Results: Mother education and children well-being



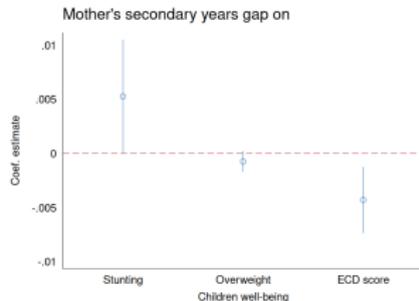
(A)



(B)

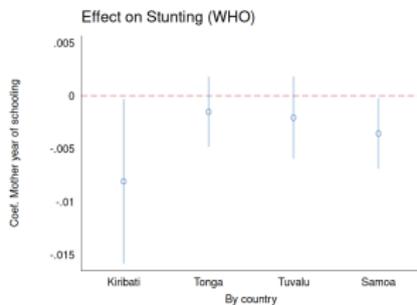


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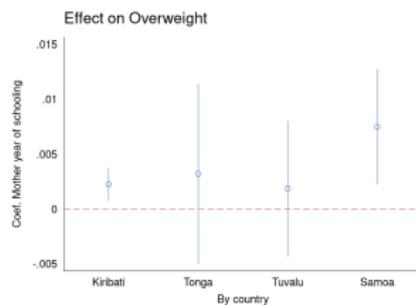


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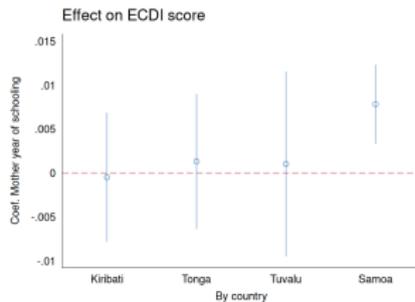
Results: By country



(A)



(B)

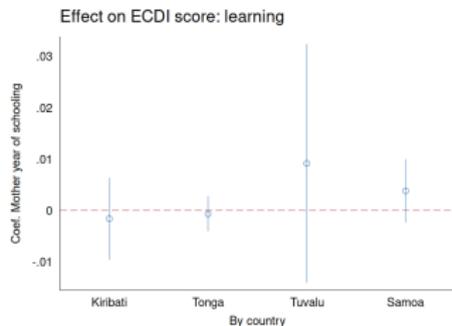


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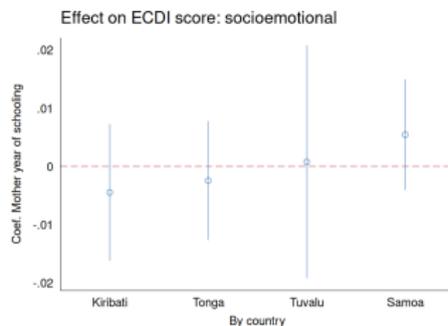
Results: Comments

- An additional year of schooling corresponds to 5.4% and 6% reduction of stunting incidence. [see Figure](#)
- Positive correlation between maternal education and children being overweight. Supports previous findings ((Feng et al., 2019; Makoka and Masibo, 2015; Fertig et al., 2009)).
 - Mother education affects obesity via employment effects.
 - Feeding behavior.
- Suggestive evidence that quality education matters. [see Figure](#)
- Results are mostly driven by Kiribati and Samoa results. [see Figure](#)
- Positive correlation between mother education and ECDI score is driven by Samoan sample. Mostly null correlation in other countries.
- ECDI score (by countries) has a low Cronbach alpha value which raises concern on the internal validity of the responses. [to Table](#)

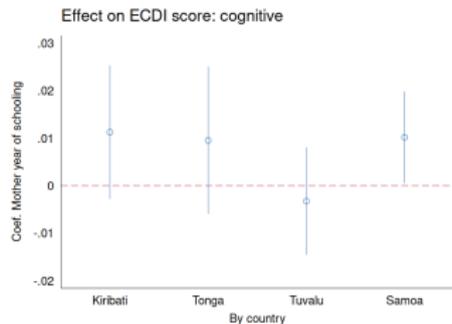
Results: More on ECDI components



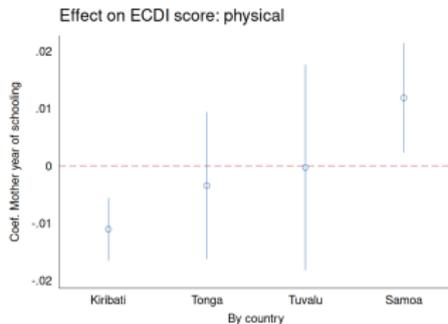
(A)



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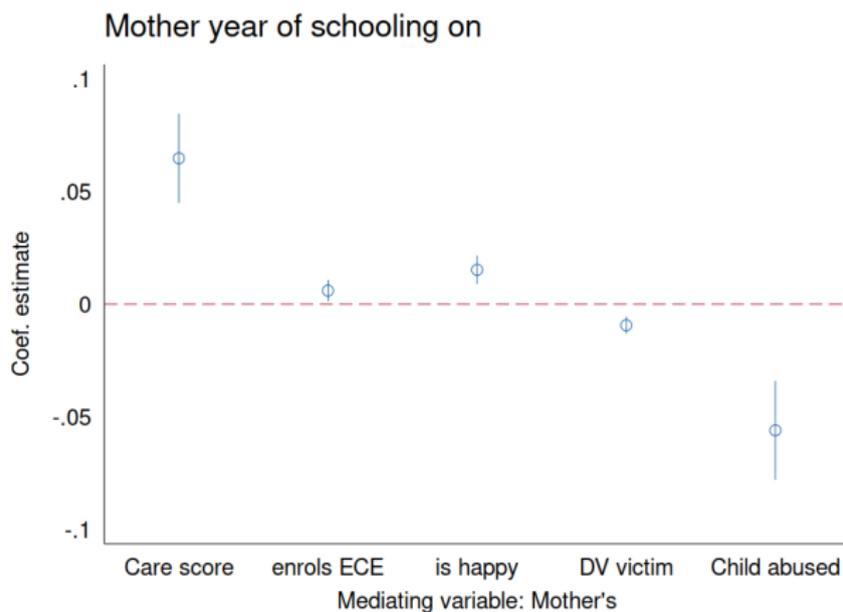


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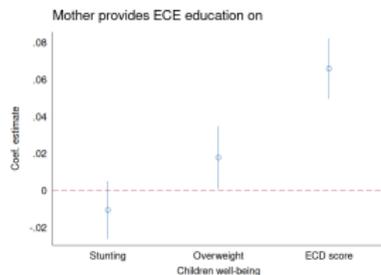


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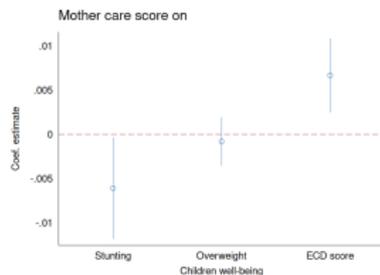
Mediating variables and maternal education



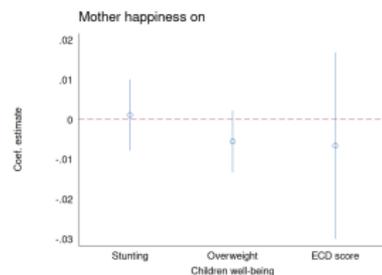
Mediating variables and children well-being



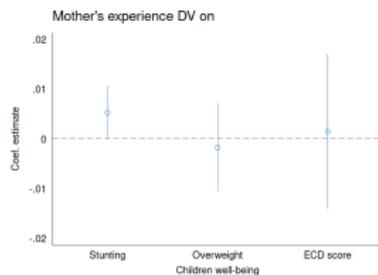
(A)



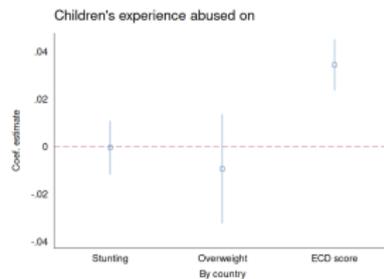
(B)



(C)



(D)



(E)

Mediating: Comments

- We find evidence that enrolling children in ECE positively correlates with ECDI score but not for other outcomes. [to Figure](#)
- We find that mother care score has negatively correlated with stunting and positively with ECDI score [to Figure](#)
- No evidence of mother happiness correlating with the children's well being however, mother happiness seems to correlate with less overweight children. [to Figure](#)

Want to test whether after controlling for mediating variables, it would absorb all the year of schooling effect

Test for direct and indirect effects

Modifying previous equation

$$Y_{i,h,r,c} = \gamma_0 + \gamma_1 \text{MotherYoS} + \theta \text{Mediating} + \gamma^k X + \kappa_c + \epsilon_i, h, r \quad (2)$$

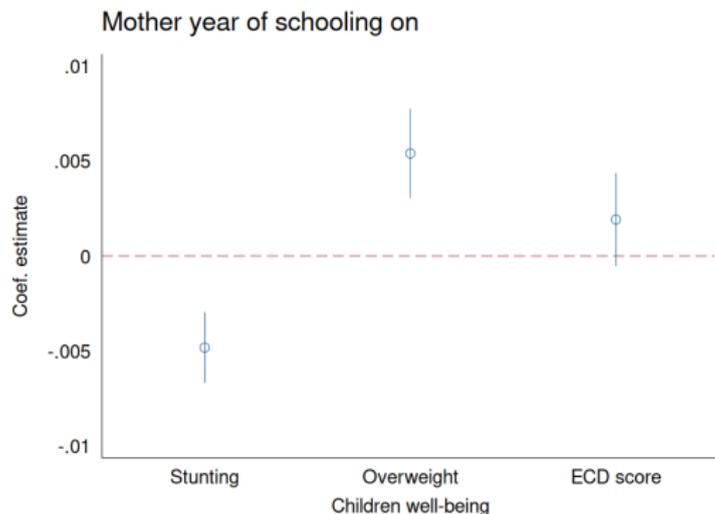


Figure: Direct effect of maternal education

Additional analysis

Previous results suggest years of schooling may have direct effects. This could be interpreted as:

- Direct effect does exist which may represent the 'nature' mechanism.
- Fail to capture other important mediating variables (omitted variable bias)

Tease out 'causal effect' of mother's education using an instrument: leave-one-out mother's peer education.

- Peers: birth cohort, region of residence, religion and country of residence
- Peer education potentially affects the mother's education via cohort-specific education policy exposure and social conformity. Unlikely to affect own-children well-being.

The strategy summarized as follows:

First Stage

$$MotherYoS = \beta_0 + \beta_1 PeerMotherYoS + \beta^k X + \kappa_c + \epsilon_i, h, r \quad (3)$$

Second Stage

$$Y_{i,h,r,c} = \delta_0 + \delta_1 \hat{MotherYoS} + \theta Mediating + \delta^k X + \kappa_c + \epsilon_i, h, r \quad (4)$$

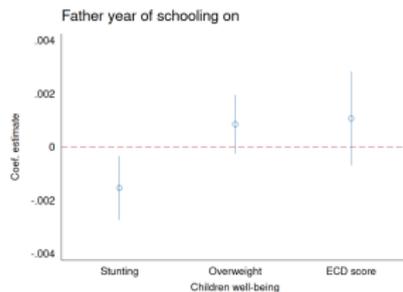
to IV

IV estimate of years of schooling

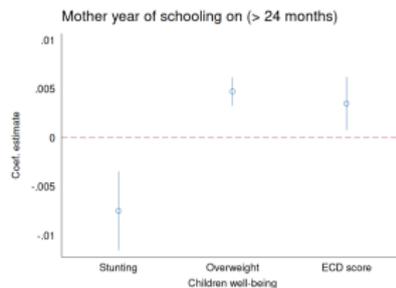
First-stage and second-stage results

<i>Panel A. Second stage</i>	(1)	(2)	(3)
	Stunted (=1)	Overweight (=1)	ECDI - overall
	b/se/t	b/se/t	b/se/t
Mother YOS	-0.060***	-0.028	0.019
	(0.019)	(0.018)	(0.019)
	[-2.671]	[-1.530]	[0.995]
Kleibergen-Paap F-stat	35.896	34.854	18.099
Kleibergen-Paap rk LM-stat	36.159	35.149	17.878
Mean	0.072	0.071	0.715
Covariates	Yes	Yes	Yes
Sample	All children	All children	All children
Clustered S.E	robust	robust	robust
<i>Panel B. Reduced form</i>	Stunted (=1)	Overweight (=1)	ECDI - overall
	b/se/t	b/se/t	b/se/t
Mother's peer YOS	-0.011***	-0.006	0.005
	(0.004)	(0.004)	(0.005)
	[-2.898]	[-1.600]	[0.999]
<i>Panel C. First stage</i>	Mother YOS	Mother YOS	Mother YOS
	b/se/t	b/se/t	b/se/t
Mother's peer YOS	0.211***	0.208***	0.252***
	(0.035)	(0.035)	(0.059)
	[5.991]	[5.904]	[4.254]
Observations	6384	6346	2631

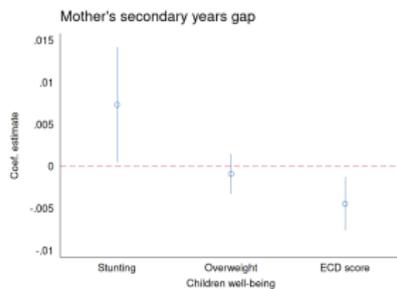
Sensitivity checks



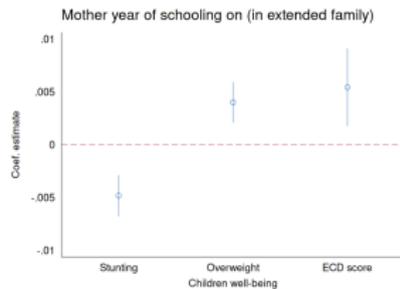
(A)



(B)



(C)



(D)

Conclusion

Remarks

- We find that year of schooling has a negative correlation to stunting incidence, yet has a positive correlation to ECD score and being overweight.
- The effects vary across countries.
- We find two important mediating variables: (1) ECE education, (2) better child-care practice
- We further find weak evidence that year of schooling has direct effects on stunting. Potential omitted variables (e.g: via nutritional diet knowledge which is not fully captured by the mediating factors).

Policy relevance

- Improving access to education to the women population per se has a small incremental effect in Pacific countries.
- Advocate for disseminating specific maternal and parenting knowledge and improving ECE access to more children.

Caveats - Future research

- Children left behind: case of migrant workers household
- Causal inference: focus on policy reform?