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

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Abstract

We study the relationship between maternal education and children's well-being in four Pacific countries. We exploit the richness of the MICS dataset to investigate such relationships and underlying mechanisms. We find that mothers' years of schooling is positively correlated with the likelihood of children being overweight and the Early Childhood Development Index (ECDI) score, while negatively associated with child stunting. These patterns are mainly driven by the Kiribati and Samoa country samples, potentially due to larger sample sizes. Further investigation reveals that the mother's years of schooling indirectly affect these outcomes through better caring practices and the higher likelihood of enrolment in early childhood education (ECE). Meanwhile, the lower likelihood of stunting remains to be the direct effect of higher maternal education. Our findings suggest that improving access, but not quality, to education for women may have limited future returns on child well-being, and highlight the importance of also disseminating specific maternal and parenting knowledge and improving ECE access.

Keywords: maternal education, stunting, obesity, early childhood development index, Pacific countries.

JEL Classification: I25, J1, J13, F63

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1 Introduction

Our study investigates the correlation between women's empowerment, as measured by maternal education, and children's well-being across four countries in the Pacifics: Tonga, Kiribati, Samoa, and Tuvalu. We focus on small-island economies in the Pacific given their unique economic, geographic and sociocultural challenges and opportunities. In particular, as most Pacific countries have high and frequent natural disasters, human capital accumulation becomes even more important than physical or capital investment. This study looks into both the health and educational well-being of the children, as well as explores potential intermediary effects of maternal education as a way to understand the potential mechanism. The latter is carried out by testing the hypothesis that a well-educated mother would positively associate with better childcare practice as well as better mother well-being, which then will influence children's well-being.

Pacific women and girls contribute greatly to their societies and economies, but they face many challenges, ranging from domestic violence to vulnerable informal employment. Pacific countries rank among the worst in terms of violence against women incidence, including domestic violence. As many as 60 percent of women and girls experienced violence from intimate partners or family members. Large informal and subsistence economies characterize the labor market across the Pacific, with a significant share of the workforce (about 25 percent) working in vulnerable employment. The vast number of women engaged in subsistence agriculture with minimum income security and social protection. In the meantime, the nutrition and education status of Pacific children are relatively lower compared to other developing countries. Many households were already struggling to provide enough nutritious food to their children before the epidemic hit due to conflict, natural disasters, and climate change, with one in every three children under five suffering from malnutrition. According to data from the World Bank (2021), the prevalence of children suffering from stunting in the Pacific is 38.4 percent, higher than in Asia (31.7), Eastern Africa (34.5) and Middle Africa (31.5 percent). Countries in the Pacific also experience limited progress in universal primary education and even a decline in net enrolment rates (Kiribati).

Among many ways to promote gender equality and women empowerment, the importance of education cannot be overstated. This study contributes to the lack of literature and empirical findings on maternal education and economic opportunity and children's well-being, particularly in the Pacific. This paper aims to provide evidence of how investing in women's education can enhance the well-being of children. Investing in women has a profound impact, not only on their families but also on communities and countries, by leading healthier and more productive lives to build better futures for themselves and their families. In a region where access to education is relatively high in terms of enrollment, it is intriguing to learn how extending education at the margins can improve child well-being. If positive results are found, then investment in access to education must continue, but if limited effects are

found, then other factors or mechanisms influencing child well-being, including educational quality, must be investigated.

Existing studies suggest a positive relationship between women's empowerment and economic development in either direction (Duflo, 2012). Investing in women improves the well-being of families. Improving women's education leads to better quality childcare (nurture effect) which leads to improved child welfare and health in both the short-run and long-run (Chen and Li, 2009). At the household level, improved education attainment for women increases the labor market access for women which also leads to additional resources being allocated for children's investment within a household. Improving education could also lead to higher bargaining power within households for women which also affects the household allocation toward children (Doss, 2013).

Motivated by the aforementioned context, we aim to answer two main research questions: (1) Does a mother's education have a positive association with the improvement of a child's well-being? (2) What is the mechanism behind the improvement of child well-being if any? If not, what could be the factors that hinder such mediation relationships? As our study is non-causal, we focus on looking at the mechanism behind how improvement in education would improve children's well-being. First, as the baseline estimation, we provide results of the linear correlation between mother's years of schooling and children's well-being following Cuartas (2022) approach. Next, we explore potential mediating variables of maternal education based on the suggestive evidence provided by the baseline estimation. We focus on five potential mediating variables, including (1) the mother's care score; (2) children's enrolment in ECE; (3) the mother's happiness indicator; (4) female domestic violence; (5) children's physical punishment.

This paper contributes to the literature on the Pacific in three ways. First, our paper, to our knowledge, is the first systematic effort to provide evidence of the effect of maternal education on child well-being in the Pacific by offering multiple alternative measurements of maternal education and child well-being. Second, we complement previous studies by using a mediation framework to examine mother-children relationships and the mechanism behind the improvement of child well-being using rich household survey data. Third, our paper provides unique cross-country insights using multiple country datasets. Lastly, our paper also contributes to the literature, in particular, by serving empirical evidence of the relationship between maternal education and child well-being when access to education for women is already high. Using the richness of the Multiple Indicator Clustering Survey (MICS) datasets, we investigate the role of the years of schooling on child well-being as measured by three outcomes: stunting incidence, overweight incidence and Early Childhood Development Index (ECDI) score. Overall, using the pooled dataset, we find that the mother's years of schooling correlate with the lower likelihood of stunting incidence. An additional year of education for the mother is also associated with a higher ECDI score. However, higher maternal education is correlated with a higher likelihood of children being overweight. Further analysis shows

the effect varies across countries.

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We examine further potential mechanisms behind the role of years of schooling on child well-being outcomes. We find that providing ECE education and better care practice as two important mediating factors that explain the indirect effects of years of schooling. We further find suggestive evidence that a mother's years of schooling has a direct effect on reducing the likelihood of stunting, arguably via nutritional knowledge which is not fully captured by the mediating factors.

We structure the rest of our paper as follows. The next section lays out the importance of nurture over nature in predicting children's well-being. This section lays out the specific challenges in the Pacific in terms of children's well-being. In the third section, we describe the survey dataset used in the main analysis and the main variables. We discuss our main estimation strategy in the fourth section. The fifth section presents and discusses the main results. Section 6 concludes our research.

2 Context

2.1 Nurture framework

Previous studies provide compelling evidence that shows significant well-being gaps between children from high socioeconomic status family and their counterparts from low economic status families. the positive association between maternal education and children's well-being especially health status. Glewwe (1999), Chen and Li (2009) and more recent studies by Rubio-Codina and Grantham-McGregor (2019); Cuartas and McCoy (2021) shows that there is a positive association between maternal education and own children well-being. After controlling for parents' health status (nature), they find that more educated parents provide better healthcare and nutrition that lead to lower incidences of stunting and malnutrition. Furthermore, well-educated mothers were also found to practice more hygiene in child care and provide safer environments (Currie and Moretti, 2003; Thomas et al., 1990). Thus, most of the previous studies advocate for nurture as the key mechanism behind the positive association between children's well-being and wealth status of their original household as opposed to nature mechanism.

Nevertheless, a body of nutritional literature also shows mixed results concerning the relationship between maternal education and overwweight incidence. On one hand, previous literature shows a positive association between low economic status and overweight incidence. They find that children of a household with single-mother (Gibson et al., 2007), of an obese mother (Hesketh et al., 2007) and a low family income (Gibson et al., 2016). This low economic status indirectly implies a lower educated mother. However, there has been growing literature showing a negative correlation between maternal education and childhood obesity. Studies in China (Feng et al., 2019), Sub-Saharan Africa (Makoka and Masibo, 2015), and South America. Maternal education might affect child obesity via the employment channel (Fertig et al., 2009). While higher employment translates to higher calorie intake via income effect, it would also affect feeding styles such as more takeaway consumption and eating while watching TV. Maternal education and child obesity may also be interconnected via excessive early breastfeeding practice Feng et al. (2019). Lastly, maternal education sorts them into specific occupations which require less physical activity. This potentially also correlates with less physical activity within the household.

Beyond health status, a positive association between mother well-being and education is also evident in their children's cognitive and emotional development perspectives. Maternal education is associated with child cognitive development via better knowledge of educational choices. Meanwhile, psychological literature suggests a direct link between maternal well-being to child well-being. Mother's happiness is found to be a good predictor of child cognitive and emotional outcomes (Amato, 1994; Berger and Spieß, 2011)

2.2 The Pacific context

The Pacific consists of small archipelagic countries that are vulnerable to severe and recurring natural disasters. The interaction of frequent natural disasters and challenging geographies affect investment in physical capital to yield low to modest economic returns (Utz, 2021). Consequently, this highlights the importance of human capital investment to achieve sustained economic growth and development. The Human Capital Project by the World Bank,[1] for instance, highlights the importance of investing in children's education and nutrition as key factors behind poverty reduction and sustained economic growth in the Pacific.[2] A collection of evidence across developing countries show that investing on early childhood development is a foundation of human capital accumulation (Daelmans et al., 2017). The Pacific, however, possesses several unique challenges and opportunities in terms of investing in early childhood development.

[1]Human Capital Project is an ambitious global effort to accelerate more and better investment in people for sustained growth. More on this project can be found in the following link: https://www.worldbank.org/en/publication/human-capital

[2]See https://www.worldbank.org/en/news/feature/2019/11/07/human-capital-in-the-pacific-islands-and-papua-new-guinea

Overall, in Pacific countries, the majority of adult female has access to secondary education. On average, about 60% of adult women attained secondary education (World Development Indicator). Moreover, in most Pacific Island countries, the secondary net enrolment rate (NER) is significantly higher for girls than boys. One explanation for the gender disparity (in favor of girls) in secondary participation appears to be that boys leave school to pursue vocational training and employment opportunities, partially influenced by perceptions of traditional gender roles, limiting the number of females pursuing perceived "male" vocations and careers.

In the meantime, there are still significant barriers to education, including the vast geographical dispersal of the islands, posing a serious challenge to accessing quality education. Poor internet connectivity and infrastructure also impede the development of online/remote training alternatives to address the geographical challenge. Several Pacific Island countries, such as Tonga and Tuvalu are among countries of our interest that rely heavily on financial and technical support from external donors to support their educational activities, raising concerns about the long-term viability of development initiatives (UNICEF, 2017). Extreme reliance on foreign donor funding makes the education system extremely vulnerable to external economic shocks, making it one of the most pressing sustainability challenges. Particularly in Kiribati, Tonga, and Tuvalu, funding for education development is inadequate or is not reaching the areas that would benefit the most.

Despite relatively high education attainment, the Pacific Island countries have specific challenges in terms of children's and women's well-being (Blankenship et al., 2020). First, compared to other developing countries, Pacific children have a higher likelihood to suffer from obesity, leading to a higher likelihood of non-communicable disease (NCD) in later life. According to a recent analysis of the Global Burden of Disease (GBD) study, NCD is the main cause of illness and death in the Pacific Island countries, accounting for more than three-fourths of all deaths, with economic burden greater than expected for middle-income countries (Hou et al., 2022). The dramatic rise in the disease burden of obesity is largely due to shifting dietary patterns, including the change from a traditional diet of fish and fruits to one of highly processed food like biscuits, noodles, and high-fat products. A lack of arable land has also partly led to a decline in healthy agricultural production in the Pacific. Moreover, cultural preferences and established norms for larger body sizes (which are seen as symbols of higher status, hierarchy, and beauty) may also contribute to the high rates of obesity in the Pacific countries (UNICEF, 2017).

Second, the Pacific also suffers from high gender-based violence evidence (World Bank, 2021).[3] A recent analysis of survey data indicates that the lifetime prevalence of physical and sexual violence (by intimate partners and non-partners) among Pacific Island women ranges between 60 and 80 percent (UNICEF, 2017). Various child, adolescent, and maternal health outcomes were found to be affected by gender norms, frequently to the detriment of women

[3]World Bank, Gender Data Portal. Access via https://genderdata.worldbank.org/topics/violence/

and girls. Traditional gender roles, which are prevalent throughout the Pacific, support and facilitate violence against women and girls. This type of violence has been linked to several mental, physical, sexual, and reproductive health outcomes. Although the status of women has been improving in the Pacific, women are still frequently viewed as subordinate to men, and gender roles remain quite rigid. According to the results of the Family Health and Safety Studies (UNFPA, 2006, 2010, 2014), the widespread prevalence of physical and sexual partner violence can be traced back to entrenched gendered social norms that justify such treatment of women as a necessary and even deserved form of discipline for those who fail to adhere to traditional gender roles.

From the cultural perspective, a typical pacific nation household has a large member size, co-habits with extended families, and often live within proximity with relatives. On one side of the coin, this could lead to potential informal child-care support that may or may not mask the importance of maternal knowledge. On the other side, living in a larger family may also increase resource competition, especially for the young household member, as predicted in the quantity-quality trade-off framework (Becker, 1981). Across the Pacific, kinship care is the most common alternative care for children. Yet, in many countries, there is still a lack of alternative care options for children who are unable to be placed in a safe environment with a family member. Inadequate access to alternative forms potentially endangers children, especially in situations where extended family networks are strained. Concerns are also raised about the care and protection of children in kinship care due to a lack of support and monitoring. (UNICEF, 2017). It has also been found that in some Pacific Island countries, children who live in larger families are at a higher risk of poverty. In Fiji, for instance, households with three or more children are more likely to be living in poverty (Adelman and Ivaschenko, 2014).

Our countries of study, except for Kiribati, share a similar size of GDP per capita. However, children's well-being indicators show significant variations Despite a potential link between the size of GDP per capita and children's nutritional status, for some countries, higher GDP per capita does not necessarily mean better nutritional status for children. For instance, Kiribati, with the lowest GDP per capita, has the highest underweight and stunting prevalence of 6.9% and 15.2% of children less than 5 years (World Development Indicator). Nevertheless, Tonga's prevalence of being underweight (0.8%) is significantly lower than Samoa's (3.4%) and Tuvalu's (2.9%), even though their GDP per person is about the same. Similarly, in terms of stunting, Kiribati has the highest share with 15.2% of children less than 5 years whose height-for-age is more than two standard deviations below the median of the reference population. This figure is followed by Samoa (7.3%), Tuvalu (5.7%), and Tonga (2.2%), where substantial variation is also observed among these three countries.

Our analyzed dataset confirms such variations. In terms of weight and height measurement, as summarized in Figure A4 Panel A and B, we could observe that in Kiribati and Samoa, more children have lower than median weight-for-age and height-for-age z-score compared

to their counterparts in Tonga and Tuvalu. Figure A4 Panel C suggests that the overweight problem is more prevalent in Samoan compared to Kiribati, Tonga, Tuvalu, and Samoa. In terms of ECDI score, as illustrated in Figure A4 Panel D, the median of ECDI score across four countries are similar but vary in terms of the distribution. More extreme-low score cases are found in Tonga and Samoa as opposed to Tuvalu, for instance. Finally, the four countries share a similar median maternal year of schooling. However, Figure A4 shows us that, across countries, variation in mothers' educational attainment does exist. Thus, our study benefitted from the similarity of the institutional and economic background of the analyzed countries, at the same time, the variation of outcomes and maternal education among them.

Along the same lines, public goods provisions and strategy related to early childhood development and maternal well-being also varies. The majority of the Pacific Island countries have formulated National Development Plans or Strategies, serving as a source of direction for the government, often covering a period of 3 to 10 years. Due in large part to the fact that many of the countries in the Pacific are dependent on official development assistance (ODA), economic growth is a central component of many of the plans. However, the social protection system that enables households to invest in children's well-being and human development is very limited and largely varies across countries. In Kiribati, although the provision is limited, there is social assistance measure focused on school fee schemes and the provision of cash payments to incapacitated parents of secondary school children (UNICEF, 2017). Samoa has subsidized fee-free primary schools, but no cash transfer system for vulnerable children or families (UNICEF, 2017). Meanwhile, in Tuvalu and Tonga, currently, there are no social assistance programs targeting children or families who are poor and vulnerable (UNICEF, 2017). In most Pacific Island countries, other non-standard social protection schemes that are not provided by the state play a quite significant role. Important safety nets can be found in the form of informal extended family and community networks. Churches across the Pacific also provide forms of support to their members, but they also require time and financial commitment.

3 Data

3.1 MICS

This study uses the Multiple Indicator Clustering Survey (MICS) which is a multi-round cross-sectional harmonized household survey implemented by UNICEF that focuses on mother's and children's outcomes across low-income countries.[4] The survey is designed to be representative of the adult population. Since the inaugural round in 1990, in addition to Vanuatu (surveyed in 2007-2008), the survey started to include broader Pacific countries in 2019-2020 which will be the countries of focus of this research.

[4]MICS dataset is publicly available at: https://mics.unicef.org/surveys

In this study, we use the sixth round of MICS conducted between 2019 and 2020 for Tonga, Kiribati, Samoa and Tuvalu. The survey interviewed women and men aged 15-49 years old and their household members. The sampling frame of the MICS is designed to provide estimates that are representative of the national level and urban and rural areas. We find that the MICS suits our interest since the questionnaire has rich arrays of children's well-being outcomes including nutritional status, education and cognitive development. The MICS also provides detailed information on mothers' characteristics and childcare practices within the households. For our main analysis, we restrict our sample to children aged 0 to 14 years old who live in the same household as their mother. In some outcomes, such as the ECDI indicator, the sample was restricted to those aged older than 7 years old. In this survey, the respondent to the household questionnaire could be any knowledgeable adult member living in the household. The questionnaire for children under age five and children 5-17 is administered to the mother of the child.

Our main sample consists of children aged 0-4 years old who cohabitate with at least his/her mother. It yields a total of 6,714 of 6,718 total surveyed children where virtually almost every child identifies their mother as their main caregiver.[5]. Of 6,714 children, 182 children live in a household where fathers were not present during the time of the survey. The survey consists of a balanced composition of male and female children. About 52$ of 6,714 total children in the main analysis were male, otherwise female. In regards to well-being outcomes, the survey measures the height and weight of each child from 0 to 59 months old. For the ECDI modules, the survey only interviews the caretaker of children aged at least 35 months old.

3.2 Main variables

Nutritional status

Our first aspect of children's well-being is nutritional status. First, we use the incidence of stunting as a measure of nutritional status. We follow the WHqO definition as we define stunted children if his/her age-adjusted height (height-for-age) z-score lies below two standard deviations of his/her reference group.

Our second measure of nutritional status is overweight. Most studies that examine the nutritional status and maternal well-being provide less attention to overweight incidence. Being overweight is defined as an age-adjusted body mass index (BMI) greater than two standard deviations of the population. Consequently, very limited empirical evidence shed light on the relationship between maternal well-being and obesity. However, as widely known, Pacific countries have the highest rate of obesity for adults in the world. On one hand, childhood obesity is a predictor of adult obesity.

[5] About 99.94% of the sample identifies mothers as their main caregivers

Table 1: Descriptive statistics

	KIR	TON	TUV	WSM	Total
Child characteristics					
Total child sample	2179	1347	501.0	2687	6714
	(.)	(.)	(.)	(.)	(.)
Stunted (=1)	0.137	0.0141	0.0415	0.0429	0.0665
	(0.344)	(0.118)	(0.200)	(0.203)	(0.249)
Overweight (=1)	0.0170	0.130	0.0428	0.0742	0.0661
	(0.129)	(0.336)	(0.203)	(0.262)	(0.249)
Height-for-age	-1.034	0.159	-0.407	-0.102	-0.364
	(1.103)	(0.988)	(1.062)	(1.253)	(1.235)
Body Mass Index	15.74	16.84	15.95	16.19	16.17
	(1.193)	(1.658)	(1.515)	(1.597)	(1.542)
ECDI - overall	0.774	0.733	0.657	0.670	0.717
	(0.152)	(0.181)	(0.157)	(0.228)	(0.197)
ECDI - learning	0.788	0.904	0.771	0.753	0.799
	(0.333)	(0.261)	(0.322)	(0.354)	(0.331)
ECDI - socioemotional	0.777	0.712	0.680	0.649	0.707
	(0.253)	(0.266)	(0.292)	(0.315)	(0.289)
ECDI - physical	0.843	0.691	0.768	0.748	0.767
	(0.236)	(0.301)	(0.266)	(0.318)	(0.292)
ECDI - cognitive	0.716	0.669	0.485	0.582	0.638
	(0.293)	(0.322)	(0.354)	(0.374)	(0.344)
Cronbach's alpha	0.462	0.558	0.323	0.673	0.555
	(.)	(.)	(.)	(.)	(.)
Mediating variable					
Mother care practice score	1.996	2.710	2.016	2.202	2.221
	(2.319)	(2.586)	(2.368)	(2.463)	(2.448)
Child attend ECE	0.320	0.162	0.326	0.121	0.210
	(0.467)	(0.369)	(0.469)	(0.326)	(0.407)
Mother's happiness score	0.535	0.672	0.741	0.663	0.627
	(0.499)	(0.470)	(0.439)	(0.473)	(0.484)
Mother experience DV	0.492	0.461	0.548	0.559	0.517
	(0.500)	(0.499)	(0.498)	(0.497)	(0.500)
Child physical punishment score	1.847	1.717	1.197	1.353	1.578
	(1.781)	(1.704)	(1.357)	(1.509)	(1.651)
Parents characteristics					
Mother's age	31.24	33.07	32.86	32.10	32.07
	(8.188)	(8.936)	(10.21)	(9.232)	(8.943)
Mother's year of schooling	10.25	11.40	12.14	12.46	11.50
	(2.567)	(2.357)	(2.905)	(2.271)	(2.616)
Father's age	23.91	23.16	22.47	26.91	24.86
	(15.98)	(17.80)	(17.06)	(17.27)	(17.04)
Father's year of schooling	6.947	7.045	7.232	8.297	7.527
	(5.011)	(5.711)	(6.167)	(5.914)	(5.646)
Father not live in HH (=1)	0.0255	0.0276	0.0388	0.0301	0.0287
	(0.158)	(0.164)	(0.193)	(0.171)	(0.167)
Live in urban area (=1)	0.528	0.211	0.650	0.162	0.326
	(0.499)	(0.408)	(0.478)	(0.368)	(0.469)
Index of household assets	0.713	0.979	0.994	0.885	0.855
	(0.453)	(0.142)	(0.0742)	(0.320)	(0.352)
Live with extended family (=1)	0.724	0.620	0.882	0.784	0.738
	(0.447)	(0.486)	(0.323)	(0.411)	(0.440)

Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Statistics are weighted using sample weights provided by the survey.

Childhood development

The MICS allows us to construct Early Childhood Development Index, a childhood development measure developed by UNICEF (Loizillon et al., 2017). The measure consists of 10 parent-reported items that cover four domains of children's development: learning, cognitive, social and emotional, and physical development. The questionnaire aims to track the development progress of children aged 3 to 4 years old.

For each question, parents provide binary responses to the following questions. For learning domains, the survey asks whether the child able to (i) follow simple directions and (ii) do something independently. For cognitive domains, the survey asks whether a child can: (iii) identify at least ten letters of the alphabet, (iv) read at least four popular words, (v) knows names and recognizes all numbers from 1-10. For the socioemotional domain, the survey asks whether a child is able to: (vi) get along well with other children, (vii) kick, bite or hits other children or adults and (viii) get distracted easily. Finally, for the physical domain, the survey asks if a child can: (ix) pick up small objects with two fingers and (x) sometimes are too sick to play.

Although the set of questionnaires to proxy ECDI has been standardized and follows the UNICEF framework closely, it is possible that given the sample size, method of interview and other factors internal reliability of such questions might be affected. To test, we compute Cronbach's alpha (Cronbach, 1951) to test the internal reliability of 10 asked questions. Cronbach's alpha computes the correlation between two random samples of items from a module of items, for instance, a test. Higher alpha coefficients suggest higher internal consistency of a test hence the reliability of a test to measure the intended outcomes. The resulting Cronbach's alpha shows that overall the measurement lies below the standard acceptable threshold of 0.60 (Taber, 2018).[6] Respectively, the alpha coefficient ranged from 0.33 to 0.67 where Tuvalu is the lowest and Samoa is the highest. Despite the limitation, the index is the only reliable source of information regarding early childhood development. The information is used as an interim indicator for reporting on goal 4.2.1 of the Sustainable Development Goals (SDGs) in corresponding countries.

We construct ECDI scores by taking the mean average across 10 binary items. By construction, our ECDI takes a value from 0 to 1, where a higher scale represents a higher development index. If a child satisfies all the development indicators, he/she takes the highest value of 1, while 0 otherwise. The measure also can be interpreted as how much a child achieves the bare minimum of childhood indicators according to their age. More on outcomes distribution are summarized in Figure A3 in Appendix.

[6] In practice many argue that the acceptable threshold ranged from 0.70 to 0.95 (Tavakol and Dennick, 2011)

Maternal education

The MICS provides detailed information on the highest level of education attended, the highest grade attended including the highest grade completed. This allows us to measure an accurate measure of years of schooling rather than imputed years of schooling based on the highest level of education attended which is common in household surveys.

As mentioned in Section 2.2, the survey data also reflects high access to secondary education for mothers. From Table 1, it emerges that, on average, mothers of children sampled in the main analysis complete 11 years of education. In other words, about 46% of children's mothers attended upper secondary education. It also reflected from the main analyzed data their corresponding mother has slightly more educated than their father. We present the illustrations of father and mother years of schooling distribution by country in Figure A1 in Appendix.

Given the unusually high level of education of women in the analyzed sample, one may consider that simple years of schooling measurement could not capture the variation in maternal education. On the other hand, measuring simple years of schooling might not be able to capture the learning gained from the education itself. Thus, we consider the following alternative measures to maternal education. First, we consider the years of schooling gap to the completion of second grade. Second, we are also considering the difference between the actual years of schooling and the compulsory education level. As a note, the compulsory year of education varies across countries. Lastly, we construct a dummy variable that indicates if a mother has higher years of schooling compared to the median of other mothers. We test the relationship of each proxy of maternal education to the children's outcomes as part of our results in Section 5

4 Estimation strategy

We adopt Cuartas (2022) approach to estimate the linear correlation between years of schooling and children's well-being. The following equation summarises the linear specification to estimate the correlation between maternal education and child well-being for the pooled sample of four countries.

Where children's well-being outcome Y of children i at household h who live in the region r and country c. Our main maternal education variable is the mother's years of schooling ($MotherYos$). We measure years of schooling as years of completed education rather than the highest attended education grade. We include a vector of covariates (X) which include the children's age, the mother's age, the father's age, the father's years of schooling, an urban dummy variable, an index of household assets (UNICEF, 2017), indicator variable of living with extended family and dummy variable of whether the father of children does not live in

the household at the time of the survey.[7] Finally, we also control for country fixed effects (κ_c). We cluster our standard error at the regional level to correspond to each country.

$$Y_{i,h,r,c} = \alpha_0 + \alpha_1 MotherYoS_{h,r,c} + \alpha^k X_{i,h,r,c} + \kappa_c + \epsilon i, h, r, c \tag{1}$$

In the similar spirit of equation 1, we also estimate separately for each country to tease out the variation of maternal education effect. The estimation framework becomes the following.

$$Y_{i,h,r,c} = \alpha_0 + \alpha_1 MotherYoS_{h,r,c} + \alpha^k X_{i,h,r,c} + \epsilon i, h, r, c \tag{2}$$

As mentioned in the previous section, Pacific countries have relatively high education attainment as most women hold secondary degrees and a better attainment rate than men. Hence, the marginal effect of additional years of schooling might not be linear. As an alternative, we also use different measurements of maternal education. Our first alternative is years of compulsory education. This variable simply measures the gap between the completed year of education and the corresponding compulsory education year. As a second alternative measurement to education, we use a year's gap to complete secondary school. For instance, if a mother completed 8 years of schooling, the gap to completing secondary school is 4 years (assuming 12 years to complete full secondary school).

Although this paper does not claim causality, to the reader's benefit, we discuss potential endogeneity issues of examining the causal effect of maternal education on children 's well-being. First, highly educated mothers may transfer a particular individual trait or ability to their children. For instance, a mother with high cognitive ability would likely have children with high cognitive ability. Hence, the quality of education does not matter much to the children's well-being when measured in cognitive outcomes since it largely explains by genetics. Second, education decisions may also be endogenous. For instance, mothers who can attain higher education were likely to come from a high social-economy status family which through intergenerational transfer affected their current social-economy status. Hence, her child-well being is no longer a matter of the mother's education but access to more endowment. Thirdly, there are several potential omitted variable biases in the estimation given unobservable information from the survey. As an example, parenting style would affect child-wellbeing and correlates with maternal education (either directly or indirectly) but is challenging to measure in the survey. Given the endogenous education decision and the potential omitted variable bias issue, in my additional analysis, we apply an instrumental variable strategy.

We employ an instrumental variable approach to deal with this endogeneity issue. We use the peer's mother's education as an instrument to the mother's years of schooling. The two-step procedure is summarised as follows.

[7]The dummy variable needed as for those who had no father cohabitation with children during the survey we recode their responses as zeros

$$MotherYoS_{h,r,c} = \beta_0 + \beta_1 PeerMotherYoS_{h,r,c} + \beta^k X_{i,h,r,c} + \kappa_c + \epsilon i, h, r, c \tag{3}$$

$$Y_{i,h,r,c} = \delta_0 + \delta_1 \hat{MotherYoS}_{h,r,c} + \theta Mediating + \delta^k X_{i,h,r,c} + \kappa_c + \epsilon i, h, r, c \tag{4}$$

Peer is defined as a group of people that share a birth cohort, region of residence, religion, and country of residence. The rationale for the validity of the instrument is as follows. We argue that peer education is a good candidate to be an instrumental variable for the following reasons. First, it satisfies the relevance assumption as peer education may strongly affect children's mother's education. On one hand, empirical findings have shown significant peer effects on women groups on education, fertility and employment decisions (Kavas and De Jong, 2020; Kandpal and Baylis, 2019; McCrary and Royer, 2011). On the other hand, peer education also captures education policies applied to particular birth cohorts. Second, we claim that a mother's peer's education is less likely to directly affect her own children's well-being. Peer education might affect one's own children's education only via their own mother's education or if one believes there is such a spillover effect from the community. We do admit that the spill-overs effect is plausible, hence the exogeneity assumption is weakly implied. Nevertheless, we construct a mother's peer education as a leave-one-out means of education such that one's own mother's education does not contaminate a peer's education.

5 Results

5.1 Regression analysis

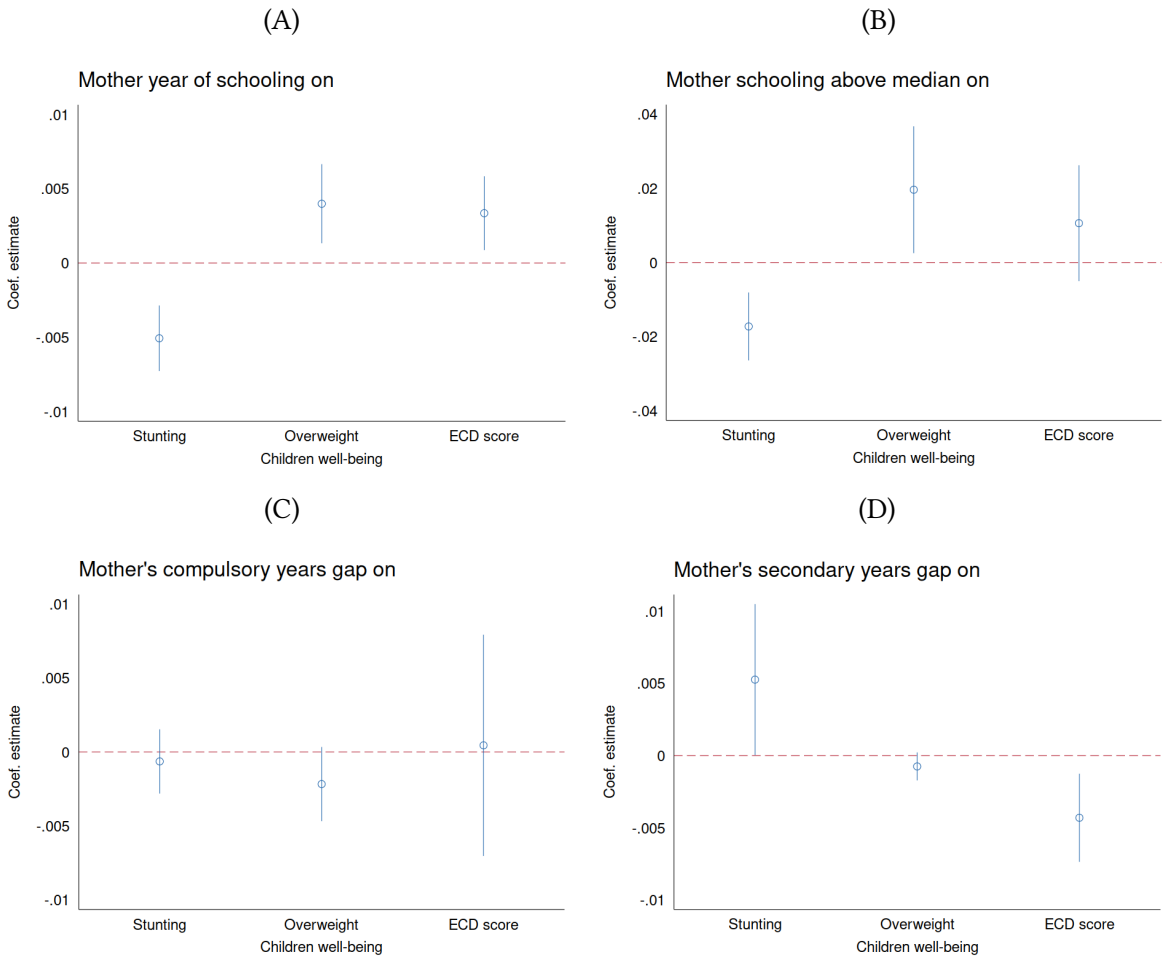
We start with Figure 1 which summarises the effect of maternal education, proxied by several alternatives, on the children's well-being. This plot refers to equation 1. Each plot in Figure 1 represents separate regression on pooled samples of countries. From Panel A and B, it emerges that using years of schooling and the dummy variable of having years of schooling higher than the median, maternal education is associated with a lower likelihood of stunting incidence and a positive effect on overweight likelihood. However, the two measurements disagree on the effect on the ECDI score. years of schooling model captures a positive effect on ECDI meanwhile having longer years of schooling than half of the mother observations have a positive but not statistically significant correlation. From Panel C and D, we learn that there is no effect of maternal education on any of the child's well-being indicators.

We also provide the estimates for a set of alternative outcomes as presented in Figure A8 in Appendix. For this study, we argue that using years of schooling instead of a dummy variable of a year of education above the median as a better proxy of maternal education captures more variation along the incremental increase of the level of education.[8] Thus, we focus on

[8]Comparison between mothers who had below and above the median of years of schooling over child well-

the years of schooling variable for the rest of the discussion. However, we interpret median results in Panel B as suggestive evidence of the role of quality of education

Figure 1: Mother education proxies and children well-being



Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Covariates include children's age, mother's age, father's age, father's years of schooling, living in urban dummy variables, living with extended family, household asset index and an indicator of whether the father lives in the household during the interview. Standard error clustered at the regional level. Plotted standard errors reflect a 95% confidence interval.

Next, we consider our model separately for each country. The coefficient of estimates plotted in Figure 2 corresponds to equation 2. Mixed results emerge across countries. First, as in Panel A, we find that in Kiribati and Samoa, additional years of education correspond to lower-stunted children's likelihood. The coefficient, albeit small, is substantive considering the incidence of stunting in corresponding countries. An additional years of schooling corresponds to 5.4% ($\frac{0.07}{0.13}$) and 6% ($\frac{0.004}{0.6}$)reduction of stunting incidence.

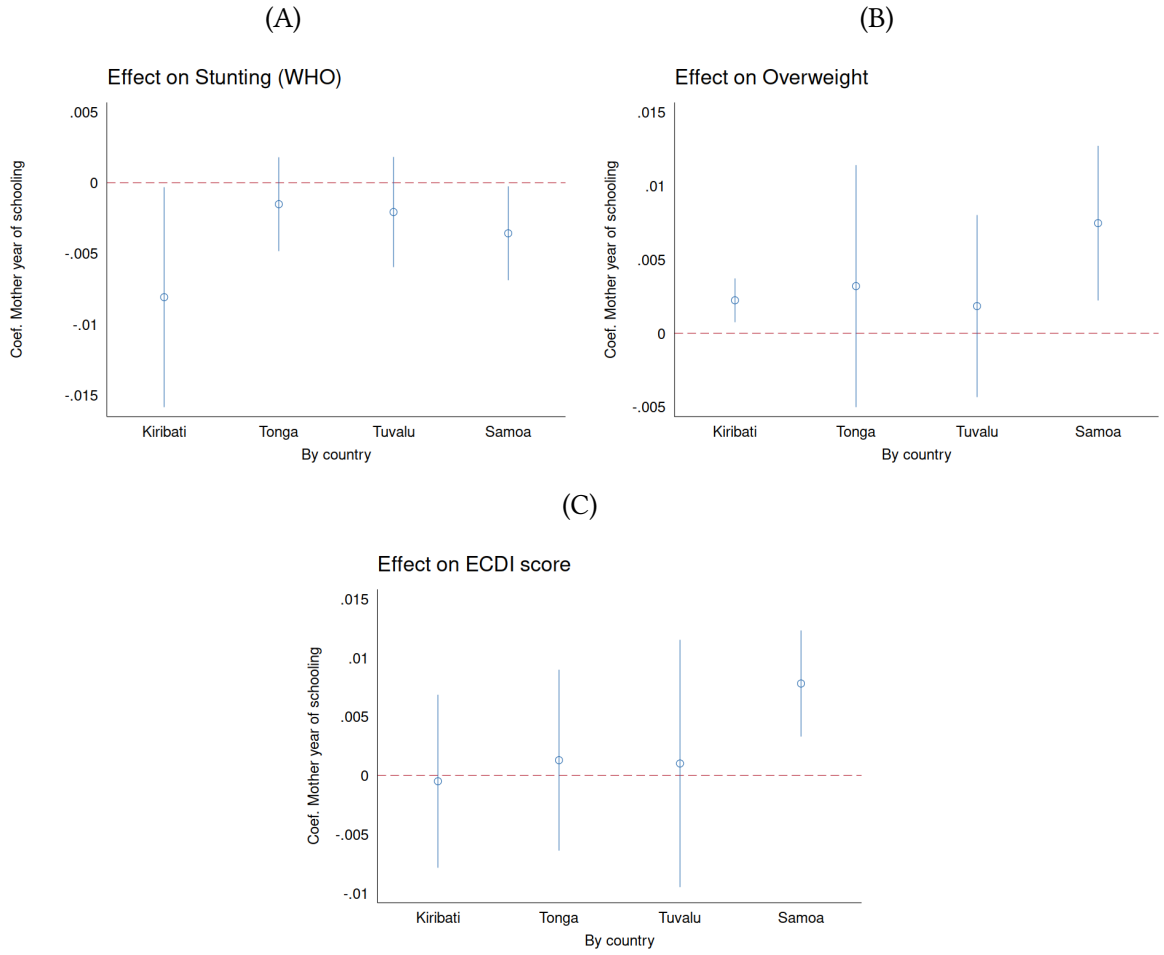
On overweight incidence (see Figure 2, Panel B), we find that a positive correlation between maternal education and childhood overweight is also driven by Kiribati and Samoa

being outcomes are summarized in Figure A5 and Figure A6 in Appendix.

results. We find empirical evidence that suggests higher maternal education correlates with a high incidence of being overweight. This supports previous findings (Feng et al., 2019; Makoka and Masibo, 2015; Fertig et al., 2009) that show a positive correlation between maternal education and obesity. Regarding previous studies, one possible explanation is that mother education affects obesity via employment effects. A highly educated mother is likely to be more participating in the labor market. Thus, this could affect feeding behavior, such as more takeaways food intakes due to the limited time available for feeding preparations. It is also possible that children from highly educated mothers will be less likely to be involved in child labor as family workers. Mothers with high education would likely be participating in formal occupations. Whereas, a child from a low-educated mother may be more likely to be involved as a family worker which affects their physical activity intensity.

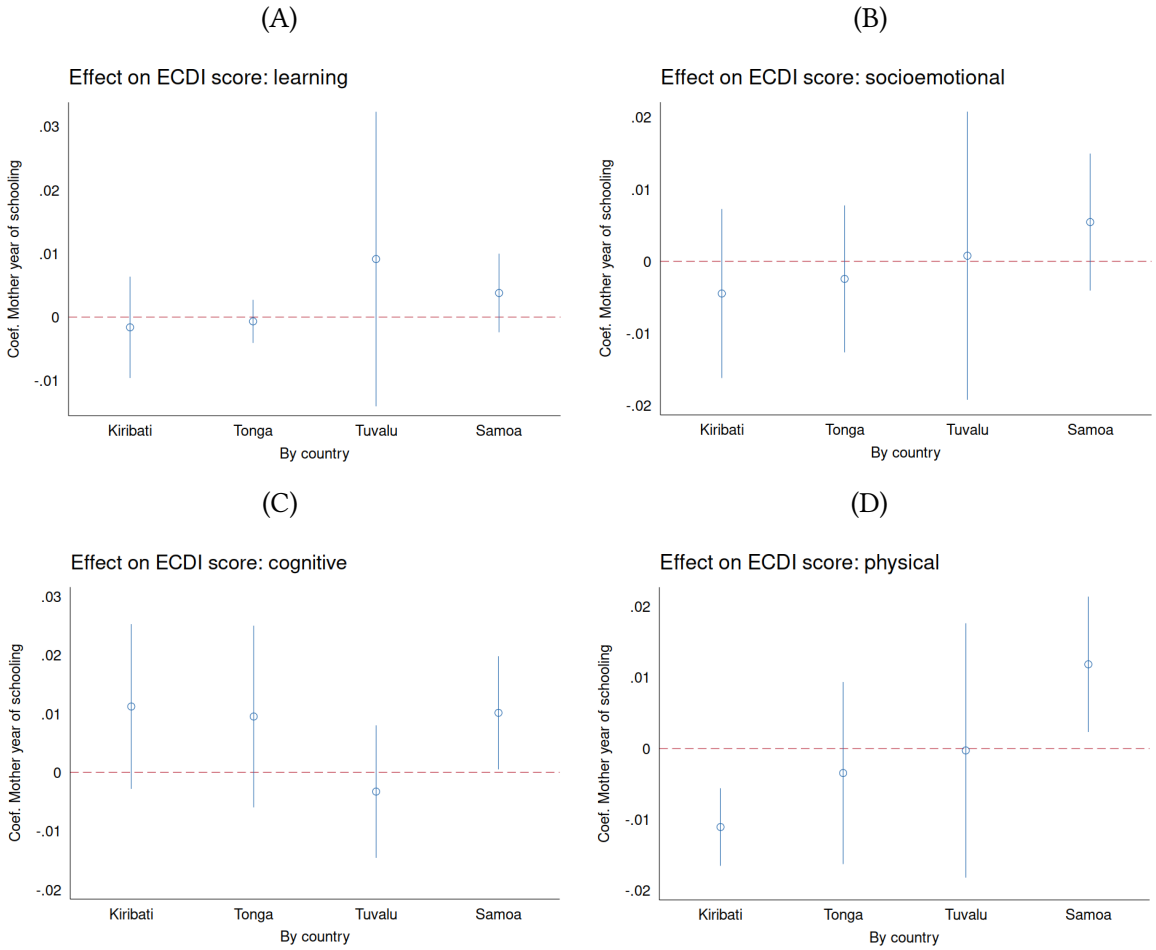
Lastly, we find that a positive correlation between mother education and ECDI score is driven by the Samoan sample (see Figure 2, Panel C). In most countries, maternal education has a null correlation to ECDI score, except for Samoa. This could relate to our early concern about the low-scale reliability coefficient of the ECDI questionnaire in Kiribati, Tuvalu and Tonga. Notice that only in Samoa do we find Cronbach alpha to be at an acceptable level. Despite potential measurement error, we take this as weak evidence of a positive correlation between maternal education and ECDI score. Further investigation on ECDI score reveals that maternal education only affects physical dimensions (see Figure 3).

Figure 2: Mother education and children well-being, by countries



Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Covariates include children's age, mother's age, father's age, father's years of schooling, living in urban dummy variables, living with extended family, household asset index and an indicator of whether the father lives in the household during the interview. Standard error clustered at the regional level. Plotted standard errors reflect a 95% confidence interval.

Figure 3: Mother education and component of ECDI



Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Covariates include children's age, mother's age, father's age, father's years of schooling, living in urban dummy variables, living with extended family, household asset index and an indicator of whether the father lives in the household during the interview. Standard error clustered at the regional level. Plotted standard errors reflect a 95% confidence interval.

5.2 Mediating variable

Previously we find suggestive evidence that shows a positive association between maternal education the overweight incidence and ECDI score, albeit weak as well as a negative correlation to stunting incidence. In this section, we examine further factors that significantly affect children's well-being outcomes. In other words, we look into several mediating factors that correlate to children's well-being. Figure A7 summarizes the idea of such mediating effects and direct effects of years of schooling on the children's well-being.

We focus on five potential mediating variables of maternal education to children's well-being Cuartas and McCoy (2021). The first mediating variable is the mother's care score. Mother care score is constructed using a set of unique questionnaires that elicit several caring practices. We first use information that determines whether any household member aged 15

years old engages in the following activities to the corresponding child: reading books, telling stories, singing songs, taking outside, playing with names, drawing, and counting things. We simply construct a score based on the number of care practices performed by the mother. We then combine this score with vaccination status and public health utilization to create a composite score of the mother's care practice.

Our second mediating variable is whether parents enroll their children in ECE. As summarized by (Cuartas and McCoy, 2021), early childhood education has empirically proven to have a long-lasting impact on children 's cognitive development.

The third mediating variable is the scale of mother happiness where a higher scale represents more happiness level. Amato (1994) find that mother's well-being, including psychological well-being, is an important factor that affects children's well-being. Mother's well-being affects the relationship between mother and children.

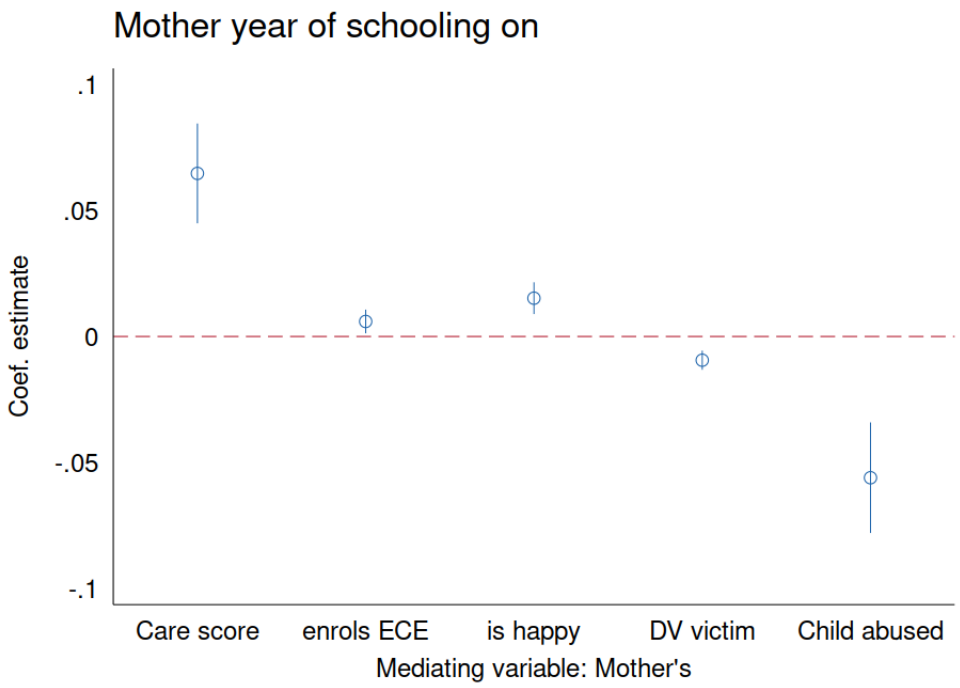
As our fourth and last mediating variable, we look into abusive behaviors within the household. First, we construct a dummy variable that indicates if the mother was a victim of domestic violence. Lastly, we construct a score that indicates the number of physical punishment methods used to discipline children in the household. The survey lists twelve methods of disciplining a child where six of them were direct physical contact, which includes (i) shaking him/her, (ii) spanking on the bottom with a bare hand, (iii) hitting on the bottom with a hard object(s), (iv) slapped on the face, (v) hit or slap on the hand arm and leg and (vi) beating as hard as one could.[9] The score is a linear additive of each binary response from the adult respondents.

We begin with establishing the correlation between mother years of schooling and the mediating variables. We estimate each of the mediating variables on the mother's years of schooling using the same covariates as in equation 2. Figure 4 summarises the results.

We find evidence that suggests the mother's years of schooling has a positive association with higher care score, enrollment of children to ECE and happiness. On the opposite side, the mother's years of schooling have a negative correlation with the mother being a domestic violence victim and practicing physical punishment to children.

[9]The rest of the discipline methods includes: taking away privileges or not allowing children to leave the house, giving something else to do, shouting or yelling at, explaining what was wrong and locking or tying the child (only available in Kiribati.

Figure 4: Mediating variable and maternal education

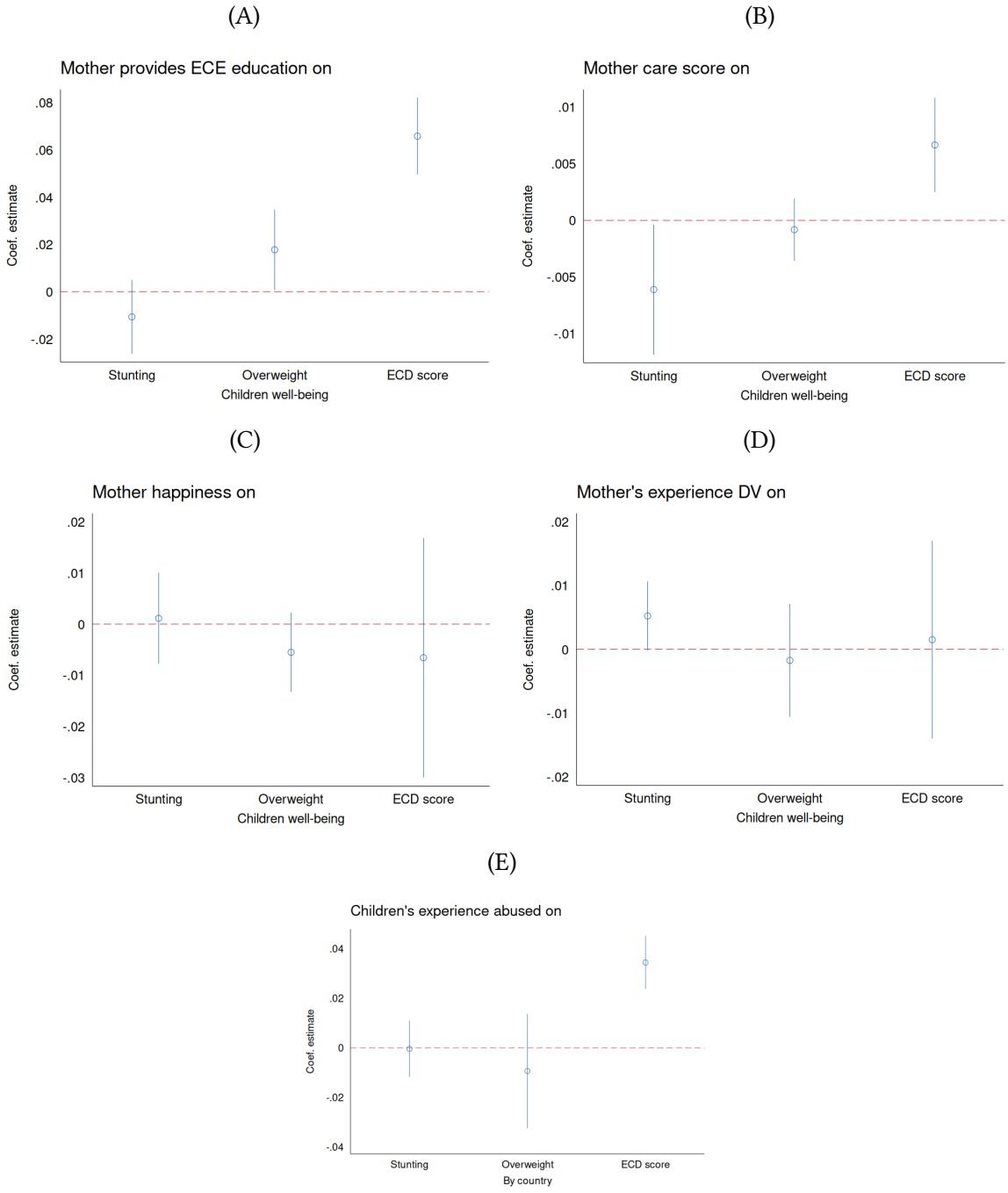


Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Covariates include children's age, mother's age, father's age, father's years of schooling, living in urban dummy variables, living with extended family, household asset index and an indicator of whether the father lives in the household during the interview. Standard error clustered at the regional level. Plotted standard errors reflect a 95% confidence interval.

Next, we test if there exists a correlation between the mediating variable and children's well-being. In a similar spirit to equation 2, but now we estimate children's outcomes with each of the mediating variables. The results are summarised in Figure 5.

From Figure 5, Panel A, we find evidence that enrolling children in ECE positively correlates with ECDI score but not for other outcomes. From Panel B, we find that mother care score has negatively correlated with stunting and positively with ECDI score. We find no evidence of mother happiness correlating with the children's well-being however, mother happiness seems to correlate with less overweight children. We also do not find convincing evidence on the correlation between mothers who were victims of domestic violence and their children's well-being (see Panel D). Surprisingly, we find that physical punishment practice has a positive correlation with ECDI. Further investigation shows that these results are driven by the positive correlation between physical punishment and the physical dimension of ECD. We present the corresponding table to Figure 5 in Table A2 in Appendix

Figure 5: Mediating variable and children well-being



Notes: Results are based on MICS dataset

Finally, we want to test whether after controlling for mediating variables, it would absorb all the years of schooling effect. In practice, we estimate the following.

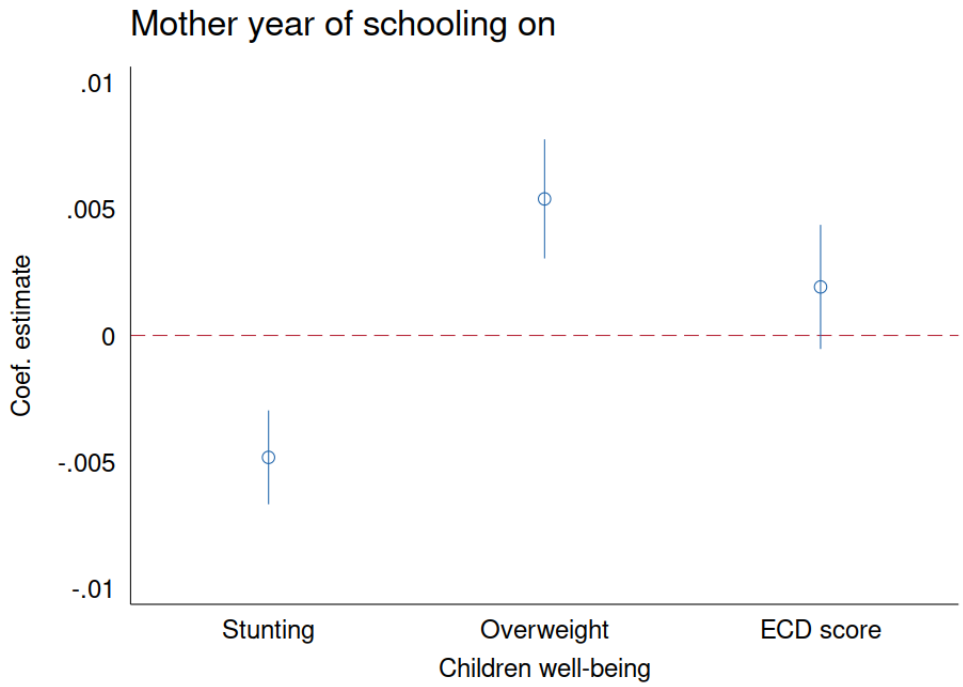
$$Y_{i,h,r,c} = \gamma_0 + \gamma_1 MotherYoS + \theta Mediating + \gamma^k X + \kappa_c + \epsilon i, h, r \tag{5}$$

If years of schooling affect children's well-being via all the mediator variables, we expect $\gamma_1 = 0$. The case when $\gamma_1 \neq 0$ could be interpreted in two ways. Firstly, it presents evidence

of the direct effects of years of schooling on children's well-being. Secondly, the non-null effect of years of schooling after controlling mediating variables may serve as evidence to the omitted mediating variables issue.

From Figure 6, we learn that $\gamma_1 < 0$, $\gamma_1 > 0$, and $\gamma_1 = 0$ for the likelihood of stunting, overweight and ECD score respectively. For the ECDI score, the mediator variable seems to capture all the effects from years of schooling and leaves the direct effect of years of schooling to be null. On the other hand, for stunting and overweight children outcomes, we find evidence that there is a direct effect of years of schooling or other important mediating factors that are omitted in the model. In the next section, we consider which possible explanation is empirically evident by estimating a 'causal model' of year schooling to check the existence of direct effects of years of schooling. We present the corresponding table to Figure 6 in Table A4 in Appendix.

Figure 6: Mediating variable and maternal education



Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Covariates include children's age, mother's age, father's age, father's years of schooling, living in urban dummy variables, living with extended family, household asset index and an indicator of a father lives in the household during the interview. Standard error clustered at the regional level. Plotted standard errors reflect a 95% confidence interval.

Motivated by our previous finding, we test for a direct effect of years of schooling using the instrumental variable approach. As mentioned in section 4, we employ leave-one-out mothers' peer education as an instrument of mother education. We argue that peer education

potentially affects mothers' education via confounding education policy exposure to particular birth cohorts and social conformity. We also argue that peers' years of schooling are unlikely to affect children's well-being directly.

To begin with, the first stage results show a strong and positive correlation between a mother's peer's years of schooling and the mother's years of schooling. The coefficient of correlation is 0.2 ($t - 6.10$), with (Kleibergen-Paap rk LM statistic being 36.159 (see Table A3 Panel A and C in Appendix). The weak identification test suggests rejecting weak instruments (Cragg-Donald Wald F statistic = 36.159). The reduced form results, as available in Table A3 Panel B, show that the mother's peer has a negative and small direct correlation to children-well being, except for ECDI outcomes. Only for stunting outcomes, we find that peer education has a significant effect on children's well-being. Full report on the 2SLS regression available in Table A3 in Appendix.

Figure A10 in Appendix summarises our main estimate of interest from the second-stage regression after controlling for a set of mediating variables. It suggests that years of schooling only have a causal effect on stunting outcomes but not other outcomes. Using these results, we argue that for overweight and ECD outcomes, years of schooling have zero direct effects but we potentially exclude important mediating factors. However, for the stunting outcome, we observe that such direct effects from years of schooling exist.

6 Sensitivity checks

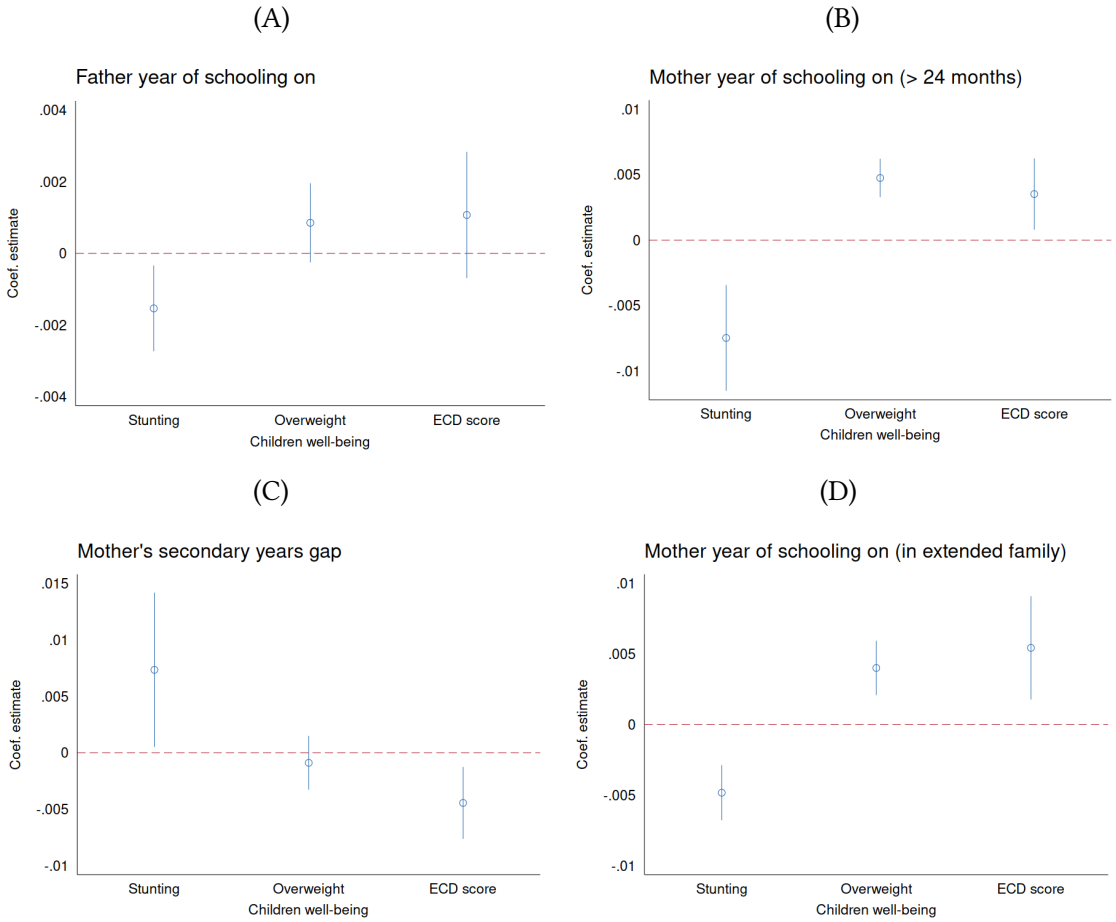
As sensitivity checks, we do the following. First, we test if the father's year of schooling also has a significant correlation with the children's well-being outcomes. Following our framework, as our results are arguably driven by care practices by the mother, we do not expect the father's education would affect the children's well-being significantly. This may serve as an imperfect falsification test for the following reasons. First, the father's education might be highly correlated with the children's well-being via assortative matching. A more educated husband is likely to marry a more educated wife. Second, fathers may also affect children's well-being if they serve as primary carers. However, our data reveal that more than 95% of primary carers are mothers. Our results in Figure 7 shows that in our case father's year of schooling is not significantly affected but has a similar direction as the mother's year of schooling in regards to children's well-being

We do our second sensitivity check by restricting our sample to only children who were older than 24 months. We test that our main results are not driven by a particular age group of children. Moreover, for some outcomes such as being overweight and stunting, younger children might tend to bias the estimated coefficient downwards. As summarized in Figure 7 Panel B, we find our results robust to alternative sample restriction. Our third sensitivity check relates to our discussion in Section 5.1. If education matters, we should find similar results using another proxy of education. As a large proportion of women in our sample have

a secondary education, an alternative measure of education is a gap in attending secondary education. The larger the gap represents the distance to completing secondary education. To be consistent with our main results, we expect to obtain results that point to the opposite relationship to the children's well-being. Results in Figure 7 Panel C confirm our hypothesis. Higher education gap to secondary education associated with higher stunting, lower obesity (not significant) and lower ECDI score.

Lastly, as we mentioned earlier, many households in our sample live within an extended family. One might suspect that maternal education will be less relevant since spill-over knowledge and extra care may exist from other household members. We find, as depicted in Figure 7 Panel D, the results for those living with extended family mimic our main results for each child's well-being. The estimated coefficients of the mother's year of schooling to children's well-being remain statistically significant for children who live in a household with extended families.

Figure 7: Sensitivity checks



Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Covariates include children's age, mother's age, father's age, father's years of schooling, living in urban dummy variables, living with extended family, household asset index and an indicator of a father lives in the household during the interview. Standard error clustered at the regional level. Plotted standard errors reflect a 95% confidence interval.

7 Conclusion

We study the relationship between maternal education and child well-being using Pacific countries as a study case. Pacific countries provide unique motivation to the literature for at least four reasons. First, empirical studies on Pacific countries have been very limited due to data availability issues. Second, women in Pacific countries relatively enjoy good access to education where most women at least have a secondary degree. Third, children in Pacific countries are exposed to high obesity cases compared to other developing countries.

Using the richness of the MICS dataset, we investigate the role of years of schooling on child well-being as measured by three outcomes: stunting incidence, overweight incidence and ECDI score. Overall, we find that years of schooling have a negative correlation to stunting incidence. On the contrary, it has a positive correlation to ECD score and being overweight. Further analysis shows the effect varies across countries.

We examine further potential mechanisms behind the role of years of schooling on child well-being outcomes. We find that providing ECE education and better care practice as two important mediating factors that explain the indirect effects of years of schooling. We further find suggestive evidence that years of schooling have positive direct effects on stunting, arguably via nutritional knowledge which is not fully captured by the mediating factors.

Finally, from a policy perspective improving access to education for the women population per se has limited effect in Pacific countries. Our results advocate for disseminating specific maternal and parenting knowledge and improving ECE access to more children as more effective policies to improve child well-being in the area.

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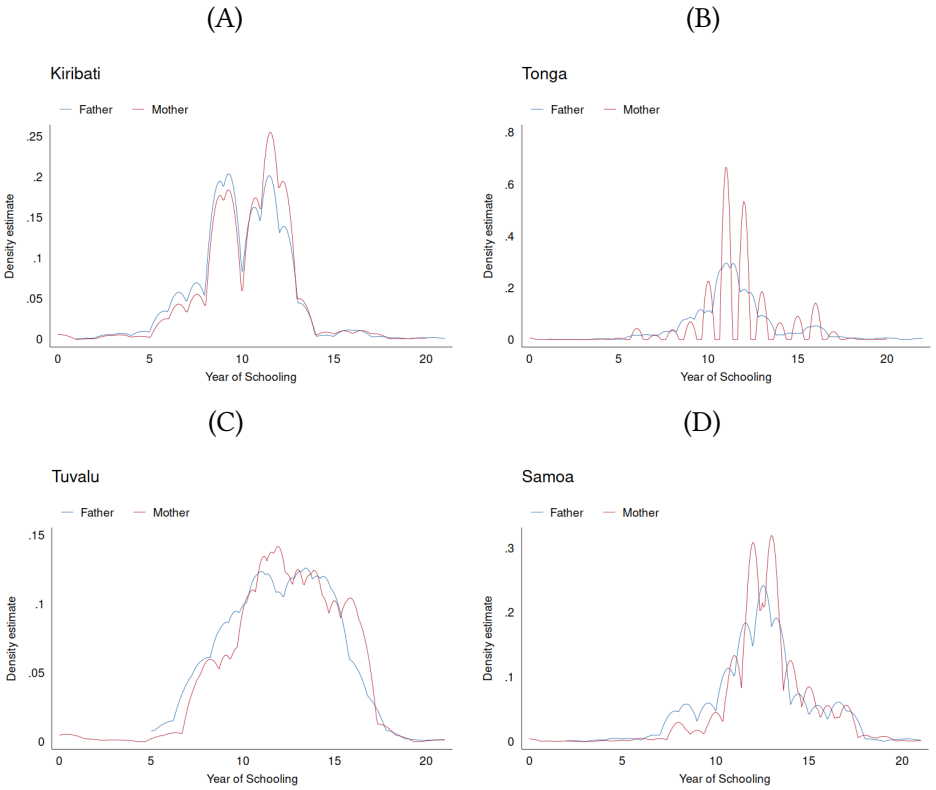
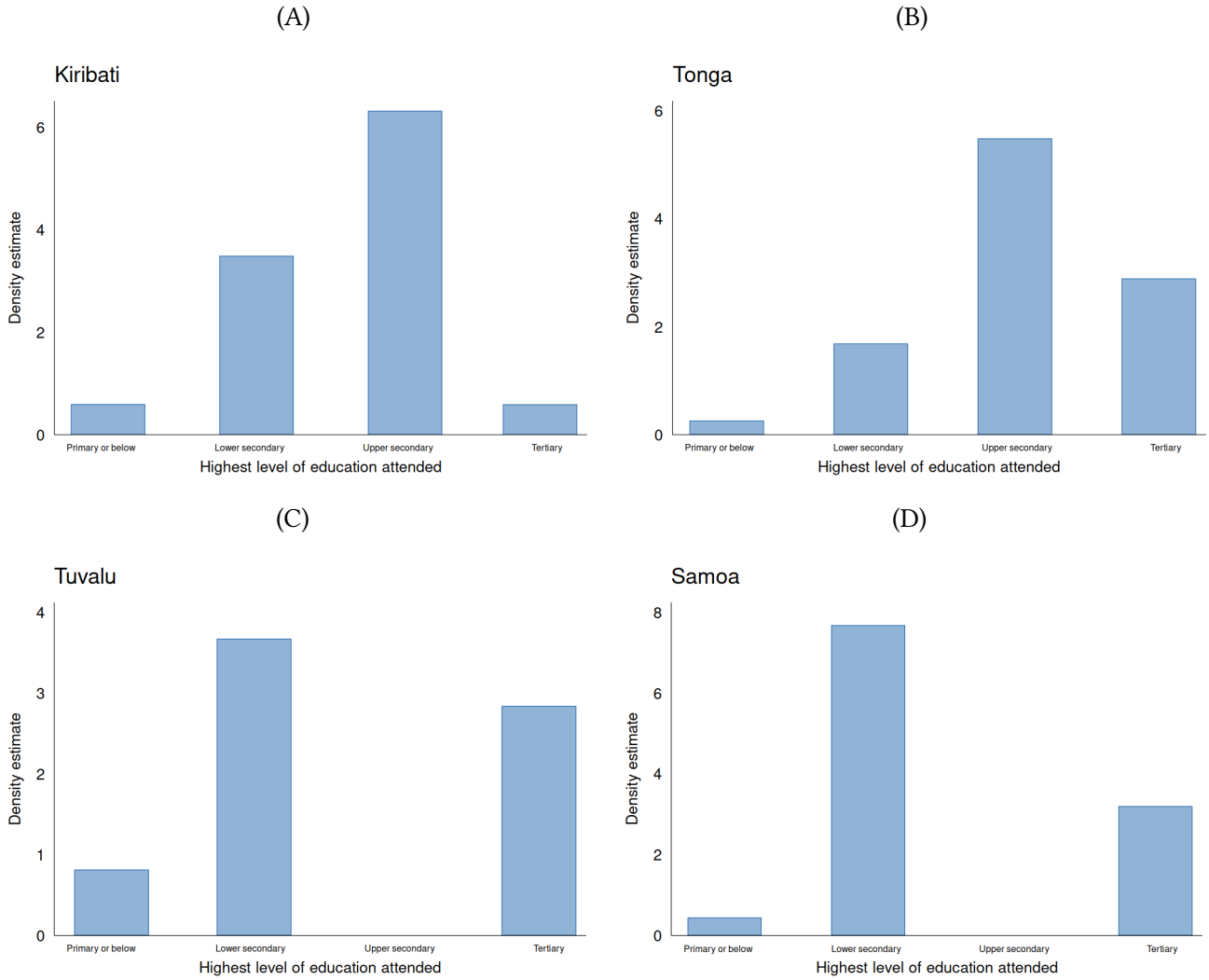
8 Appendix

Figure A1: Density estimate of years of schooling



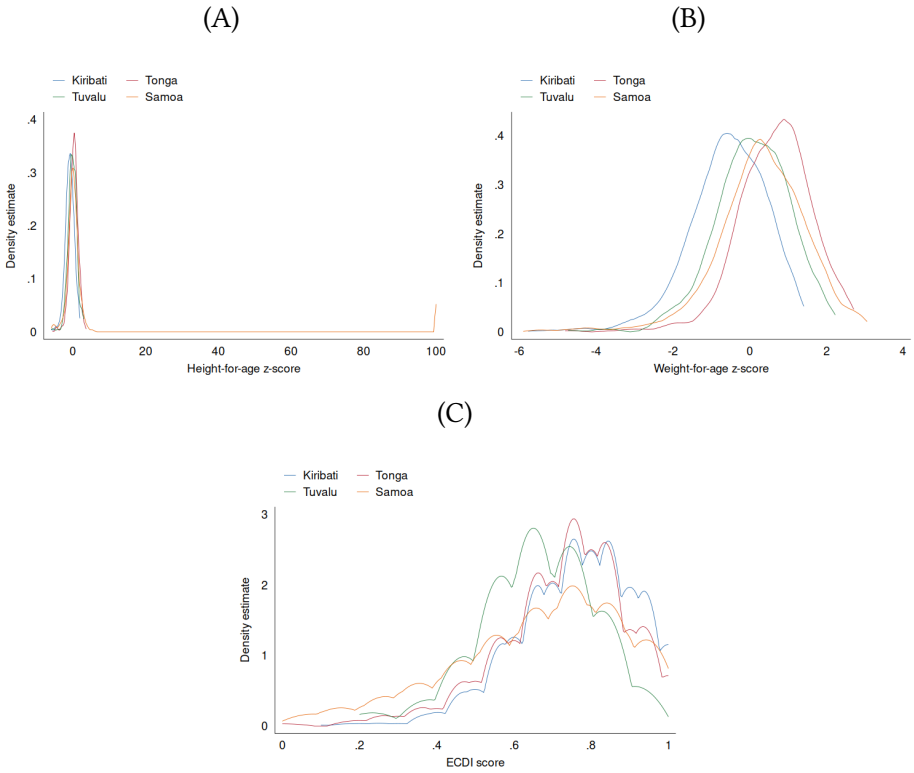
Notes: Estimates using Epanechnikov kernel. Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Mother and father's years of schooling consider the level of education attended and actual years completed.

Figure A2: Density estimate of highest education level attended



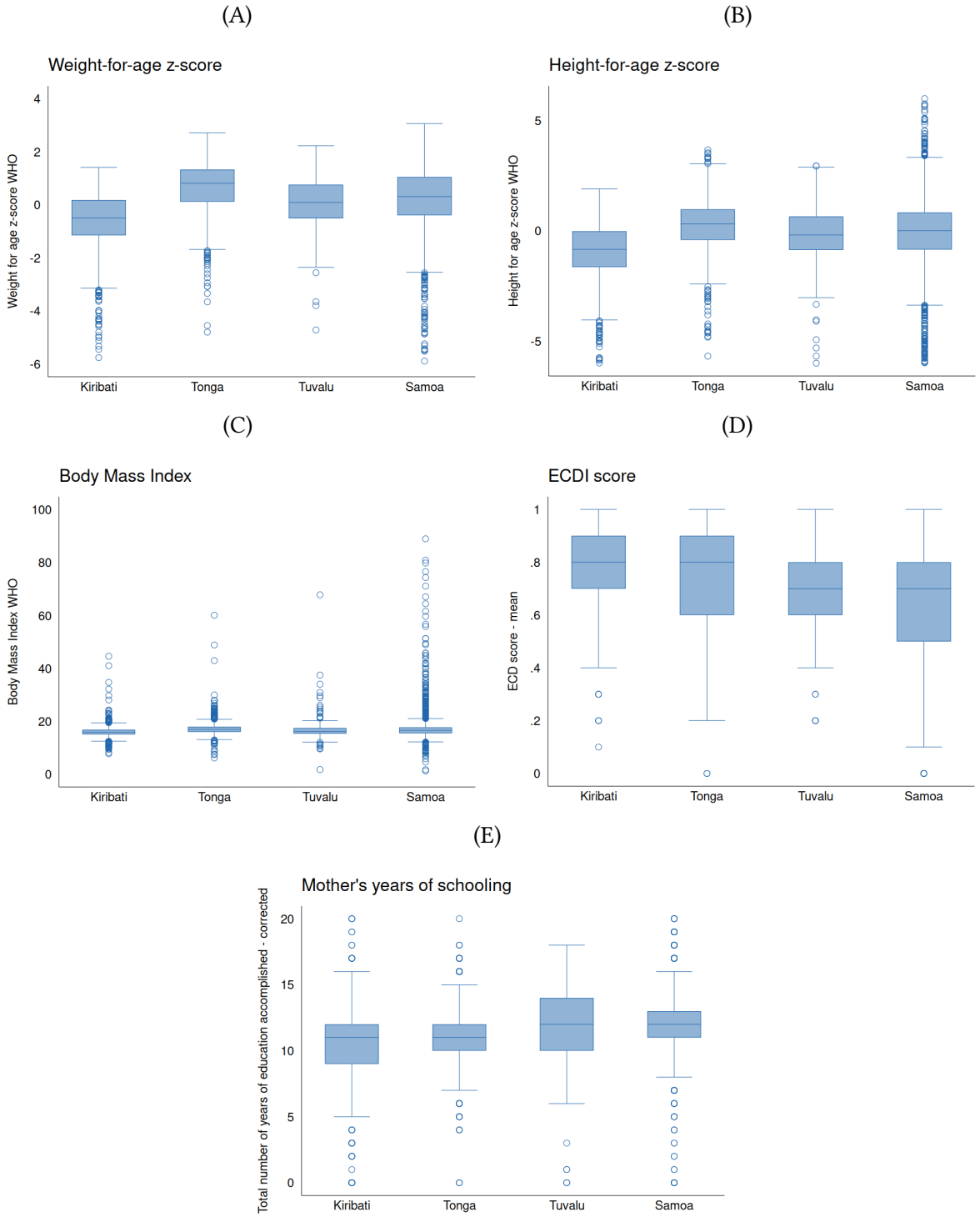
Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother.

Figure A3: Density estimate by outcomes and country



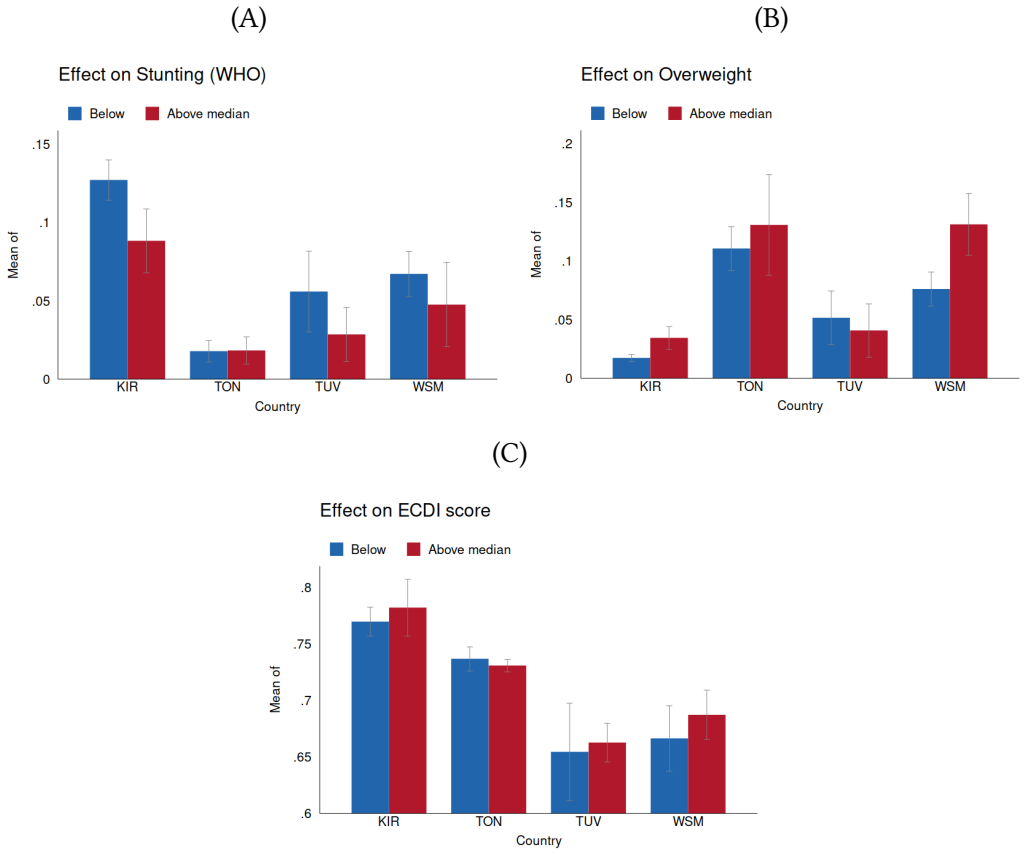
Notes: Estimates using Epanechnikov kernel. Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother.

Figure A4: Density estimate by outcomes and country



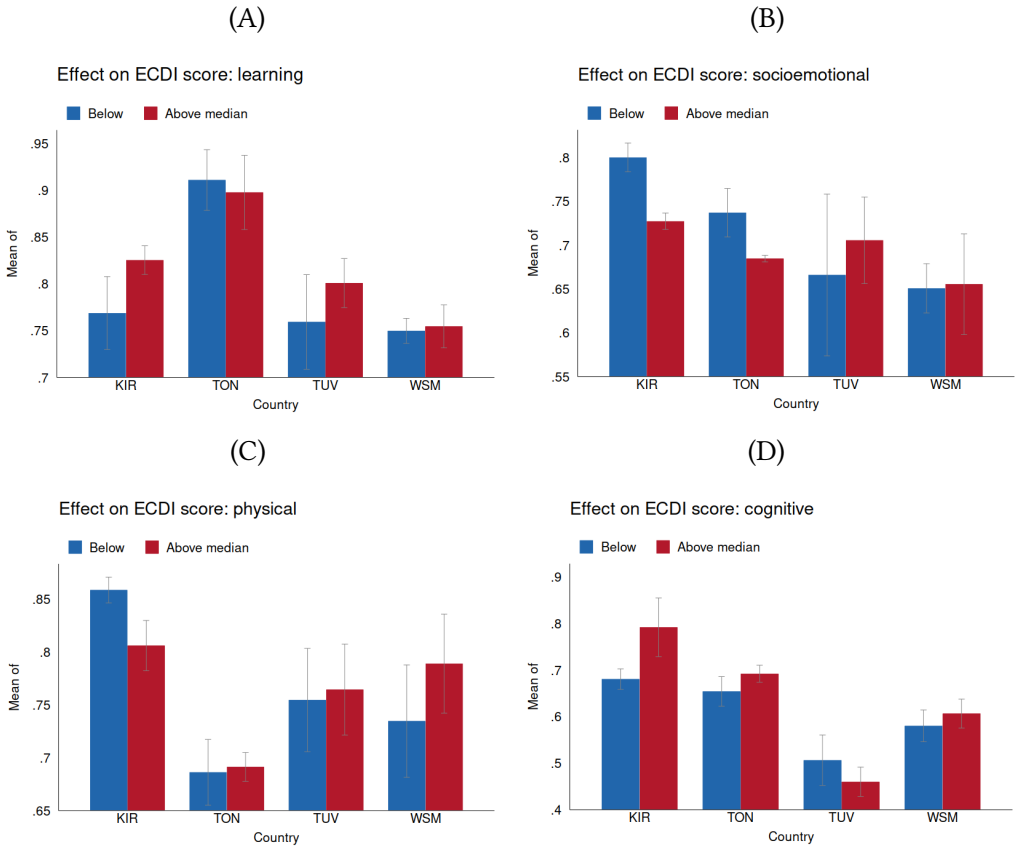
Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Weighted using individual sample weight provided by the survey

Figure A5: Mother education and child well-being



Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Standard error clustered at region level. Plotted standard errors reflect a 90% confidence interval.

Figure A6: Mother education and component of ECDI



Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Standard error clustered at region level. Plotted standard errors reflect a 90% confidence interval.

Figure A7: Mediation illustration

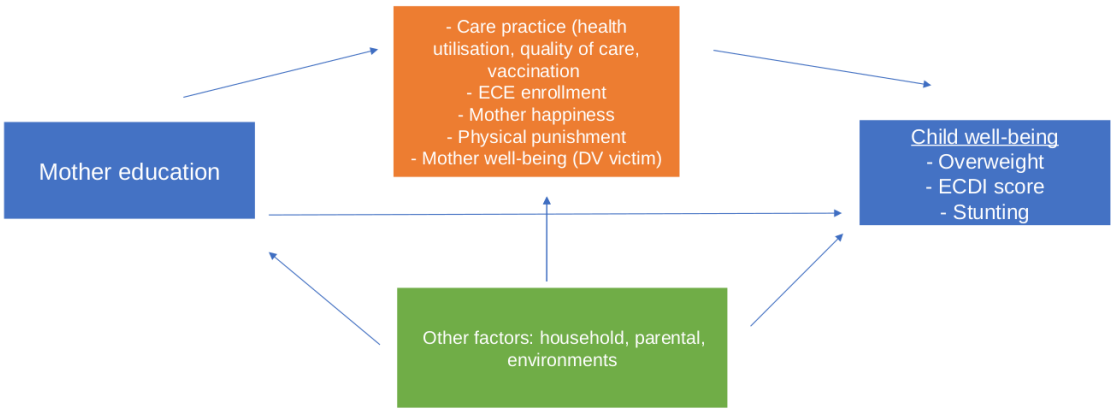
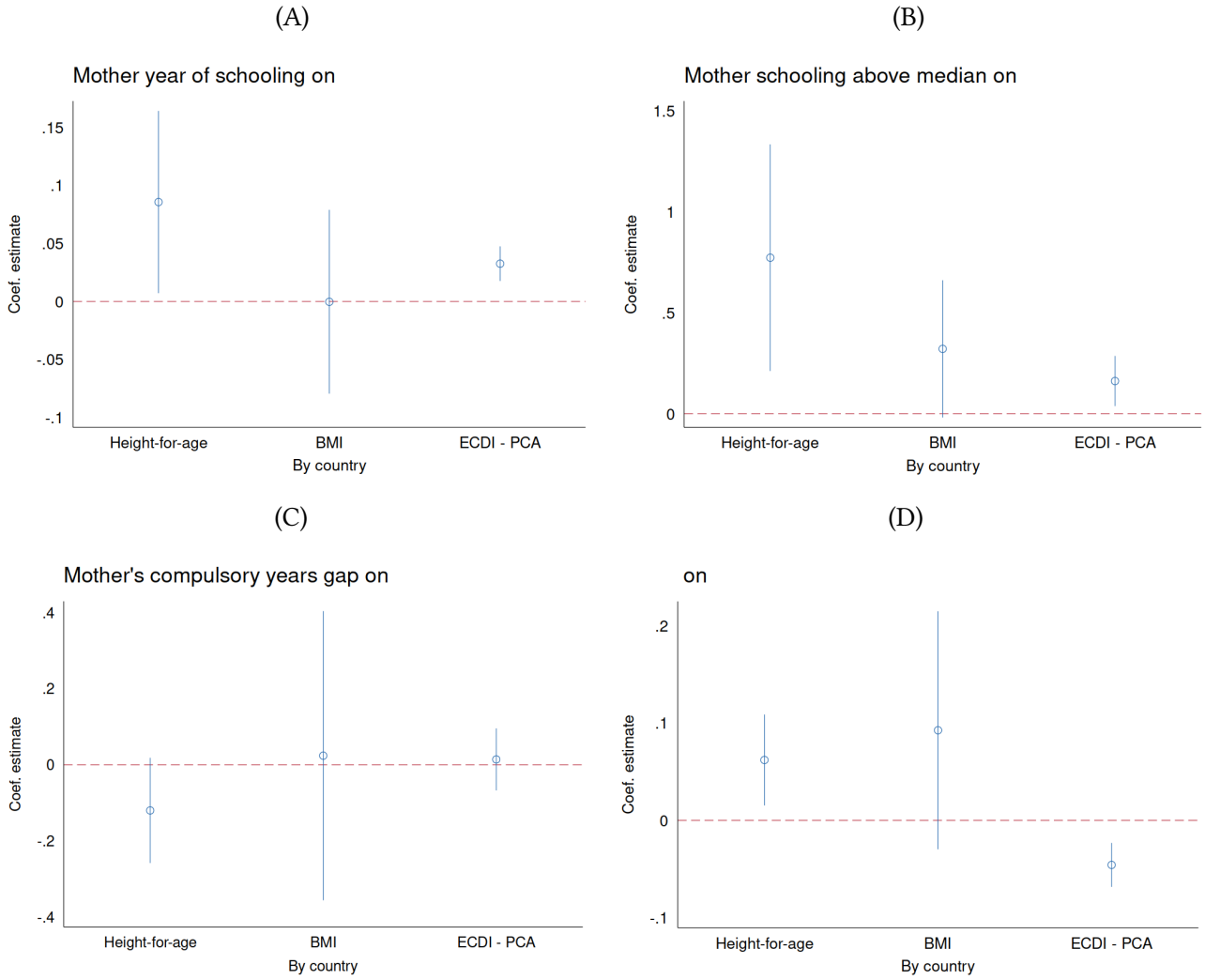
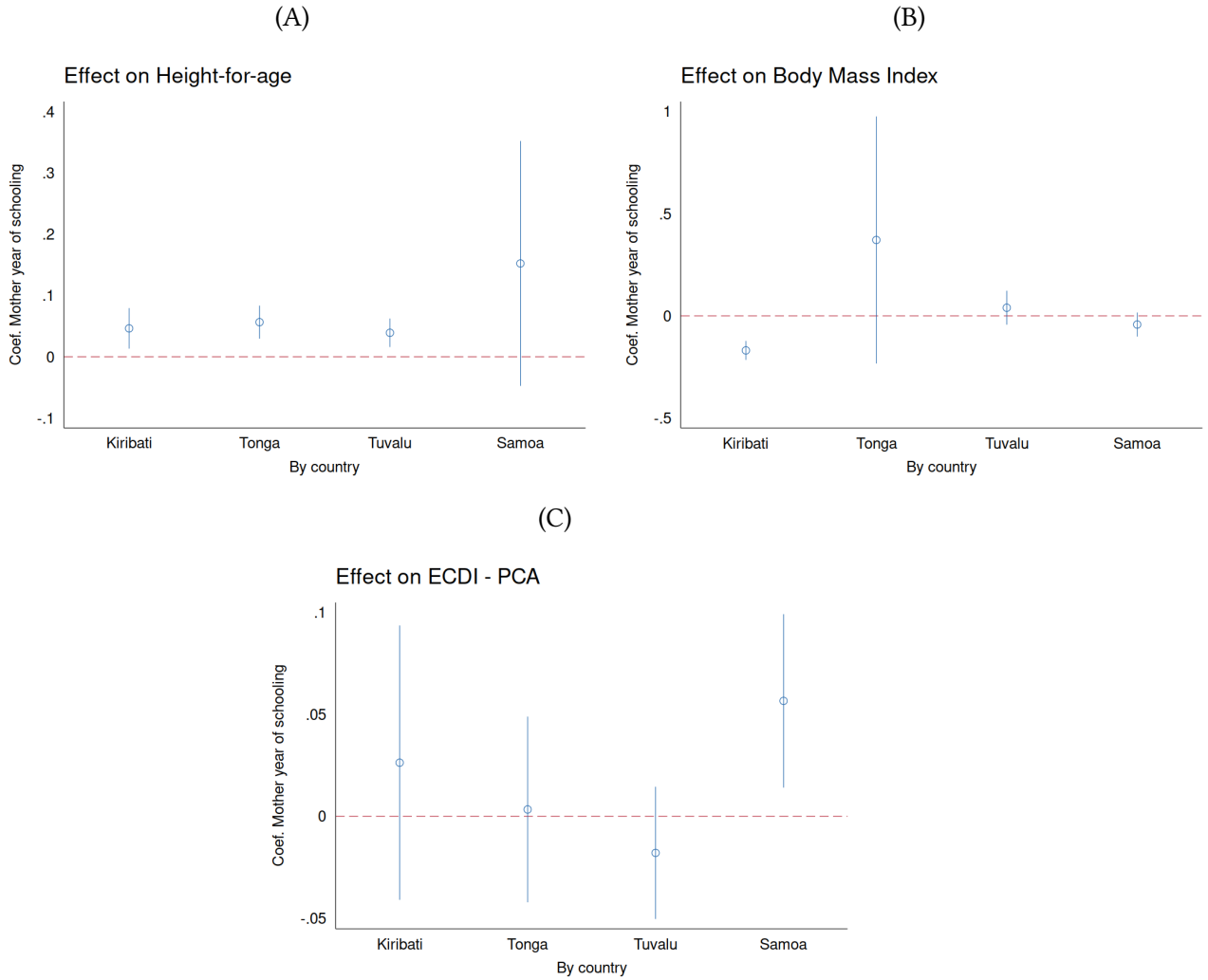


Figure A8: Mother education proxies and alternative children well-being outcomes



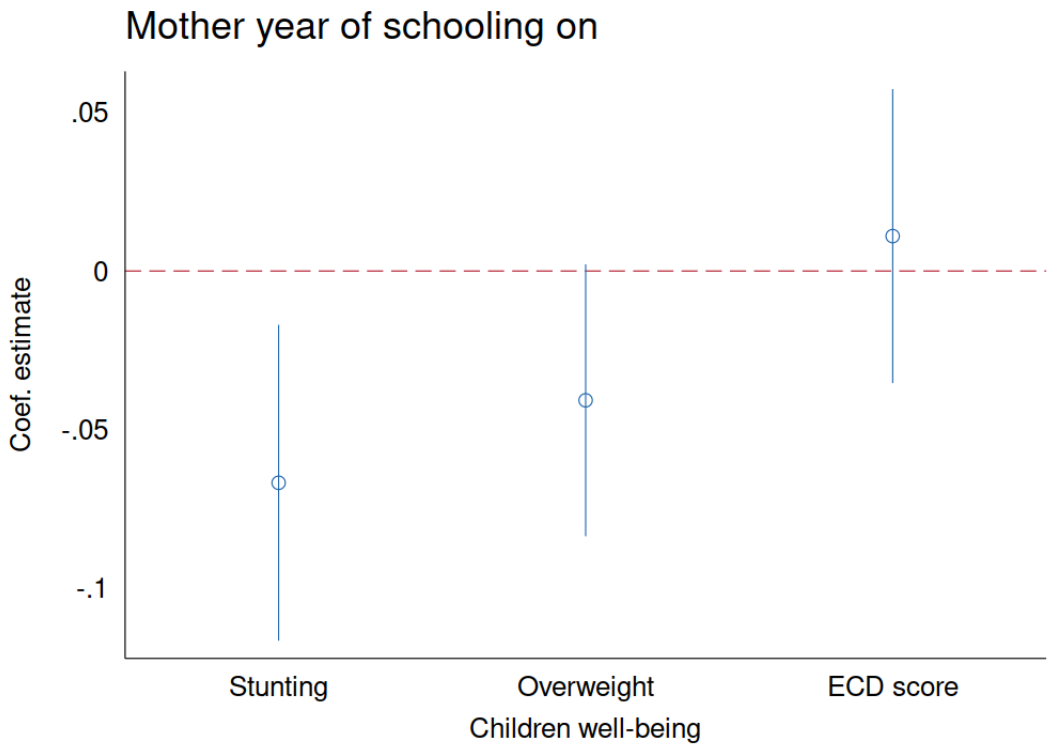
Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Covariates include children's age, mother's age, father's age, father's years of schooling, living in urban dummy variables, living with extended family, household asset index and an indicator of whether the father lives in the household during the interview. Standard error clustered at the regional level. Plotted standard errors reflect a 95% confidence interval.

Figure A9: Mother education and alternative children well-being outcomes, by countries



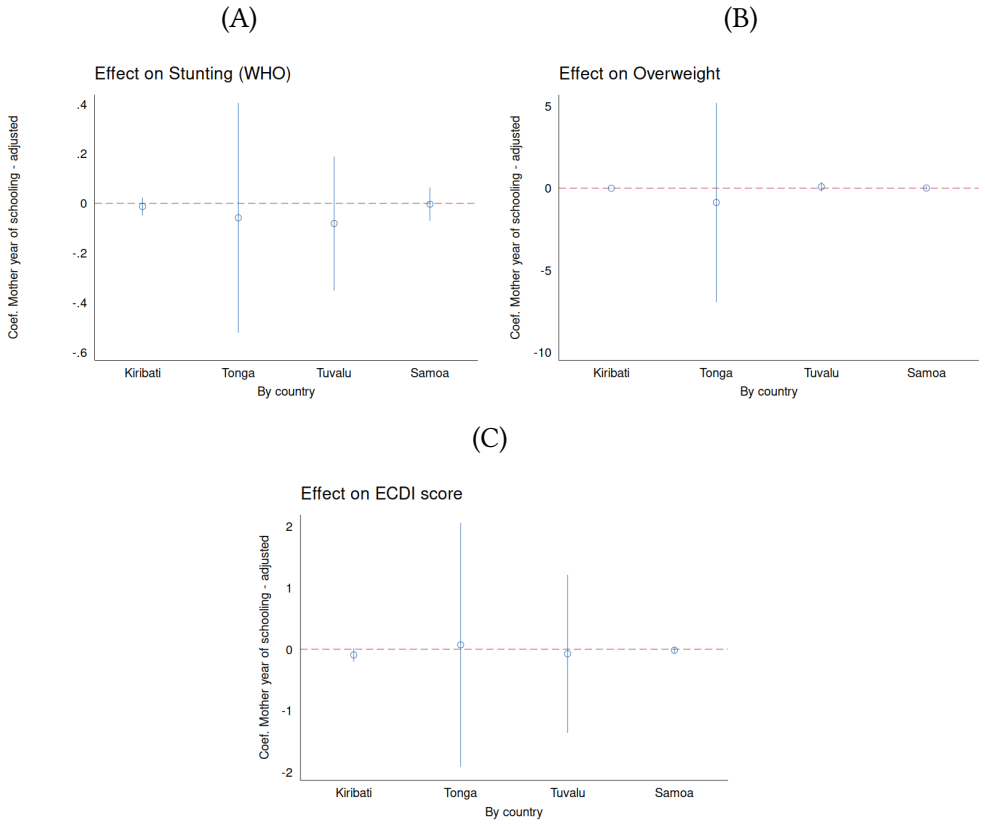
Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Covariates include children's age, mother's age, father's age, father's years of schooling, living in urban dummy variables, living with extended family, household asset index and an indicator of whether the father lives in the household during the interview. Standard error clustered at the regional level. Plotted standard errors reflect a 95% confidence interval.

Figure A10: Second-stage results: Direct effect of years of schooling on outcomes



Notes: Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. The instrument variable is the leave-one-out mean of years of schooling of the mother's peers. Peer groups are defined based on birth cohort, region of residence and religion. Covariates include children's age, mother's age, father's age, father's years of schooling, living in urban dummy variables, living with extended family, household asset index and an indicator of whether the father lives in the household during the interview. Standard error clustered at the region level. Plotted standard errors reflect a 95% confidence interval.

Figure A11: Mother education and children well-being



Notes: Results are based on MICS dataset

Table A1: Baseline regression

	(1) Stunted (=1) b/se	(2) Overweight (=1) b/se	(3) ECDI - overall b/se
Mother YOS	-0.005***	0.004**	0.003**
	(0.001)	(0.001)	(0.001)
Mother's age	0.000	0.001	0.000
	(0.000)	(0.001)	(0.000)
Age of children	0.005	-0.006***	0.072***
	(0.003)	(0.001)	(0.009)
Father's age	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)
Father's year of schooling	-0.001	0.000	0.000
	(0.001)	(0.001)	(0.001)
Father not live in HH (=1)	0.027	0.046	0.014
	(0.024)	(0.024)	(0.008)
Live in urban area (=1)	0.002	0.025**	0.002
	(0.007)	(0.010)	(0.008)
Index of household assets	-0.016	0.012	0.030**
	(0.017)	(0.009)	(0.011)
Live with extended family (=1)	-0.011	-0.000	-0.005
	(0.007)	(0.007)	(0.011)
TON	-0.086***	0.088***	-0.049***
	(0.011)	(0.014)	(0.007)
TUV	-0.058**	0.004	-0.120***
	(0.016)	(0.016)	(0.008)
WSM	-0.038***	0.064***	-0.111***
	(0.009)	(0.009)	(0.012)
Constant	0.170***	-0.062**	0.445***
	(0.023)	(0.019)	(0.013)
R2	0.024	0.029	0.094
Mean	0.072	0.071	0.715
Country FE	Yes	Yes	Yes
Sample	All children	All children	All children
Clustered S.E	Regions	Regions	Regions

* p<0.05, ** p<0.01, *** p<0.001. Standard errors in round parentheses. Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Covariates include children's age, mother's age, father's age, father's year of schooling, living in urban dummy variables, living with extended family, household asset index and indicator whether father lives in the household during the interview. Standard error clustered at region level.

Table A2: Mediating variable regression

	(1) Stunting (=1) b/se	(2) Overweight (=1) b/se	(3) ECDI score b/se
Mother care score	-0.006*	-0.001	0.007**
	(0.003)	(0.001)	(0.002)
R2	0.024	0.028	0.098
Mean	0.072	0.071	0.715
Country FE	Yes	Yes	Yes
Sample	All children	All children	All children
Clustered S.E	Regions	Regions	Regions
	b/se	b/se	b/se
Mother happiness	0.001	-0.005	-0.007
	(0.005)	(0.004)	(0.012)
R2	0.021	0.027	0.096
Mean	0.072	0.071	0.715
Country FE	Yes	Yes	Yes
Sample	All children	All children	All children
Clustered S.E	Regions	Regions	Regions
	b/se	b/se	b/se
Mother's experience DV	0.005	-0.002	0.002
	(0.003)	(0.005)	(0.008)
R2	0.021	0.027	0.095
Mean	0.072	0.071	0.715
Country FE	Yes	Yes	Yes
Sample	All children	All children	All children
Clustered S.E	Regions	Regions	Regions
	b/se	b/se	b/se
Children's experience abused	-0.000	-0.004*	0.009***
	(0.002)	(0.002)	(0.002)
R2	0.022	0.029	0.098
Mean	0.072	0.071	0.715
Country FE	Yes	Yes	Yes
Sample	All children	All children	All children
Clustered S.E	Regions	Regions	Regions
	b/se	b/se	b/se
Mother provides ECE education	-0.011	0.018*	0.066***
	(0.008)	(0.009)	(0.008)
R2	0.023	0.029	0.113
Mean	0.072	0.071	0.715
Country FE	Yes	Yes	Yes
Sample	All children	All children	All children
Clustered S.E	Regions	Regions	Regions

* p<0.05, ** p<0.01, *** p<0.001. Standard errors in round parentheses. Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Covariates include children's age, mother's age, father's age, father's year of schooling, living in urban dummy variables, living with extended family, household asset index and indicator whether father lives in the household during the interview. Standard error clustered at region level.

Table A3: IV regression

Panel A. Second stage	(1) Stunted (=1) b/se/t	(2) Overweight (=1) b/se/t	(3) ECDI - overall b/se/t
Mother YOS	-0.050***	-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
R2	-0.129	-0.046	0.062
Mean	0.072	0.071	0.715
Covariates	Yes	Yes	Yes
Sample	All children	All children	All children
Clustered S.E	robust	robust	robust
Panel B. Reduced form	Stunted (=1) b/se/t	Overweight (=1) b/se/t	ECDI - overall 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]
Panel C. First stage	Mother YOS b/se/t	Mother YOS b/se/t	Mother YOS 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

* p<0.05, ** p<0.01, *** p<0.001. Standard errors in round parentheses. t-statistics in brackets. Results are based on the MICS dataset. Instrument variable is peer's mother's year of schooling. Peer groups are defined as sharing same 5-year birth cohort group, gender, regions of residence and country of residence. Sample of 6,174 children who cohabitate with their mother. Covariates include children's age, mother's age, father's age, father's year of schooling, living in urban dummy variables, living with extended family, household asset index and indicator whether father lives in the household during the interview. Standard error clustered at region level.

Table A4: Mediating variable regression

	(1) Overweight b/se	(2) Stunting (WHO) b/se	(3) ECDI score b/se	(4) ECDI - learning b/se	(5) ECDI - socioemotional b/se	(6) ECDI - physical b/se	(7) ECDI - cognitive b/se
Mother year of schooling	0.005***	-0.005***	0.002	0.000	0.001	0.001	0.005
	(0.001)	(0.001)	(0.001)	(0.002)	(0.004)	(0.001)	(0.005)
Mother provides high care	0.003	-0.016	0.033**	0.037*	0.003	0.022**	0.068**
	(0.005)	(0.009)	(0.009)	(0.015)	(0.005)	(0.008)	(0.020)
Mother provides ECE education	0.013	-0.012	0.063***	0.052***	0.019	0.024	0.140***
	(0.010)	(0.008)	(0.012)	(0.014)	(0.012)	(0.016)	(0.022)
Mother happiness	-0.008	0.004	-0.007	-0.009	-0.009	-0.020	0.006
	(0.004)	(0.004)	(0.011)	(0.023)	(0.021)	(0.019)	(0.020)
Mother's experience DV	-0.004	0.002	-0.002	0.001	-0.007	0.020	-0.014
	(0.005)	(0.003)	(0.007)	(0.013)	(0.012)	(0.011)	(0.014)
Children's experience abused	-0.004	-0.001	0.011***	0.007	0.033***	0.008**	-0.007***
	(0.002)	(0.002)	(0.002)	(0.004)	(0.003)	(0.003)	(0.002)
R2	0.030	0.024	0.127	0.055	0.079	0.055	0.138
Mean	0.071	0.072	0.715	0.797	0.705	0.762	0.637
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	All children	All children	All children	All children	All children	All children	All children
Clustered S.E	Regions	Regions	Regions	Regions	Regions	Regions	Regions

* p<0.05, ** p<0.01, *** p<0.001. Standard errors in round parentheses. Results are based on the MICS dataset. Sample of 6,174 children who cohabitate with their mother. Covariates include children's age, mother's age, father's age, father's year of schooling, living in urban dummy variables, living with extended family, household asset index and indicator whether father lives in the household during the interview. Standard error clustered at region level.