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What happens to the learning outcomes of left-behind children when parents are away? Evidence from four pacific island countries

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ADB Working Paper Series

**WHAT HAPPENS TO THE LEARNING
OUTCOMES OF LEFT-BEHIND CHILDREN
WHEN PARENTS ARE AWAY? EVIDENCE
FROM FOUR PACIFIC ISLAND COUNTRIES**

Trang Thu Vu and Daniel Suryadarma

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Abstract

When parents migrate from home to another place and leave their children behind, it can have a large influence on their children. This study explores the relationship between parental migration and the learning outcomes of left-behind children aged 7–14 in Pacific Island economies, particularly Fiji, Kiribati, Samoa, and Tonga, by using the Multiple Indicator Cluster Survey 6. Using propensity score matching, we observe no significant effects in Fiji, Kiribati, and Tonga. However, our findings indicate that in Samoa, children whose parents are absent from home make significant improvements in their reading skill, despite struggling in mathematics. In addition, living in an extended family could benefit Samoan children when a parent is away. We also find that the effects in Samoa are isolated among girls.

Keywords: Pacific Island countries, left-behind children, foundational skills

JEL Classification: I25, I30, F22

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1. INTRODUCTION

Voluntary migration is mainly economically motivated. For the poor or those in rural areas, migration is considered a prominent livelihood strategy (Stark and Bloom 1985; Bryan, Chowdhury, and Mushfiq Mobarak 2014). Given the extent of economically motivated migration worldwide, hundreds of millions of children are left behind when their parents migrate. For instance, more than a third of all children residing in rural People's Republic of China (PRC)—amounting to about 61 million—are left behind by one or both migrant parents. More than 40% in rural South Africa, about one-third in Ghana, Moldova, and Georgia, and around a quarter of all children in the Philippines are left behind (Fellmeth et al. 2018; Antia et al. 2020).

We estimate the impact of the absence of parents on their children's learning outcomes in Fiji, Kiribati, Samoa, and Tonga. We contribute to the small body of research focusing on the impact of parent migration on children's literacy and numeracy. Ours is the first study in the region, in which nationally representative household surveys containing objective measures of children's foundational skills only became publicly available recently.

The absence of parents due to migration can significantly impact children's outcomes. Remittances are the most visible and expected benefit of migration (Stark 1991; Stark and Taylor 1991). The transfer helps make schooling and healthcare more affordable and accessible, reduces child labor, increases children's leisure time (Basu et al. 2010; Antman 2013; Alcaraz, Chiquiar, and Salcedo 2012), and improves children's health outcomes (Frank and Hummer 2002; Antón 2010). Yang (2008) finds a positive effect of international remittances on child education and labor in the Philippines. Binci and Giannelli (2012) conclude that internal remittances increase school attendance and reduce child labor in Viet Nam. Nguyen and Nguyen (2015) find that receiving international remittances helps children increase completed grades by around 2%. Hildebrandt et al. (2005) find that children in international migrating households in Mexico have lower rates of infant mortality and higher birth weights. Carletto, Covarrubias and Maluccio (2011) document that the nutrition intake of children in migrant-sending households in Guatemala improves faster than that of children in households without migrants.

The benefits of parental migration, however, do not always materialize on the left-behind children. Migration does not necessarily lead to a higher income for migrant-sending households. Migration can also prevent these households from engaging in high-return but labor-intensive activities (Taylor 2010). Regular absence of the most productive household members may also impose monetary or nonmonetary costs on the family and community members left behind (Gibson, McKenzie, and Stillman 2011a and 2011b). When parents migrate, children may receive less care and attention – for instance, less time for reading books, helping with homework, and attending school meetings to learn about child issues. Nguyen (2016) finds that although parental migration helps families increase per capita consumption, it does not improve the health (weight and height) or cognitive ability (math score, and Peabody Picture Vocabulary Test) of children aged 5–8 years in Ethiopia, India, Peru, and Viet Nam. Meng and Yamauchi (2017) show that when Chinese rural workers migrate to cities for work, the left-behind children, especially boys, experience sizeable health and education adverse effects. In addition, children may have to do more housework and/or take care of other family members. Many studies show the adverse effects of parental migration on children's education (McKenzie and Rapoport 2011; Frisnacho Robles and Oropesa 2011; Coffey 2013; Lu 2014; Robles-Llana 2021).

Another disadvantage for children is the social impacts of extended family separations. Withers (2022) finds evidence in Pacific Island economies on the difficulties of maintaining relationships at a distance, including managing childcare. The absence of parents can also lead to a relationship where children receive only one-sided love. Children and caring in relation to finance are the second-ranked social issue, after extramarital affairs, frequently occurring among seasonal workers in the Pacific.

Across many Pacific Islands countries (PICs), labor mobility plays a vital role in supporting living standards. Internal migration has increased significantly and intensively over the past five decades (Naidu and Vaike 2016). Also, a considerable number of people from these islands live abroad, forming diaspora communities (Doan, Dornan, and Edwards 2023). The countries have received substantial amounts of remittances, with some having one of the world's highest ratios of remittances to gross domestic product. Notably, Tonga, Samoa, Fiji, and Kiribati are among the top 10 recipients of remittances as a share of the GDP in the Asia and the Pacific region. In Tonga, remittances account for over a fifth of national income, and in Samoa, they reach 35% (World Bank 2023).

Despite the increasing trend of migration in PICs, the existing literature on migration and child development in the region remains limited (World Migration Report 2020). There is a lack of contextually relevant research that needs to be set at both national and regional levels for comparison. A major reason for the scarcity of research in PICs on this topic is the lack of data availability (UNICEF 2020). Most of the studies in the PICs focus on evaluating international seasonal mobility programs (Gibson, McKenzie, and Stillman 2011b; Gibson and McKenzie 2014; Gibson and Bailey 2021). Of these, only a few examine the effect on school attendance (Gibson and McKenzie 2014; Gibson et al. 2019). Moreover, studies that examine the impacts of migration on the math and reading proficiency of children, especially for children between the ages of 7 and 14, do not yet exist.

We use the sixth round of the UNICEF Multiple Indicator Cluster Surveys (MICS6) in 2019 for the four countries. We implement a propensity score matching (PSM) approach to establish causality, particularly the Mahalanobis matching technique. We find no evidence in Fiji, Kiribati, and Tonga that children with at least one parent migrating have a different probability of acquiring foundational reading or mathematics skills from those living with both parents. In Samoa, the left-behind children have a higher chance of acquiring foundational reading skills by 11.7 percentage points, but a lower chance of acquiring foundational mathematics skills by 8.6 percentage points. These are large effects given the low levels of literacy and numeracy in the country.

The rest of this paper is structured as follows: Section 2 provides a succinct background of the four countries; Section 3 discusses data and the estimation strategy; we present the results and a discussion in Section 4; Section 5 provides the conclusion.

2. FIJI, KIRIBATI, SAMOA, AND TONGA: ECONOMIC SITUATION AND LABOR MOBILITY

The four Pacific Island countries of Fiji, Kiribati, Samoa, and Tonga vary significantly in size and economic development level. Fiji is the largest country in terms of both land area and population within the region. Table 1 shows that Fiji has the highest GDP per capita among the four, while Kiribati has the lowest. The most recent poverty headcount data from the World Development Indicators, using the \$3.65 a day poverty

line (2017 PPP), show that the poverty rate in Fiji was 12.4% in 2019, increased from 6% in 2013. In Samoa, the poverty rate was 10.5% in 2013; it was 19.5% in Kiribati in 2019, and 13.9% in 2015 for Tonga, which was also higher than its 9.6% in 2009.

In general, the economies of the four countries rely heavily on a combination of industries, with agriculture, fishing, and tourism being the primary contributors to economic growth. Subsistence farming and handicrafts are also major sources of income. The majority of households, particularly on the outer islands, are self-sufficient (Georgeou et al. 2022).

Table 1: Country Background, 2021

Country Characteristics	Fiji	Kiribati	Samoa	Tonga
Land area (sq. km)	18,270	810	2,830	720
Population (million)	902,899	121,388	200,144	106,759
GDP per capita (constant 2015 US\$)	4,708.1	1,473.9	3,972.2	4,629.9
Urban share (%)	58	56	18	23
Remittances (% of GDP)	7.8	8.2	25.3	39
Compulsory education, duration (years)	NA	9	8	15

Source: The World Bank, data bank. Data on remittances are from 2020.

These economies have been facing various and persistent challenges. Geographically isolated, there is a vast distance between them and larger markets and natural resources (Gibson 2007). They are also vulnerable to natural disasters like cyclones and tsunamis, and they have limited infrastructure and small domestic markets. Furthermore, climate change poses a substantial threat, as rising sea levels and extreme weather patterns directly impact these low-lying island nations (Asian Development Bank 2022).

Across many (PICs), labor mobility plays an essential role in supporting living standards as well as being a way of coping with the effects of climate change and disaster risks. Internal migration has increased significantly and intensively over the past five decades (Naidu and Vaike 2016). Also, a considerable number of people from these islands live abroad, forming diaspora communities (Doan et al. 2023), taking advantage of labor mobility schemes from the Australian and New Zealand governments (Doan, Dornan, and Edwards 2023).¹ Overseas migrants work primarily in New Zealand, Australia, and the United States. The countries receive substantial amounts of remittances, with some having one of the world's highest ratios of remittances to GDP. As Table 1 shows, remittances as a share of GDP range from 7.8% in Fiji to 39% in Tonga.

¹ Three of the main labor mobility schemes in the Pacific regions that migrants apply for are the Seasonal Worker Program (SWP) since 2012, the Pacific Labor Scheme (PLS) in Australia, and the Recognized Seasonal Employer (RSE) since 2007 in New Zealand. Migrants work mostly in labor-intensive sectors such as horticulture, aquaculture, cane and cotton agriculture, forestry, hospitality, tourism, fisheries, meat processing, and the elderly care sector (Australia) and viticulture industries. The stay is up to nine months within the SWP and up to three years within the PLS.

3. DATA, IDENTIFICATION STRATEGY AND DESCRIPTIVE STATISTICS

3.1 Data and Main Variables

We use the sixth round of the UNICEF Multiple Indicator Cluster Surveys (MICS6) from 2019. The MICS is a household survey that contains basic demographic information about all household members, women and men aged 15–49, and children under five and aged 5–17 years living in the household. Moreover, the MICS includes a reading and mathematics assessment administered to children aged 7–14 years. From each sampled household, one child was randomly selected. The survey is representative at the national level. It uses a multistage, stratified cluster sampling approach. The MICS6 is the first household-based learning assessment in the region that has been made publicly available.² It is also the first survey in the region to measure the foundational literacy and numeracy skills of children across different ages, allowing direct observation of children’s foundational skills over the early years of primary through lower secondary school.

We use the UNICEF definition of literacy and numeracy (UNICEF 2020): A child is literate if they can read 90% of the words in a simple 70- to 80-word story and answer five questions about the story. The five questions are categorized into two groups: literal questions (i.e., starting with “what”) and inferential questions (i.e., starting with “why”). A child is numerate if they can correctly answer 21 math questions on number identification, number comparison, basic one- and two-digit addition, and number patterns (i.e., 3, 5, 7, _). We consider this a strict measure, as a child has little room for error to be seen as acquiring foundational skills. One wrong answer would mean that the child is considered not to have literacy or numeracy skills. Further work is still needed to check the sensitivity of the threshold (Silberstein 2021).

We define left-behind children as those who have at least one parent not living in the same household. The parent(s) can be on another island (internal economic migration) or in another country (international economic migration). We exclude children whose parents have passed away, live in another household on the same island, are divorced, or are in institutions. Therefore, we compare the outcomes of two groups of children. One group consists of those who have at least one parent living abroad or on another island, and the other group includes children living with both parents.

3.2 Identification Strategy

The model that we use is expressed in Equation (1):

$$Y_{ih} = \beta_0 + \beta_1 ParentsMigrate_{ih} + \beta_2 X_{ih} + \varepsilon_{ih}, \quad (1)$$

where Y_{ih} are learning outcomes of child i in household h . We have two learning outcomes: (i) a binary variable equal to one if a child is proficient at reading as defined by the MICS, and zero otherwise; (ii) a binary variable equal to one if a child is proficient at mathematics as defined by the MICS, and zero otherwise. $ParentsMigrate_{ih}$ is the binary variable with the value of one if at least one parent of child i has migrated (and thus no longer lives in household h), and zero if the child is

² In addition, there is the Pacific Islands Literacy and Numeracy Assessment (PILNA). However, the assessment focuses on the numeracy and literacy proficiency skills of Year 4 and Year 6 students at school: <https://eqap.spc.int/PILNA>.

currently living with both parents. X_{ih} is a set of control variables including age, gender, number of siblings, parental education, and rural residence. And ε_{ih} is the error term.

Parent migration is not an exogenous variable. Estimates from Equation (1) could be biased due to omitted variables. There are observable ones, such as parental education and rural residence, which we could control for. There are also unobserved sources of bias. For instance, parents who care more about children's education may give more attention and effort to improving children's schooling outcomes, including migrating to earn additional income. This will overestimate the estimated coefficients. On the other hand, if poorer parents are more likely to migrate and poverty is negatively correlated with learning outcomes, then our estimates are underestimated. As previously mentioned, there is no household panel dataset available in the four Pacific countries, which may help in removing time-invariant unobserved sources of bias. Also, there are no relevant policies available to use as a natural experiment. Finally, the MICS primary sampling units are not sufficiently granular to give us a chance to take advantage of within-country heterogeneity in infrastructure, weather, or other sources of exogenous variation. Furthermore, data unavailability precludes us from using the instrumental variables that previous studies employed such as the migration rate at village level (McKenzie and Rapoport 2011).

Working with the available data, we establish causality by employing a nonparametric estimator through a propensity score matching (PSM) method to estimate the average treatment effects. The idea of PSM is to match children whose parents migrate with other children who are observably similar, except that they are living with both parents. The two key assumptions of PSM (Rosenbaum and Rubin 1983) are: (1) unconfoundedness or conditional independence: The observable covariates to be included in the model for predicting the probability for treatment should not be affected by treatment, or the anticipation of it, and the potential outcome must be independent of treatment assignment; and (2) common support: The matching should be done within the range of propensity scores that overlap across the treatment and control groups.

We select the covariates for matching that influence the migration decision or children's learning outcomes, or both – in other words, the variables that determine the assignment of treatment but are unaffected by migration (Fakir and Abedin 2021). Specifically, children with migrant parents are matched with children living with both parents based on propensity scores generated from the following covariates: children's age and children's sex, education of mother and father, household size, number of siblings, living in rural area, and region code. These covariates are chosen because they are considered main determinants of parent migration in literature (McKenzie and Rapoport 2011). We do not include income, wealth, or durable asset ownership as proxies for household wealth as the MICS measures them at the time of the survey. Hence, these variables are likely to be affected by treatment. In this study, we apply the Mahalanobis matching technique to estimate the average treatment effect (ATE).

3.3 Parental Migration

We present the descriptive analysis of parental migration and outcomes of children aged 7–14 in Fiji, Kiribati, Samoa, and Tonga. Table 2 shows the share of children whose parents migrate, across four countries by location, abroad and other islands, and by the migrating parent. Overall, 18.3% of children in Fiji, 20.3% in Kiribati, 19.6% in Samoa, and 25.2% in Tonga live without at least one parent, as they have migrated. We also see that between 3% and 10% of children have parents who live abroad, while the rest have parents who live on a different island in the country. This indicates that

internal migration dominates international migration. The smallest share of children with at least one parent living abroad is in Fiji, while Tonga has the largest share.

Table 2: Share of Children Living Separately from Parents Due to Migration

	Fiji	Kiribati	Samoa	Tonga	Pooled Sample
A. Live separately from at least one parent	0.183	0.203	0.196	0.252	0.203
Parent abroad	0.035	0.041	0.073	0.103	0.068
Parent on another island	0.156	0.164	0.131	0.158	0.16
B. Live separately from mother	0.101	0.118	0.100	0.142	0.112
Mother abroad	0.011	0.009	0.028	0.050	0.021
Mother on another island	0.090	0.108	0.073	0.093	0.090
C. Live separately from father	0.149	0.170	0.175	0.225	0.174
Father abroad	0.029	0.039	0.063	0.09	0.051
Father on another island	0.120	0.130	0.114	0.134	0.123
D. Live separately from both parents	0.067	0.084	0.079	0.115	0.082
Children's characteristics (mean)					
Share of males	0.52	0.50	0.54	0.53	0.52
Share living in extended family	0.10	0.18	0.33	0.23	0.20
Number of siblings	2.27	2.57	3.05	2.63	2.46
Household size	5.6	6.5	7.7	6.5	6.5
N	1,462	1,097	1,198	766	4,523

Note: In the context of this study, an extended family encompasses individuals beyond the nuclear family (i.e., outside the household head, spouse, and children).

Panel B of Table 2 shows that between 10.1% and 14.2% of children live separately from their mother. In Fiji and Kiribati, there are virtually no children whose mother lives abroad. The rates are higher in Samoa and Tonga. Meanwhile, Panel C shows a similar pattern to Panel B, but with a different magnitude. Between 14% and 22% of children do not live with their father. Finally, Panel D shows that between 6.7% and 11.5% of children live separately from both parents. In our context, this means that both parents are working either abroad or on a different island.

3.4 Learning Outcomes of Children in Fiji, Kiribati, Samoa, and Tonga

In this subsection, we present several facts about school participation, as well as mathematics and reading proficiency in the four Pacific countries. Overall, the primary and secondary education system in the four Pacific islands is comprised of 12 grades, divided into three levels: primary, junior secondary, and senior secondary school. Education is free for the first eight years, between the ages of 6 and 14, and compulsory across Tonga, Samoa, and Kiribati. In Fiji, education is free but not compulsory. Table A1 in the Appendix provides further details.

School participation is above 95% for 7- to 14-year-old children and exhibits no gender differences, as can be seen in Figure 1 (Panels A and B). In Fiji, almost all sampled children attend school despite the lack of compulsory education.³ Children with migrant

³ Studies about seasonal workers from Pacific Island countries (PICs) show that the most important use of the money that migrants from PICs had earned from working abroad, i.e., Australia or New Zealand, was for making improvements or extensions to their homes. The next most common use of their

and non-migrant parents also have similar school participation, with more than 95% of sampled children attending school.

Figure 1: Panel A. School Participation by Sex across Countries

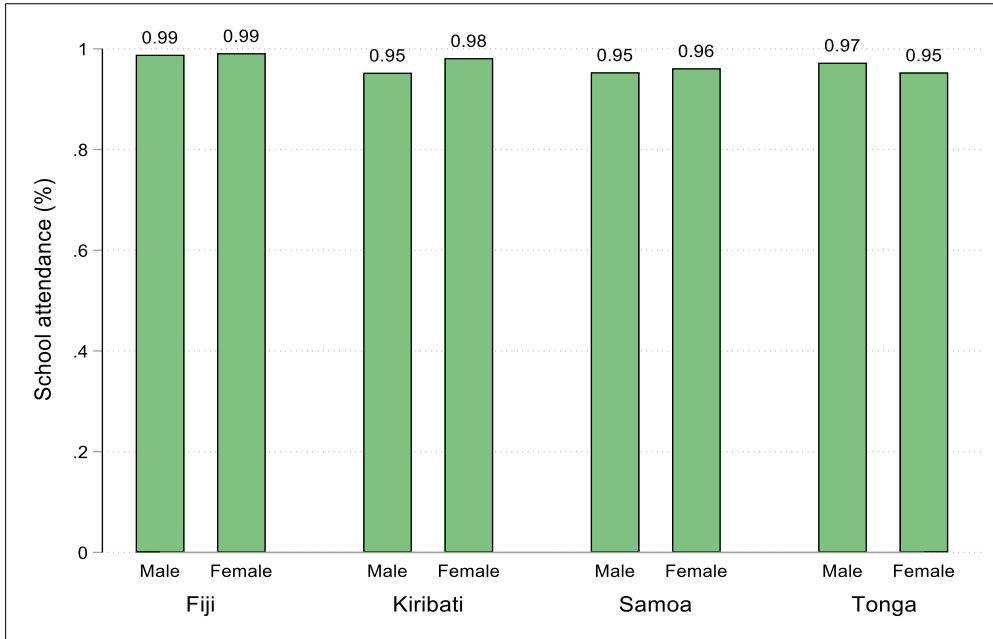
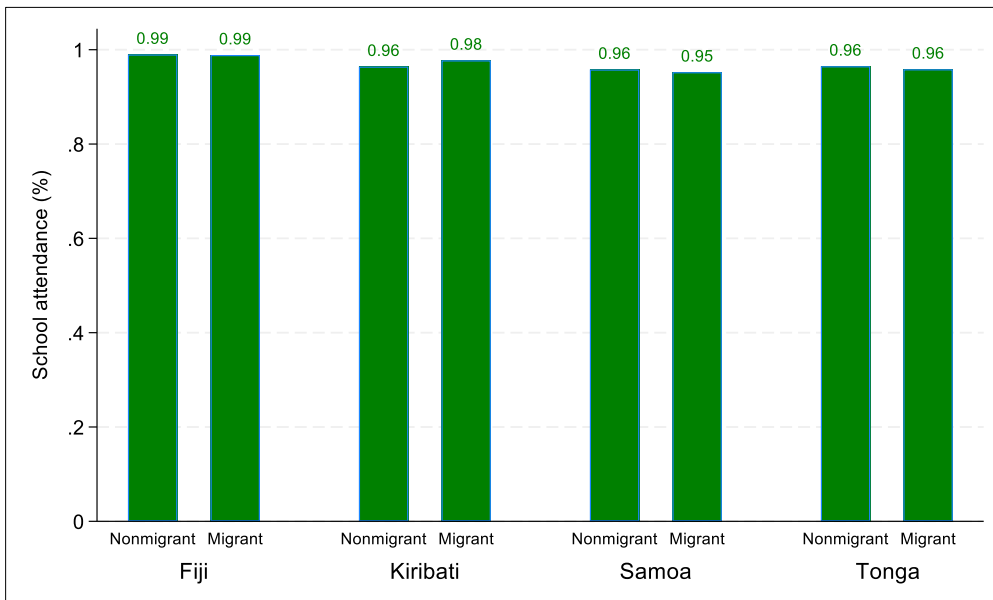


Figure 1: Panel B. School Participation by Parent Migration Status across Countries



earnings was for school fees (Gibson and McKenzie 2014). Moreover, earnings from seasonal workers support the education of children indirectly by contributing to community projects such as funding the local village water supply, street lighting, a school scholarship fund for local children, such as in Tonga, upgrading energy sources, and increasing mobile phone usage (Gibson and McKenzie 2014; Gibson and Bailey 2021).

When disaggregated by age, school participation is also high for each age across four countries as shown in Figure 2. Almost all students attend school from the age of 7 to 14 in Fiji and Tonga. However, in Samoa and Kiribati, the proportion of students attending school decreases from the age of 12. While still high, less than 90% of the students in these countries are enrolled in schools in these two countries.

Figure 2: School Participation by Age and Country

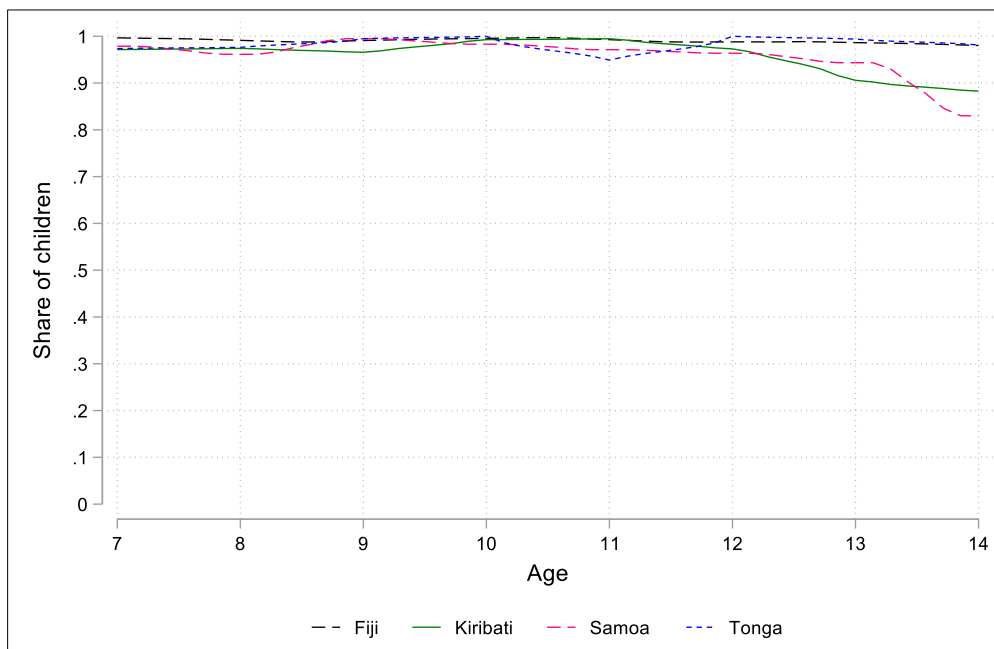


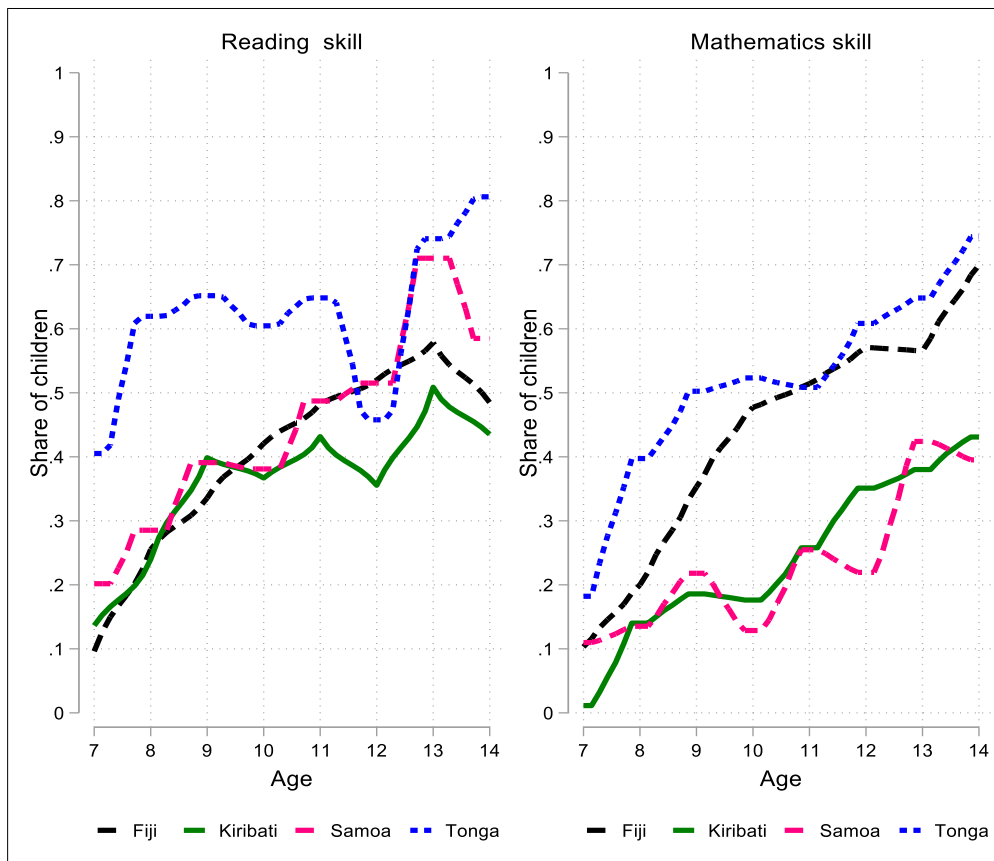
Figure 3 shows the learning profile of the foundational reading and mathematics skills of the children as they progress through school across four countries. Learning profiles are a tool, often represented in line graphs, illustrating the progression of children’s knowledge and skills acquisition within a specific environment over time (Kaffenberger and Pritchett, 2020; Crouch, Kaffenberger, and Savage 2021). By examining these profiles, we can address critical inquiries related to the educational predicament and potential solutions. Key issues include the learning trajectory, points at which children start lagging, and the impact of equal opportunities for girls in terms of schooling and academic achievement compared to boys (Silberstein 2021).⁴

Learning profiles in all four countries are generally positively sloped, indicating that children gain skills as they complete more education. The slopes in reading skills, however, differ between countries. In Tonga, 7-year-olds already have very high reading skills compared to the three other countries. However, its learning profile is flat in the region of 8- to 11-year-olds. In other words, the share of 11-year-old Tongans considered to be literate by the MICS is the same as that of 8-year-olds. In contrast, a very small proportion of 7-year-old children in Fiji and Samoa are literate, but the share of 12-year-olds with foundational literacy is almost on a par with Tongan children. In Kiribati, on the other hand, the learning profile flattens by the age of 10, implying that spending more time in school does not increase the chance of acquiring foundational

⁴ <https://riseprogramme.org/tools/learning-trajectories>. Note that in this paper, the learning profiles are constructed from cross-sectional data. The children of different ages are different, implying that we assume zero cohort effects when interpreting these graphs. Most learning profiles from developing countries use cross-sectional data.

reading skills. At the age of 14, although virtually all these children are in school, 80% of Tongan children are literate, while only 40%–50% of Fijian and Kiribatian children are.

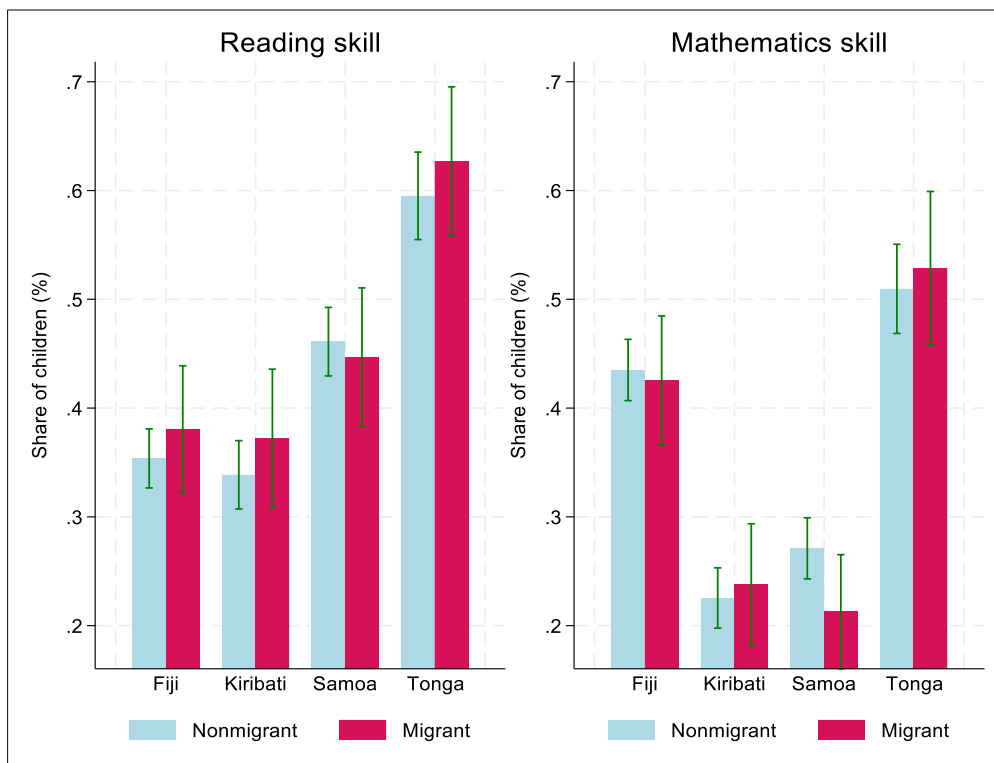
Figure 3: Learning Profile of Foundational Reading and Math Skills by Countries



The slope of the numeracy learning profiles is similar in the four countries, but only a small share of Fijian, Kiribatian, and Samoan children are numerate at the age of 7. By the age of 14, only 40% of Kiribati children are numerate. The rate is closer to 70% for Fijians and Tongans of the same age. Overall, Tonga has the best learning profiles for both literacy and numeracy, followed by Samoa in reading and Fiji in mathematics. Kiribati is ranked at the bottom. We could not delve deeper into explaining this phenomenon as the MICS do not collect data from schools or teachers.

We present the share of children with foundational skills by parents' migration status in Figure 4. The figure shows that in Samoa, children staying with both parents have better literacy and numeracy than children not living with at least one parent. In contrast, this is not the case in Fiji, Kiribati, and Tonga. These differences, however, are not statistically significant.

Figure 4: Children’s Foundational Reading and Mathematics Skills by Parents’ Migration Status



Note: The confidence interval is 95%.

4. ESTIMATION RESULTS

4.1 Correlates of Having Migrant Parents

Table 3 shows the results of the logistic regression that we use to predict the propensity scores. The estimates indicate that the education of parents, especially that of fathers, is significantly related to migration status. In the pooled sample, as well as in each country, having a father with secondary or higher education is negatively correlated with having a migrant parent. However, this is not the case for mothers. In Kiribati, having a highly educated mother is positively correlated with the propensity to be living in a migrant household. This variable is not statistically significant in other countries. Other factors that significantly predict the likelihood of having a migrant parent include household size and living in rural areas. In contrast, the child’s age and gender are not significant predictors of having a migrant parent.

Table 3: Correlates of Having at Least One Migrant Parent

	(1)	(2)	(3)	(4)	(5)
At Least One Parent Migrates	Fiji	Kiribati	Samoa	Tonga	Pooled Sample
Age of child	-0.00264 (0.00391)	-0.00208 (0.00484)	-0.000372 (0.00376)	0.00278 (0.00535)	-0.000445 (0.00236)
Male	0.0264 (0.0168)	0.0206 (0.0204)	-0.00101 (0.0172)	0.0237 (0.0265)	0.0162* (0.00970)
Child's functional difficulties (aged 5–17years)	-0.0119 (0.0286)	-0.00114 (0.0235)	0.0165 (0.0208)	-0.0693 (0.0480)	-0.00104 (0.0134)
Household size	-0.0173*** (0.00556)	-0.00549 (0.00393)	-0.00304 (0.00226)	-0.0114* (0.00630)	-0.00585*** (0.00189)
Mother's education, secondary school or higher	0.0162 (0.0228)	0.0474** (0.0238)	0.0317 (0.0285)	0.0116 (0.0290)	0.0298** (0.0124)
Father's education, secondary school or higher	-0.336*** (0.0147)	-0.378*** (0.0244)	-0.372*** (0.0109)	-0.446*** (0.0266)	-0.381*** (0.00843)
Rural area	-0.0755*** (0.0188)	-0.00774 (0.0230)	-0.0875*** (0.0231)	-0.0420 (0.0485)	-0.0413*** (0.0148)
Observations	1,461	1,097	1,198	766	4,522

Note: Logistic regression, marginal effect is shown. The regression also includes fixed effects for regions in each country. *** p < 0.01, **p < 0.05, * p < 0.1.

4.2 The Impact of Parental Migration on Children's Literacy and Numeracy

We implement nearest-neighbor matching using Mahalanobis distance, in which each individual in the treatment group is matched with the nearest individual in the control group. As we show in the previous subsection, the matching is based on age, gender, parental education, household size, children's functional disabilities, living in rural area, and region fixed effects.⁵ The predicted propensity scores for the treatment group, which includes children who have at least one migrant parent, and the control group are shown in Figures A1 and A2 in the Appendix. Common support is presented by the overlap in the distribution of the propensity scores of the two groups.

Table 4 shows the impact of parental migration on children's probability of having foundational literacy and numeracy. The estimates show that overall, there is no evidence that having at least one parent migrating significantly affects the probability of obtaining either skill (Column 5). Having a migrant parent only has a statistically significant effect in the case of Samoa (Column 3). In this country, having a migrant parent increases the chance of being literate by 11.7 percentage points, but reduces the likelihood of being numerate by 8.6 percentage points. These are large effects given the low share of Samoan children who have literacy or numeracy skills (Figure 4).

⁵ Because age and household size are continuous covariates, we include a bias-correction term based on those two covariates.

Table 4: Propensity Score Matching Results: Mahalanobis Matching

	(1)	(2)	(3)	(4)	(5)
	Fiji	Kiribati	Samoa	Tonga	Pooled Sample
Reading skill					
At least one parent migrates	-0.0572 (0.0501)	0.0220 (0.0545)	0.117* (0.0705)	0.0516 (0.0729)	0.0258 (0.0342)
Math skill					
At least one parent migrates	-0.0177 (0.0578)	0.0905 (0.0560)	-0.0861* (0.0484)	-0.0472 (0.0782)	-0.000736 (0.0345)
Observations	1,461	1,097	1,198	766	4,522

Notes: This table shows estimated differences in reading and math skills between the treatment and the control group. The set of variables used in the matching consists of the age of children, sex, education of mother and father, household size, indicator for living in rural area, and region indicators. Standard errors in parentheses are clustered at cluster level; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.3 Heterogeneity Analysis by Sex and Living with the Extended Family

Alternative living arrangements could play a crucial role in understanding the potential impact of the absence of parents on the well-being of left-behind children (Doss et al. 2022; Pritadrajati 2023). When one or both parents are absent, children are more likely to live in an extended family, and their welfare will depend on the family members. Extended family could be considered an important informal support for the children of migrants, particularly when both parents are away from home, or the remaining partner may struggle to adapt to take care of the child. On the other hand, living in an extended family, such as with grandparents or other relatives, could be a potential source of deficit in terms of values and parenting roles. In some cases, a child might be abused (Withers 2022).

Reflecting our finding on the significant impacts of parents' migration on children's literacy and numeracy in Samoa but not in other countries (Table 4), in Table 5 we find a large negative and significant effect of parent migration on the numeracy of Samoan children not living with their extended family (19 percentage points), while there is no evidence that parent migration affects the numeracy of children living in extended families. We also find a positive and large effect of parent migration on the literacy of children living in an extended family in the country (16.2 percentage points). These findings imply that in Samoa, the extended family arrangement protects or even benefits children's learning outcomes in cases where at least one parent migrates.

Parent migration could also have different effects on boys and girls. Booth and Tamura (2022) and Wang (2019) find a more negative impact of parental migration on the education outcomes of boys than girls. Cortes (2015) and Apatinga, Kyeremeh, and Arku (2022) find that boys are significantly more negatively affected than girls, even though there is wide evidence that education expenditures on girls are more sensitive to income changes. Similarly, Acosta (2011) shows that remittances can improve education for girls but not for boys in El Salvador. However, Meyerhoefer and Chen (2011) find that parental labor migration in the PRC is associated with a decrease in the education of girls rather than boys, since girls have to spend more time on housework when parents are absent from home. Chang et al. (2019) found that left-behind girls were negatively affected by one parent migrating, especially if it was the father. These results could be different depending on the context and norms around gender roles.

Table 5: Parental Migration and Children's Learning Outcomes by Extended Family and Gender across Four Countries

Extended Family	Fiji		Kiribati		Samoa		Tonga	
	No	Yes	No	Yes	No	Yes	No	Yes
Reading skill								
At least one parent migrates	-0.0673 (0.0618)	0.0514 (0.104)	0.0578 (0.0713)	-0.0862 (0.0714)	0.0490 (0.128)	0.162* (0.0881)	0.0575 (0.0939)	0.154 (0.109)
Math skill								
At least one parent migrates	-0.0214 (0.0711)	0.110 (0.0993)	0.0126 (0.0544)	0.121 (0.0883)	-0.19*** (0.0711)	-0.0381 (0.0489)	-0.0530 (0.0926)	0.0527 (0.106)
N	1,315	146	890	207	804	394	589	177
Gender	Female	Male	Female	Male	Female	Male	Female	Male
Reading skill								
At least one parent migrates	-0.0568 (0.0824)	-0.0206 (0.0590)	-0.0778 (0.0602)	0.143* (0.0843)	0.166*** (0.0616)	0.0643 (0.117)	0.0357 (0.0859)	0.0312 (0.109)
Math skill								
At least one parent migrates	-0.0131 (0.0852)	-0.00494 (0.0797)	0.193** (0.0954)	-0.0302 (0.0513)	-0.102* (0.0534)	-0.103 (0.0717)	-0.0949 (0.0996)	-0.0213 (0.102)
N	694	767	543	554	551	647	362	404

Notes: Estimated using Mahalanobis matching; extended family encompasses individuals beyond the nuclear family (i.e., excluding the household head, spouse, and children); standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In the context of the four countries that we examine, Table 5 shows mixed evidence on the impact of parental migration on the literacy and numeracy of boys and girls. In Samoa, parental migration only affects girls' outcomes. It has a large and adverse effect on girls' chances of acquiring numeracy skills by -10.2 percentage points, but a positive impact on the probability of having literacy skills by 16.7 percentage points. On the other hand, in Kiribati, parental migration has a positive and significant effect on boys' literacy by 14.3 percentage points. It also improves girls' chances of being numerate by 19.3 percentage points. These are all large effects. Unfortunately, the lack of data availability precludes us from delving deeper into the potential explanations of these findings.⁶

5. CONCLUSION

Parents play a pivotal role in shaping their children's educational journey and overall development. Their presence and involvement create a foundation that impacts a child's learning outcomes. The absence of parents from home may pose challenges for the academic performance of a child. However, if the absence is economically motivated, the higher income could compensate for the loss of the parents' presence.

We examine the impact of parent migration on the foundational literacy and numeracy of children left behind. The context is four Pacific Island countries characterized by a high rate of migration and heavy reliance on remittances. Given data constraints, this is the first study to address the topic in the context of Pacific Island countries. Therefore, our findings should be seen as a first step, with future research hopefully delving deeper into the issue.

⁶ We also estimate the impact by whether parents migrate to another island in the country or overseas. We find no evidence of impact heterogeneity.

Our matching estimates indicate that in Samoa, children for whom at least one parent migrates make significant improvements in their literacy but have lower numeracy. The heterogeneity analysis shows that living in an extended family could benefit Samoan children when a parent is away. We also find that the effects in Samoa are isolated among girls. We do not observe a significant impact in other countries.

In the Pacific countries where data are available, therefore, migration has a relatively muted effect on the learning outcomes of children. This may indicate that the positive income effect and the negative absence effect may cancel each other out. But there may be other reasons, as we find some evidence of heterogeneity by gender and by living arrangements. Unfortunately, we do not have access to more detailed data, for example on household education spending, to delve deeper.

This study has certain constraints that open up opportunities for subsequent research. Our method of estimation, propensity score matching, requires strong identification assumptions. The use of panel data could help overcome this limitation, but such data do not yet exist in the context of the Pacific.

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APPENDIX

Table A1: Basic Education System in Fiji, Kiribati, Samoa, and Tonga

	Primary School	Junior Secondary	Senior Secondary
Fiji	6	4	2
No compulsory English instruction	Free		
Kiribati	6	3	4
Compulsory	Free		
Samoa	8	5	2
Free and mandatory	Samoan and English (from third year)	English	Highly selective
Tonga	6	3	3
	Free for government- sponsored schools		

Source: Fiji: <https://www.studycountry.com/guide/FJ-education.htm>.

Kiribati: https://www.epdc.org/sites/default/files/documents/EPDC_NEP_2018_Kiribati.pdf.

Samoa: <https://www.studycountry.com/guide/WS-education.htm>.

Figure A1: Propensity Score

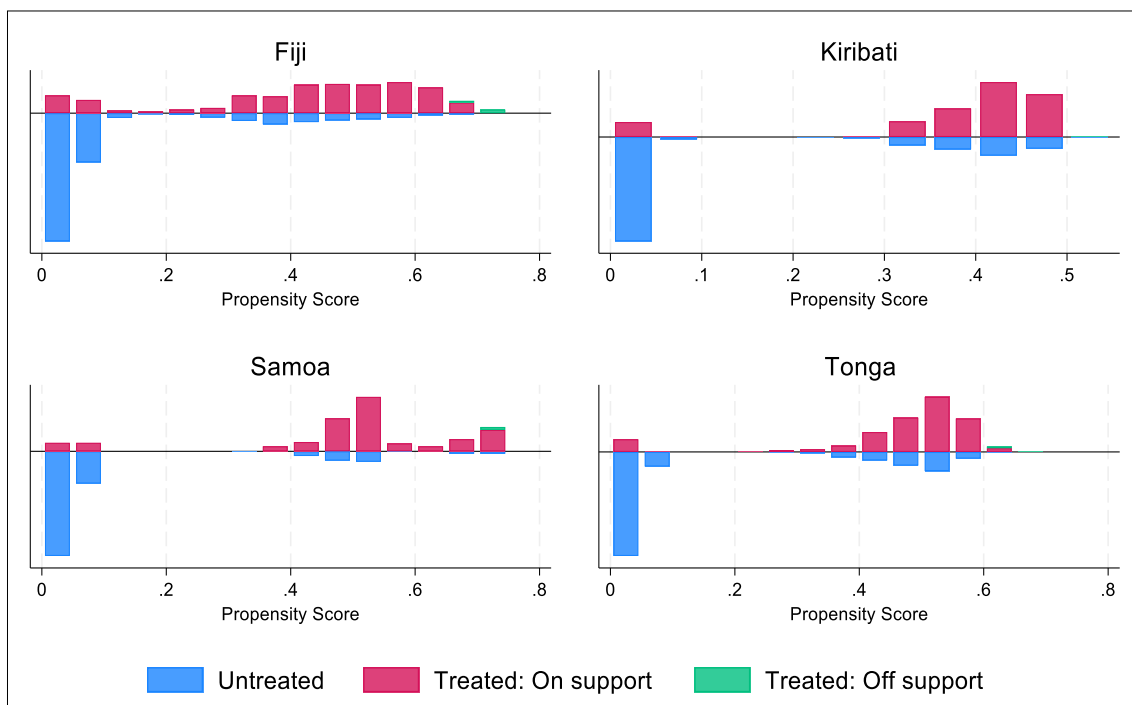


Figure A2: Propensity Score, Pooled Sample

