



Impact of Social Protection Programmes on Reducing Inequality in Education in Sri Lanka: A Matching Estimator Approach

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Abstract

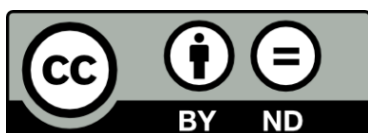
This empirical study examined the impact of social protection programs in reducing inequality in education in Sri Lanka. In the present study, information was collected from 378 randomly selected households with a total of 536 children of school age. Data collection was done through a structured questionnaire, while the selection of the sample was carried out using a combination of purposive and random sampling techniques. Selection was done on purpose, based on two criteria: the poverty ratio and the percentage of informal sector workers. Districts such as Colombo, Nuwara-Eliya, Batticaloa, Puttalam, Anuradhapura, and Rathnapura were selected along with all their Divisional Secretariat divisions and Grama Niladhari divisions. Households from within these areas were selected randomly. It includes social protection programs supporting education with free school uniforms, textbooks, stationery, scholarships, mid-day meals, and milk. The present study identified the use of the Propensity Score Matching technique to identify the impact of social protection programs on reducing educational inequality. The key findings revealed that students who received at least one form of social protection had over a 13 per cent higher probability of attending school frequently when compared with a student who received no social protection. It can be concluded from this that social protection programs ensure regular attendance in school among students who experience a multitude of disadvantages and, therefore, reduce educational inequality. Based on these findings, the research recommends introducing a school-funded scholarship program that would increase the capacity of poor households and promote current social protection programs more efficiently to suit the differing needs of disadvantaged students.

Keywords: Education system, Impact Evaluation, Reducing Inequality in Education, Social protection programs in Sri Lanka

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Original Article

INTRODUCTION

"Education is the most powerful weapon which can be used to change the world." (Mandela, 2014, p.45). It has been considered one of the major human rights, and it is crucial for the development of any nation. The treatment of education for the life of an individual is considered the most important thing for living a better life and being productive. The World Bank has defined it as vital in developing countries because education reduces poverty and inequality. Poverty is the result of lack of education. Moreover, it also slows down the economic development processes within a country. It enhances Gross Domestic Product (GDP), reduces the infant mortality rate, develops lifetime income, and increases human life expectancy (Glewwe & Muralidharan, 2016). Therefore, education in developing countries plays a vital role.

International conventions and national policies have also always advanced the need for imparting education. United Nations Convention on the Rights of the Child proclaims that every child has a right to education. In addition, in 2015, every member of the United Nations agreed on the 2030 Agenda for Sustainable Development. It consists of 17 goals and 169 targets. Goal 4 focuses on Quality Education (United Nations, 2019, p. 18). According to the United Nations, this goal SDG 4 can be expressed as aiming to "ensure inclusive and equitable quality

education and promote lifelong learning opportunities for all" (United Nations, 2015, p. 21). To achieve the goal of quality education by the year 2030, ten targets have been established. Targets include:

1. Free primary and secondary education
2. Equal access to quality pre-primary education
3. Equal access to affordable technical, vocational, and higher education
4. Increase the number of people with relevant skills for financial success.
5. Eliminate all discrimination in education.
6. Universal literacy and numeracy
7. Education for sustainable development and global citizenship
8. Build and upgrade inclusive and safe schools.
9. Expand higher education scholarships for developing countries.
10. Increase the supply of qualified teachers in developing countries.

Actively pursuing these targets, countries can work towards meeting this goal of Quality Education, ensuring inclusive and equitable educational opportunities for all by 2030.

When considering education performance indicators globally, their achievement is usually higher in literacy rate and primary and secondary school enrollment rates, which are widely considered markers of achievement and performance of



Original Article

education. Literacy rate refers to the proportion of the population in the age group who can read and write (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2019). The best example of this can be attributed to the fact that the global literacy rate stood at 92 per cent among people aged 15 to 24 years in the year 2020, reflecting wonderful gains (World Bank, 2021). In a like manner, the literacy rate for adults (those 15 and above) was 87 per cent (World Bank, 2021). These numbers present a promising pattern in the continual growth of educational opportunities and developing literacy levels.

However, differences in general geographical areas remain. The adult literacy rate in Sub-Saharan Africa stood at 67 per cent for the year 2020, showing that much more needs to be implemented to improve these numbers in that sub-continent (World Bank, 2021). In South Asia, for instance, the illiteracy rate was measured as 23 per cent of the population (World Bank, 2021). Most countries in the Sub-Saharan African region have a literacy rate of less than 50 per cent. Therefore, these regions require targeted interventions to ensure levelling of the playing field in terms of access to quality education and improvement in literacy rates for all.

Another performance indicator in education is the school enrollment ratio. It is defined as the ratio of children of official school age who are enrolled in school to the population of

the corresponding official school age (UNESCO, 1997). The World Bank indicated that the net percentage of primary enrollment stood at 89 per cent in 2018. However, within the same period, the net secondary enrollment ratio (%) among all eligible children was 66 per cent (World Bank, 2020). This, therefore, means that although primary education rates have gone up globally, the rate of enrollment in secondary has gone down. These disparities, most of which are due to factors such as gender, age, location, and household wealth, persist with strength in the dropout rates at the secondary level. It is these disparities that have taken centre stage regarding the differences in continuation observed in students. UNESCO stated that in 2019, around seventeen per cent of all youth, adolescents, and children were out of school. These seventeen percent account for one-sixth of the whole world population. Meanwhile, the percentage is divided into 8.2 per cent at primary, 15.6 per cent at lower secondary, and 35.2 per cent at upper secondary school levels. Further, striking inequalities regarding school enrollment are found among these regions. In 2018, the drop-out rate in Sub-Saharan Africa was 31.2 per cent among children (UNESCO, 2019, p.4), while in South Asia, it was 21.5 per cent of the total (UNESCO, 2019, p.4).

In line with global education trends, Sri Lanka has made significant strides in improving fundamental education indicators, particularly in literacy rates.



Original Article

As reported by the Central Bank of Sri Lanka (2021), the country achieved a commendable literacy rate of 93 per cent in 2020. Notably, both females and males exhibited high literacy rates of 92.2 per cent and 93.8 per cent, respectively, during the same period (Central Bank of Sri Lanka, 2021). This demonstrates the country's commitment to education and literacy. The World Bank (2021) further highlights that 92 per cent of adults aged 15 and above in Sri Lanka possess the ability to read and write, further underscoring the importance placed on education and literacy in the country.

Moreover, the initiation of the all-inclusive free education policy in 1945 has formed the basis for education development in Sri Lanka. This is evidenced in the number of school enrollments as participation has increased due to the influence of this policy on the attainment of primary and secondary education. According to the Central Bank of Sri Lanka, it was estimated that 94 per cent of children attended primary school in the year 2020. During the same period in 2020, the school enrollment ratio for secondary education on account of qualified enrollment of children in secondary schools stood at 91 per cent.

Although these overall positive achievements have been achieved, Sri Lanka still faces disparities across different regions in the country, particularly in estate areas. Evidence of extremely alarming dropout rates for students residing in estate areas was

provided by a study conducted by Vithanage in the Institute of Policy Studies (IPS) of Sri Lanka in 2022. This research identified that in 2021, approximately 4 per cent of primary, 20 per cent of secondary and 26 per cent of collegiate students dropped out of the estate sector (Vithanage, 2022). The estate sector dropouts are much higher when compared to urban and rural sectors, pointing toward regional disparities.

Existing inequalities in the education sector prevent all children from reaching their full potential and accessing equitable opportunities and resources. These inequalities encompass aspects of access to education, quality of education, and learning outcomes (Sarma et al., 2018). Access and quality are critical considerations in determining educational opportunities, while student performance and skills serve as indicators of educational outcomes. These outcomes are influenced by the opportunities available to students (Sarma et al., 2018).

Inequalities within the education sector deny all children the opportunity to realize their full potential and equally avail themselves of opportunities and resources. These inequities relate to aspects such as access, quality, and learning outcomes in and of education (Sarma et al., 2018). Access and quality play a prime role in determining the opportunities available to a student; performance and skills will reflect the outcomes of their education. This



Original Article

outcome, however, will be based on the available opportunities for these students (Sarma et al., 2018).

There are many areas where the facility for basic needs is still lacking in schools, and most of the schools have no water, toilets, or electricity. Specifically, in some districts of the Northern Province, ensuring efficiency is hard due to a lack of facilities for teaching and learning (Sarma et al., 2018). More specifically, the unequal funding in general education can also be considered one of the reasons for generating inequality, which was given to the provincial schools, receiving just 65 per cent of the total expenditure while educating the majority of the students of total enrollment (Ministry of Education, 2018).

In addition, there is unequal distribution of qualified teachers across provinces and districts impinging on the quality of education. There are gaps in academic performance among students in urban areas and those in the estate sector. The differences in performance in the GCE O/L examination in 2018 ranged from 31.16 per cent to 49.98 per cent (Department of Examinations [DOE], 2019). These disparities highlight the need for targeted interventions to address the educational challenges faced by students in specific regions and sectors.

Social protection has an essential role in responding to existing inequalities in education. It provides a vital tool for reducing inequalities and

strengthening resilience throughout an individual's life course (Economic and Social Commission for Asia and Pacific [ESCAP], 2020). Unfortunately, about two-thirds of all the children across the world have remained with no form of social protection (United Nations International Children's Emergency Fund [UNICEF], 2022).

In 1945, the government introduced the Universal Free Education Policy in Sri Lanka, which was taken as one major stride towards the provision of free education right from kindergarten to university by the state for each and every student (Tilakaratne, 2015). This policy recorded enormous effects, promoting school enrollment and attendance without any financial hindrances to access education.

The government has also initiated various social protection programs that do not only target reduction in the education gap. Various programs include provision for free school textbooks and uniforms; this removes the economic burden from poor families and ensures that no child is left behind because of the lack of something. Authorities have also introduced the facility of travelling subsidies through school and higher education season tickets to ensure that children from poor families commute freely without any restriction (Tilakaratne, 2015). In addition, noontime meal programs satisfy nutrition requirements and enhance the attendance rate because of healthy meals in a school day schedule, and



Original Article

therefore, have a positive effect on learning and students' general well-being. It is equally significant to provide scholarship programs for needy families to provide funding sources to eligible students to pursue additional studies so as to maximize their full potential irrespective of the student's family background.

Further, the Ministry of Women, Child Affairs, and Social Empowerment designs group-specific programs for children facing various adversities. The target group programs include programs for economically disadvantaged children, out-of-school children, irregular school-going, natural disaster victims, and children who lost either or both parents. These programs support vulnerable children by ensuring access to education and helping them overcome obstacles.

This study considers various educational assistance programs: the school textbook program, free school uniform material program, stationery program, scholarship program, and mid-day meal and milk program. It evaluates whether students receive support from at least one of these social protection programs for their education. Notably, the study specifically focuses on educational assistance programs.

Inequality in education is measured in terms of students' schooling frequency. This variable was grouped into three categories: frequent schooling, less frequent schooling, and dropout.

- i. Frequent schooling: This category includes students who attend school regularly and consistently, either daily or with minimal interruptions.
- ii. Infrequent schooling: This indicates a child who rarely attends school or attends sporadically, with a considerable gap between attendances.
- iii. Dropout: Students who are considered dropouts have stopped their schooling at any grade and are not enrolled in any educational institution.

These categories provide a framework for understanding the different patterns of school attendance and discontinuity observed among the selected students in the sample.

In light of this, this research paper explores the impact of social protection programs on mitigating educational inequalities in Sri Lanka. As mentioned above, despite advancements in the education system, factors such as school type, teacher availability, infrastructure, and household characteristics (ethnicity, gender, income, and location) contribute to unequal access to quality education. These disparities affect attendance rates and academic performance, particularly for students from economically disadvantaged backgrounds.

The present study aims to address these issues by focusing on how social protection programs within the realm



Original Article

of education may be helpful in reducing inequity in education. It narrows down to assess the effectiveness of existing programs that successive governments have already implemented in Sri Lanka in providing school uniforms, textbooks, stationery, scholarships, and other forms of assistance. Programs that provide subsidies or other necessities to students from indigent families aim at alleviating costs and better-preparing students for improved access and participation in quality education.

The present study, therefore, attempts to bring out some valuable insight into how such programs have contributed towards reducing educational inequalities in Sri Lanka. The problem is therefore presented as an inquiry in the following form: "What is the contribution of social protection programs towards achieving equality in education in Sri Lanka?"

LITERATURE REVIEW

A number of social protection programs are using support and resources for the most disadvantaged to improve equity in education. Many of these strategies involve cash transfers, scholarships, grants, and even targeted financial assistance programs that will serve to reduce barriers and provide equal opportunity for students. Devereux et al. (2004) have cited such measures as important in reducing inequality in education.

Hanushek and Woessmann (2012) emphasized the importance of educational quality and teacher effectiveness in reducing disparities. Using a meta-analysis, they advocate for investments in enhancing education quality, including teacher training and accountability measures, to narrow the achievement gap. Their study underscored the need for evidence-based policies and effective resource allocation to reduce education inequality.

Garcia and Miranti (2015) reviewed universal primary schooling, with a particular emphasis on Conditional Cash Transfers to improve the probability of school enrollment among low-income families. These programs have led to increased participation, but large numbers of the most vulnerable children have not been covered yet. Furthermore, Alderman et al. (2017) carried out an assessment of school feeding programs with conditional cash transfers through random control trials and found the interventions effective in bridging disparities in education and improving learning among vulnerable children.

The study by Baird et al. (2011), through a controlled trial in Malawi, has shown that conditional cash transfers boost enrollment into schools and also reduce dropout rates. Filmer and Schady, 2009, present, in a quasi-experimental approach, how conditional cash transfer in Colombia enhances schooling enrollment and test



Original Article

scores for particular benefits to disadvantaged children.

Evans and Popova (2016) reviewed the impact of cash transfer programs, highlighting through a systematic review their role in increasing investment in children's education and reducing educational inequalities. Using a longitudinal study design, Gitter and Barham (2009) studied conditional cash transfers in Nicaragua and found positive effects on school enrollment and attendance rates among poor and marginalized populations.

Using a meta-analysis, Snilstveit et al. (2016) investigated educational assistance programs in low- and middle-income countries. They note the effectiveness of cash transfer programs and school feeding initiatives in improving participation and learning outcomes. Attanasio et al. (2006) analyzed the "Familias en Acción" program in Colombia using a quasi-experimental approach and found increased school enrollment and reduced child labour among younger children.

Churchill et al. (2021) have examined unconditional cash transfers in Pakistan using a Regression Discontinuity Design (RDD). They revealed positive impacts on school enrollment and grade promotion but mixed effects on school dropout rates and child labour. Gardener et al. (2006) studied the Female Stipend Program in

Bangladesh through a cohort study, which significantly increased girls' enrollment and attendance in secondary school.

Kremer and Muralidharan (2008) assessed private school vouchers in rural India using a randomized controlled trial (RCT) and demonstrated their effectiveness in increasing enrollment and reducing educational inequality. Das et al. (2013) have also pointed out such situations, using a mixed-methods approach to outline how school infrastructure and household investments are vital in the improvement of educational outcomes within rural North India.

Following studies conducted in Sri Lanka, Singh and Rao applied a difference-in-differences methodology in 2012, Gunawardena did a pre-post analysis in 2015, Wijetunge and Dassanayake conducted panel data analysis in 2018, and Arunathilaka used a household survey in 2006-all these authors cited the positive effects of cash transfer programs on school enrollment, attendance, and education performance. The cost-benefit analysis was performed by Kumara & Pfau (2011), who concluded that cash transfer programs are cost-effective in reducing child poverty and incentivizing school attendance; hence, expanding eligibility criteria creates substantial benefits.

The existing studies highlight the crucial importance of reducing educational inequality, with social



Original Article

protection programs playing a vital role in supporting this endeavour. These research articles have extensively examined the determinants of reducing inequality in education and underscored the significance of social protection programs in addressing this issue. However, literature on how social protection programs affect educational inequality in the Sri Lankan context has been relatively scant. Therefore, the study aimed to fill this research gap by investigating the determinants of reduction in inequality in education and assessing the specific impact of social protection programs in the reduction of inequality in education within Sri Lanka.

RESEARCH METHODOLOGY

Data collection technique

This was based on information from a sample of 378 randomly selected households involving 536 school-aged children. Data collection was through the use of a structured questionnaire, while the selection of the sample was through a combination of both purposive and random sampling techniques. Consequently, Colombo, Nuwara-Eliya, Batticaloa, Puttalam, Anuradhapura, and Rathnapura districts have been purposively selected based on two selection criteria, viz., poverty ratio and percentage of informal sector workers. In addition, the respective Divisional Secretariat divisions and Grama Niladhari divisions in the selected areas have also been taken into account. Households in

the selected areas have been randomly selected. The sample size was selected based on equation 01, which is given below (Krejcie & Morgan, 1970).

Equation 01

$$S = \frac{X^2 NP(1 - P)}{d^2(N - 1) + X^2 P(1 - P)}$$

$$= \frac{1.96^2 * 23,348 * 0.5 * (1 - 0.5)}{0.05^2 * (23,348 - 1) + 1.96^2 * 0.5 * (1 - 0.5)}$$

$$S = \frac{22,419.917}{59.32775}$$

$$S = 378$$

Where,

S = sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level ($1.96 * 1.96 = 3.841$).

N = the population size

P = the population proportion (assumed to be 0.50 since this would provide the maximum sample size)

d = the degree of accuracy expressed as a proportion (0.05).

Analytical tool and technique

Using the Propensity Score Matching technique, the impact of social protection programs on the reduction in education inequality in Sri Lanka was estimated. PSM technique controls the selection of observable characteristics by comparing the treatment group with very similar control groups. In addition, this method controls unobservable characteristics based on conditional independence, which means that a set of observable conditioning variables



Original Article

for which the outcome is independent of the treatment condition. PSM allows correcting possible selection by comparing each treatment student with similar non-treated students based on their propensity scores, which is the probability of being in the treatment group based on observed baseline characteristics. PSM technique gives a more accurate non-experimental estimate when there is a self-selection problem.

The first step of the PSM is to estimate the propensity scores. The propensity score is defined as the conditional probability of receiving a treatment given pre-treatment obstacle characteristics (Abadi et al., 2018). Based on a set of observable characteristics that may affect participation in the program, the propensity scores are constructed using a logit or probit model. Once all relevant covariates are selected for inclusion, a logit or a probit regression is performed, and the predicted probabilities are obtained.

If $D_i = 1$, student "i" is receiving social protection, and $D_i = 0$ is not receiving social protection. Associated with each student "i" and each value of treatment $t=1$ or 0, a potential outcome $Y(t)_i$. $Y(t)_i$ represents the outcome variable of student i : frequency of schooling. $Y(t)_i$ can be defined as:

$$Y(t)_i = E\left(\frac{Y(1)_i}{D_i} = 1\right) - E\left(\frac{Y(0)_i}{D_i} = 1\right) \text{---- (2)}$$

The outcome is associated with the treatment level and a vector of pre-

treatment variable X_i . Pre-treatment variables (covariates), X_i include both individual and household characteristics such as age of the student, gender, residential area, the mother's education level, employment status of the head of the household, monthly household income, and number of school-aged children. The variables (covariates) used for the study are measured as the following Table 01.

Table 01: Description of variables

<i>Variable</i>	<i>Type of the Variable</i>	<i>Measurement</i>
Frequency of schooling (dependent variable)	Dummy	1 frequent schooling 0 infrequent schooling
Age of the student	Continuous	Number
Gender of the student	Dummy	1 Male 0 Female
Mother's education	Categorical	0 no schooling 1 primary (grade 1- 5) 2 secondary (grade 6- 13) 3 tertiary and above
Employment status of head of the household	Categorical	0 unemployed 1 government 2 private 3 self employed
Residential area	Dummy	1 urban 0 rural
No. of school-aged children in the household	Continuous	Number
Household income	Continuous	LKR



Original Article

Variable	Type of the Variable	Measurement
Receiving social protection (treatment variable)	Dummy	1 receiving 0 not receiving

These variables cover most of the important determinants of educational inequality, as identified in the literature. The propensity score $P(X)$ is the probability of the student receiving social protection conditional on a vector of observable characteristics.

$$P(X_i) = \Pr(D_i = 1/X_i) \text{----- (3)}$$

Once the propensity scores are estimated, units in the treatment group are then matched with non-beneficiaries with similar propensity scores or probability of participating in the program. Once units are matched, the characteristics of the constructed treatment and control groups are not significantly different. The matched units in the treatment and control groups are statistically compared. Balance is checked using a T-test to compare the means of all covariates included in the propensity score in order to determine if the means are statistically similar in the treatment and comparison groups.

In the current study, students are divided into two groups, namely the students receiving social protection and the students receiving social protection, and ranked according to their propensity scores. The students are matched with similar students from

the other group. Students in the treatment group are matched and compared with students from the control group who have similar characteristics in every aspect except that they don't receive any social protection related to education (Abadi et al., 2018).

$$ATT = E(Y(t)/D = 1, P(X)) - E(Y(t)/D = 0, P(X)) \text{----- (4)}$$

Finally, once the balance is achieved, the intervention's impact is estimated by the average treatment effect. Equation 4 measures the average treatment effect, which can be estimated by subtracting the average treatment effect of the treated group from the control group.

RESULTS AND FINDINGS

Factors influencing social protection

In the first stage of propensity score matching, the study modelled the probability of receiving social protection. The main concept of matching is to compare beneficiaries with non-beneficiaries who share similar observed characteristics (Cruyff et al., 2016). Only variables that affect both the treatment (receiving social protection) and the outcome (educational inequality) are considered for matching and included in the probit model, which is used to derive the propensity scores. To fulfil this requirement, the propensity scores of each individual were predicted using a probit model in this study. The



Original Article

"psmatch" command in STATA was utilized for this purpose. The estimated probit results are presented in Table 02.

Table 02: Probit model

Probit regression					
Log likelihood = -196.23848			Number of obs = 536		
			LR chi2(7) = 89.03		
			Prob > chi2 = 0.0000		
			Pseudo R2 = 0.1849		
<i>Receiving social protection (Dependent Variable)</i>	<i>Coef.</i>	<i>Std Err.</i>	<i>P>z</i>	<i>[95% Conf. Interval]z</i>	
Mother's education	.1911825	.116981	0.102	-.038096	.420461
Employment status of HH	-.1913164	.0877198	0.029	-.363244	-.0193889
Residential area	.3046842	.1499808	0.042	.0107273	.5986412
Household income	-.1292412	.0218415	0.006	-.1720498	-.0864326
No. of school-aged children	.3155326	.0814891	0.000	-.4752483	-.1558169
Age	-.1302369	.0218897	0.000	-.1731399	-.0873339
Gender	.1684641	.143496	0.240	-.1127829	.449711
_Cons	2.195175	.5830335	0.000	1.05245	3.337899

Table 02 showed that out of the seven explanatory variables, five variables are statistically significant at 0.05 level, namely household income, employment status of the head of the household, residential area, number of school-aged children in the family, and age of the student. The other two variables, namely the mother's education level and the gender of the student, are not statistically significant. The model is well specified with a high likelihood ratio of Chi-squared and Pseudo R-squared coefficients. Pseudo R² is a measure of how well the model's variables explain the phenomenon. According to the results, Pseudo R² 0.1849, which means that only 18.49 per cent of the variation in the effects of receiving social protection is explained

by the considered explanatory variables.

In the model, receiving social protection is considered the treatment variable. According to the results in Table 02, it is observed that when household income increases by one unit, the probability of receiving social protection is decreased by 12 per cent. This could be because social protection programs are often designed to support those with lower incomes. As household income rises, families may surpass the eligibility threshold for such support, leading to a reduced probability of receiving social protection. Results in Table 02 show that students from rural areas have a 30 per cent higher likelihood of getting



Original Article

social protection compared to school-attending students from urban areas, possibly due to targeting efforts aimed at rural populations, who, without targeting, have less access to resources and services than their city counterparts. In addition, rural areas may face higher poverty rates, which could also increase the number of beneficiaries eligible for social protection. Also, with the increase in the number of students in the family under school age by one student, the probability of receiving social protection goes up by 31 per cent. The larger the family is, the more children it has, and this usually increases the financial burden and, therefore, their eligibility and receipt of social protection to cover education needs. On the contrary, the results show that for every additional year of age by a student, the likelihood of receiving social protection decreases by 13 per cent. This may be a factor when students grow older and pass the age bracket within which some forms of social protection are offered. Moreover, older students may be expected to contribute to household income or have different educational expenses that already existing social protection schemes may not cover. The higher the employment status of the household head, the lower the probability of receiving social protection by 19 per cent. As the employment status of a household head increases, the income of the household probably improves, hence minimizing their eligibility for social protection aimed at unemployed

or underemployed persons. These observations would, therefore, indicate variations in the relationship between the variable and the probability of receiving social protection in the context of the study.

These findings also help point out the rich insights of how different socio-economic factors affect the possibility of receipt of social protection. They indicate the selectiveness of social protection programs, which depend on household income, residence location, family size, the age of the children, and the kind of occupation that results in employment status.

Balancing check

After estimating the propensity score using the probit model, the study conducted matching between the group of social protection receivers and non-receivers. A statistical test was performed to assess the similarity of observed characteristics between the two groups. The results indicated that there were similarities in observed characteristics between social protection receivers and non-receivers in the sample.

The study further analyzed the impact of social protection by pooling a group of 427 social protection receivers and a group of 91 social protection non-receivers. The "pstest" command in STATA was utilized for this purpose. The command provided the means of the treatment and control groups, as well as a standardized percentage bias.



Original Article

Additionally, a t-test was performed to test the equality of means across the treatment and control groups.

Table 03: Testing of balances of propensity scores and covariates

Variable	Unmatched	Mean		%reduct		t-test		V(T)/
	Matched	Treated	Control	%bias	bias	t	p>t	V(C)
Employment status of HH	U	2.4356	2.7033	-32.0		-0.78	0.006	1.00
	M	2.4356	2.3653	8.4	73.8	1.32	0.187	1.36*
Age	U	11.607	14.231	-81.4		-6.35	0.000	2.11*
	M	11.607	12.539	-28.9	64.5	-3.99	0.000	1.54*
No. of school-aged children in the family	U	1.6557	2.1758	-58.9		-5.50	0.000	0.65*
	M	1.6557	1.7986	16.2	72.5	-2.76	0.006	1.14
residential area	U	1.8642	1.7253	29.3		2.53	0.012	1.01
	M	1.8642	1.8571	1.5	94.9	0.24	0.808	1.71*
Household income	U	40624	32664	34.1		2.80	0.005	1.41*
	M	40624	40889	-1.1	96.7	-0.17	0.869	1.38*

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.176	84.94	0.000	47.1	34.1	111.4*	1.07	60
Matched	0.118	139.34	0.000	21.5	8.4	84.7*	2.26*	80

Table 03 presents a comparison between the unmatched and matched samples, revealing a significant reduction in bias for each variable. This suggests that the matching process effectively addressed the initial differences in observed characteristics between the social protection receivers and non-receivers, leading to a more balanced comparison between the two groups.

Impact of social protection on inequality in education

Once the balancing property is satisfied and the treated and non-treated groups are comparable in terms of socio-demographic characteristics except for social protection, it becomes possible to examine the impact of social protection on reducing inequality in education. The difference in means of imbalanced variables between the two groups can be attributed to the effect of social



Original Article

protection. By analyzing these differences, we can gain insights into how social protection contributes to reducing inequality in education.

To determine similar observations or counterfactuals for each social protection-receiving student and obtain robust estimates of the effect of social protection on reducing inequality in education, the nearest-neighbour matching criteria are employed. This criterion searches for the closest unit(s) in the non-social-protection-receiving group for each social protection-receiving observation based on the estimated propensity score.

In this study, inequality in education is measured by how students attend school, specifically the distinction between frequent and infrequent schooling. By comparing the outcomes of students who receive social protection with those of their matched

counterparts who do not receive social protection, the effect of social protection on reducing education inequality can be assessed.

After matching similar non-social protection-receiving observations to social protection-receiving individuals, the average treatment effect (ATE) was calculated. The ATE represents the estimated impact of social protection on reducing inequality in education. To determine the statistical significance of the estimated effect, the researchers also reported the corresponding z-value.

The results of the propensity score matching, which estimate the impact of social protection on reducing inequality in education, are presented in Table 04. The researcher specifically focused on the ATE and its associated z-value as indicators of the effectiveness of social protection in reducing education inequality.

Table 04: Average treatment effect of social protection on inequality in education

<i>Frequency of schooling</i>	<i>AI Robust</i>			<i>Z</i>	<i>P> z </i>	<i>[95% Conf. Interval]</i>
	<i>Coef.</i>	<i>Std. Err.</i>				
ATE Receiving social protection (1 vs 0)	.1351351	.0568119		2.38	0.017	.0237858 .2464844

Results in Table 04 indicate that students who have social protection attend school more frequently compared to students who do not receive social protection. Estimation

results indicate a probability of approximately 13 percent higher to go to school more frequently for students with social protection. This supports the fact that social protection results in



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positive and significant contributions toward daily attendance at school.

These findings have important implications for reducing inequality in education. Government social protection can help address the challenges that stand in the way of students attending school regularly.

Therefore, it is based on these results that the Sri Lankan government is encouraged to put in place a well-rounded social support program among school-aged children. Such programs should encompass financial support, educational assistance, and other forms of aid that will give all children equal opportunities to receive education. Moreover, the government needs to give special attention to disadvantaged students and marginalized communities so as to reduce the current inequality in educational resource distribution further.

Thus, the government, through a well-rounded social support program, can ensure equity in the educational system and equal opportunity for all, regardless of economic background. In turn, such initiatives will present an opportunity to contribute to the total development and well-being of the entire nation by offering quality educational opportunities to every child.

CONCLUSION

This analysis provided valuable insights into the impact of social protection programs on reducing inequality in education in Sri Lanka. Through the utilization of the Propensity Score Matching (PSM) model, this study successfully achieved the objective of identifying the effects of social protection programs on educational inequality. The finding reveals that when students receive at least one form of social protection, there is a significant positive impact on their school attendance. Specifically, the probability of students attending school frequently increases by more than 13 per cent compared to those who do not receive social protection.

These findings saddle social protection programs with great importance, as they reduce inequalities in education and improve equity in school attendance. Social protection programs are crucial since improved school attendance levels reduce the gap in education between pupils from different socio-economic backgrounds; hence, equality in education is enhanced by creating equal opportunities for all to learn and compete academically.

Based on data analysis, the researcher proposes key policy implications to decrease educational inequality in Sri Lanka, offering guidance for policymakers and relevant authorities.



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- i. **School-Funded Scholarship Program:** Monthly education expenditure affects educational inequality, highlighting the struggles of low-income families. Introducing a school-funded scholarship program to provide educational materials (stationery, shoes, bags) to these students is recommended. Funding can be sourced by renting school facilities, securing grants, and hosting fundraising events. This initiative reduces the government burden and covers general school expenses, which are managed by school leadership and the past pupil association.
- ii. **Enhancing Social Protection Programs:** Findings show students with social protection are 13 per cent more likely to attend school frequently. To improve impact, link social protection to academic performance and attendance, with close monitoring. Basic needs support, like food and beverages, should be provided unconditionally. This ensures frequent attendance and better educational outcomes.

In conclusion, implementing a school-funded scholarship program and improving social protection effectiveness can significantly reduce educational inequality in Sri Lanka.

Lastly, this research study has a few limitations. Due to the pandemic Covid-19, the respondents of the households sounded unwilling to

cooperate with the surveyor. Issues related to the pandemic, such as maintaining social distancing, or avoiding too much contact with outsiders, prevented them from cooperating fully with the research study.

The respondents demonstrated a lack of interest or willingness to dedicate sufficient time to respond to the questionnaire. Their busy schedules and other commitments limited their availability to engage with the survey.

Differently-abled children often experience inequality in education. However, in this study, data related to them was not considered. Therefore, it is recommended to include them in future studies to address this important aspect of educational inequality.

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