

DO POVERTY DETERMINANTS DIFFER OVER EXPENDITURE DECILES? A SRI LANKAN CASE FROM 1990 TO 2010

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Abstract

The purpose of this paper is to examine the poverty profile and the determinants of poverty over expenditure deciles in Sri Lanka in 1990 to 2010. The study employed probit, Quantile and OLS regressions based on Sri Lankan HIES data. The results confirm that the major determinants of household poverty in Sri Lanka are human capital-related factors which can be linked to the labour market. This is a common factor for each expenditure quantiles in Sri Lanka. Quantile regression results showed that remittances played a significant role in poverty reduction, in particular; higher expenditure quantiles indicated a higher impact. Further, the 2009/10 results confirmed that local remittances have contributed tremendously to poverty reduction in the higher expenditure quantiles.

Keywords: Poverty Profile, Poverty Determinants, Expenditure Deciles, HIES Data, Quantile Regression, OLS, Sri Lanka

INTRODUCTION

Analysis of the determinants of household poverty is imperative in order to develop strategies for efficient and effective intervention schemes aimed at poverty reduction. A key point in poverty analysis is the poverty profile, where poverty measurements provide significant yardsticks for understanding the nature of poverty, which differs from region to region and country to country. Since the poverty profile describes the pattern of poverty, understanding the poverty profile is vital for effective planning for poverty reduction in any country. However, poverty profiles are not principally concerned with the factors which determine household poverty but instead represent more of a cross-sectional association between poverty and

various characteristics. A satisfactory explanation of why some people are poor is essential to tackle the roots of poverty in any country; in particular, the correlates of poverty in a country/region/area are important in understanding the depth of the problem as the probability of being poor varies significantly with characteristics such as the location of the household and the characteristics of the head of the household and/or their spouse.

Poverty may be due to national, sectoral, community, household or individual characteristics. Therefore, many studies have attempted to explore the factors causing poverty in national and international arenas (Bhatta & Sharma, 2006; Datt & Jolliffe D., 1999; Epo & Baye, 2012; Jalan, Ravallion, & Unit, 1998; Okurut, Odwee, & Adebua, 1999; Rodriguez, 2002). However, since there is no reason to believe that the root causes of poverty are the same everywhere in the world, country-specific poverty analyses are indispensable in designing effective local poverty reduction programmes. In particular, poverty changes over expenditure deciles add new insights to the poverty literature. Thus, this paper attempts to identify and analyse the main factors which have determined household poverty in Sri Lanka, particularly among expenditure deciles within the last two decades, using four comparable household surveys conducted in 1990/91, 1995/96, 2006/07 and 2009/10. A notable feature of this study is that the study aims at the changes of poverty determinants among the expenditure deciles for the first time in Sri Lanka poverty literature.

Poverty has always occupied a prominent place in the economic development agenda of successive governments in Sri Lanka since independence. This is evidenced by the fact that Sri Lanka had achieved the MDG Goal 1 by 2010 despite the difficulties caused by the long-lasting ethnic conflict between the Tamil minority and Sinhalese majority. However, the economic benefits of development have not been evenly distributed over the whole country. Regional disparities are large and have been a key concern. Therefore, a detailed poverty analysis is necessary: (1) to have a clear understanding of the fundamental causes of poverty; (2) to observe which factors contribute more to poverty changes in each expenditure decile separately, and; (3) for developing an effective strategy for combating poverty in Sri Lanka.

Poverty Trends in Sri Lanka

Sri Lanka is an island nation-state in the Indian Ocean with a land area of 6.55 million hectares and a middle-income developing economy with a GDP per capita of US\$ 3280 and GNP per capita of US\$ 3191 in 2013. Although successive governments have given top priority to welfare programs while improving other aspects of the economy over time, poverty and inequality have remained as a main problem which hinders the development of the country.

Figure 1 shows that how poverty has changed (dropped tremendously) at the national and sectoral levels in Sri Lanka within the last two decades. Poverty headcount ratio has fallen down from 26.1 per cent in 1990/91 to just 6.7 per cent of the population living in poverty in 2013. However, rural and estate sectors were above the national average while only the urban sector was below the national average of poverty measures in 2013.

Figure 1: Poverty headcount ratio in Sri Lanka 1990-2013

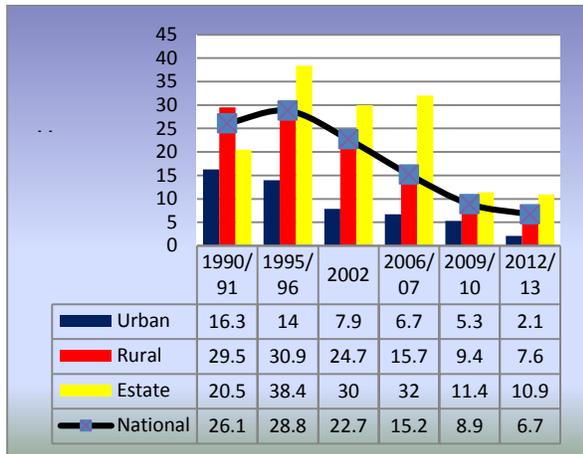
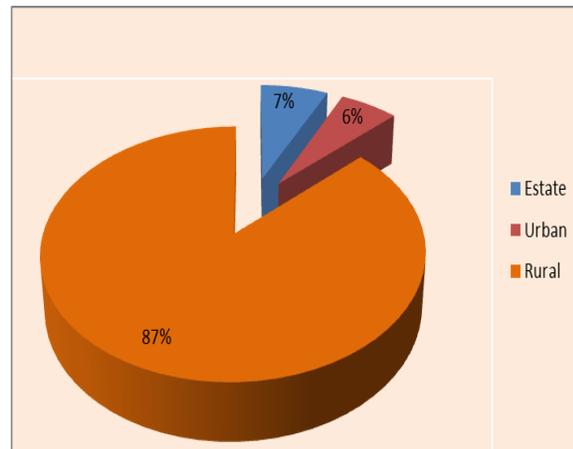


Figure 2: Contribution to total poverty by sector in Sri Lanka in 2013



Source: Department of Census and Statistics, Sri Lanka, Various HIES reports 1990-2013

In contrast, the fact that nearly 87 per cent (Figure 02) of the total poor belong to the rural sector indicates that rural poverty in Sri Lanka is alarming yet. The sectoral imbalances in economic development enlarge the gaps between rich and poor while creating poverty groups within the rural sector. Sri Lanka has already achieved the first Millennium Development Goal of reducing national poverty, and reducing sectoral poverty by 50 per cent, except in the estate sector. Although only the percentage measures for poverty analysis are often considered, the number of poor people is also important in planning effective poverty reduction programmes in each district.

EMPIRICAL STUDIES ON POVERTY DETERMINANTS

Among the vast area of rich literature on poverty, this study focused at the literature on poverty measures and determinants, as it is important to identify the poor, the nature and extent of poverty and to assess the impact of policies and welfare programs on the poor (Gunawardena, 2004). Considerable analytical efforts have been made within the last two decades in poverty-related studies directed toward driving good practices in measuring poverty in all its dimensions

and generating the data required. Those studies primarily focused on the determinants of poverty, how changes in economic policies influence poverty and various other poverty measures (Datt & Jolliffe D., 1999; Datt & Ravallion, 1992; De Silva, 2008; Deaton, 1997; Mok, Gan, & Sanyal, 2007; World Bank, 2005).

Most of the poverty studies were based on multivariate regression analysis to identify the determinants of poverty at the household level, using reduced form models of various structural relationships (Glewwe, 1991). The literature indicates that regardless of the definition of the poverty line, the most commonly used dependent variables in poverty functions are dichotomous in nature or measures of the poverty gap. However, there is debate over the usefulness of poverty probit versus an OLS on consumption (Coudouel, Hentschel, & Wodon, 2002; Pradhan & Ravallion, 2000; Ravallian, 1996; Ravallion & Wodon, 1999; Wodon et al., 2001; World Bank, 2005). It is argued that taking the dependent variable as a binary variable will lose a lot of information about the dependent variable and make the estimates of logit or probit regressions relatively sensitive to specification errors. However, there are some appropriate uses of probit or logit regressions (Coudouel et al., 2002, p. 45). Firstly, probit and logit regressions can be used to assess the predictive power of various variables used for means testing for targeting analysis. Secondly, probit or logit regressions can be used to analyse the determinants of transient versus chronic poverty where panel data are available.

Although there is a rich literature on poverty focused on the measurement of poverty and related issues, there are very limited studies of poverty determinants in Sri Lanka (De Silva, 2008; Gunawardena, 2004; Ranathunga & Gibson, 2014; Ranathunga & Gibson, 2015). De Silva showed that education of the head of the household, or having a household head engaged in salaried employment or engaged in business, were the most significant positive poverty determinants for Sri Lanka for the year 2000. She further identified that the probability of being poor rises with household size, the household head being female, living in a rural area, and being a casual wage earner. These results were obtained by estimating a logistic regression for poverty determinants using data from the Sri Lanka Integrated Survey conducted by the World Bank in 2000. Ranathunga and Gibson (2014); Ranathunga and Gibson (2015) showed that poverty determinants in Sri Lanka are mainly human capital related factors which can be linked to the labor market. Further they have showed that both international and internal remittances have contributed significantly to poverty reduction in Sri Lanka in all the years both in the rural sector and the estate sectors comparing 1990 and 2010. However, none of these studies focused on the poverty determinants and the changes among expenditure deciles.

A recent study (World Bank, 2007) on poverty in Sri Lanka indicated that poverty is strongly associated with attributes of individuals/households such as educational attainment,

employment status, and family size. Further, this report explains that larger households, especially those with children, are more likely to be poor whereas households with a member working abroad have a significantly lower likelihood of being poor. It has been found that after individual differences are accounted for; the likelihood of being poor also depends on a range of spatial factors, such as poor regional growth and employment opportunities, and the availability of infrastructure, such as roads and electricity.

METHODOLOGY

In this paper, quantile and ordinary least square (OLS) regression models are employed to examine the behaviour of determinants of poverty within expenditure deciles in Sri Lanka. This study uses disaggregated data from two Household Income and Expenditure Surveys (HIES) carried out by the Department of Census and Statistics (DCS) Sri Lanka in 1990/91 and 2009/10. DCS Sri Lanka conducted HIES once every five years until 2006/07 and then, once every three years, mainly covering demographic factors, health and education, food and non-food expenditure, and household income from different sources including transfers. The HIES 2009/10 was conducted covering the entire county for the first time.

Dependent Variable

An appraisal of the literature shows that most studies have used household income or expenditure as a welfare indicator, which is compared to the poverty line to identify poor households. The study uses household consumption expenditure to form the dependent variable, because income data in many countries is believed to be less reliable than consumption data in household surveys (Deaton, 1997). Since income is often under-reported and there are difficulties in quantifying some incomes (e.g. self-employment and capital income), income data is expected to be less reliable. Also there is a time factor that has an influence on recorded income due to seasonality; this is likely to have less effect on expenditures. Hence, consumption is often regarded as better indicator of poverty calculations. Household per capita expenditure per month was used as poverty measurement variable, adjusted for household size (number of household members). It was calculated considering both food and non-food expenditure, including in-kind transactions for the household.

Explanatory Variables

The explanatory variables included in this study are the demographic and socio-economic variables of the household, the location of the household (urban, rural, estate), human capital variables and other attributes of the households. Some of these variables are included as

continuous variables and some are dummy variables. The key causes of poverty and correlates of poverty usually include regional level characteristics, community level characteristics, household level and individual characteristics.

Demographic and socio-economic variables were captured using the age and employment status of the head of the household. The latter was explained using three dummy variables: employment in the government sector; private sector; or self-employed based on the available data. Further, agricultural and non-agricultural sectors were added as dummy variables in the employment sector. The gender of the household head was determined by applying the value 1 if the household head was female and 0 otherwise. Although there is debate concerning the sign expected for this variable, most of the literature assigns a negative sign for a male head of the household. This means male-headed households are less likely to be poor while female-headed households are more likely to be poor (Mok, Gan, & Sanyal, 2007). Ethnicity was also considered as a dummy variable. If the head of the household belonged to a non-Sinhalese group, the value assigned was 1, and otherwise zero (Table 01).

The variable 'age of the head of the household' captured work experience. The expected sign here was negative, because the greater the age, the higher the level of work experience and thus the higher the age, the higher the earnings. Further, both the dependency ratio variable, which includes the number of children under the age of 15 and elderly people above the age of 60 in the household, and the household size variable, were included in the model.

Table 1: Explanatory Variables

Variable	Description
Household Head:	
Age	Number of years
Employed in government sector	Dummy if head engaged government job=1
Employed in private sector	Dummy if head engaged private sector job=1
Self-employed	Dummy if head engaged in self-employment =1
Engaged in non-agricultural job	Dummy if head engaged in non-agriculture job=1
Education	Number of years of schooling
Ethnicity (non-Sinhalese=1)	1 if head is non-Sinhalese
Household Demography :	
Spouse employed	1 if spouse employed
Female-headed household	1 if household head is female
Average education of other members	Average number of schooling years of the members of the household except head and those who are still in school
Household size	Number of household members living in the household
Female adult ratio	Number of females over age 15, divided by total household size
Dependency ratio	number of children below the age of 15 and elderly above 60

Remittances:	
Local Remittance	1 if household receives local remittances
Foreign Remittance	1 if household receives foreign remittances
Region:	
Rural	1 if household is located in rural sector
Estate	1 if household is located in estate sector
Urban	1 if household is located in urban sector

Source: Compiled by the author

The human capital variable captured the education of the members of the household and the head of the household. The education of the head of the household and the average years of schooling of the other members of the household are included as two variables. It is assumed that a year of education is of equal value regardless of the school, the curriculum and the time period when schooling took place. Education is considered a significant determinant of household welfare in most of the studies in Sri Lanka as well as in other similar developing nations (De Silva, 2008; Glewwe, 1991; Mok et al., 2007). As higher education qualifications provide better opportunities for earnings, the expected sign for the variable is negative.

Foreign and local remittances were included as explanatory variables in this study and the expected signs were negative. Sectoral dummies have been included for urban, rural and estate sectors to capture regional disparities.

Quantile Regression Analysis and Ordinary Least Square (OLS) Analysis

Quantile regression, as introduced by Koenker and Bassett (1978), may be viewed as an extension of classical least squares estimation of conditional mean models to the estimation of an ensemble of models for several conditional quantile functions. Quantile regression (QR) analysis examines the correlation between real expenditure per capita (natural log) and poverty determinants (explanatory variables) in urban, rural and estate sectors in Sri Lanka at the mean and various other expenditure quantiles. Compared to the OLS regression, quantile regression has two attractive features (Cameron & Trivedi, 2010). First, quantile regression is more robust than OLS regression, as OLS is sensitive to the presence of outliers, and thus can be inefficient when the dependent variable takes a highly non-normal distribution. Second, the correlation of poverty determinants with relative poverty (items of the various quantiles of expenditure) can be examined along the welfare distribution through QR. Therefore, it provides a richer analysis of data than OLS.

As the dependent variable for the QR is monthly real per capita expenditure as a natural log, the estimated values for the independent variables in each quantile show the percentage

change in monthly expenditure per capita with respect to a unit change in factors associated with household poverty in Sri Lanka.

Although household expenditure is a continuous variable, we examined the poverty status of the households as the poverty determinant. Therefore we used the poverty status of the household; poor/not-poor as a binary variable. To examine poverty status we used the poverty line to derive the dichotomous dependent variable in the model. Thus, we used the probit model to examine how poverty determinants impacted on changes in the probability of a household being poor over the past two decades in Sri Lanka. In addition, we used a linear probability model estimated by OLS to compare the averages between per capita expenditure and poverty determinants, using an identical set of independent variables.

RESULTS AND DISCUSSION

Quantile Regression and Determinants of the Household Poverty in Sri Lanka

This section discusses the quantile-based impact of various demographic and other characteristics on household expenditure in Sri Lanka. Although OLS estimates identify the impact of the covariates on the conditional mean of household expenditure, they do not indicate the size and the nature of these effects on the tails of the household expenditure distribution. The conditional mean measures only the centre of the conditional distribution of the response variable. Conversely, QR estimates provide a better picture of the effects of the covariates and give a more complete summary of the conditional distribution.

The determinants of per capita expenditure at the selected per centiles along the distribution were examined over time by comparing these with OLS at the mean. Table 02 and Table 03 depict the magnitudes of the determinants of expenditure at different points of the conditional distribution of the household expenditure in Sri Lanka in general in 1990 and 2010 respectively. QR results indicate that the covariates of education, foreign remittances, whether the spouse is employed, the female adult ratio, whether the household head is engaged in a non-agricultural job and belonging to an ethnic minority played important roles in poverty reduction in 1990 (Table 02). Regarding female adult ratio, the magnitude of the coefficient has increased in lower expenditure deciles in 2009/10 but decreased in the 90th decile and in the mean compared to 1990/91. If the head belongs to non-Sinhalese ethnicity, they are more likely to be poor regardless of the expenditure quantile in 2010 (Table 03). However, compared with the mean, the higher expenditure deciles depict a greater impact. Sectoral dummies indicate that households located in the urban sector have higher expenditure compared to the other two sectors. Even within the urban sector, higher expenditure deciles indicate higher expenditure levels with respect to the above covariates.

Table 2: Determinants of Expenditure at Mean and Selected Quantiles in Sri Lanka 1990/91

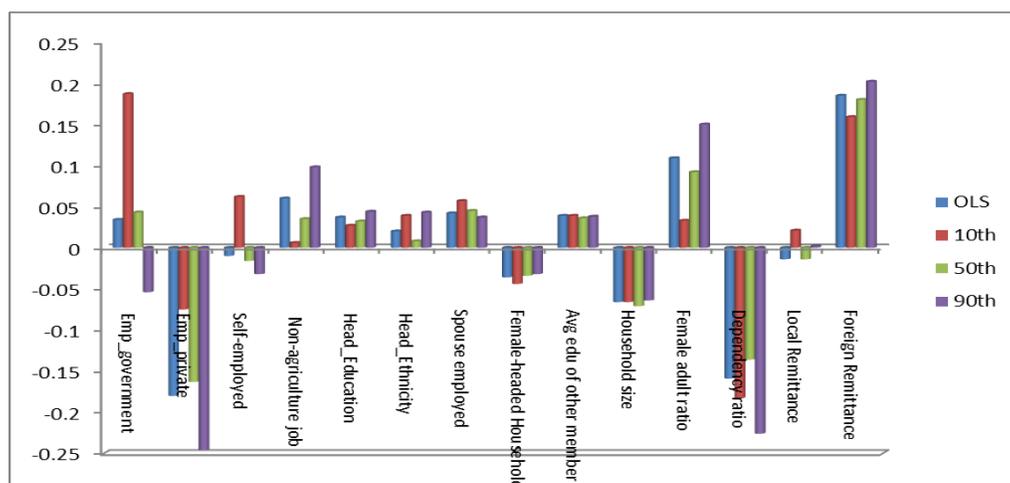
Dependent Variable: Lnexp_Capita, N=89967

Poverty Determinants	OLS	10 th	50 th	90 th
Household Head:				
Age	0.003 (24.95)**	0.003 (15.65)**	0.003 (24.02)**	0.004 (22.45)**
Employed in government sector	0.034 (5.26)**	0.187 (17.39)**	0.043 (5.60)**	-0.054 (4.47)**
Employed in private sector	-0.180 (31.40)**	-0.075 (11.30)**	-0.163 (23.38)**	-0.246 (22.82)**
Self-employed	-0.010 (2.06)*	0.062 (7.55)**	-0.016 (2.83)**	-0.032 (4.35)**
Engaged in non-agricultural job	0.060 (14.58)**	0.006 (0.89)	0.035 (6.21)**	0.098 (12.27)**
Education (number of years)	0.037 (69.19)**	0.027 (30.34)**	0.032 (52.40)**	0.044 (60.26)**
Ethnicity (non-Sinhalese=1)	0.020 (4.13)**	0.039 (5.78)**	0.008 (1.29)	0.043 (6.23)**
Household Demography:				
Spouse employed	0.042 (12.03)**	0.057 (10.14)**	0.045 (10.51)**	0.037 (7.15)**
Female-headed household	-0.036 (4.31)**	-0.044 (3.96)**	-0.034 (3.33)**	-0.032 (2.14)*
Average education of other members (No of years)	0.039 (51.13)**	0.039 (35.08)**	0.036 (37.62)**	0.038 (27.30)**
Household size	-0.066 (80.07)**	-0.066 (52.73)**	-0.071 (63.27)**	-0.064 (54.54)**
Female adult ratio	0.109 (7.09)**	0.033 (1.33)	0.092 (6.98)**	0.150 (7.48)**
Dependency ratio	-0.159 (19.14)**	-0.183 (14.37)**	-0.136 (15.18)**	-0.226 (23.11)**
Remittances:				
Local Remittance	-0.014 (1.63)	0.021 (1.26)	-0.014 (1.18)	0.002 (0.11)
Foreign Remittance	0.185 (21.66)**	0.159 (13.23)**	0.180 (17.24)**	0.202 (15.85)**
Region:				
Rural	-0.051 (6.24)**	-0.117 (17.49)**	-0.166 (50.62)**	-0.231 (34.38)**
Estate	-0.217 (27.38)**	0.021 (2.25)*	0.053 (4.41)**	-0.010 (0.60)
Urban	6.507 (479.61)**	5.936 (357.85)**	6.524 (663.49)**	6.998 (394.54)**
R-squared	0.34			

Source: Author's calculation using HIES data in 1990/91

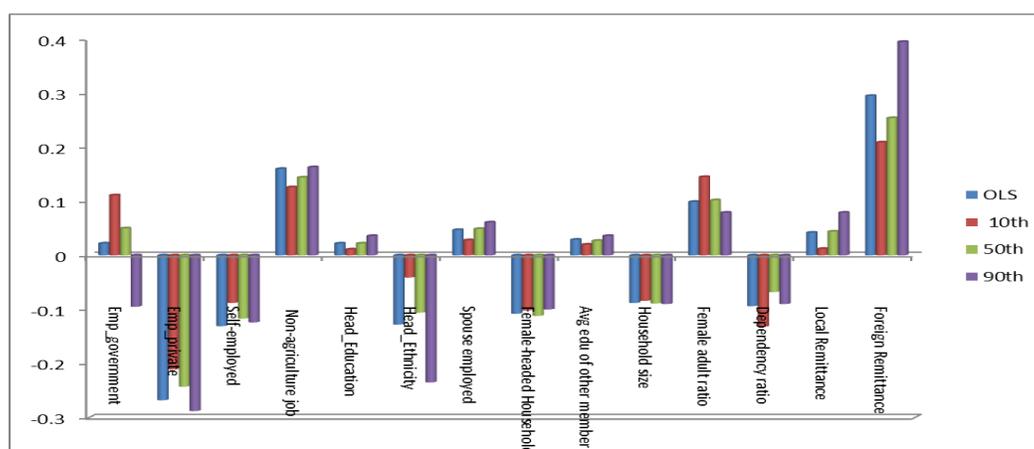
* Significant at 5%; ** significant at 1% Robust t statistics in parentheses

Figure 3: Changes in the Determinants of Expenditure at Mean and Selected Quantiles in 1990 in Sri Lanka



Source: Compiled by the author using HIES data

Figure 4: Changes in the Determinants of Expenditure at Mean and Selected Quantiles in 2010 in Sri Lanka



Source: Compiled by the author using HIES data

Table 3: Determinants of Expenditure at Mean and Selected Quantiles in Sri Lanka 2009/10
Dependent Variable: Lnexp_Capita

Poverty Determinants	OLS	10 th	50 th	90 th
Household Head:				
Age	0 (2.38)*	0 (2.07)*	0.001 (4.72)**	0.001 (4.08)**
Employed in government sector	0.022 (2.81)**	0.111 (6.79)**	0.05 (8.28)**	-0.095 (5.92)**
Employed in private sector	-0.268 (40.68)**	-0.211 (21.88)**	-0.243 (47.56)**	-0.288 (31.01)**

Table 3...

Self-employed	-0.131 (21.30)**	-0.088 (8.97)**	-0.117 (18.20)**	-0.124 (8.68)**
Engaged in non-agricultural job	0.16 (33.71)**	0.126 (22.71)**	0.144 (27.88)**	0.163 (15.79)**
Education (number of years)	0.022 (42.77)**	0.011 (12.29)**	0.022 (39.75)**	0.036 (32.26)**
Ethnicity (non-Sinhalese =1)	-0.128 (29.34)**	-0.041 (5.18)**	-0.106 (23.61)**	-0.235 (29.11)**
Household Demography:				
Spouse employed	0.047 (10.32)**	0.028 (4.20)**	0.049 (13.30)**	0.061 (9.69)**
Female-headed household	-0.108 (19.90)**	-0.102 (14.92)**	-0.112 (17.19)**	-0.1 (8.72)**
Average education of other members (No of years)	0.029 (36.55)**	0.02 (19.79)**	0.027 (33.74)**	0.036 (25.45)**
Household size	-0.088 (78.76)**	-0.084 (53.53)**	-0.089 (82.12)**	-0.09 (42.79)**
Female adult ratio	0.099 (7.04)**	0.145 (7.23)**	0.102 (4.95)**	0.079 (2.37)*
Dependency ratio	-0.094 (9.15)**	-0.132 (11.21)**	-0.068 (6.16)**	-0.09 (4.24)**
Remittances:				
Local Remittance	0.042 (5.22)**	0.012 -1.3	0.044 (8.75)**	0.079 (4.56)**
Foreign Remittance	0.295 (37.28)**	0.209 (18.56)**	0.254 (46.50)**	0.395 (21.63)**
Region:				
Urban	0.282 (37.45)**	0.271 (25.79)**	0.257 (42.59)**	0.24 (14.96)**
Rural	0.054 (7.55)**	0.079 (6.90)**	0.054 (6.87)**	-0.029 (2.37)*
Constant	8.664 (496.59)**	8.211 (379.77)**	8.62 (445.06)**	9.187 (281.92)**
Observations	79585	79585	79585	79585
R-squared	0.28			

Source: Author's calculation using HIES data in 2009/10

* Significant at 5%; ** significant at 1%, Robust t statistics in parentheses

Household size, dependency ratio, being located in the rural and estate sectors, female-headed households, engaging in self-employment and private sector employment show a negative relationship with per capita expenditure despite the income deciles.

Compared to the QR results in 1990 (Table 03), the 2010 results (Table 04) show an almost similar trend. However, two main variables have changed within the last two decades.

These are the ethnic minority variable and local remittance. Accordingly, changes in the coefficients can be examined through the deciles and a few changes can be identified in these two sectors.

CONCLUSION

This study mainly focused on changes in micro-level poverty determinants over expenditure deciles in 1990 and 2010, and on their behaviours. The results show that the major determinants of household poverty in Sri Lanka are human capital-related factors which can be linked to the labour market. This is a common factor for each expenditure quantiles in Sri Lanka. Also it was apparent that increasing the level of education (number of years schooling) of the head of the household, and education of other family members decreased household poverty in Sri Lanka irrespective of the expenditure quantiles.

Another major observation is that the characteristics of the household head and other family members, notably employment, gender, age of the head of the household and household size, dependency ratio, and receipt of remittances have significantly influenced household poverty in Sri Lanka during the past two decades.

However, the results indicated that despite significant reduction of overall poverty in Sri Lanka by 2010, female-headed households are more likely to be poor in lower expenditure quantiles. The larger the household size, the greater the likelihood of being poor and the impact is greater in the higher expenditure deciles. Further the results indicated that factors affecting poverty vary according to the location of the household.

It was observed that both international and internal remittances have contributed significantly to poverty reduction in Sri Lanka throughout the period 1990–2010. QR showed that remittances played a significant role in poverty reduction, in particular; it was indicated a higher impact higher in expenditure quantiles. Further, the 2009/10 results show that local remittances have contributed tremendously to poverty reduction in the higher quantiles.

In terms of future directions, there are many opportunities for research to build on the current platform. For example, with respect to poverty analysis, this research can be expanded by including new poverty determinants in particular, one can examine multi-dimensional poverty index. Poverty changes could also be viewed more clearly by developing a panel data set for each region separately.

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