

Multilevel Analysis of Urban Poverty in Sri Lanka

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Abstract

Urban poverty in Sri Lanka has long been neglected and given less priority in policy interventions and academic contributions following favorable nominal poverty statistics which underscore the need for urgent attention in matters pertaining to urban livelihood. The negligence of the urban sector and the urban poor for many decades has created a severe dearth of academic contributions. Thus the main objective of this paper is to examine poverty covariates in the urban sector to void some of these knowledge gaps which are vital to be addressed at the current development phase in the country. This study utilizes multilevel models to analyze poverty variations in the urban sector taking both individual and contextual levels simultaneously. It was found that about 11 per cent of total error variance of poverty was attributed to the contextual level. While age, gender, family size, education level and employment status significantly contributed at the individual level; female labor force participation, magnitudes of main employment sectors: agriculture, service and industry were significant at the structural level. It was evident that the risk of poverty varied across districts considerably but there was no evidence of significant variations in the patterns of covariates. Findings of this study suggest that poverty alleviation policies should focus on multilateral way.

Keywords: Urban poverty; Asset index; Multilevel mixed models; Sri Lanka

1. Introduction

In contrast to many developing economies, and especially those of South Asia, Sri Lanka has experienced relatively low rates of urbanization (1 per cent). According to Department of Census and Statistics (DCS, 2016a), poverty in Sri Lanka is also said to be predominantly rural with more than 70 per cent of rural population. However, urban sector provide very favorable poverty statistics from the national point of view. It has the lowest rates of poverty in Sri Lanka with only 5.3 percent of the population falling below the poverty line. This is significantly lower than the national rate of 8.9 per cent and the rural rate of 9.4 per cent (DCS, 2016b).

Although the nominal poverty status is very favorable, there are several vital reasons which demand a rigorous sector-specific poverty analysis for the urban sector. Firstly, the story behind the nominal official poverty statistics is not favorable for the urban sector. Although the percentage of population below the poverty is higher in rural areas, the absolute number of the poor is larger in urban areas proving the monetary poverty rate (HCI- Head Count Ratio) is misleading (Center for Poverty Analyses- CEPA, 2008). Further, the depth and severity of poverty in urban areas are higher (DCS, 2016a). Therefore, urgent attention to the matters pertaining to urban livelihood should be paid. However, perhaps followed by the favorable nominal statistics, poverty in the urban sector has been relatively neglected and it has been given less importance in the development agenda. Consequently, much of the research done on poverty as well as the policy formulation and interventions are heavily biased towards the rural and estate sectors (Gunetilleke, Cader, & Fernando, 2004). Though, this knowledge gap of urban poverty still exists highlighting a vital need for more research (CEPA, 2008) there is no systematic academic contribution so far to analyze urban poverty in depth (Thuduwe, 2001).

Secondly, it has been identified that the country's urban population has been steadily growing over the past years and present level exceeds 30 per cent of the total population. Further, there is a significant increase of the poor in the urban sector (Siddhisena & Jayathialake, 2004). Therefore, urban poverty should be one of the key areas to be concerned (Ministry of environment and natural resources, 2007).

Thirdly, factors that determine poverty exist in both individual (Datt & Gunewardena, 1997; DCS, 2013a; DCS, 2013b; Gunetilleke & Cader, 2007; Senavirathna, 2003; Siddhisena & Jayathialake, 2004) and contextual levels (Gunetilleke & Cader, 2007; Sandaratne, nd; Tudawe, 2001; World Bank-WB, 2016; WB, 2007) which creates heterogeneity across regions, sectors, communities etc. This also specifies the need of sector specific analysis in one hand and the use of the appropriate statistical technique which can address the multilevel data on the other. Especially, the latter stressed the need of correcting the conventional methodological issues. Given this context, the main objective of this paper is to assess poverty levels disaggregated by socio-economic profiles of households as well as to examine the influence of macro-level factors simultaneously in urban sector. Contribution of the study can be signified through the expansion of the multilevel poverty literature, urban focus. More specifically, this is the first academic contribution in identifying poverty covariates under the method of multilevel modeling in Sri Lanka.

This paper is organized as follows. Followed by the introduction, Section 2 focuses on the available

literature. Individual and contextual level poverty correlates that have been analyzed by the previous researchers are reviewed in the section. Section 3 deals with the methodology while Section 4 delineates with the results. Final section concludes with a brief summary of main findings and policy implications.

2. Previous Research

The majority of the poverty researches focused on personal and household-level characteristics such as age gender marital status ethnicity family size, number of elderly people in the household, level of education etc. with human capital theory perspective. Research findings regarding age are controversial in contemporary urban poverty literature. Some of them argued that poverty increases with a person's age as the productivity of the individual decreases, resulting in a loss of income (Alem, 2010; He, Wu, & Webster, 2010; Onu & Abayomi, 2009). In contrast some of the findings are in line with human capital theory which claims that individuals get older, they accumulate more knowledge and work experience, poverty incidence should be lower (Becker, 1975). In relation to poor in Sri Lanka, Siddhisena and Jayathialake (2004) found that share of the young is higher among the poor. For most researchers in the local setting, age is insignificant in explaining poverty. Higher tendency of female-headed households to fall in poverty or feminization of poverty has been the focus of many studies in recent times (Akerlele, Phillip, & Ashaolu, 2012; Anyanwu, 2013; Brady & Burroway, 2012; Chen, & Wang, 2015). Szekely (1998) find that male-headed households are more likely to suffer from poverty while Rodriguez (2011) found no evidence of the feminization of poverty. Gender is not reported be a significant factor in explaining any type of poverty (Datt & Gunewardena, 1997; DCS, 2009; Thuduwe, 2001). Household size and dependency ratio have often been shown as a significant factor in household exposure to poverty in many studies (Anyanwu, 2013; Aassve & Arpino, 2007; Chen, & Wang, 2015; He et al., 2010; Ofem, Akpan, & Uoren, 2010). Large family size is found to be positively associated with poverty in Sri Lanka (DCS, 2009, 2016a; Damayanthi, 2012a, 2012b ; Gunewardena, 2007; Siddhisena & Jayathialake, 2004).

Substantial empirical evidence supported the hypothesis of positive relationship between human capital and poverty. These studies find that households headed by individuals with either no schooling or only basic primary schooling are significantly more likely to be in poverty than households with better-educated household heads (Alehegn, 2013; Ofem et al., 2010). According to DCS (2009, 2016a), head of households that had not passed at least G.C.E. (O.L.) has higher probability of falling in to poverty (95 percent) while only less than 1 percent of G.C.E. (A.L.) passers and graduates falls into poverty in Sri Lanka.

Elucidating the studies on poverty based on the human capital theory recent studies have concerned poverty on the grounds of labor force status: unemployed, employed, student or disable; employment status: government, private or self employed and occupational choice: professional, clerk, unskilled worker etc. Most of the studies have demonstrated that the probability of being poor is negatively correlated with secondary sector, state, professional or skilled employments rather than being self-employed, small business owner or private sector worker (Akerlele et al., 2012; He et al., 2010). As shown by the available reports, poverty in Sri Lanka is highly connected with employment status of the head of the household. It is recorded that HCI is largest among unskilled laborers and agricultural and fishery workers (DCS, 2009, 2016a).

Most of the contextual factors affecting poverty, not necessarily for urban poverty, are explained by the studies in line with economic growth and tickle down theory. Other than common theoretical perceptions on economic growth, unemployment, inflation and income inequality, there are important geographical and institutional factors driving poverty (Chen, & Wang, 2015; Elhadary & Samat, 2012; Epprecht, Muller, & Minot, 2011; In this regard, it is well documented the importance of contextual factors such as economic, regional, geographical and institutional factors (Aassve & Arpino, 2007; Chaudhry, 2009; Chen, & Wang, 2015; Justino & Litchfield, 2004; Ofem et al., 2010).

Despite vast literature available on single level analyses on poverty, studies applying multilevel technique are very rare. Kim, Lee & Lee (2010) have analyzed factors behind poverty among welfare states using household and country level variables simultaneously. This method has been applied at the regional level by Arpino & Aassve (2013). They have found that 31.4 percent of the variation of household poverty is at the village-level.

However, the majority of previous studies has restricted to an analysis of one of the two levels and limited their main focus to single region or cross level comparison and do not capture urban sector poverty at desegregated level. Further, most of the studies has incorporated contextual level into studies through implications obtained from the individual level or conducting analyses only on contextual level. Studies conducted using data at more than one level have used OLS either by aggregating up to the level of contextual or disaggregating down to the level of individual. In this scenario, the data user would assign the characteristics of individuals to the context in the form of mean values. The main problem with this method is that a lot of within group variation is discarded even before the analyses begun. Avoiding the methodological limitations of earlier researches and filling the void of non-availability of urban sector poverty analyses in the country, this study takes into account both individual- and regional-level variables that are expected to affect the poverty status of

urban sector households in Sri Lanka.

3. Research Methods

3.1. Data and Variables

The primary data source for this study is the Household Income and Expenditure Survey (HIES) 2012/13. The sample consists of 25,000 housing units from all three sectors which is adequate to provide reliable information down to district level. Of the total sample, an extracted sub sample for the urban sector that consists of 5273 housing units was used in the current study. Deletion of the cases with missing values refined the sample size to 3062 at level one and the number of districts (level 2) to 20.

Three poverty measures as the criterion variables were created for the estimation of the models. It has been widely recognized the failure and the issues of one-dimensional monetary measures; income or expenditure, for explaining poverty particularly in developing countries (Damayanthi, 2012a, 2012b; Erenstein et al., 2010; Mitlin & Satterthwaite, 2013; Moser & Felton, 2007). Therefore, to capture the multifaceted nature of poverty and its complexity as well as its sensitivity to local cultural and socioeconomic conditions on one hand and to minimize the “orthogonalize” problem which is common in socioeconomic data on the other hand, the this study used multidimensional poverty index derived from information on household assets and amenities using Principal Components Analysis (PCA). Resulting latent construct was used firstly as continuous dependent variables in multilevel linear mixed model and then considering 40th percentile as the poverty threshold, binary variable was created for the multilevel logit model. In the sense those falling below the 40th percentile of household asset index score were classified as poor, while those above the threshold are classified as non-poor. As a measure of household’s living standard under nominal approach the household’s consumption expenditure was used. It was considered a household is deemed poor if their consumption expenditure falls below the poverty line.

Age of head of the household, gender, marital status, household size, ethnicity, level of education and employment status mainly are at the household level variables. Based on standard literature, female labor force participation, magnitude of agricultural, service and industrial sectors, unemployment rate, Gini percapita expenditure, share of own account workers and the share of non-agricultural informal workers are used as the contextual level predictors in this study.

3.2. Empirical Models

The empirical technique stemming from the research objectives is the dependent method where regression analyses can be applied. But the data used were drawn from a large scale survey that employs multi-stage sampling and hence with a possibility of having nesting data structure which produces erroneous inferences if Ordinary Least Squares (OLS) method is applied (Smith, 2011). Hierarchical generalized linear models can address multilevel data derived from multi stage sampling by partitioning of the error structure into components at the individual level and at the district level. Estimation of separate error terms at each level of analysis avoids violation of the assumption of independent errors (Snijders & Bosker, 1999). Hence, multilevel regression is an appropriate statistical technique to analyze data not only with such a hierarchical structure but also the possibility of handling variables measured at different levels; micro, macro simultaneously (O’Loughlin, 2004, Snijders & Bosker, 1999). Thus in achieving the stated objectives, this study specifies multilevel mixed and logistic regression models. Multilevel models operate by developing regression equations at each level of analysis. Accordingly, The model at household level derived as in the equation 1,

$$y_{ij} = \beta_0 + \beta_1 x_{ij} + \varepsilon_{ij} \quad (1)$$

When y_{ij} is functionally depends on household level covariates and intercept vary between districts, the level 1 model takes the form as in equation 2,

$$y_{ij} = \beta_{0j} + \beta_1 x_{ij} + \varepsilon_{ij} \quad (2)$$

In this model the intercept β_{0j} depends on the group but the regression coefficient of x , β_1 is constant. In this level-1 model β_{0j} is the mean asset score while β_1 is the average differential in asset score associated with individual level covariates across all districts. Meanwhile, ε_{ij} is the individual or the level-1 residual term.

In order to construct a two level random component model, the group dependent intercept, β_{0j} , can be expressed as a sum of a constant β_0 and random term μ_{0j} as in equation 3:

$$y_{ij} = (\beta_0 + \mu_{0j}) + \beta_1 x_{ij} + \varepsilon_{ij} \quad (3)$$

Denoting $\beta_0 = \gamma_{00}$

$$\beta_{0j} = \gamma_{00} + \mu_{0j} \quad (4)$$

Substituting this level-2, between district model, in to level-1 model in equation 2 and rearranging, y_{ij} can be expressed as

$$y_{ij} = \gamma_{00} + \beta_1 x_{ij} + (\mu_{0j} + \varepsilon_{ij}) \quad (5)$$

The model specified in the equation 5 is the basic model in the multilevel analysis that has been used to quantify

the poverty covariates. Firstly, this multilevel mixed model was estimated with continuous outcome variable and secondly, it was converted to probability model.

Relying on the adaptive Gauss- Hermite quadrature with seven integration points to approximate the likelihood function, specified models were estimated using maximum likelihood method available in STATA 11.0.

4. Results and Discussion

Sample description: Table 1 depicts the distribution of urban sector sample. Colombo district contributes to the largest portion (about one fourth) because it is the most urbanized district and therefore with the largest urban population. Secondly, about 9 percent of the sample is from Gampaha while the least number has been taken from Kegalle district.

Table 1: Sample distribution by district

	Households	%
Colombo	1306	24.8
Gampaha	496	9.4
Kalutara	344	6.5
Kandy	190	3.6
Matale	102	1.9
N'Eliya	86	1.6
Galle	424	8.0
Matara	386	7.3
Hambantota	183	3.5
Jaffna	176	3.3
Vauniya	145	2.7
Batticaloa	303	5.7
Ampara	296	5.6
Trincomalee	161	3.1
Kurunagala	110	2.1
Puttalam	151	2.9
Anuradhapura	128	2.4
Badulla	114	2.2
Ratnapura	119	2.3
Kegalle	53	1.0
Total	5273	100

Source: HIES, 2012/13

According to the demographic characteristics presented in the Table 2, most heads of household were Sinhalese and male. While more than 80 percent of them are above 40 however, more than 65 percent of household heads are in active labor force. It was shown that about two thirds of the respondents are married, about 18 per cent widowed and 5 percent separated or divorced. About 32 percent of the households have less than 3 members while the majority of the households consist of five or four members. Mean family size is 4.3.

Table .2: Characteristic of selected household level predictors

Age distribution		Ethnicity	
19 -	0.1	Sinhalese	57.9
20-29	5.0	Sri Lankan Tamil	21.3
30-39	17.8	Indian Tamil	1.3
40-49	24.8	Sri Lankan Moor	18.3
50-59	24.3	Other	1.1
60+	27.9		
Mean	51.0		
Median	50.0		
(SE)	13.9		
Gender		Household size	
Male	72.7	1	3.4
Female	27.3	2-3	28.2
<u>Marital status</u>		4-5	45.2
Never married	2.6	Above 5	23.1
Married	77.0	Mean HH size	4.3
Widowed	18.1	(SE)	1.8
Separated/divorced	2.3		

Source: HIES, 2012/13

Once the poverty is concerned, uncontrolled results indicated that both males and females who are young have shown somewhat higher contribution to the poor population (refer Figure 1 shows the age sex distribution of the households who are poor). In terms of marital status, majority (77%) of the household head were married.

When poverty status of them is considered only 47 percent is poor compared to 58 percent of the unmarried poor.

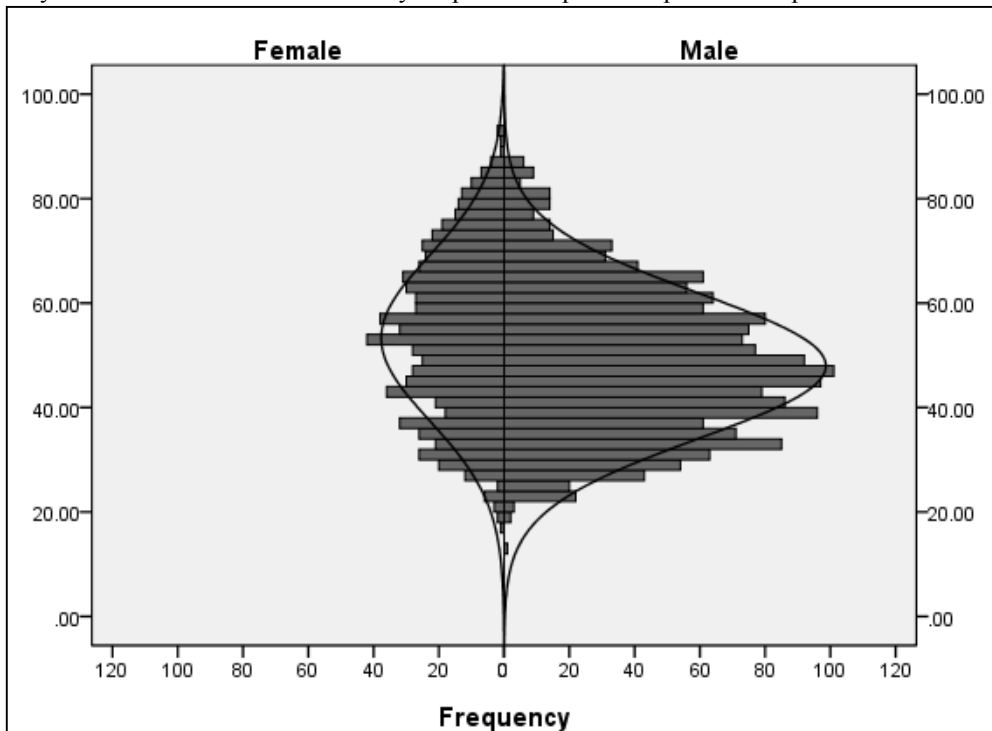


Figure 1 : Age-sex distribution of the poor
 Source: HIES, 2012/13

The incidence of poverty is highest among the population living in households with a head with little or no education (about 95 percent) and the lowest when the head has a high level educational attainment (less than 1%). Poor households are very fewer or negligible in higher levels of education in all districts as shown in the Figure 2.

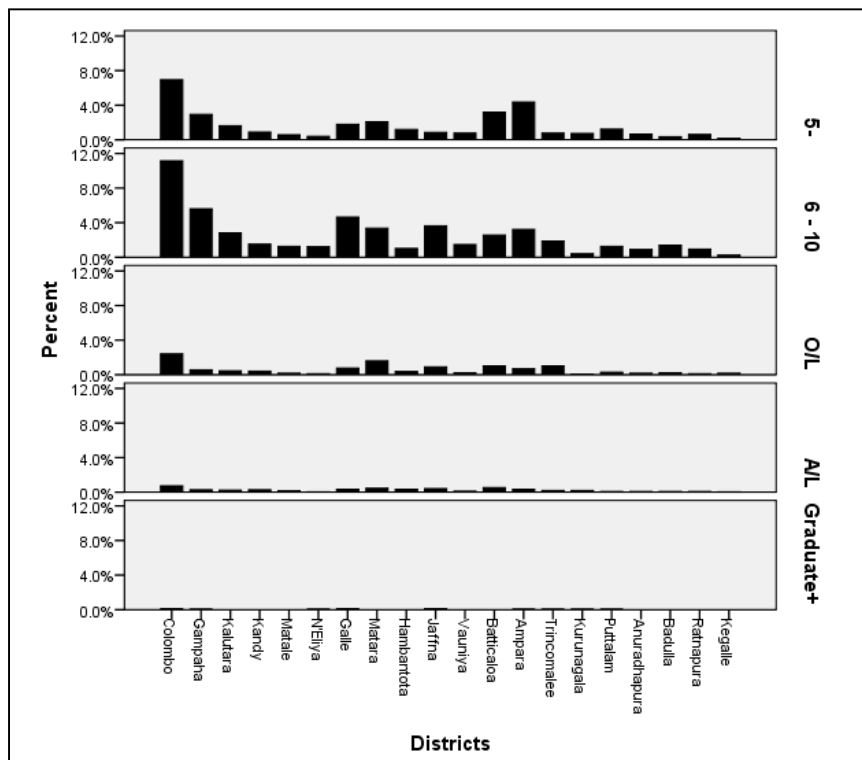


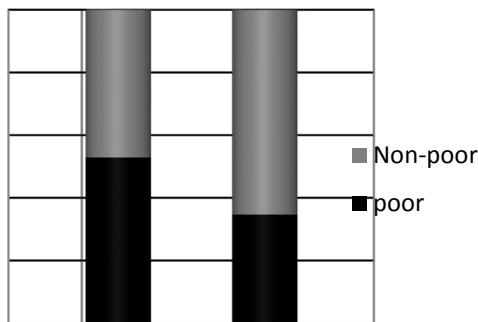
Figure 2 : % Distribution of poor households by level of education
 Source: HIES, 2012/13

When occupational distribution is concerned, poverty incidence is highest among households headed by

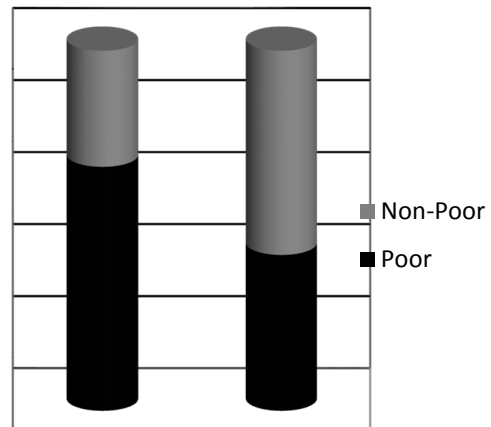
persons with elementary occupations (about 30 percent). Poverty rate of the households that are headed by senior officials and managers was recorded as 4.7. It was found that the highest proportion of the poor is recorded in the private sector accounting for about 58 percent of the total poor. The share of own account workers are also considerably higher amounting 30 percent.

Once access and ownership of resources are considered, about 28 percent of have access to credit. The share of population living under poverty line from those who have formal financial access is only about 8 percent compared to their counterparts. More than 70 percent of the urban households in the sample have land ownership which is considered as crucial in their livelihood. Only 6 percent of the households own livestock. As shown in the Figure 3a to 3c access to credit and land ownership is negatively correlates with the criterion variable whereas livestock ownership has positive relationship.

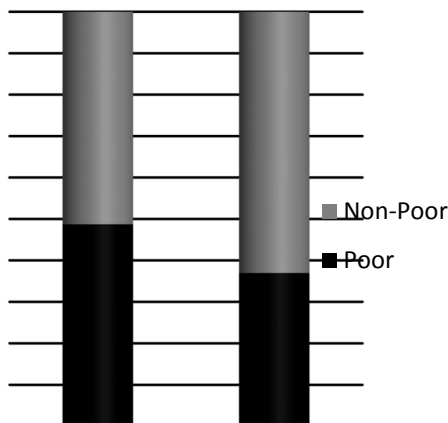
3a: Credit access



3 b: Land ownership



3c: Remittances



3d: Livestock

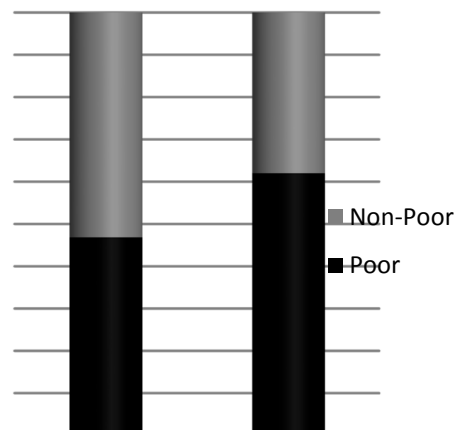


Figure 3: Resource access
 Source: HIES, 2012/13

Statistical and empirical validity of the dependent variable: sine the dependent variable for the study was created by using principle component method, the basic requirements of PCM have to be met. As it is required, Firstly all the variables were coded assigning value 1 for the presence of particular characteristics and otherwise zero. Sample adequacy; minimum sample size (50 or above) and the cases per variables (5); were easily met with HIES sample. Factor loadings of final model which shows the proportion of the variance in the original variables that is accounted for by the factor are sufficiently large for the majority of the indicators as reported in Table 3. Further the formal evaluation criteria; Kaiser Mayer Olkin (KMO) index that indicates the sample adequacy of

variables to reproduce actual variance through extracted components is 0.86. It shows the components collectively explain more than 80 percent of the variance in the set of variables used and hence variable selection for asset index is appropriate enough.

Table 3: Extracted variance of original variables

Asset	Communality	Asset	Communality
Radio	0.298	Water pump	0.611
TV	0.480	Fishing nets	0.672
VCD	0.431	House structure	0.348
Sewing machine	0.365	Bed rooms	0.563
Washing machine	0.553	Area	0.583
Fridge	0.582	Walls	0.509
Gas cooker	0.604	House ownership	0.477
Fans	0.503	Toilet use	0.448
Land line	0.470	Lightning source	0.588
Mobile	0.464	Water suf-drink	0.788
Computer	0.475	water suf-other	0.792
Bicycle	0.478	Cooking fuel	0.579
Motor bicycle	0.421	Power line	0.472
Three wheel	0.522	Tele-line	0.659
Car_Van	0.461	Water line	0.558
Tractor	0.605		

Source: Estimations based on HIES, 2012/13

Empirical sufficiency of criterion variable: Magnitude of urban poverty in any country is affected by both the measure used to define the urban sector and the urban poverty. There is no specific urban poverty measurement in Sri Lanka. The common and the official poverty measure is consumption poverty line derived through cost of basic needs method which defined poverty as pre-determined caloric requirement in monetary terms. Therefore, the national poverty line does not take in to account multiple aspects of poverty. It has found that the share of the poor under asset based poverty is higher than that of under nominal poverty line showing greater likelihood of the incident of urban poverty to be underestimated and the use of asset poverty line is strongly justifiable.

Need of multilevel specification: Table 4 shows the parameter estimates for OLS or no-levels models which shows the contributory variables at different levels separately. Table 5 that records the parameter estimates of the null model. Accordingly, the estimates of across-district variance in individual asset score are 0.12 while the within-district variance is .904 in the linear mixed model. Hence, the estimated variance partition coefficient which indicates that, prior to the addition of explanatory variables to the model, 11.7 percent of the variation in asset score is attributable to district differences confirming the nested structure of the data.

Table 4: Multi level mixed effect regression: coefficients of no-levels models

	No levels			
	Level 1 only		Level-2 only	
	Coe.	SE	Coe	SE
Fixed effects				
Individual level variables				
Age	0.01***	0.001		
Male	0.14***	0.055		
Family size	0.0711***	0.008		
Married	0.298***	0.056		
Ethnicity -Sinhala	0.037	0.018		
Educational attainment				
No or below primary	ref			
Low	0.408***	0.380		
Medium	0.928***	0.047		
High	1.315***	0.048		
Employment sector				
Gvt or Semi-gvt	ref			
Private	-0.363***	0.039		
Own account	-0.067**	0.042		
Owned livestock	-0.167***	0.055		
Owned Lands	0.421***	0.035		
Hv Credit access	0.156***	0.031		
Hv Remittances	0.264***	0.067		
District level variables				
%LFP_female			0.036***	0.005
% Em_Indus			0.023***	0.003
% Em_service			0.013***	0.002
% Em_Agri			-0.016***	0.002
% Self employed			-0.004	0.004
% Unpaid family workers			0.021	0.007
Gini P_capita income			-0.925*	0.379
% Non-Agri Informal			0.015***	0.004
Constant			-2.739*	0.370

*** p < 0.001; ** p < 0.01; * p < 0.05

Table 5 : Multi level mixed effect regression: coefficients and variance partitions

	Null	Base
	Coe.	Coe.
Fixed effects		
Individual level variables		
Educational attainment		
No or below primary		
Low		
Medium		
High		0.902*** (0.034)
Variance components		
District-constant	0.124* (0.029)	0.068* (0.023)
Individual - constant	0.904* (0.018)	0.830* (0.016)
AIC	14372	13698
-2LL	-7182	-6845
Individual	5152	5138
Districts	20	20

*** p < 0.001; ** p < 0.01; * p < 0.05

Table 6 : Multilevel linear mixed models: Coefficients and variance components of final models

	Individual model		Contextual model		Full model	
	Coe.	SE	Coe.	SE	Coe.	SE
Fixed effects						
Individual level variables						
Age	0.006**	0.001			0.011**	0.001
Male	0.059**	0.029			0.156*	0.055
Family size	0.023***	0.005			0.066***	0.009
Married	0.120*	0.029			0.279*	0.056
Educational attainment						
No or below primary	ref					
Low	0.151***	0.020			0.409***	0.040
Medium	0.373***	0.021			0.956***	0.048
High	0.530***	0.026			1.346***	0.050
Employment sector						
Gvt or Semi-gvt	ref					
Private	-0.183***	0.021			-0.398***	0.041
Own account	-0.044*	0.031			-0.095**	0.044
Owned Lands	0.018***	0.020			0.399***	0.039
Hv Credit access	0.076***	0.017			0.171***	0.032
Hv Remittances	0.127***	0.036			0.254***	0.072
District level variables						
%LFP_female			0.043*	0.010	0.021**	0.007
% Em_Indus			0.021*	0.007	0.014***	0.005
% Em_service			0.016**	0.006	0.012*	0.004
% Em_Agri			-0.018**	0.004	-0.012***	0.003
% Self employed			-0.005	0.007	-0.012*	0.005
% Unpaid family workers			0.014	0.011	0.015*	0.008
Gini P_capita income			0.061	0.011	0.087	0.622
% NonAgri Informal			0.013**	0.008	0.011**	0.006
cons			-1.656	0.461	-3.785	0.564
2LL	-3881.4		-6781.8		-3649.5	
N	3285		4839		3062	
n	20		20		20	

	Individual model		Contextual model		Full model	
	Coe.	SE	Coe.	SE	Coe.	SE
Variance components						
District-constant	0.037***	0.014	0.015*	0.009	0.014***	0.005
Individual - constant	0.602***	0.015	0.952***	0.019	0.609***	0.015
AIC	7794.8		13579.6		7347.1	
2LL	-3881.4		-6781.8		-3649.5	
N	3285		4839		3062	
n	20		20		20	

*** p < 0.001; ** p < 0.01; * p < 0.05

In general, multilevel analysis examines how much of the variance in the dependent variable comes from disparities in personal characteristics and how much is contributed by macro-level traits. As in the Table 6, upon addition of individual level predictors, variance at household level was reduced by about 50 per cent while it was 70 per cent at the level-2. Additionally, all 14 covariates were statistically significant at conventional levels as shown in the Tables 5 and 6. They are also jointly significant based on the Wald test statistics. The results also suggest that household covariates related to demographic and socioeconomic factors: age gender, marital status, level of education, employment category, and reduced within-district/ between households and between district variability are also significant.

Based on the results shown on the Table 6, the demographic factors; marital status, age of the household head and family size, were comparatively weak in predicting asset score and also poverty status albeit significant in the linear mixed model. Most of these results are consistent with general poverty literature in the country. As it is expected, assets are accumulating with the age and so with the family size. Consequently there is a positive association between age and the level of household assets though the impact is negligible. (Siddhisena &

Jayathialake, 2004) Compared to female headed households the expected asset score of male heads 27% higher showing contrasting results from the previous studies. Though the effect size is small, being married and both are living have positively impacted on criterion variable. Further ethnicity had no prediction power over wealth or asset score and also for poverty status at level -1 agreeing with the general cultural and socio economic background of the urban sector in the country.

Adding the individual predictors one at a time revealed that education was driving force of the most of the reduction in variability at level one. It was about one fifth from the initial level. Education as the only household characteristic in the model, between-district variance in initial status dropped from 0.904 to 0.731. Specifically dummy variable for higher education showed more than 11 percent reduction in variability. All else being equal, as education level changed from primary to some secondary will increase the asset score by .41 while this change is much higher for secondary and higher education levels recording .95 and 1.3 respectively. There was no considerable sectoral difference can be seen in terms of educational impact. Effect size of each educational level varied more significantly across some districts. For instance, a head of household who has at least 6 years of education falls into non-poor in N'Eliya district but about 20 percent higher odds of falling in to poverty in Colombo district. Finding show that the effects of education on poverty status varied substantially not only across the different groups or districts of the country, but also across different households of the same group.

Employment category is reported to be highly significant in predicting asset and poverty status both at multidimensional and nominal among urban residents. Land ownership has strong positive effect in predicting asset score of the household. It has no variability at level one but much higher variability at the contextual level. More than one third of the intra-district differences of asset score was explained by this predictor. Overall, effect of this covariate is significantly negatively associated with poverty regardless of the poverty measure and the sector. The coefficient on credit access covariate is negative, significant and the effect is considerable compared to the variables other than education and employment category. Addition of this variable made 4.2 percent variance reduction at individual level. Almost 11 percent variation of contextual level in the initial status was attributed to this variable. This obviously indicates that the availability of formal credit is more heterogeneous across districts than households.

As indicated by the linear mixed model results in the Table 6 the effect of receiving remittances was positively significant and unit change in remittances associate with 25% increase of the value of asset score. With regard to contextual level characteristics, five variables were significantly associated. Among them female labor force participation was the prominent in increasing the asset position of a household: a unit increase in percent of LFP is expected to increase asset by a factor .043. Percentage of service sector employment and industrial sector employment are more significant in expected asset accumulation at contextual level. However the magnitude of the agricultural sector which was measured by the percentage of employment in a district has significant negative association with the asset score of households. Further, the percentage of self employed in a district is significantly negatively associated with asset score at conventional levels. Further, this result demonstrates that districts with high percentage of self employed people or agriculture workers have comparatively higher levels of poverty. In contrast, only two district level variables were appeared to be significant for the rural sector (results were not reported).

Summary and Concluding Remarks

Considering the nested data structure of the multi-stage cluster sampling, this study utilize multi level models to delved into variability of assets poverty using both individual and macro-aspects simultaneously. The nesting structure was households in districts. The value of intra-class correlation coefficient 11.7% and the significance of the error variance manifest the nested data structure and validity of using multilevel modeling.

The analyses revealed that almost all the personal household-level variables, including age, gender, marital status, educational attainment, and sector of employment of the head of household, agricultural and related land ownership, access to formal credit, receiving remittances are significantly related to the poverty albeit effect size of some demographic variables are least. In contrast, only some of the covariates: female labors force participation rate, percentage of self employed persons and the magnitudes of three sectors: agriculture, service and industrial, are significantly related to the level of poverty at contextual level.

According to the findings of this study, the poverty status of a household is significantly associated with several demographical characteristics of the head of household in contrast to the previous studies. Specifically, younger age, being female are those demographic factors which are to be concerned with probability of being impoverished in the urban sector. To effectively address the social problem of poverty, therefore, policies and programs designated to ameliorate the economic insecurity of female headed families should be further developed or redirect to the urban sector (Datt & Gunewardena, 1997).

Findings suggested that socio-economic factors are mostly contributing to increase asset position of a household and thus have lower effect of being poor. Higher levels of education have found to be associated with greater possibility being non-poor (Damayanthi, 2012a, 2012b). Thus, along with subsidies and other income-

maintenance policies, programs designed to improve the human capital of the economically disadvantaged should be further developed.

Being employed in government or semi-government sector pays an important role in escaping poverty for the urban residents. In this context, special attention ought to be placed on private sector and own account workers. Own account workers are more economically vulnerable group while most of the private sector workers have higher probability of being poor. Hence, policies should be focused to improve welfare of the private sector workers by increasing wages and fringe benefits, working conditions, and other asset accumulation related facilities such as low interest property loans. Further it is considerable to form a suitable adjustment mechanism for the private sector salaries in order to keep-up them with cost of living variations. On the other side, special attention needs to be paid to own account workers by designing long term plans so that regular progress of their micro-businesses are maintained. Invariably this will help to achieve macro aspects of micro enterprise development towards economic growth in the country. Moreover intra-district variability of access to formal credit is considerable. Actions to expand formal financial sector towards the poor is still crucial in this respect.

Secondly, significance of two contextual variables: female labor force participation and the percentage of own account workers clearly show the essential role of government interventions in alleviating poverty in the long- run. Active state involvement is key to increase female labor force participation at regional level. Expansion of industries, services at the regional level is apparently beneficial in minimizing poverty in the urban sector. Therefore incentives are needed to be created or diverse with an aim of industrial decentralization. More importantly, positive relationship between agricultural sector has to be taken in to special attention. This implies that the living standard of the people who employed in the agricultural sector is low instead. Therefore, long term policies should be formulated with careful identification of the causal factors.

It is worthy to discuss some limitations of this study. Firstly, there are some restrictions in the data which prevented taking some inclusive variables into account at the contextual level. It can be expected that the proportion of government expenditure on education, health and infrastructure are influential on poverty. Moreover, levels of public and private transfers, presence of industrial zones, average levels of private expenditure on education, were not included in this study as well. All these limitations and suggestions are open for further researches.

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