AN ASSOCIATION AMONG POVERTY, ECONOMIC GROWTH, INCOME INEQUALITY AND UNEMPLOYMENT IN SRI LANKA: ECONOMETRICS ANALYSIS

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Abstract

It is the fact that there is significant impact of unemployment, income inequality and economic growth on poverty incidence in Sri Lanka. The 78% of variation in poverty has been explained by unemployment, income inequality and economic growth. Accordingly, income inequality and unemployment have positive association with poverty while economic growth has negative relationship with poverty. The regression result clearly revels that even though economic growth is a significant variable; its impact on poverty is very margin in Sri Lanka.

Keywords: *Poverty, economic growth, income inequality, association, marginal.*

Introduction

Sri Lanka is an island found in the South East of India surrounded by Indian Ocean with total land area 65610square kilometers. In other words, Sri Lanka has multifarious and multitudinous resource endowment which can be made use of growth and development of the country. Poverty measures fall under two broad categories. The term of absolute poverty means that "The State which people do not have the minimum level of income deemed necessary for living in the civilized way. Different societies will have different conceptions of this necessary. The other term of Relative poverty explains that "In comparing people with other income/ wealth/ According the world development report 2013, 40% of people live under poverty in every developing Country and over 515 million of people live in absolute poverty in the World (world development report, 2013). And most of the poor live in rural areas.

Trends in poverty by sector indicate a continuous decline in the incidence, depth and severity of urban poverty, but poverty levels in the rural and estate sectors are high as compared to urban sector in Sri Lanka. The bulk of the estate population has a household per capita consumption that is very close to the poverty line (World Bank 2007, Dileni 2004). Estate sector reports the highest head count index than that of other two sectors in Sri Lanka.

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Literature review

Poverty is the major problem and great challenge faced by all developing countries (World Bank, 2001). This is not different in case of Sri Lanka. The large numbers of Poverty alleviation programs have been implemented by successive Sri Lankan government since independence. But majority of rural people and estate people are yet under severe poverty ridden conditions (Vijayakumar and Brezenova 2012). Therefore poverty in Sri Lanka is basically rural phenomenon (Dhilani 2004, Vijayakumar and Brezenova 2012). The variable such as Road facilities, Education, Industrial employment and access to market has significantly negative influence on the incidence of the poverty in the Estate sector in Sri Lanka (Vijayakumar and Brezenova, 2012).Estate sector is place where the highest levels of extreme poverty, inequality and unemployment are focalized in many countries like Sri Lanka. Despite, the poverty has been sustained till now especially rural and estate sector. Trends in poverty by sector indicate a continuous decline in the incidence, depth and severity of urban poverty, but fluctuating poverty levels in the rural and estate sectors (Dhilani 2007). Therefore that in Sri Lanka is a rural phenomenon is the general conclusion of all previous studies and is confirmed by Dhilani (2000).

The poverty as a concept is closely related to inequality given the average income level and a higher level of inequalities will be associated with high level of poverty (Sen 1984). It is real fact that the poverty reduction will depend on the rate of average income growth, the initial level of inequality, and changes in the level of inequality (World Bank 2001). The majority of the studies seems to suggest that high initial inequality is harmful for overall economic growth, and thus for poverty reduction, at least in environments of very high (income or asset) inequality (World Bank 2001, Chen and Ravillion 2001). Therefore, it is the fact that employment generation via growth of industrial and agricultural development, infrastructural development, poverty reduction and income inequality are interrelated to each other (Vijajakumar and Brezenova 2012).

Poverty itself is acknowledged to be a complex phenomenon, dynamic and varying over time. Productivity-increasing technological change reduces the cost of food production, lowers food prices and increases the demand for labor. Such developments will be favorable to the poor. On the other hand, it is also argued that unequal access to land and other resources will bring about adverse consequences for the poor. The relationship between agriculture growth and poverty has been most studied in India. Ahluwalia (1978), in a pioneering study of rural poverty in India, sought to explain rural poverty in terms of agricultural performance and a time trend to capture all other factors through to effect poverty. He concluded that 'there was strong evidence to suggest that agricultural growth,

within the existing institutional system, tends to reduce the incidence of poverty.' Griffin and Ghose (1979) however argued that changes in the reference period in Ahluwalia's study indicated that there was no significant relationship between the change in rural poverty and the rate of growth of agricultural production at the region level. An IFPRI study also suggests that investment on rural roads and research had significant impacts on poverty (Ravillion 1997).

Many researchers find out that many factors to causes the severity of the poverty in Sri Lanka. Vijayakumar (2013) explained through their econometric analysis about poverty determinants that, economic growth, SMEs and human development has negative association as well as significant in determining poverty while inflation, income inequality and unemployment have positive association as well as significant in determining poverty. Even though SMEs is generally a significant variable, its impact on poverty is very margin in Sri Lanka(Vijayakumar,2013).

Kottegoda (2005) examines the process of impoverishment in Sri Lanka and the implications of the structural adjustment policy, while drawing a gendered perspective on poverty. Evidently, the poor communities in Sri Lanka are governed by a powerful sense of social obligation towards their families, which imposes additional burden on the poor women. In additional to household 'duties' and role as 'nurturers', the women are compelled to engage in income-earning activities for the survival of their households. Thus, the socio-economic status of poor women is governed by:

- Economic aspects, in terms of income, access to capital, saving ability, indebtedness, employment/unemployment, role in the formal/informal sector;
- Social aspects of physical/health condition, condition of the family households.

In analyzing the above perspectives, the paper places women as a significant social group in poverty, in particular, those migrating for employment and women heads of households. The author suggests areas for research and policy development to empower women in poverty (Kottegoda, Sepali 2005).

Objectives of the study

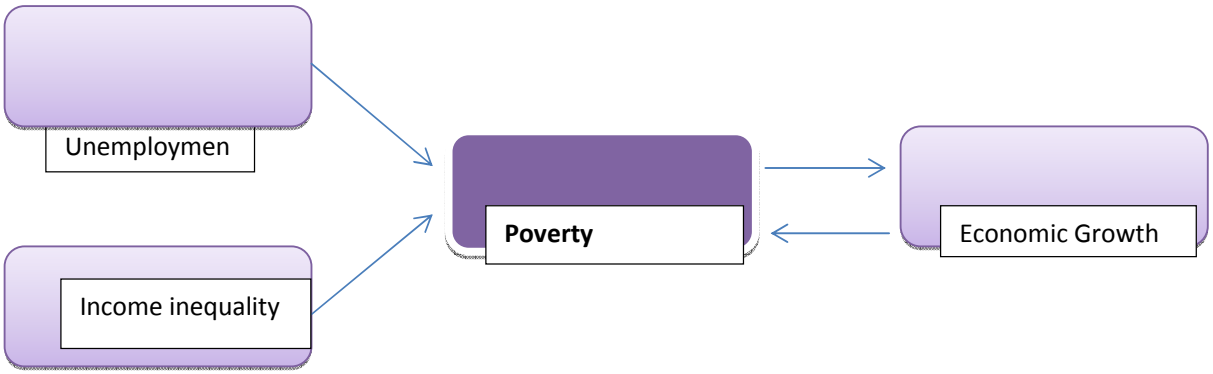
Reducing the poverty is a difficult and complex challenge to Sri Lanka like many of the developing countries. Sri Lanka is an interesting case for adding literature as each Sri Lankan successive government put top priority on the poverty alleviation programs. Main objective of the study is to find out and identify the relationship among the Unemployment, income inequality, economic growth and poverty.

Methodology and Tools

This study is fully based on secondary data. Data collected from the reports of central bank and department of census and statistics have been utilized in this study. Further, text books, journals, magazines in the economic perspective were utilized for this study. This study is conducted in Sri Lanka perspective, especially on the poverty, income inequality, unemployment and economic growth. The time series Data for poverty, income inequality, unemployment and economic growth for period of 1985-2012 were employed in this analysis.

For the study purpose, the E-views software has been employed to find out the relationship among the variables. Therefore, tools such as Multiple Regression Test, Augmented Dicky fuller Test or Unit Root test, Johanson co-integrated Test, Pair wise Granger Causality Test, Serial correlation LM test, Multicolinearity Test ,Hetrosedasticity Test have been used for data analysis. Time series analysis was also carried out to identify the trends over the 25 years. And also, unit root test was applied to see the stationary or non-stationary of the series. Regression analysis was conducted to find out the impact of economic growth, unemployment and income inequality on poverty. And also the granger causality test is focused in this study to check the causal relationship among the variables. Serial correlation and hetrosedasticity test were used to identify the error of the model specifications. This is very important test in the fitting the regression model because non-stationary data make a model as spurious which is not use for complete predicating or decision making (Vijayakumar 2013).

Conceptual frame work



The above conceptual frame work describes about way of relationship among the hypothesis or variables. In this frame work poverty is determined by unemployment, income inequality and economic growth. And also it shows that, there is an interrelationship between poverty and economic growth. It means sometimes poverty has impact on economic growth and another way; the economic growth may impact on poverty.

Research Hypothesis

There are several factors that cause the poverty in Sri Lanka of which, lack of economic growth, lack of socio infrastructures, income inequality, unemployment, inflation, poor growth of SMEs are predominant factors for the severe poverty in Sri Lanka (Vijaya kumar 2014). But for this study purpose, economic growth, income inequality and unemployment are specially focused as key factors for the poverty incidence in Sri Lanka. Therefore the hypotheses developed to find out the relationship among the variables or impact of every variable on poverty incidence.

H1: There is negative association among unemployment, income inequality and economic growth with poverty

Model specification

In the model, the poverty is function of Unemployment, income inequality and Economic Growth. In this model, unemployment, income inequality and economic growth are independent variable and poverty is dependent variable.

$POV= \beta 0+ \beta 1UNE+ \beta\ 2INE+ \beta\ 3EG+\varepsilon i$ ---------- (1)

$\beta 0$= Intercept, POV= Poverty, UNE=Unemployment, INE=Income inequality, EG= Economic Growth, εi = Random Error

The model is converted in to Log form as follows

$LNPOV= \beta 0+ \beta 1LNUNE+ \beta 2LNINE+ \beta 3LNEG+\varepsilon i$ ---------- (2)

Data analysis

ADF test has been applied to check the whether there is unit root problem or not at the level and first difference.

Variables	ADF statistic	T statistic at 1%	T statistic 5%	Prob%
LOGPOV	-1.352159	-4.273277	-3.557759	0.8557
LOGEG	-4.480461	-4.296729	-3.568379	0.0065
LOGINIE	-1.543834	-4.309824	-3.221728	0.7901
LOGUNE	-3.073981	-4.339330	-3.587527	0.1323

Table-1: Unit root test-level of significance

The table 1 shows that the variable of economic growth has no unit root problem. Because the absolute value is greater than critical values and also p value is less than 0.05%. But there are unit root problem in poverty, income inequality and unemployment. It means that the time series data about particular variables are non-stationary.

In accordance with table 1, as absolute value of ADF statistic is less than critical value of t at 1% and 5%, all variable are not stationary at level. The p values also confirm the fact that there are non-stationary at level. Therefore, data were converted into stationary by first difference (Table 2).

Variables	ADF statistic	T statistic at 1%	T statistic at 5%	Prob%
LOGINE	-4.704749	-4.309824	-3.574244	0.0040
LOGPOV	-7.049536	-4.284580	-3.562882	0.0000
LOGUNE	-5.540518	-4.356068	-3.592026	0.0007

Table 2: Unit root –first difference of variables

Table 2 indicates that the all variables are stationary. As absolute value of ADF statistic for all variables are more than critical values and also p value is less than 0.05% of all variables. It is the fact that residuals do not have unit root problem in this analysis.

Generally, several factors determine of poverty incidence in Sri Lanka. Especially author takes that Unemployment, income inequality and economic growth are predominant factors for the severity of the poor. Multiple regressions for model is as follows

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOGINEU	0.093798	0.659179	0.142295	0.0279
DLOGUNE	0.839584	0.501851	1.672974	0.0059
LOGECO	-0.048782	0.114982	-0.424254	0.0147
C	0.079786	0.179289	0.445013	0.6599
R-squared	0.782872	Mean dependent var		-0.036874
Adjusted R-squared	0.043191	S.D. dependent var		0.211940
S.E. of regression	0.207312	Akaike info criterion		-0.189269
Sum squared resid	1.160414	Schwarz criterion		-0.004238
Log likelihood	6.933670	F-statistic		1.451409
Durbin-Watson stat	2.003551	Prob(F-statistic)		0.049878

Table: 3 Multiple regression results

Accordance with regression results of table 3, R^2 is 0.78 meaning that 78% of variation of poverty incidence is explained jointly by Unemployment, Income inequality and Economic growth. Rest of the 22% can be explained by other factors. R^2 of 0.78 indicates the fitness of the model. The p value of F-statistics of 0.049878 which is less than 5% also confirms the fact that this is model is more appropriate to further analysis and also As Durbin-Watson stat

has the value is 2.003551 which is closer to 2.0, there is no heteroscedasticity problem between the particular variables and poverty. Unemployment is significant because its p value is 0.0059 which is less than 5%. According to result, Economic growth has negative impact on the poverty incidence. its f-statistics is statistically significant .

Inequality is concerned with the changes in the entire distribution of well-being and changes in the relative position of anyone in society. Poverty and inequality are strongly related (Dhilini 2004). Generally, income inequality will increase and further worsen the poverty incidence of country. In same words, income inequality is a main cause for increase and severe poverty stricken in general. It is true in the Sri Lankan context. Gini-coefficient as proxy for measurement of income inequality having positive sign is significant to explain the poverty as its p value (0.0279) is less than 5%. In the table 3, 1% increases in income inequality leads 0.09% increase of poverty. Therefore after 1977, equality has been high in among Sri Lankan societies.

Ranja Sengupta (2007) explained to cause for the inequality in Sri Lanka is globalization and open economy. Sri Lanka has been long open to the world economy with the objective of attaining high growth through export promotion, liberalization, and privatization of the economy. Vijayakumar (2012), indicate that "gini coefficient among rural, estate and urban is uneven which negative indicator for development of economy. In Sri Lanka, gini coefficient in estate is the lowest indicating that even the non-poor are also not much for above poverty line. Therefore the co integration test has been focused to find out the long run equilibrium relationship among unemployment, income inequality, economic growth and poverty.

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.787333	76.70476	47.85613	0.0000
At most 1 *	0.531320	34.90807	29.79707	0.0118
At most 2	0.339927	14.44652	15.49471	0.0715
At most 3	0.112771	3.230598	3.841466	0.0723

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.787333	41.79669	27.58434	0.0004
At most 1	0.531320	20.46155	21.13162	0.0618
At most 2	0.339927	11.21592	14.26460	0.1437
At most 3	0.112771	3.230598	3.841466	0.0723

Table 4

According to the co integration test (Table 4), both trace statistic and max- Eigen statistic are used to whether there is a long run relationship or not among the particular variables with poverty in the Sri Lankan context. Further the trace statistic value is 76.70476 higher than critical value (trace) 47.85613 at five percent significant level. This trace statistic result indicates that there is a long run association among the variables with poverty at five percent significant level. Further, max-Eigen statistic is 41.79669, greater than critical value (Eigen) 27.58434 at five percent significant level. And also, at most 1* level, max-Eigen statistic is 20.46155, lower than critical value (Eigen) 21.13162 at five percent significant level.

Null Hypothesis:	Obs	F-Statistic	Probability
DLOGINEU does not Granger Cause DLOGPOV	30	0.84674	0.44074
DLOGPOV does not Granger Cause DLOGINEU		0.11855	0.88870
DLOGUNE does not Granger Cause DLOGPOV	30	0.39425	0.67830
DLOGPOV does not Granger Cause DLOGUNE		0.29782	0.74504
LOGECO does not Granger Cause DLOGPOV	27	0.04970	0.95162
DLOGPOV does not Granger Cause LOGECO		0.41822	0.66334
DLOGUNE does not Granger Cause DLOGINEU	30	0.72400	0.49470
DLOGINEU does not Granger Cause DLOGUNE		0.62115	0.54541
LOGECO does not Granger Cause DLOGINEU	27	2.65503	0.09270
DLOGINEU does not Granger Cause LOGECO		2.30518	0.12334
LOGECO does not Granger Cause DLOGUNE	28	0.75473	0.48143
DLOGUNE does not Granger Cause LOGECO		3.87475	0.03546

Table 5. pair wise granger causality test

Granger causality test has been employed to find out the causal relationship between two variables. According to the table 5, income inequality does not granger cause poverty and poverty does not granger cause income inequality because p value is greater than 5%. Further, unemployment does not granger cause poverty and poverty does not granger cause unemployment. It means that, the particular two variables are not mutually correlated. And also unemployment and income inequality are not mutually correlated because their p values are greater than 5%. Meantime, economic growth does not granger cause income inequality and income inequality does not granger cause economic growth. It means that, the two variables are not mutually correlated because their p values are greater than 5% (0.09270, 0.12334). Despite, economic growth and unemployment are mutually correlated. That why their p values are less than 5%. It means that unemployment creates low economic growth also low economic growth creates unemployment.

Generally, while fitting the regression equation, multicollinearity problem may arise. The following correlation matrix (Table 6) clearly shows the fact that this model does not have multicollinearity problem.

	DLOGPOV	DLOGINEU	DLOGUNE	LOGECO
DLOGPOV	1.000000			
DLOGINEU	-0.090823	1.000000		
DLOGUNE	0.364863	-0.241948	1.000000	
LOGECO	-0.180500	-0.204470	-0.308493	1.000000

Table 6: Correlation matrix

In conformity of the theory of econometrics, explanatory variables should not have high correlation for the best model. Accordingly, what is noteworthy is that there is no multicollinearity problem because of no-high correlation among explanatory variables.

F -statistic	1.03434	Probability	0.112256
Obs*.R-Squared	23.22675	Probability	0.239671

Table 7: White heteroscedasticity test

In the heteroscedasticity test result (table 7), observed R-squared is 23.22675 and it' p-value is 0.239671 which indicates that there is no heteroscedasticity problem because p value is more than 5% (0.05). Further, if Durbin-Watson value is closer to 2 or between 1.5 and 2.5, the model would not suffer the problem of heteroscedasticity. In this study, Durbin-Watson value which is 2.003551 also confirms the same conclusion that there is no heteroscedasticity.

F -statistic	1.374644	Probability	0.2374011
Obs*.R-Squared	2.4162487	Probability	0.542043

Table 8: Breusch-Godfrey Serial correlation LM test

Breusch-Godfrey-LM test was carried out to find out whether or not this model has serial correlation of residuals. According to this test, observed R-squared is 2.4162487 and corresponding p-value is 0.542043 which indicates fact that model does not has serial correlation because p value is greater than 5%. Therefore the model fitted for this analysis is highly acceptable and goodness of fit because of high $R^{2,}$ significant p value for f-statistic, no multicollinearity, no causal relationship, no heteroscedasticity and no serial correlation.

Conclusion

Based on the overall study, it is the fact that there is significant impact of unemployment, income inequality and economic growth on poverty incidence in Sri Lanka. Therefore, the variables such as unemployment, income inequality and economic growth have jointly 78% impact on poverty. Accordingly, income inequality and unemployment have positive

association as significant in determining poverty while economic growth has negative relationship with poverty. The regression result clearly revels that even though economic growth is a significant variable; its impact on poverty is very margin in Sri Lanka. The result of this study is consistent with some studies (Vijayakumar 2013, Sarvananthan 2004). In contrast, we found that, in the Sri Lankan context, there is a long run equilibrium relationship among the particular independent variables and poverty. And also Granger causality test indicates that there does not Granger cause among the variables. It means that the variables are not mutually correlated.

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