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(SLERC) 2016**

**5th International Conference of
Sri Lanka Forum of University Economists**

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Volume I

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Message from the Vice Chancellor University of Kelaniya



It is heartening to note that the Department of Economics of the Faculty of Social Sciences, University of Kelaniya had successfully organized the 5th International Conference of the Sri Lanka Forum of University Economists (SLFUE) with the aim of bringing together the Economics scholars to present and discuss their research findings. And I am happy to see that you are stepping up towards the success of SLFUE through new publications with valuable research findings. Let me congratulate for the first volume of the Conference Proceedings Full Paper Series of Sri Lanka Economic Research Conference (SLERC) of the Sri Lanka Forum of University Economists (SLFUE).

I am extremely happy that the organizers have identified a highly relevant theme for the conference, *“A paradigm shift of thought and policies: The need of the hour for the developing economics”*. This proceedings full paper series of the 5th international conference will undoubtedly provide a platform for academics, researchers, policy makers, practitioners and other interested parties share their views and issues of mutual importance for policy making to the nation. A glance at the contents of reviewed full paper illustrates that important aspects in the field of Economics are addressed. I am therefore very happy to send this message to the full paper series which disseminates research findings of economist in Sri Lanka.

I also congratulate the local and foreign researchers who submitted full papers to this full papers series. I wish all success for all the authors and the organizing committee.

Senior Professor Sunanda Madduma Bandara
The Vice Chancellor
University of Kelaniya

Message from the Co-Chair
Sri Lanka Economic Research Conference (SLERC) 2016
University of Kelaniya



As the head of the department, Department of Economics, I would like to convey my heartiest wishes for the publication of proceedings full paper series of the 5th International Conference of the Sri Lanka Forum of University Economists organized by the Department of Economics, University of Kelaniya.

SLERC 2016 serves as a catalyst to illuminate inner aptness and adroitness of researchers which paves the way to publish fruitful researches.

It is clear that this is an output of a collective effort of those who dedicated their valuable time and energy. I would like to offer my gratitude to everyone who worked hard to make this event a success. Moreover, I would like to take this opportunity to wish all the very best for this endeavour.

Prof Upali Hettiarachchi

Head, Department of Economics,
University of Kelaniya

Editorial Preface

Sri Lanka Economic Research Conference (SLERC) 2016



This is the first volume of the Conference Proceedings Full Paper Series of Sri Lanka Economic Research Conference (SLERC) of the Sri Lanka Forum of University Economists (SLFUE). As the Coordinator of SLFUE and SLERC 2016 and the Chief Editor of this publication, it is with great privilege and pleasure that I write this message. We at the Department of Economics, University of Kelaniya, are honoured to host SLERC 2016 and also to issue this volume as the first of its kind to be published in relation to SLERC. Let me congratulate all the authors whose full papers were published in this volume of the Conference Proceedings Full Paper Series. There were 15 full papers which were successful in this respect, and which were selected for this publication. While it is regrettable that our review also resulted in the disqualification of several papers due to their inability to meet the standards upheld by us, we hope this would not dissuade their authors: SLERC fosters research at all levels, and looks to encourage these authors to improve their papers with our comments and suggestions and send back for the two forthcoming volumes of the Sri Lanka Journal of Economic Research (SLJER) which is a refereed tri-lingual Journal, and I wish to kindly invite all economists to contribute for the forthcoming SLJER.

Economics is the study of how people choose to use resources, including the time and talent available to them, as well as the land, buildings, equipment, and other tools at hand, and the knowledge of how to combine them to create useful products and services. Economists seek to measure wellbeing, to learn how wellbeing increases overtime, and to evaluate differences in the wellbeing of the rich and of the poor. Hence, it is a discipline of rigorous and exciting research. Through affiliated programs, seminars, workshops, and programs in graduate study, leading scholars in the field of economics converge from around the world to present ideas and pursue research. This research, both collective and individual, can affect the economy.

At SLERC 2016, we created a wonderful platform for university economists and other researchers in the field of economics and related studies nationally and internationally to share new knowledge and to enhance their research capabilities by networking with experts in the field, under the timely theme, '*A Paradigm Shift of Thoughts and Policies: The Need of the Hour for Developing Economies*'.

Sri Lanka Economic Research Conference

I am certain that this Forum will shed light over the community of economists in Sri Lanka and motivate them to take up their responsibility to enrich the discipline of economics and to uplift the economy of mother Sri Lanka.

Seetha P. B. Ranathunga (PhD, Waikato, NZ)

Chief Editor and Coordinator – SLERC 2016

Senior Lecturer,

Department of Economics,

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**SRI LANKA ECONOMIC RESEARCH CONFERENCE
2016**

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Table of Contents - Proceedings Full Paper Series

Unpacking Household Asset Inequality between Male and Female Headed Households in the Post War Economy of Eastern Sri Lanka: A Decomposition Analysis

Sasini T. K. Kulatunga 1

Unsatisfactory Performance of Sri Lanka's State-Owned Enterprises: Causality Diagnostics in Management Autonomy and Accountability

T. Lalithasiri Gunaruwan 11

Impact of Major Macroeconomics Variables on Stock Prices in Sri Lanka: A Time Series Analysis

S. J. Francis and M. Ganeshamoorthy 19

Contribution of Occupational Health and Safety Practices on Non-managerial Employee Productivity in the Apparel Industry of Sri Lanka

Apeksha Embuldeniya 31

Evaluation of Entrepreneurship Development Programmes in Sri Lanka

A. M. N. J. Abeykoon 39

Relationship between Trade Openness and Economic Growth in Sri Lanka: Time Series Analysis

K. W. K. Gimhani and S. J. Francis 47

Preferential Trade Liberalisation through Bilateral or Regional Agreements: Need for a National Strategic Approach for ETCA and Beyond

T. Lalithasiri Gunaruwan 55

The Impact of Credit Risk on Profitability of Commercial Banks in Sri Lanka

R. A. Rathnasiri 65

Sri Lanka Economic Research Conference

The importance of water management in overcoming the developmental challenges faced by Sri Lanka

Kasundi Mallawaarachchi..... 77

An extension to theory of Planned Behavior: Explaining Entrepreneurial Intentions of Undergraduates

ChinthakaJayasundara, AthulaRanasinghe 85

Youth Participation in the Informal Labour Market: The Case of the Northern Province of Sri Lanka

N. Balamurali and Priyanga Dunusinghe 95

Relevance of Development Assistance to the Economy and Its Impact after Sri Lanka's Elevation to the Upper Middle Income Status

H.S.G. Fernando 109

Economics of Flood Damage Prevention Investment in Colombo Metro Area: Strategic Perspectives Explored through a Viability Threshold Analysis

T Lalithasiri Gunaruwan 123

The Conceptual Policy Framework for Computer Lab: Special Reference in University of Kelaniya Sri Lanka

P.K.G.C.Pitigala 133

A Study on Industrial development in the Northern and the Eastern Provinces in Post-war Period.

Osantha Nayanapriya Thalpawila 141

Changes in Determinants of Poverty in Sri Lanka within last two decades: A household level Analysis

Seetha P. B. Ranathunga..... 151

An Econometric Application for Economical Thinking of Sport :The probability estimation)Forecasting of getting out in ODI Cricket (of getting out in ODI Cricket

A. R. N. D Ramanayaka, W. M Semansinghe² , P .A .L Oshani³, W .G .D .S Wehigaldeniya³ 161

Comparative Economics of Planning for Public Transport Provision to Address Transport Connectivity Issues of a Rural Setting: The Case of Kalyanipura – Welioya

T. Lalithasiri Gunaruwan and M. H. SaumyaDilrukshi 177

Unpacking Household Asset Inequality between Male and Female Headed Households in the Post War Economy of Eastern Sri Lanka: A Decomposition Analysis

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Abstract

This study investigates inequalities beyond income and expenditure based assessments across divers groups of male and female headed households and presents empirical evidence to household assets based welfare outcomes in the post war Eastern region of Sri Lanka. The study is unique because it moves away from traditional utility maximizing explanations of income and expenditure and situates the analysis of gendered household inequality within broader social divisions such age and ethnicity allowing to seek an in-depth understanding into the intersectionality of gendered inequality and social divisions. The paper uses Multiple Correspondence procedures to construct a rural household asset based index to ascertain household level inequalities between male headed and female headed households. The asset based welfare differentials are then decomposed both across the mean and across distribution. For this, the paper follows Oaxaca-Blinder (Oaxaca 1973) decomposition and Firpor et al.'s (2009, 2011) method relying on re-centered influence function (RIF) regressions implemented within a quantile regression approach. The findings of the paper finds that regardless of notable economy wide increases in asset ownership, post war transformations have thus far failed to remove deep rooted gender inequalities in household asset ownership, which stems from both structural biases disfavoring female headed households and the lack of capabilities in terms of employment. Therefore, the paper concludes that level playing field conflict transformation policies that are directed to conflict affected communities irrespective of factors such as gender, household composition, ethnicity are no longer satisfactory for removing deep seated patriarchal injustice and the traditional patriarchal socio-economic structures that inherently affect the wellbeing of both de facto and de jure female headed households.

Background

For almost three decades, Eastern Province has been the theater for a civil war, protracted and violent in nature. In recent years the province has been growing at an

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average of 6.1% (2009-2014) and by 2014 shared a 5.9% of the total GDP of Sri Lanka. However, there are reports of female headed households in comparison to male headed households been recognized as an economically vulnerable group in the post war region (International Labour Organization, 2013; United Nations Sri Lanka & CEPA, 2015). This study probes as to if there are any inequalities beyond income and expenditure based assessments across divers groups of male and female headed households and presents empirical evidence to household asset based economic outcomes of gendered households in the post war region.

The study is unique because it moves away from traditional utility maximizing explanations of income and expenditure based economic outcomes and situates the analysis of gendered household inequality within broader social divisions such age and ethnicity allowing to seek an in-depth understanding into the inter-sectionality of gendered inequality and social divisions.

Methodology

Data on family ownership of assets representing multiple dimensions of tangible and intangible assets linked to education, land, household physical capital assets, financial assets and social capital assets were collected from 351 households from 8 Grama Niradhari divisions in the districts of Trincomalee, Batticaloa and Ampara of the Eastern Province. The sample is a random selection of households proportionate to the ethnic compositions of the province and disproportionate across gendered household headship.

Applying procedures proposed by L.M Asselin (2009, 2002) and Asselin and Anh (2008), a Multiple Correspondence Analysis assets were aggregated into indices to reflect overall individual and household wellbeing.

Using the asset index as the dependent variable an OLS regression was established with ten (10) row vector of determinants in linear form.

$$\ln(A_i^{\text{Male}}) = \beta_0 + \beta_{1i}X_{1i} + \beta_{2i}X_{2i} \dots + \beta_{10i}X_{10i} + \varepsilon \quad (1)$$

$$\ln(A_i^{\text{Female}}) = \beta_0 + \beta_{1i}X_{1i} + \beta_{2i}X_{2i} \dots + \beta_{10i}X_{10i} + \varepsilon \quad (2)$$

A: log of Asset index of household i, M: male headed F:female headed.

Where, X_{1i} : household heads age in log form, X_{2i} : dummy for household unemployment, X_{3i} : Female intra household decision making index in log form X_{4i} : dummy indicating ethnicity, X_{5i} : dummy for household in a military controlled area

during war or not, X_{6i} : dummy for number of girl children in family (more than 2 or not), X_{7i} : dummy for number of boy children in family (more than 2 or not), X_{8i} : dummy for cohabitation, X_{9i} : the log of access to public services index (depicting satisfactory access to health, transportation, livelihood extension service and communication).

The identification of potential welfare differentials between male and female headed households is carried out by applying the Oaxaca-Blinder (Oaxaca 1973) decomposition. Asset gap equation in terms of the mean (average) between the two household types is indicated in the form of,

$$\bar{A}^{Male} - \bar{A}^{Female} = \beta^{Male} \bar{x}^{Male} - \beta^{Female} \bar{x}^{Female} + \varepsilon^{Male} - \varepsilon^{Female} \quad (3)$$

Going beyond the mean decomposition, the asset based welfare differentials are decomposed between male and female headship along different points of the asset based welfare distribution. For this, the paper follows Firpor et al.'s (2009, 2011) method relying on re-centered influence function (RIF) regressions implemented within a quantile regression approach.

The generalized form of the counterfactual treatment in the RIF regression is $A_\tau^C = \hat{\beta}_\tau^C \bar{x}^C$, where \bar{x}^C is the matrix of reweighted covariates and $\hat{\beta}_\tau^C$ is the estimates of the RIF regression. The counterfactual assets shows female headed household's assets if they had equal characteristics of the male headed households and can be written as,

$$A_\tau^{Male} - A_\tau^{Female} = (\hat{\beta}_\tau^{Male} \bar{x}^{Male} - \hat{\beta}_\tau^C \bar{x}^C) + (\hat{\beta}_\tau^C \bar{x}^C - \hat{\beta}_\tau^{Female} \bar{x}^{Female}) \quad (4)$$

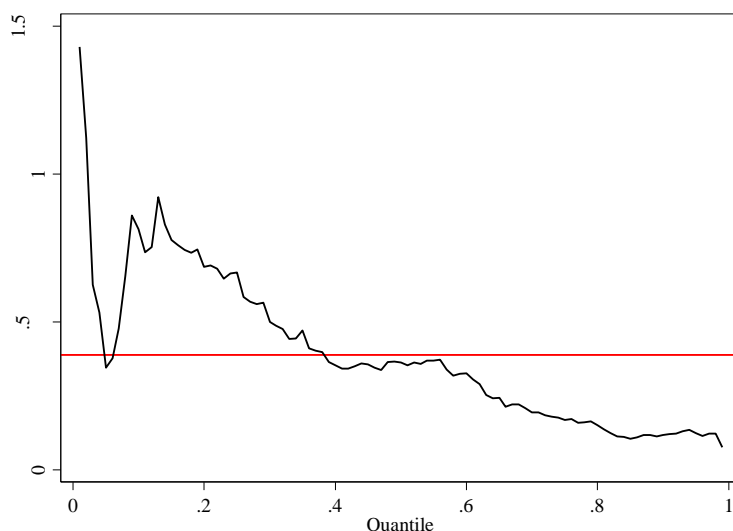
The overall gap ($A_\tau^{Male} - A_\tau^{Female}$) can then be decomposed using the classical Oaxaca (1973) decomposition to depict the effects of the composition and the effects of the structure.

Results

The distribution of the composite asset index across the household population indicates first order stochastic dominance² of the distributions of assets among male headed households over female headed households. Therefore, it is evident that there is a notable asset based welfare gap across household headship. (See Figure 1)

² Tested using a two sample Kolmogorov-Smirnov test. The null hypothesis for a greater asset distribution among female headed households had to be rejected.

Figure 1: Differences of the raw gendered household asset gap. Line in red represents the mean asset gap in log differences which is 0.388



The mean overall gap between the male and female household asset welfare (computed from equation 3) stands at 10.58% disfavoring female headed households over male headed households. The OB decomposition into the differences of the coefficients and the endowments explains covariates explain bulk of the gap.

Composition effect

This study finds the differences in the status of cohabitation makes the largest contribution to the composition of the asset gap. Among the other contributions to the composition effect at mean are differences in the access to public resources and the household head's age. In the lowest quintile the composition of the asset gap is influenced by the differences in the access to satisfactory levels of public goods and service and by the differences in household head's age. From the second quintile to the fourth, the difference in cohabitation makes the largest contribution and in the highest quintiles the share of the contribution increases.

Structural effect

At the mean, the differences in the coefficients relating to household head's age reports the largest contribution to the structural effect. In the 1st quintile and the 2nd quintile the coefficient difference in household head's age contributes significantly to the total structural effect. However, this trend is reversed in the 3rd and the 4th quintiles as the differences in coefficients reduce the structural effect. The other

notable contribution comes from the status of cohabitation which explains 32% of the total structural effect at the mean. Cohabitation increases the asset gap disfavoring the female headed household, from the 1st quintile to the 4th and accounts for the second largest contributors to the total structural effect.

Male and female headed households belonging to the Sinhala ethnic group report a negative coefficient effect at the mean and throughout the quintiles (significant at $p < 0.05$ in the 3rd quintile and significant at $p < 0.01$ at the 4th quintile). Linking this with the findings associated with the composition effects, it can be said that the composition and structural effects of being Sinhalese contributes to diminish disparity across household headship. Being Muslim contributes 2% at the mean. It also amounts to the increase of the gap due to structural effect across quintiles from 2% at the 1st quintile to 71% (significant at $p < 0.05$) and to 290% (significant at $p < 0.01$) thereafter in the 4th quintile. Households belonging to the Tamil ethnic group reports impact to widening the gap due to difference in coefficients (structural effect) at the mean and across quintiles (with the exception of the 2nd quintile, which is -1%).

Differences in the coefficients of male and female headed households for the covariate 'households with more than 2 male children reported 30% contribution to the total structural effect at the mean. Similarly, the results for the decomposition through quintiles suggests that group differences in the coefficients of more than 2 male children in household, contributes to the differences in the log asset index between male and female headed households. The reverse is true for households with more than 2 girl children. In this case, the results of the mean decomposition show that the contribution to the difference in the log asset index is negative and across quintiles the effect is negative and is diminishing (with the exception at the 1st quintile). Thus, households with more than 2 female children, contributes to diminishing the gendered household asset gap.

Evidence of possible differences in the locational specificities is demonstrated in the differential impact for the district of Batticaloa and for former area under military control. For Batticaloa particularly at the mean and at quintiles 2nd to 4th structural effects are visible. The differential impacts on the total structural effect for Trincomalee and Ampara remains negative.

While differences in coefficients for household unemployment explains 9% of the overall structural effect at the mean. Access to satisfactory levels of public goods

and services reduces the structural effect by 46% at the mean. For access to satisfactory public goods the negative effect can be seen throughout the quintiles.

Total Effects

The combined effects of composition, structure and the interactions of the OB and RIF decompositions are depicted in Figure 2 and 3. The combined effects shows how each covariate has contributed to the total household gender asset gap.

Figure 2: Composition and Structural effects of the OB decomposition

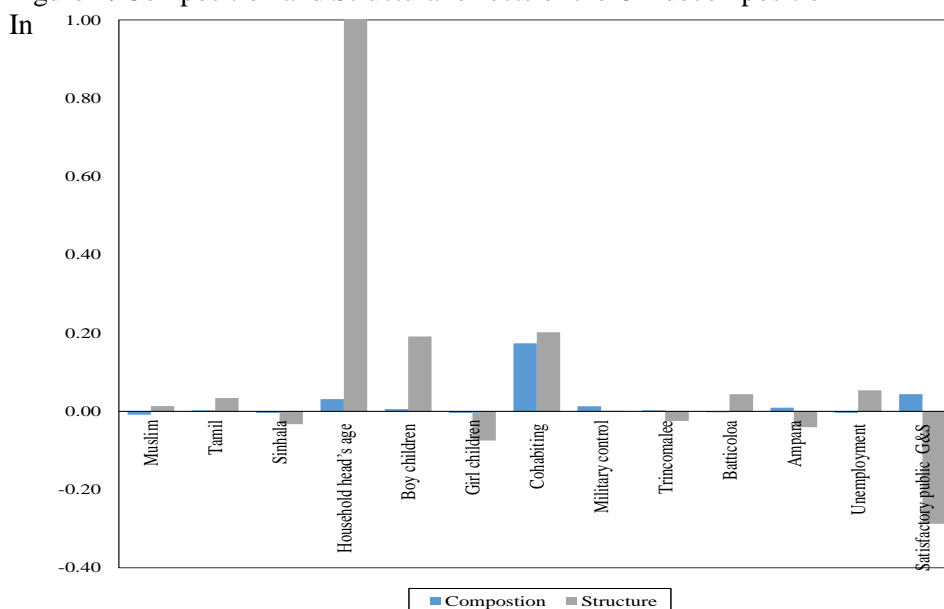


Figure 2 it can be seen that household heads age, cohabitation, boy children, being Muslim, being Tamil, household unemployment and dwelling in the district of Batticaloa act as covariates for increasing the household gender asset gap at the mean of the distribution. These results show some changes when the asset based welfare index is decomposed across quintiles as depicted in Graph 3. For instance the total effect of household head's age on the asset gap is only valid at the mean and the lower quintiles. For households in the higher asset cohorts increases in the household head's age reduces the household gendered asset gap implying that among asset richer older male and female headed households the inequality is lowest.

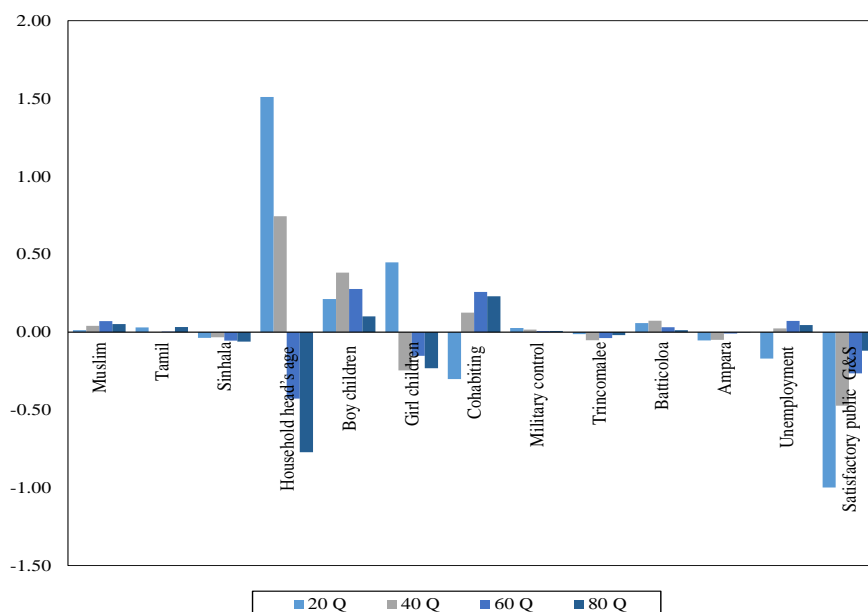
Having more boy children in household contributes to the overall asset gap but the impact of it is reduced at higher asset quintiles. However, if a household has more

than two girl children the contribution to the overall asset gap tends to reduce across quintiles irrespective of asset levels.

The overall effect of being Sinhalese reduces the asset gap while belonging to other ethnicities impact the overall household gendered headship asset gap. In-depth research is required to ascertain reasons for such ethnicity based differences. Overall effects of Access to satisfactory levels and quality of public services imply that increases translated to reducing of the household gender asset gap.

Unlike the districts of Trincomalee and Ampara the Batticaloa district has less than 1% of Sinhalese households. In the sample used in this study, households belonging to Sinhalese from Batticaloa was not included as stratification across ethnicity resulted in a very small sample of Sinhalese to be drawn at a higher field research cost. This population difference partially explains why dwellers in the district reported higher household gender asset gaps than the other two districts. Thus, the difference in districts can also be attributed to ethnicity based differences.

Figure 3: The combined effect of the composition, structure and interaction effects of each covariate of the RIF decomposition.



The dark blue bars represent the higher quintiles, while the lighter bars represent the lower quintiles of the distribution

Conclusion

Use of assets in place of income or expenditure allows the analysis to focus away from the neoclassical utility maximizing, egalitarian framework which is bounded by the often contested assumption of rationality and maximization. It also provided the study to bring out analysis on both market and non-market factors that widens disparity in a post war rural economy.

The descriptive results and the decomposition results prove that there is considerable disparity between male and female headed households. The decomposing of inequality shows that this disparity is partially attributed to social divides; ethnicity, household head's age, cohabitation status and gender of children while economic divides such as satisfactory access to public resources, labor markets and locational factors that interacts with both the social divides and economic divides are equally important to the discussion.

The decomposing of the gap at both mean and quintiles is imperative to understand the asset gap for gendered household headships. Asset based welfare of male headed households outperforms that of the lone mother households in all asset types incorporated in the composite asset index. The household asset welfare gap at mean disfavors females while the gap is higher at lower quintiles and reduces in the higher asset cohorts. Thus, household asset disparity is aggravated by relative deprivation of assets.

This study finds the differences in the status of cohabitation makes the largest contribution to the composition and structure of the asset gap at the mean. Beyond the mean, the effect of cohabitation also contributes to the structure and the characteristics (composition) of the household asset gap positively. Even at higher asset cohorts, cohabitation remains a vital as cohabiting with a male even in a de facto state seem to reduce asset based welfare vulnerabilities. Furthermore, the results are evident of the fact that household's with more male children and those without, intersects with household headship to contribute towards asset disparity. Hence, post conflict economic transformations have not been successful to remove patriarchal dependency and male labor-skill dependency of the lone mother households.

Household head's age plays a critical role when intersecting with gendered household headship especially at the mean and at the lower quintiles of the asset distribution. Thus, at policy levels household's headed by older females must be considered as a vulnerable group.

This study finds that when ethnicity traverses with gendered household headship Muslim and Tamil ethnic households are at a disadvantage than the households belonging to Sinhala ethnicity. In other words, the gendered household asset gap widens if the households are non-Sinhalese. Intersections between gendered households and ethnicity correspondingly impact district level disparities in the gendered household asset gap. Thus, post conflict economic structures are intertwined with cultural and religious biases, norms and practices.

Among the market related factors widening the gendered household gap is unemployment. Female headed households have higher unemployment rates. Satisfactory access to public goods and services reduces the gendered asset gap across quintiles. Thus, both non market and market related elements are crucial to the discussion on gendered household asset gaps.

Level playing field conflict transformation policies that are directed to conflict affected communities irrespective of gender, household composition, ethnicity are no longer satisfactory for removing deep seated patriarchal injustice and the traditional patriarchal socio-economic structures that inherently affect the wellbeing of lone mother families. Continuation of marginalization could even provide impetus for future violence, disrupting the hard earned peace the regions currently enjoys after 26 years of protracted conflict.

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Unsatisfactory Performance of Sri Lanka's State-Owned Enterprises: Causality Diagnostics in Management Autonomy and Accountability

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JEL Codes: L32, L33, P42, P48

Abstract

The State-owned enterprises in Sri Lanka have been widely criticized for their inefficiency. Many attempts had been made in the past to rectify this situation because their inefficiency meant waste of public resources and added burden on State coffers, regardless of the purpose for which they had been set up. However, the problem persist, reflecting the possibility that diagnostics of causal factors could be inaccurate. The present study attempted to examine the root causes of this problem through a study of various categories of State-owned enterprises in the Sri Lankan setting. It looked into structural issues plaguing the State-owned enterprises and their implications on decision making autonomy and accountability. Successful management models such as that of Temasek in Singapore were comparatively studied. Gap analysis and logical reasoning approach were used as analytical methods. The outcomes revealed that the internal management dynamics of SoEs, regardless of their type, do not have the required natural or structural incentives to be productively steered to realise their strategic objectives. Inadequate management autonomy with regard to Department-type organisations and the lack of managerial accountability in the case of bodies corporate and companies were diagnosed as the main gaps which caused the failure of Sri Lanka's SoEs. The study concludes that appropriate management structural relations which are compatible with organisational productivity and managerial efficacy have to be invented and institutionalised in SoEs. The outcomes of the study enabled recommendation that an innovative model has to be invented and tested, possibly through an establishment of an independent and professionally managed umbrella organisation for Strategic Enterprise Management. It could appoint the individual Boards, and monitor their performance while paving the way for the required autonomy and accountability.

Key Words: *State-Owned Enterprises, Performance Diagnostics, Management Autonomy and Accountability Mismatch, Structural Reforms*

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Introduction

Establishing State-owned Enterprises (SoEs) is viewed as a strategy within the interventionist approach to development (Mises, 1998), where the State assumes an active role in steering economic activity. However, it is imperative that SoEs so established run efficiently; the absence of which condition leads to waste of resources, making SoEs a burden on public coffers and a drawback on the economy's progress rather than a strategic support. Such inefficient SoEs would provide more evidence to substantiate the neo-liberal view (Hayek, 1944) that the State should keep itself away from doing business.

Sri Lanka has many SoEs of different categories, such as Departments, Authorities, Boards, Corporations and Companies. While the different purposes of their establishment could be justifiable, they are widely criticised for their inefficiency (Pathfinder, 2015). Many attempts to address this unsatisfactory performance of SoEs could be observed in literature (Athukorala, 2008), some through internal procedural reforms, others through management structural reforms, and others yet through corporatisation. While such efforts would have brought some positive effects, the problem persists.

The purpose of the present research was to address this issue of unacceptable performance among Sri Lanka's SoEs by examining their organisational structures and the adverse dynamics which appear unresolved through previous attempts at performance improvement, in view of diagnosing the causal factors for poor performance. It also intends to explore the possibilities of developing a structural and procedural solution to resolve the problem of inefficiency among Sri Lankan SoEs.

Materials and Methods

The research was launched from the platform that there is no prima-facie structural reason for the destined failure of SoEs. Large private sector enterprises, particularly those public quoted companies and multi-nationals, are managed at high levels of efficiency by agents (professional 'Boards of Management') and not by principals (the share-holders); and thus, it becomes a question as to why this principal-agent relationship does not appear functional with regard to SoEs (Holzer & Shwester, 2011) where agents (Governments) seem incapable of taking care of the interests of their principals (true owners, the general public) and run down the assets of the SoEs.

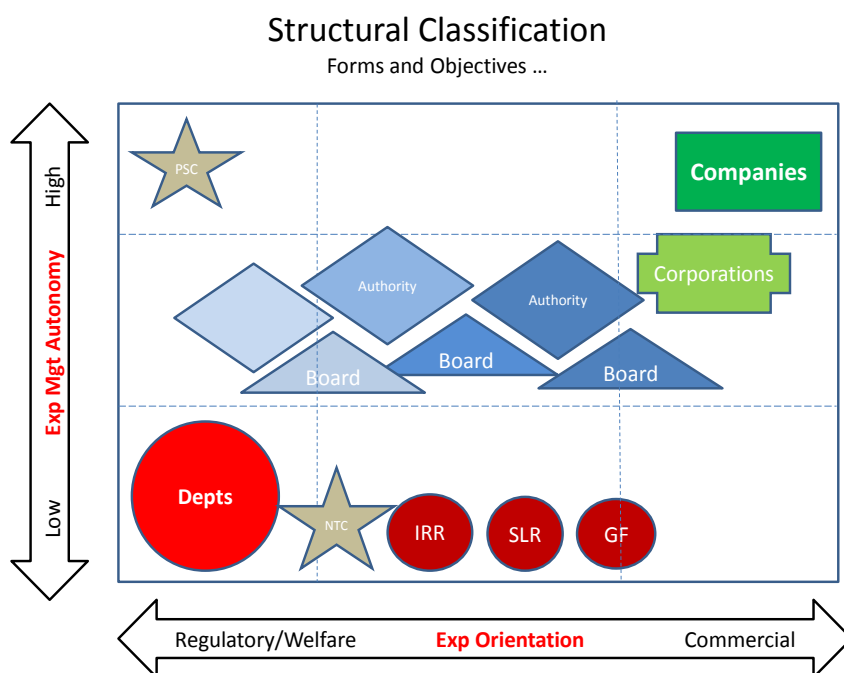
To answer this question, Sri Lankan SoEs belonging to different types and their organisation structures were analysed in view of understanding weaker links. Successful management models, such as that of Temasek in Singapore (APO, 1989), were used to appraise how well such links could be made stronger. Gap analysis and logical reasoning approach were used as analytical methods.

Results and Analysis

The research findings revealed that inefficiency is a common feature in all Sri Lankan SoEs, across all organisational categories. This suggests that the crux of the problem could be found much deeper than the organisation structure itself.

A common feature identified in almost all cases except possibly in the case of company structure (Figure 1), was the inadequacy of management autonomy which discourages commercial initiative and risk taking, leading to poor performance.

Figure 1: Management Autonomy against Expected commercial orientation



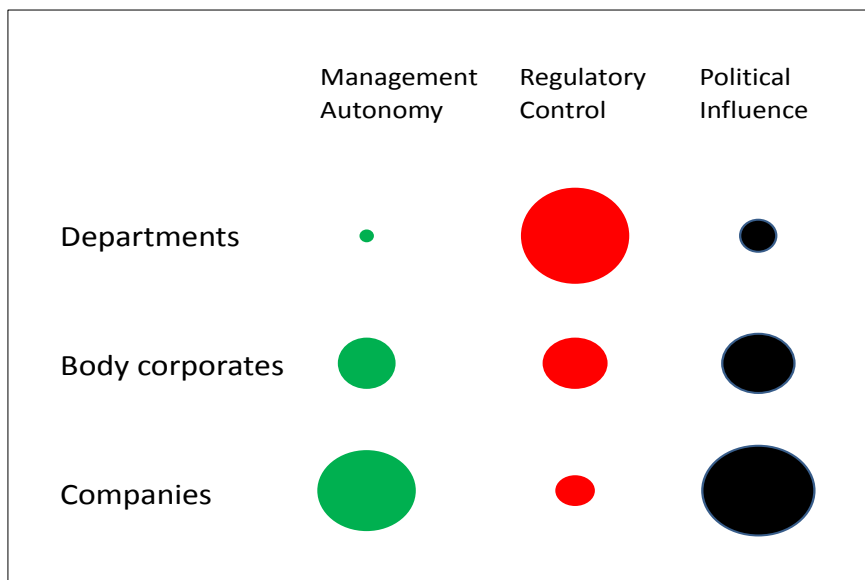
Source: Author compilation

The Department structure was found to have the lowest degree of management autonomy (governed by many rules and regulations, and decisions pertaining to

management of their factors of production taken by outside agencies or commissions). The departmental management does not have decision making power on two most important factor inputs: capital and finances are Treasury controlled and human resources are managed largely by the Ministry of Public Administration and the Public Service Commission. Not even the authority of recruitment, promotion or disciplinary matters are found within the purview of the Department Head. Yet, the service delivery responsibility is with the Head of the respective Department, and at times, enforced even by specific statutes.² Though less harmful with regard to policy, planning or regulatory-type functions (such as Public Administration, Internal Affairs, National Budget, Inland Revenue, Pensions, Immigration and Emigration, etc), such weak management autonomy could be critically damaging vis-à-vis those Departments producing goods or services competitively procured from the market (such as Government Factory, Railways, etc). However, the study found that management autonomy alone could not solve the problem. This is indicated by those companies (such as Sri Lankan Airlines, Mihin Air, Lakdiva Engineering Ltd, etc.) which exercise greater degree of management autonomy but incur heavy losses nevertheless. These companies are managed by “boards of management” just like in the case of privately owned companies, and thus should be free to make commercial decisions for the betterment of the companies, and their shareholders (in this case, the Government). The decision making autonomy exercised by these SoEs with company structure does not appear to be translating into management efficiency and organizational productivity. Rather, the degree of autonomy seems often abused, and producing negative implications on productivity, at times even more damaging than in the case of Department structure with quasi absence of decision making autonomy.

² For instance, the Railway Department is governed by the Railway Ordinance, 1902, and the General Manager Railway, but not the other administrative authorities which are vested with powers to control over capital and labour inputs, is held accountable for the service delivery (Gunaruwan, 2009)

Figure 2: Management Autonomy, Regulatory Control and Political Influence:
A Comparative Presentation



Source: Author depictions

The research went in to examining the reasons behind this by examining the “external influence” to management of SoEs to understand the degree of accountability (exercised through regulatory control) and political influence (exercised by political authority over these SoEs), the results of which analysis are depicted in the Figure 2.

These observations reveal that management autonomy and regulatory control are two factors positioned in opposing directions. Though understandable, this observation points to possible inadequacy of accountability in structures having greater managerial autonomy. It is noteworthy that regulatory control and political interference are inversely related, implying that management autonomy and political interference could go hand-in-hand.

The possibility of “abusing” the decision making autonomy in the absence of management control could thus explain why the SoEs in the structural framework of companies do not appear to be capable of achieving expected efficiency levels. Lack of adequate accountability when enjoying management autonomy might be exposing the company structure to political interference. While quasi absence of decision making autonomy amidst inadequate management authority is plaguing the departments and crippling their performance, the absence of controlling mechanism seems to have failed in ensuring good governance in the SoEs in organisation

structures with greater degree of management autonomy. Evidence thus suggests that a root cause for the poor performance of SoEs could be the mismatch between management autonomy and accountability.

It is interesting to fathom deep into this problem, drawing lessons from literature. Agents in the private sector (Board of Directors), though would be having their own sub-optimal objectives of maximising their welfare,³ are naturally pushed to ensure a minimum required profitability to keep principals content, even though they too attempt to maximise their personal welfare (Lane, 2005). No such natural dynamics exist in the State sector: thus an important automatic check for accountability is absent. Managers of SoEs would want to keep their appointing (political) authority happy for survival reasons rather than to safeguard the interests of the true owners, the general public. Unlike in private companies, true owners of SoEs do not vote for their agents (Government) at an election with the single objective of having their SoEs managed well, but also do so with a spectrum of other desires in mind, with the result that voting interests become unclear and diluted.

A comparison with the Temasek model which appears successful in managing Singaporean SoEs efficiently, makes this gap in Sri Lanka further transparent. Temasek acts as a powerful holding company for the SoEs under it and has been successful in ensuring both management autonomy and accountability of SoEs, while keeping political interference at bay. It appraises performance of the individual Boards of management of State-owned companies brought under its purview, and the survival of such members of management boards would depend only on satisfactory performance of such SoEs. If a “public service obligation” any such SoE is pushed to deliver by the Government policy leads to financial ill-effects, Temasek would ensure due compensation so that the management of organisations could be held accountable for their performance. No room is thus left

³ “Agent-Principle Conflict” described in *Managerial Economics* explains this dichotomy. Shareholders (the Principals) would want to see enhanced organisation profitability enabling them to earn maximum possible dividends, while the interests of the “professional managers” could well be the organisational “growth, which would enable them better fringe benefits and stature, possibly even at the expense of “profits” to a certain extent . However, the theory also shows means of convergence of interests as the managers are compelled to ensure at least a satisfactory level of dividends to owners; who, otherwise, would be tempted to divest their shares, inducing discontinuation risk on managers (Hill & Jones, 1992). It is observed that such natural converging dynamics do not function in SoEs where the “trustees” (usually politicians) of the true owners (the public) of SoEs becoming interested in maximising business performance of the enterprises they hold in trust is more an exception than the rule.

open to hide managerial inefficacy behind social welfare service obligations performed.

The Sri Lankan experiment with the Strategic Enterprise Management Agency (SEMA) established with the same objective was a failure, apparently for two reasons as identified by this study: (a) the SoEs brought under SEMA continued to be managed through Boards appointed by the relevant Ministers depriving SEMA of any accountability hold over them (respective Acts were not amended to change the appointing mechanism of Boards), and (b) SEMA's composition was itself more political than professional. The independent Strategic Enterprise Management Commission in the lines of Temasek model, pledged in the election Manifesto of the winning President in January 2015,⁴ has not yet been established.

Conclusion and Recommendations

This research enabled arriving at a number of insightful conclusions. It is clear that the internal management dynamics of SoEs, be they Departments, Authorities, Boards or Corporations, do not have the required natural or structural incentives to be productively steered towards realising their strategic objectives. Inadequate management autonomy with regard to Department-type organisations and the lack of managerial accountability in the case of bodies corporate and companies were diagnosed as the main gaps which caused the failure of Sri Lanka's SoEs.

This leads to the inference that appropriate management structural relations which are compatible with organisational productivity and managerial efficacy have to be invented and institutionalised in SoEs. This is tantamount to calling for reform of SoEs, and cannot be rationally resisted even by opponents of neo-liberal ideological reasoning.

It could therefore be recommended that an innovative model with the features of an independent and professionally managed umbrella organisation for Strategic Enterprise Management, which could appoint the individual Boards, and monitor their performance while paving the way for the required autonomy and accountability, may be tested in Sri Lanka. Profits could still function as a yardstick of measuring performance if social obligations served could be compensated by the Treasury through the holding body (which would make performance

⁴ "A Compassionate Maithi Governance - A Stable Country", Election Manifesto of the Presidential candidate Maithreepala Sirisena, December 2014. [<http://www.asianmirror.lk/news/item/5782-full-text-of-maithripala-sirisena-s-election-manifesto/>]

monitoring straightforward), while non-profit based performance yard-sticks also could be thought of.

This may be considered as an alternative to privatising SoEs, which has not only failed on many occasions, but could also impoverish the nation if their shares end up in foreign hands.

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இலங்கையின் பங்கு விலைச் சுட்டெண்கள் மீது தெரிவுச் செய்யப்பட்ட
பேரினப் பொருளியல் மாறிகள் ஏற்படுத்தும் தாக்கங்கள் : ஒரு காலத்தொடர்
பகுப்பாய்வு

**Impact of Major Macroeconomics Variables on Stock Prices in
Sri Lanka: A Time Series Analysis**

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முதன்மைச் சொற்கள் : கொழும்புப் பங்குச் சந்தை, பல் பிற்செலவு மாதிரி,
பேரினப் பொருளியல் மாறிகள், காரண காரியப் பகுப்பாய்வு

Abstract

A vibrant capital market shall provide the necessary big push for a growing economy to reach a high growth trajectory. The Sri Lankan Security market performance has often been taken as indicators of economic as well as business health of the country. Volatility in stock prices is a key yardstick to assess stock market performance. This paper intends to investigate the casual effects of short and long run relationship between stock prices and macroeconomics variables and examines the effects of macroeconomics variables on the dynamics of stock price movements in the Sri Lankan stock market. The paper builds its analysis on the available literature on theoretical and empirical determinants of stock prices forecasting and applies on Sri Lanka stock market. The study uses monthly statistical data on four major macroeconomics variables inflation rate (IR), money supply (MS), exchange rate(ER), average weighted prime lending rate (AWPLR) and all share price index (ASPI) for the period of 28 years starting from January 1986 to December 2014, collected from CBSL [Central bank of Sri Lanka], Department of Census and Statistics and Colombo Stock Exchange annual reports. The multiple regression has been run using major macroeconomic variables for

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each individual stock. This study employed empirical econometrics time series analysis using ADF unit root test, Johansen Co-integration test, Vector Error Correction Modeling and granger Casualty test. The time series analysis result of the co-integration tests reveals that macroeconomics variables such as inflation rate, money supply, exchange rate, average weighted prime lending rate have significant long run and short run effects in determining stock prices in Sri Lanka. However average weighted prime lending rate and exchange rate showed a positive relationship with all share price index while narrow money supply and Colombo Consumer price inflation rate showed a negative relationship. The results are therefore, providing a justification for the use of inflationary policy instruments to control stock prices in Sri Lanka. Finally the result of Co-Integration test also confirmed that there is a long run stable stock price function for Sri Lanka. The above results have practical implications for investors -both domestic and international, policy makers, stock market regulators, and stock market analysts.

ஆய்வுப்பின்னணி

%லதனச் சந்தையில் ஒரு அங்கமாக விளங்குகின்ற பங்குச்சந்தையின் செயலாற்ற போக்கு ஒரு நாட்டின் பொருளாதாரத்தைப் பிரதிபலிக்கும் முக்கியமானதோர் குறிக்காட்டியாகவுள்ளது. ஆதலால் பங்குச்சந்தையின் போக்கு பொருளாதாரம் பற்றிய மதிப்பீட்டுக்கு மிகவும் முக்கியமானது. இலங்கையானது கடந்த 30 வருட கால யுத்தம் 2009 ஆம் ஆண்டு முடிவடைந்ததன் பின்னர் உலகில் எந்தவொரு நாடும் வளர்ச்சியடையாத அளவிற்கு தளம்பலற்ற வளர்ச்சிப் போக்கினை அனுபவித்து வருகின்றமையைக் காணமுடிகிறது. இதற்குக் காரணம் பங்குச்சந்தையின் செயலாற்றுகை அதிகரித்தமையும் அதேபோன்று பொருளாதாரத்தின் எதிர்காலம் தொடர்பில் முதலீட்டாளர்களின் எதிர்பார்க்கைகள் அதிகரித்தமையுமேயாகும் என்பதை அண்மைக்கால பொருளியல் குறிகாட்டிகள் சுட்டிக் காட்டுகின்றன. கொழும்புப் பங்குச்சந்தையானது உலகில் அதியுயர் செயலாற்றுகையைப் பதிவு செய்திக்கதுடன் அதன் %லம் உள்ளூர் மற்றும் வெளிநாட்டு முதலீட்டாளர்களுக்குத் தங்கள் முதலீடுகளை மேற்கொள்வதற்கு சந்தர்ப்பம் அமைத்துக் கொடுக்கும் மிகச் சிறந்த தெரிவாகவும் காணப்படுகின்றது. அது மட்டுமன்றி முதலாளித்துவப் பொருளாதாரமொன்றின் நிதியியல் முறைமை தொடர்ந்து இயங்குவதற்கு அடிப்படைச் சக்தியாகவும் பங்குச்சந்தை காணப்படுவதுடன் முதலீட்டாளர்கள் பங்குகளைத் தொகுதிக்கடன்களை அல்லது வேறு ஏதேனும் பிணையங்களைக் கொள்வனவு செய்கின்ற மற்றும் விற்பனை செய்கின்ற முறைமையாகவும் காணப்படுகின்றது.

நவீன சந்தைப் பொருளாதாரங்களில் பங்குப் பரிவர்த்தனை என்பது மிக முக்கிய செயற்பாடாக காணப்படுவதுடன் கடந்த சில தசாப்தங்களில் பொருளாதார செயலாற்றத்தோடு பங்கு வருமானத்தினை எதிர்வுகூறும் தன்மையானது பல ஆய்வாளர்களால் ஆய்வுக்குட்படுத்தப்பட்டுள்ளமையை அவதானிக்க முடிகிறது. இன்றைய காலப்பகுதியில் பொருளாதார

ஆய்வாளர்கள், நிதிமுதலீட்டாளர்கள் மற்றும் கொள்கை வகுப்பாளர்களும் கூட பேரினப் பொருளாதார மாறிகளுக்கும் பங்கு விலைச்சுட்டெண்களுக்குமுள்ள காரண காரிய தொடர்புகள் குறித்து ஆராய்வதற்கு அதிக அக்கறை செலுத்தி வருகின்றார்கள். அதாவது ஒரு நாட்டின் பொருளாதாரமானது சிறந்ததொரு நிலையில் உள்ளதா என்பதை அறிவதற்கான சிறந்தவொரு கருவியாக கூட பங்குச்சந்தையின் செயலாற்றங்கள் பயன்படுத்தப்பட முடியும். தற்காலத்தில் இலங்கைப் பங்குச்சந்தை நிலவரங்கள் தேசிய மற்றும் சர்வதேச முதலீட்டாளர்களால் மிகவும் கவனமாக அவதானிக்கப்பட்டு வருகின்றது. எவ்வாறாயினும் தற்போது ஒரு சிலர் பங்குச்சந்தை செயலாற்றங்கள் அதிகரிப்பதை மட்டும் வைத்துக் கொண்டு பொருளாதாரம் சிறந்த நிலையிலுள்ளதெனக் கூற முடியாது எனவும் வாதிடுகின்றார்கள். அதற்கான காரணமாக முதலீட்டாளர்கள் பெரும்பாலும் எதிர்காலம் தொடர்பிலேயே நம்பிக்கை வைக்கின்றனர் என்ற விடயத்தைச் சுட்டிக்காட்டுகின்றார்கள்.

இலங்கைப் பங்குச்சந்தை பற்றிய ஆய்வுகள் முதலீட்டாளர்களுக்கு பயனுள்ளதாக இருப்பதுடன் அத்தகைய ஆய்வுகளின் பெறுபேறுகள் சிலவேளை பங்கு விலையின் வெளிப்பாடாகவோ அல்லது பேரினப் பொருளாதார மாறிகளின் விளைவின் போக்குகளின். அத்துடன் இத்தகைய ஆய்வுகள் அங்கமாகவோ கூட அமையலாம். இந்த ஆய்வு பொருளாதார மாறிகளுடாகப் பங்குச்சந்தையின் எதிர்காலத்தை எதிர்வுகூறும் ஒரு சிறந்த கருவியாகவும் பயன்படுத்தப்பட முடியும்.

பங்குச் சந்தை செயலாற்றம் மற்றும் பொருளாதாரத்துடன் அதற்குள்ள தொடர்புகள் பற்றிய கோட்பாட்டு ரீதியான இலக்கிய மீளாய்விலே பணநிரம்பல், பணவீக்கம் மற்றும் வட்டிவீதம் போன்ற பேரினப்பொருளாதார மாறிகளுடன் தொடர்புபடுகின்ற கோட்பாடு இனங்கண்டு, அக்கோட்பாடுகளுடன் தொடர்புபடுத்தி, ஆய்வினை மேற்கொண்டவர்களின் ஆய்வுத்தன்மையானது பங்குச்சந்தை வருமானத்தின் மீது எவ்வகையான தாக்கத்தினை ஏற்படுத்துகின்றது என்பது இனங்கண்டு கொள்ளப்பட்டது.

இருந்தபோதிலும் அனுபவ ரீதியான இலக்கிய மீளாய்வானது இவ்வாய்வு சம்பந்தமாக உலக நாடுகளில் பேரினப்பொருளாதார மாறிகளுக்கிடையில் பங்குச்சந்தையின் தொடர்பு நிலையைக் கண்டறியப் பயன்படுத்திய பொருளியல் அளவைத் தொழில்நுட்ப முறைகள் மற்றும் பொருளியல் அளவைப் பரிசோதனை %லமாக உலக நாடுகளில் அபிவிருத்தியடைந்த நாடுகள் அபிவிருத்தியடைந்து வரும் நாடுகள் மற்றும் இலங்கை தொடர்பாக மேற்கொள்ளப்பட்டுள்ள அனுபவரீதியான இலக்கிய மீளாய்வுகளாக அமையவுள்ளது. அவற்றில் பிரதான அனுபவரீதியான இலக்கிய மீளாய்வுகளை நோக்கினால்; Chan, Roll மற்றும் Ross என்போர் 1986ல் USAல் மேற்கொண்டிருந்த ஆய்வொன்றிலே பேரினப்பொருளாதார மாறிகளில் சில பங்குச்சந்தை விலைச்சுட்டிகளின் மாற்றத்தில் செல்வாக்குச் செலுத்துகின்றதா என்பதனை ஆய்வு செய்தார்கள். இவர்கள் அமெரிக்காவில் ஏழு பேரினப்பொருளாதார மாறிகளைக் கொண்ட மாதிரிவடிவத்தினை அமைத்தாலும் கூட அவற்றில் பணவீக்கம், வட்டிவீதம், எதிர்பார்க்கும் திறைசேரி முறிகள் மற்றும் பணநிரம்பல் போன்ற மாறிகள் பங்குச்சந்தை

விலைச்சுட்டிகளின் மீது தொடர்புபடுகின்றது என்பதனை அடையாளப்படுத்தினார்கள். மேலும் நுகர்வு, வளங்கள் பயன்படுத்தப்படுகின்ற அளவு, எண்ணெய் விலை என்பன நிதியியல் சந்தையில் செல்வாக்குச் செலுத்தவில்லை என்பதனை எடுத்தியம்பினார்கள். இருந்தபோதிலும் கைத்தொழில் உற்பத்தித்திறன், வினைத்திறன் என்பனவற்றில் நிறுவனங்களில் ஏற்படும் சிறிது பெரிதான மாற்றங்கள் பங்குவருமான வளர்ச்சியை விளக்குவதற்கு மிகமுக்கியமானது என்பதனையும் எடுத்துக்காட்டியுள்ளனர்.

Chan 1991ல் USA இன் தரவுகளை அடிப்படையாகக்கொண்டு தனது இரண்டாவது ஆய்வினை மேற்கொண்டார். அவற்றில் சில பேரினப்பொருளாதார மாறிகளின் மாதாந்தத் தரவுகளைப் பெற்று ஆய்வுக்குட்படுத்தினார். அவற்றில் மாதாந்தத் திறைசேரி முறிகள், மொத்த உள்நாட்டு வளர்ச்சி வீதத்தினுடைய கைத்தொழில் உற்பத்தித்திறன் மற்றும் விலைச்சுட்டெண்களை வெளிப்படுத்துவதன் %லம் எதிர்காலத்தில் பங்குவருமானப் போக்கு எவ்வாறு காணப்படுகின்றது என்பதனை எதிர்வு கூறமுடியும் எனவும் தனது ஆய்விலே நிரூபித்தார்.

Gunasekarage, Pisedtaslasai மற்றும் Power என்பவர்களால் 2004 இல் இவ்வாய்வு குறித்து இலங்கையினுடைய தரவுகளை மையமாக கொண்டு ஆராயப்பட்டிருந்தன. இதில் இலங்கையினுடைய பேரினப் பொருளாதார மாறிகளால் பங்குச்சந்தை வருமானத்தின் எத்தகையை மாற்றத்தினை ஏற்படுத்துகின்றது என்பது தொடர்பாக ஆய்வினை மேற்கொண்டார்கள். அதன்படி Gunasekarage 2004 இல் மேற்கொண்ட ஆய்வில் பங்குச்சந்தையினைப் பிரதிபலிப்பதாக அனைத்துப் பங்குவிலைச் சுட்டெண்ணையும் (ASPI), பேரினப்பொருளாதார மாறிகளான பணநிரம்பல்(M_1), திறைசேரிமுறி (வட்டிவீத மாதிரி), கொழும்பு விலைச்சுட்டெண், நாணயமாற்றுவீதம் என்பவற்றினையும் கையாண்டுள்ளார். இவர்களின் ஆய்வின் படி நீண்ட காலத்தில் திறைசேரி மட்டுமே உறுதியான தொடர்பு கொண்டுள்ளதாக வெளிப்படுத்தினார்

இலங்கையில் கடந்த %ன்று தசாப்த காலமாக இடம்பெற்ற உள்நாட்டு யுத்தத்தின் காரணமாகப் பங்குச்சந்தையில் பாரிய வளர்ச்சி தோன்றவில்லை என்றாலும் 2009 ஆம் ஆண்டு இறுதி நிலையில் பங்குச்சந்தையின் அனைத்து விலைச் சுட்டெண்ணும் பாரிய அளவு வளர்ச்சியினை அடைந்துள்ளது எனலாம். யுத்த காலத்தில் நிலவிய இத்தளம்பல் நிலைக்குப் பிரதான காரணமாக அமைவது பல கம்பனிகளின் விலைகள் வீழ்ச்சி அடைந்து பங்கு விலைச்சுட்டிகளும் வீழ்ச்சி நிலையினை அடைந்தமையாகும். மேலும் பிராந்தியத்திலுள்ள மற்றைய நாடுகளுடன் ஒப்பிடும்போது கொழும்புப் பங்குச் சந்தையில் பரிமாற்றப்படும் பங்குகளின் வகைகள் வரையறுக்கப்பட்டுள்ளன. அத்தோடு கடந்த தசாப்தத்தில் (2000-2010) இலங்கையில் சராசரி அனைத்து பங்கு விலைச்சுட்டெண் 2400 ஆகவும், பொருளாதார வளர்ச்சியானது சராசரியாக 6.4% ஆகவும் பதிவு செய்யப்பட்டுள்ளதுடன், பணவீக்கமானது 11.2% ஆகவும் பதியப்பட்டிருக்கிறது. இவ்விரு பேரினப் பொருளியல் மாறிகளும் பங்குச்சந்தைச் செயலாற்றத்தின் மீது அதிக செல்வாக்கு செலுத்துகின்ற

நிலையினை அவதானிக்க முடிகின்றது. எனவே தெரிவுச்செய்யப்பட்ட நான்கு பேரினப்பொருளியல் மாறிகளான பணவீக்கம், பணநிரம்பல், வட்டிவீதம் மற்றும் நாணயமாற்றுவீதம் போன்ற மாறிகளில் ஏற்படுகின்ற மாற்றங்கள் பங்குச்சந்தையின் சாதகமான மற்றும் பாதகமான மாற்றங்களுக்கு இட்டுச் செல்கின்றதா என்பதே ஆய்வின் பிரதான பிரச்சினையாகும்.

இவ் ஆய்வினுடைய பிரதான நோக்கம் கடந்த இரண்டு தசாப்தத்திற்கு மேலான காலப்பகுதியில் (1986-2014) இலங்கையின் அனைத்துப் பங்குகளுக்குமான விலைச்சுட்டெண்ணுக்கும் தெரிவுச்செய்யப்பட்ட பேரினப் பொருளாதார மாறிகளுக்கும் இடையிலான தொடர்புத்தன்மையினை அடையாளம் காணுவதற்கான மாதிரி வடிவத்தினை உருவாக்குவதுடன், உப நோக்கங்களாக அனைத்துப் பங்குகளினதும் விலைச்சுட்டெண்ணுக்கும் தெரிவுச்செய்யப்பட்ட பேரினப் பொருளாதார மாறிகளுக்கும் இடையில் குறுங்காலம் மற்றும் நீண்டகாலத் தொடர்பினைக் கண்டறிவதுடன் நேரடியான மற்றும் மறைமுகமான தொடர்புகளை மதிப்பீடு செய்வது ஆகும். அத்தோடு பங்குச்சந்தையின் செயலாற்றத்தின் மீது ஏற்பட்ட தளம்பல் நிலைக்கு அல்லது அதிர்ச்சிகளுக்கு காரணமான பேரினப் பொருளாதார மாறிகளை இனங்கண்டு அம்மாறிகளில் ஏற்படும் எவ்வகையான மாற்றம் அனைத்துப் பங்குகளுக்குமான விலைச்சுட்டெண்ணை நகர்வடையச் செய்கின்றது என்பதைக் கண்டறிவதுமாகும்.

ஆய்வு முறையியல்

1986 [னவரி தொடக்கம் 2014 டிசம்பர் வரையான காலப்பகுதிக்குரிய தரவுகள் ஆய்வுக்கு எடுத்துக்கொள்ளப்பட்டுள்ளன. இக் காலப்பகுதியில் அனைத்துப் பங்குகளுக்குமான விலைச்சுட்டெண் மற்றும் தெரிவுச்செய்யப்பட்ட பேரினப் பொருளாதார மாறிகள் தொடர்பான மாதாந்தத் தரவுகள் பல்வேறுபட்ட %லங்களிலிருந்து குறிப்பாக கொழும்புப் பங்குப் பரிவர்த்தனை இணையத்தளம், கொழும்புப் பங்குப் பரிவர்த்தனைக் குறிகாட்டிகள், இலங்கை மத்திய வங்கி ஆண்டறிக்கைகள், இலங்கை மத்திய வங்கியினதும் குடிசன மதிப்பீட்டுத் திணைக்களத்தின் உத்தியோகபூர்வ இணையத்தளம் போன்றவற்றிலிருந்து ஆய்வுக்குத் தேவையான தரவுகள் சேகரிக்கப்பட்டன. ஆய்வுக்குரிய நான்கு சாராமாறிகள் உள்ளடங்கும் பிற்செலவு சார்பு பின்வருமாறு காட்டப்படமுடியும்.

$$LASPI_t = \beta_0 + \beta_1 LAWPLR_t + \beta_2 LMS_t + \beta_3 LEXR_t + \beta_4 LINF_t + \mu_t \quad 1$$

அத்தோடு இந்த ஆய்வில் தரவுப் பகுப்பாய்வுக்கு %ன்று பொருளியலளவை (Econometrics) முறைகள் பயன்படுத்தப்பட்டுள்ளன. முதலாவது அலகு %லப் பரிசோதனைக்காக Augmented Dicky – Fuller (ADF) நுட்பம், பிற்செலவு மாதிரி வடிவத்தினை உருவாக்க இணை ஒன்றுப்படுத்தல் (Co-integration) நுட்ப முறை மற்றும் வழு உறுப்புக்கான பரிசோதனைக்காக சரிப்படுத்தல் மாதிரியுறு (Error Correction Model) %லமாக இலங்கையின் அனைத்துப் பங்குகளுக்குமான விலைச்சுட்டெண் மற்றும் தெரிவுச்செய்யப்பட்ட பேரினப் பொருளாதார மாறிகள் என்பவற்றிற்கு இடையிலான நீண்டகால மற்றும் குறுங்காலத் தொடர்புத்தன்மைகள்

Sri Lanka Economic Research Conference

நிபிக்கப்பட்டுள்ளன. இறுதியாக கிரஞ்சரின் காரண காரியப் பகுப்பாய்வு (Granger Casualty Test) %லமாகவும் இம் மாறிகளுக்கிடையிலான தொடர்புத்தன்மை தனித்தனியாகவும் பகுப்பாய்வு செய்யப்பட்டுள்ளன.

3 தரவுப் பகுப்பாய்வும் புள்ளிவிபரப் பெறுபேறுகளும்

3.1 யுரபஅநவெநன னுடைமநல - குரட்டநச (யுனுகு) அலகு %லப் பரிசோதனை

4 யுரபஅநவெநன னுடைமநல - குரட்டநச (யுனுகு) அலகு %லப் பரிசோதனை (ருவை சுழழவ) %லமாகப் பொருளியலவைப் பரிசோதனையும் புள்ளிவிபரப் பெறுபேறுகளும் இங்கு எல்லாப் பங்குகளுக்குமான விலைச்சுட்டெண்ணுக்கும் தெரிவுசெய்யப்பட்ட பேரினப் பொருளாதார மாறிகளுக்குமான இயற்கை மடக்கை வடிவிலான புச்சிய மட்டம் மற்றும் 1ம்வேறுப்படுத்தல் மட்டத்தின்போது பெறப்பட்ட அலகு %லப் பரிசோதனைக்கான புள்ளிவிபரப் பெறுபேறுகளும் அதனுடைய புள்ளிவிபரப் பொருண்மைத் தன்மையானது வெட்டுத்துண்டு (ஐவெநசஉநிவ) மட்டும் காணப்படுகின்றபோதும் வெட்டுத்துண்டு மற்றும் காலப்போக்கு (வுசநனெ ருஐவெநசஉநிவ) காணப்படுகின்றபோது பெறப்பட்ட முடிவுகள் பின்வரும் அட்டவணை 1 இல் காட்டப்பட்டுள்ளன.

அட்டவணை:-1

இயற்கை மடக்கை (Natural Log) வடிவிலான அனைத்து மாறிகளுக்குமான அலகு %ல (Unit Root) ADF பரிசோதனைக்கான பெறுபேறுகள் (காலம் 1986 -2014 மாதாந்தத் தரவுகள்)

மாறிகள் (Variables)	எச்சிய மட்டம் (Level)				1ம்வேறுப்படுத்தல் (1 st Differences)			
	வெட்டுத்துண்டு (INTERCEPT)		வெட்டுத்துண்டு மற்றும் காலப்போக்கு (TREND & INTERCEPT)		வெட்டுத்துண்டு (INTERCEPT)		வெட்டுத்துண்டு மற்றும் காலப்போக்கு (TREND & INTERCEPT)	
	τ - statisti c	P-value	τ - statistic	P- value	τ -statistic	P- value	τ -statistic	P- value
LASPI	-0.7823	0.8223	-1.8358	0.6850	-14.6649***	0.0000	-	0.0000
LAWPLR	-1.6103	0.1428	-2.0764	0.1922	-16.5133***	0.0000	14.6265***	0.0000
LMS	-1.0442	0.7508	-2.0032	0.7957	-16.0307***	0.0034	16.4381***	0.0151
LEXR	-1.8550	0.3534	-0.9222	0.9511	-16.72932***	0.0000	16.0291***	0.0000
LINF	-2.3416	0.4511	-2.4411	0.6722	-16.5155***	0.0000	16.8552***	0.0000
							16.5057***	

%லம்:-E-views7.1 Note:-பொருண்மை மட்டம்; (Significant levels)- at 1%- *** 5% - ** 10%-*

3.2 மதிப்பிடப்பட்ட இணை ஒன்றுப்படுத்தல் (Co- Integration) மற்றும் நீண்ட கால பிற்செலவுப் பெறுபேறுகள்

அனைத்து பங்குகளுக்குமான விலைச் சுட்டெண்ணுக்கும் பேரினப் பொருளாதார மாறிகளுக்கிடையே நீண்டகாலத்தில் எவ்வகையானதொரு தொடர்புத்தன்மை காணப்படுகின்றது என்பதை அளவீடு செய்வதற்கு இணை ஒன்றுப்படுத்தல் (Co- Integration) பிற்செலவு மதிப்பிடப்பட்டுள்ளது. அவ்வாறு மதிப்பிடப்பட்ட பிற்செலவு மாதிரி தரப்பட்டுள்ளதுடன் அதனை மையமாகக் கொண்டே இந்நுட்ப முறை பிரயோகிக்கப்பட்டுள்ளது. இவ்வாறு E-views 7.1 மென்பொதியின் %லம் மதிப்பிடப்பட்ட பிற்செலவின் பெறப்பட்ட புள்ளிவிபரப் பெறுபேறுகள் பின்வரும் பின்னினைப்பு அட்டவணை 2ல் காட்டப்பட்டுள்ளன.

இழிவு வர்க்க முறைமையைப் (OLS) பயன்படுத்தி மதிப்பிடப்பட்ட நீண்டகாலப் பிற்செலவுப் பகுப்பாய்வுப் பெறுப்பேறுகள் அட்டவணை 3 காட்டப்பட்டுள்ளதுடன் பெறப்பட்ட பெறுபேறுகளின் அடிப்படையில் பிற்செலவு சமன்பாட்டினை E-views 7.1 மென்பொதி %லம் பெறப்பட்ட முடிவுகளின் அடிப்படையில் பங்குச்சந்தை விலைச்சுட்டெணுக்கான பிற்செலவு மாதிரி வடிவம் பிற்செலவு சமன்பாடு வடிவம் அமைக்கப்பட்டதுடன் மாதிரிவடிவத்தின் மாறிகளின் குணகங்களின் நியம வழு மற்றும் மாறிகளின் குணகங்களின் தனித்தனிப் பரிசோதனைக்காக வேண்டி t பரிசோதனை முடிவுகளும் தரப்பட்டுள்ளன.

அட்டவணை 3 - நீண்டகாலப் பிற்செலவுப் பகுப்பாய்வுப் பெறுப்பேறுகள்

Variable	Coefficient	Std. Error	t- statistics	P- Value
C	-10.3127	0.4839	-21.3088	0.0000
LNAWPLR	0.0679	0.0817	0.8305	0.02069
LNMS	-2.3636	0.1548	-15.2676	0.0000
LNEXR	2.3225	0.0827	28.0646	0.0000
LNINF	-0.0312	0.0226	-1.1730	0.02416
R-Squared		0.92032	Mean dependent variable	6.75884
Adjusted R-Squared		0.01932	S.D. dependent variable	1.05794
S.E. of Regression		0.30049	Akaike info criterion	0.44853
Sum Squared reside		28.80463	Schwarz criterion	0.50687
Log likelihood		-67.66248	F-Statistic	921.1654
Durbin-Watson stat		1.71039	Prob (F- Statistic)	0.00000

%லம்;-E-views7.1

பிற்செலவுச் சமன்பாடு வடிவம்

$$LASPI_t = \beta_0 + \beta_1 LAWPLR_t + \beta_2 LMS_t + \beta_3 LEXR_t + \beta_4 LINF_t + \mu_t$$

$$LASPI_t = -10.3127 + 0.0679 LAWPLR_t - 2.3636 LMS_t + 2.3225 LEXR_t - 0.0312 LINF_t$$

மேலே உள்ள பகுப்பாய்வினை மையமாகக் கொண்டு இலங்கையில் இம் மாறிகளுக்கு இடையில் நீண்டகாலத்தில் காணப்படுகின்ற நேர்க்கணிய எதிர்க்கணியத் தொடர்பினை இலகுவில் அடையாளம் காணக்கூடியதாக இருக்கின்றது. இதனையும் தவிர வழு சரிப்படுத்தல் மாதிரியுறு (Error Correction) மற்றும் கிரஞ்சரின் காரண காரியப் பகுப்பாய்வு (Granger Casualty Test) போன்ற மாதிரிப் பரிசோதனையும் செய்யப்பட்டுள்ளன. மாதிரி பரிசோதனை செய்யப்பட்டதன் முடிவுகள் பொருண்மை மட்ட அளவிலும் (Significant Level) அட்டவணைகளில் தரப்பட்டுள்ளன

அட்டவணை:-4

கிரஞ்சரின் காரண காரியப் பகுப்பாய்வு முடிவுகள்

Direction of the causality	Probability	Outcome
AWPLR → ASPI	0.1899	AWPLR does not cause ASPI
ASPI → AWPLR	0.1887	ASPI does not cause AWPLR
EXRATE → ASPI	0.0503	EXRATE causes ASPI
ASPI → EXRATE	0.0090	ASPI causes EXRATE
INRATE → ASPI	0.5352	INRATE does not cause ASPI
ASPI → INRATE	0.5135	ASPI does not cause INRATE
M1 → ASPI	0.3050	M1 does not cause ASPI
ASPI → M1	0.0481	ASPI causes M1
EXRATE → AWPLR	0.0505	EXRATE causes AWPLR
AWPLR → EXRATE	0.0147	AWPLR causes EXRATE
INRATE → AWPLR	0.1068	INRATE does not cause AWPLR
AWPLR → INRATE	0.8875	AWPLR does not cause INRATE
M1 → AWPLR	0.7523	M1 does not cause AWPLR
AWPLR → M1	0.4117	AWPLR does not cause M1
INRATE → EXRATE	0.0759	INRATE causes EXRATE
EXRATE → INRATE	0.2419	EXRATE does not cause INRATE
M1 → EXRATE	0.7762	M1 does not cause EXRATE
EXRATE → M1	0.0277	EXRATE causes M1
M1 → INRATE	0.3567	M1 does not cause INRATE
INRATE → M1	0.6424	INRATE does not cause M1

%லம;-E-views7.1

1. முடிவுரை மற்றும் கொள்கைப் பரிந்துரைகள்

இவ் ஆய்வினுடைய பிரதான நோக்கம் இலங்கையில் நிதியியல் சந்தையில் அனைத்துப் பங்குகளுக்குமான விலைச்சுட்டெண்ணுக்கும் பேரினப்பொருளாதார

மாறிகளுக்கும் இடையிலான மாதிரி வடிவத்தினை இனங்காண்பதாகும். இவ்வாய்வினுடைய நோக்கம் புள்ளிவிபர ரீதியாகவும், பொருளியலளவை ரீதியாகவும் புர்த்தி செய்யப்பட்டுள்ளதுடன், ஆய்வினுடைய உப நோக்கங்களும் அடையாளங்காணப்பட்டுள்ளன. ஆய்வின் பிரதான நோக்கமான விலைச்சுட்டெண் சமன்பாட்டினை அடையாளம் கண்டுகொள்வதற்கு நீண்டகாலச் சமனிலைத் தொடர்பு (Co-Integration) நுட்பத்தைப் பயன்படுத்தியும், நீண்டகாலப் போக்கு மற்றும் குறுங்காலப் போக்கினை இனங்கண்டுகொள்வதற்கு சரிப்படுத்தல் மாதிரியுறு (Error Correction Model) போன்றவை இவ்வாய்வுக் கட்டுரையில் பகுப்பாய்வு செய்யப்பட்டுள்ளன. எனவே, ஆய்வின் முடிவானது கோட்பாடு மற்றும் அனுபவரீதியான மீளாய்வுடனும் புள்ளிவிபரப் பொருளியலளவை ரீதியாகவும் பார்க்கின்றபோது இப்பேரினப்பொருளாதார மாறிகள் பங்குச்சந்தையின் விலைச்சுட்டெண் மீது உறுதியான குறுங்கால மற்றும் நீண்டகால தொடர்பினைக் கொண்டுள்ளன என்பதனை அவதானிக்க முடிகின்றது.

இதற்காக இவ்வாய்வினை பங்குச்சந்தையில் மாற்றத்தை ஏற்படுத்துவதற்குக் காரணமாக நான்கு பேரினப்பொருளாதார மாறிகள் ஆய்வுக்குட்படுத்தியதுடன், நிறையேற்றப்பட்ட சராசரி முதன்மை கடன் வழங்கல் வீதம் மற்றும் நாணய மாற்றுவீதம் பங்குச்சந்தையின் செயலாற்றத்தின் மீது நேரடியான தாக்கத்தினையும், கொடும்பு நுகர்வோர் விலைச்சுட்டெண் மற்றும் பணநிரம்பல் பங்குச்சந்தை செயலாற்றத்தின் மீது எதிர்க்கணியத் தாக்கத்தினையும் கொண்டுள்ளன என்பது அவதானிக்கப்பட்டது. மேற்படி ஆய்வின் %லம் பெற்றுக்கொள்ளப்பட்ட முடிவுகளின்படி இலங்கையில் பங்குச்சந்தைத் தளம்பலைக் கட்டுப்படுத்துவதற்குப் பல கொள்கைகளும், பரிந்துரைகளும் முன்வைக்கப்படவேண்டும். எமது நாட்டை ஆசியாவின் முன்னணி நாடாக மாற்றவேண்டும் என்ற எதிர்பார்ப்பு அனைவரின் மத்தியிலும் இருந்துவந்தாலும் இந்த எதிர்பார்ப்பை நோக்கி நகர்வடையவேண்டுமென்றால் இலங்கையின் பங்குச்சந்தை தொடர்பில் பலவகையான கரிசனைகளையும், கொள்கை அமுலாக்கத்தினையும் மேற்கொள்ளவேண்டும். இவ்வாறான கொள்கைகளை அடைவதற்கு முயற்சிகளை மேற்கொண்டால் நம் நாடு சுபீட்சப்பாதையை நோக்கி நகர்வடையும்.

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பிண்ணினைப்பு

அட்டவணை - 2

ஜோன்]னின் இணை ஒன்றுப்படுத்தல் (Johansen Co- Integration)
பெறுபேறுகள்

Johansen Co- integration Trade Statistic and Max-Eigen Value Results

No of co- integrating equation	Trade statistic	0.05 Critical value	P value	No of co- integration equation	Max-Eigen Value	0.05 Critical Value	Probability value
None*	696.257	69.8188	0.0001	None*	42.89133	40.07757	0.0235
1							
At most 1*	509.396	47.8561	0.0001	At most 1*	33.90649	33.87687	0.0496
6							
At most 2*	343.060	29.7970	0.0001	At most 2*	33.00939	27.58434	0.0091
8							
At most 3*	202.834	15.4947	0.0001	At most 3*	22.94787	21.13162	0.0275
5							
At most 4*	79.9273	3.8414	0.0000	At most 4*	4.557848	3.841466	0.0328

Contribution of Occupational Health and Safety Practices on Non-managerial Employee Productivity in the Apparel Industry of Sri Lanka

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Abstract

Productivity of the organization depends on the productivity of the single employee and the management is facing a complex situation in maintaining the satisfaction of the employees as they are the most valuable assets to the organization in today's business context. The level of employee productivity measured with level of individual productivity while the impact of Health and Safety (H &S) practices measured with practices towards communication of H &S practices, structure of H & S practices, maintenance towards & S practices, working conditions on H & S practices, training towards H & S practices, and employer commitment on H & S practices. There is a high rejection rate of product pieces than the expected level and therefore the general objective of this study is to suggest some ways and means to the management to enhance employee productivity by enhancing motivation and job satisfaction through addressing the significance of health and safety practices. The target population is the employees of apparel industry and the sample has selected by the stratified random sampling method while identifying each department of the chosen company as a strata. Primary data were used to gather information where the questionnaire was the main source of information and percentages, frequencies, tables and charts, correlation, chi-square test and logistic regression were used to present and analyze data with the use of statistical packages as SPSS and Microsoft Excel. There is a moderately strong positive relationship between employee productivity and health and safety practices.

Key words: *Apparel Industry of Sri Lanka, Health and Safety practices, Employee Productivity, Non-managerial employees*

Introduction

The Apparel Industry of Sri Lanka is an industry with huge opportunities for export, particularly those achievable by reducing unexpected wastage and increasing employee productivity. Employees are the most valuable assets which can drive the

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profits of an organization: this is especially true of the apparel industry. Securing the employees of an organization is not only a responsibility of the employers but also an investment in the organization as they are the driving force of a smoothly running organization.

Occupational health and safety (H & S) is the protection and maintenance of the highest level of physical, mental and social well-being of workers in all occupations. Therefore employers are conscious of H&S management which can harm the entire organization if employees contract any disease or fall victim to any accident. This has risen due to the staggering number of work related accidents resulting in death, fatal injury and illness (Armstrong, 2005).

Review of Literature

Occupational (H&S) are two terms that are closely related but which have two different meanings. However, they are used together. According to the International Labour Organisation and the World Health Organisation (1950), occupational H&S is the protection and maintenance of the highest levels of physical, mental and social wellbeing among workers engaged in all occupations.

Indicators of H&S include: Communication or awareness of H&S practices as measured in terms of the satisfaction of an employee in terms of communicating messages about H&S; Structure or designing safety equipment and protective devices and clothing; Maintenance, or maintaining records and statistics in order to identify problem areas and unsatisfactory trends, as well as carrying out regular risk assessment audits, inspections and checks and taking action to eliminate risks Working Conditions, such as layout and location, ventilation, space for movement, temperature, lighting, arrangement of tools and equipment, and other aspects which can affect employee productivity; Training to instruct employees on proper safety procedures, a continuous programme of education on working habits and methods of avoiding accidents; Employer Commitment, in identifying and implementing comprehensive, change, and consultative manner.

Employee Productivity – Dependent Variable, Productivity is an assessment of the efficiency of a worker, and the productivity of the organisation depends on the productivity of a single employee. Productivity is commonly defined as a ratio between output and input volume. According to Nawab & Shafi (2011), employee productivity is the major dynamic in shaping the success or downfall of any organization, which is why organizations continuously strive to enhance. Productivity is an overall measure of the ability to produce a good or service.

Statement of Problem

The identified common problem in the apparel industry is high labour turnover and absenteeism which lead to low employee productivity. Causes for the decrease in employee productivity are sought after, and the neglect of employee H&S has been discussed as a likely cause. As stated earlier hazardous and dangerous activities may be part and parcel of work in the apparel industry and proactive measures to prevent these could minimise and eliminate such situations. Therefore the study focuses on whether employee opinion towards the health and safety practices of an organisation has an impact on employee productivity and whether their satisfaction with H&S practices increase productivity. Therefore, the research problem is as to why employees are not reaching the expected level of productivity and are instead giving rise to unprecedented levels of turnover and dissatisfaction.

Research Question

The research question addressed by this research is whether communication practices, structure, maintenance, working conditions, training practices, and employer commitment on health and safety practices has an impact on employee productivity.

Objectives of the Research

The general objective of this study is to identify methods to enhance non-managerial employee productivity through enhancing motivation and job satisfaction by addressing the significance of occupational H&S practices in the apparel industry of Sri Lanka.

Methodology

Productivity among non-managerial employees is measured with the level of individual productivity while occupational H&S practices are measured by the opinions and levels of satisfaction among the employees towards practices. The unit of analysis is at an individual level. The study was conducted in Colombo District. The population of the study was employees in the apparel industry and the target population was all employees in the selected companies. Both primary and secondary data were used in this study where primary data were collected through questionnaires from a sample of 150 employees selected on the basis of stratified random sampling techniques where the departments were identified as strata, and secondary data was used to gain information towards the dependent variable, employee productivity, as measured with the productivity index which was generated by the organisation for each individual employee specifically. Further

descriptive analysis, chi-square analysis, and logistic regression analysis were used to analyse data with SPSS software.

This is a correlational study. In this research six main hypotheses have been formulated for testing. This study is analytical in nature rather than exploratory or descriptive refer to the following main hypotheses;

H0₁: There is no significant relationship between communication on employee health and safety practices and employee productivity.

H0₂: There is no significant relationship between structure on employee health and safety practices and employee productivity.

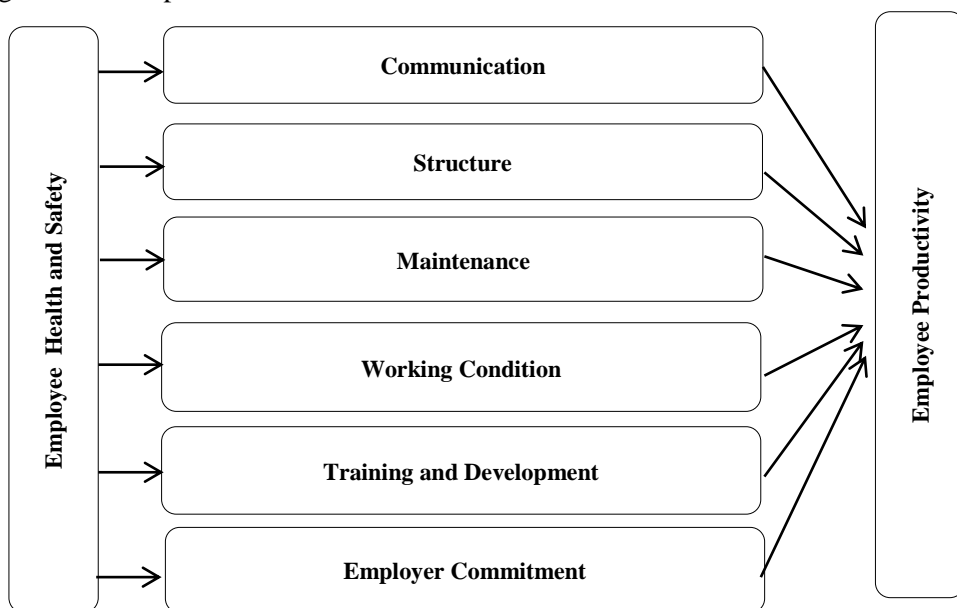
H0₃: There is no significant relationship between maintenance on employee health and safety practices and employee productivity.

H0₄: There is no significant relationship between working conditions on employee health and safety practices and employee productivity.

H0₅: There is no significant relationship between training on employee health and safety practices and employee productivity.

H0₆: There is no significant relationship between employer commitment on employee health and safety practices and employee productivity.

Figure 1: Conceptual framework

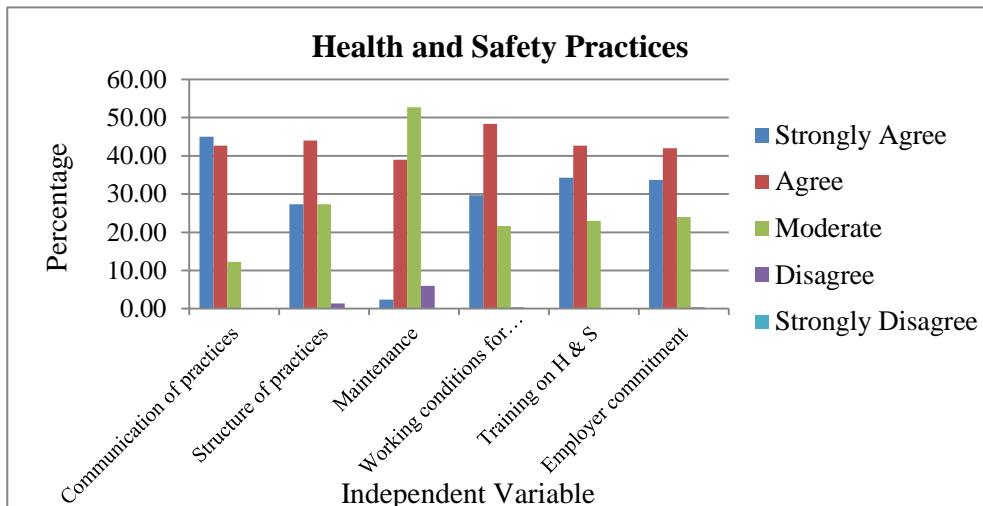


Source: Author developed, 2015

Data Analysis and Results

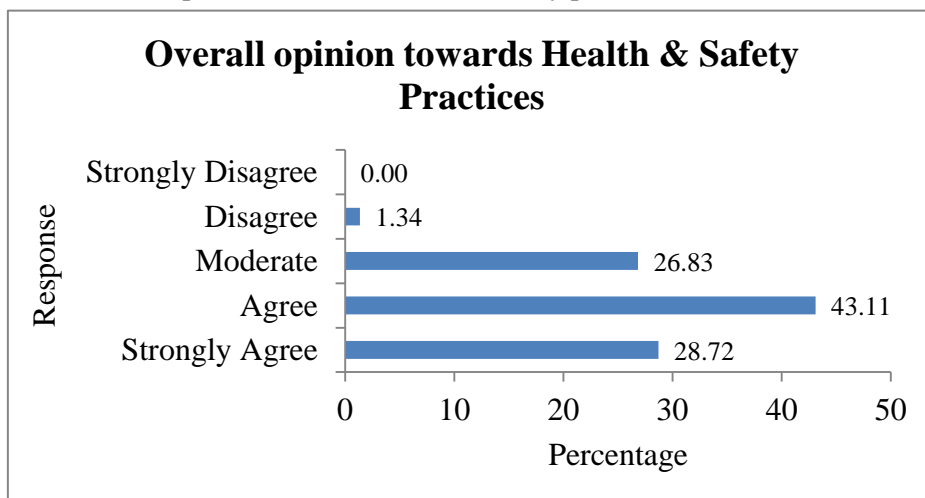
Descriptive analysis

Figure 2: Summary of responses towards health and safety practices



Source: Sample Survey, 2015

Figure 3: Overall opinion towards health and safety practices

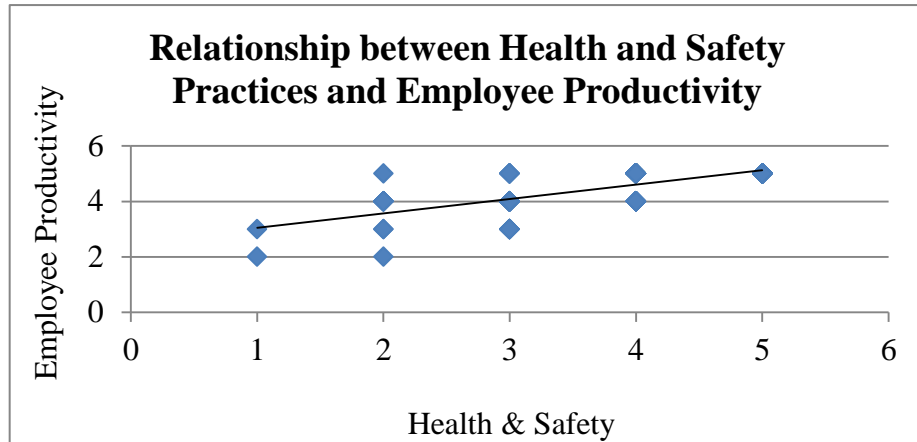


Source: Sample Survey, 2015

Communication of practices, structure of practices, maintenance, working conditions, H&S training and employer commitment decide the practices of the organisation. 28.72 percent of the employee strongly agrees and 43.11 percent

agree that H&S practices are effective and efficient; while 26.83 percent consider the H&S operations moderately effective, and 1.34 percent of the employees think it is not operating effectively. The following figure shows the combination of responses among employees regarding employee H&S practices.

Figure 3: Relationship between health and safety practices and employee productivity



Source: Sample Survey, 2015

There is a strong positive correlation between health and safety practices and employee productivity which indicated 0.762 in spearman correlation coefficient.

Chi-square test for hypothesis testing

The chi-square test was done as these variables are categorical in order to identify the relationship between employee productivity and employee H&S with reference to communication, structure, maintenance, working conditions, training and development and employer commitment.

Table 01: Analysis of independent and dependent variables

Independent Variables	Dependent Variable	Employee Productivity Chi-square Sig
a. Communication		0.000
b. Structure		0.000
c. Maintenance		0.000
d. Working Conditions		0.000
e. Training and Development		0.000
f. Employee Commitment		0.000

Chi-square is significant at the 0.01 level

The significance of the chi-square test of the relationship between communication practices on H&S and employee productivity, H&S structure and employee productivity, H&S maintenance and employee productivity, working conditions and employee productivity, H&S training and employee productivity, and employer commitment for H & S and employee productivity is 0.000, which is less than the chosen significance level of 1 percent (0.01). This means increases in employee satisfaction with regards to communication, structure, maintenance, working conditions, training and development, and employer commitment for H&S significantly relate to increases in employee productivity.

The Cox and Snell's R square and Nagelkerke R square values which explains variation in the dependent variable shows that the model ranges from 27 percent to 43.2 percent respectively. The Hosmer and Lemeshow's test shows that the significant value is 0.755, which is greater than 0.5, and therefore permits the conclusion that the model is fit. The omnibus test of model coefficient shows the value of log-likelihood of model as significant at 0.01 level and the overall model better predicts whether an employee is productive or not, then it did with only the constant. This indicated the additional ability of the model to increase goodness of fit by 34.717 with include of predictor variables into the model.

The significant values of the variables in the equation have shown that there are two variables out of six which fit the model. Therefore, the model for non-managerial employee productivity with reference to H&S practices is:

$$P(Y) = \left(\frac{1}{1 + e^{-(-9.714 + 1.240X_1 + 0.970 X_2)}} \right)$$

Y = Employee Productivity

X₁ = Working Conditions on H & S practices

X₂ = Employer Commitment on H & S practices

The analysis shows that the odds of an employee being productive are 1.736 times greater for females as opposed to males and that the main contributors for employee productivity are working conditions and employer commitment to H&S, as these two indicators are significant.

Conclusion

Correlation coefficient values measured with regard to see the relationship between independent variables include to health and safety practices and employee productivity summarizes that there are moderately strong positive relationships between communication of practices, structure of practices, working conditions, training, and employer commitment on health and safety practices and employee

productivity except maintenance towards practices. Determinants of employee productivity with reference to H&S practices of an organisation are working conditions and employer commitment to H&S practices. Similarly the logistic regression model identified that, working conditions and employer commitment to H&S practices, when duly implemented, increase the odds of an employee being productive by 3.454 times and 2.638 times respectively. Therefore the management of a company in the apparel industry would have to consider H&S practices of employees with regard to appropriate working conditions and a satisfactory level of employer commitment when stipulating strategies for the company.

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Evaluation of Entrepreneurship Development Programmes in Sri Lanka

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Abstract

Entrepreneurship plays a very important role in the economic development. Entrepreneurs act as catalytic agents in the process of industrialization and economic growth. Entrepreneurship development programmes have been considered as an effective instrument for developing entrepreneurship in a country. Sri Lanka has been engaged in the efforts of entrepreneur development since late 1960s. This study focused on evaluating entrepreneurship development programmes in Sri Lanka. The study was conducted by using both primary and secondary data. Primary data were collected through structured questionnaire and the sample was selected by simple random sampling method. Bar chart, pie chart and line chart were used for represent the data. Descriptive statistics and chi Square test were used for data analysis. The findings of the research conclude that Entrepreneurship development programmes contribute to the participants who engaged in Entrepreneurship development programmes to be a better entrepreneur. The Entrepreneurs face several problems while they doing their enterprises and time period of Entrepreneurship development programmes is not sufficient for the development of entrepreneurship in Sri Lanka. Government must intervene sufficiently to implement the Entrepreneurship development programmes.

Introduction

Entrepreneurship is the key to economic progress of a nation. Development of entrepreneurs leads to rapid industrialization and hence improved well being of a country. Entrepreneurs are therefore called the wealth creators. Traditionally it was believed that entrepreneurial talent is an innate trait which one inherits through his birth. Entrepreneurial development programme is a systematic and an organized development of a person to an entrepreneur. The development of an entrepreneur refers to inculcate the entrepreneurial skills into a common person, providing the needed knowledge, developing the technical, financial, marketing and managerial skills, and building the entrepreneurial attitude. The concept of entrepreneurship development involves equipping a person with the required information and knowledge used for enterprise building and polishing his entrepreneurial skills. The overall aim of an entrepreneurship development programme is to stimulate a person

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for adopting entrepreneurship as a career and to make him able to identify and exploit the opportunities successfully for new venture. In these days, entrepreneurship development programmes are treated as an important tool of industrialization and a solution of unemployment problem of Sri Lanka. Sri Lanka has experienced two-digit unemployment rates for almost three decades. Unemployment causes many social, economic, political problems and lack of government jobs and mismatch between job skills and job status in the private jobs. Therefore, Sri Lanka Entrepreneurship Development has entered in new approach which were conducted by ministry of rural development, ministry of youth affairs and Sports, Industry of hand loom textile in 1989 under the project of UNDP/ILO project SRL/87/035. According to this project Small Entrepreneur Development unit and Sri Lanka Industrial Development Board could obtained the Technical advice of foreign Specialists. Therefore, it enhanced the opportunity to implement entrepreneurship development programmes in Sri Lanka. Currently there are three categories of Institutes which conduct entrepreneurship development programmes in Sri Lanka. Those are government, non-government institutions and semi government institutes. Government institutes are Small Entrepreneur Development unit, Department of Manpower and employment and Ministry of women Affairs. Semi Government institute are Sri Lanka Industrial Development Board, Mahaveli Authority, National Youth crops, Sri Lanka Export Development Board, Sri Lanka Vocational Training, Entrepreneur Development Advice center of BOC. Non-government institute are B.M.B Lanka, SMED Industrial solution Lanka and CEFS NET Sri Lanka. There are many reasons to importance entrepreneurship development programmes in a country. It generates new opportunities, generate equitable income distribution, contribute for economic development, utilization of national resources, empower industrial structure and build up entrepreneurship culture. Therefore, there is an urgent need to orient the developmental policies and education curriculum towards promoting entrepreneurship and instilling entrepreneurial qualities among them.

Problem Statement

As a developing county, Sri Lanka need to reach a rapid economic development and sustainable development. Entrepreneurship development is a major strategy for that. There are many Entrepreneurship development programmes implemented in Sri Lanka. Therefore, the research problem in this study is how many participants started their own enterprises after completed their Entrepreneurship development programmes According to this research problem two hypotheses were created.

H_0 : not start an enterprises after the completed Entrepreneurship development programmes

H₁: start an enterprises after the completed Entrepreneurship development programmes

Objective of the Study

The main objective of this study is an Identify the contribution of Entrepreneurship development programmes to be an entrepreneur in Sri Lanka. Other objective are to identify the contribution of government to Entrepreneurship development programmes in Sri Lanka and identify the Strength and weaknesses of Entrepreneurship development programmes which are implementing in Sri Lanka and identify the problems of entrepreneur's which they facing during they do their enterprises.

Methodology

Primary data were collected from 60 participants who completed Entrepreneurship development programmes in small Entrepreneur Development unit which conducted by Industrial Development Bureau in kurunegala divisional secretariat area 2014. The sample was collected from 729 populations. Simple random sampling method used for selecting sample for this study. Questionnaire and interviews were used for collect primary data. Secondary data were collected through Central Bank report, International Labour Organization report, magazine, web sites. Bar chart, pie chart and line chart were used for represent the data. Descriptive and chi Square test were used for data analysis. And SPSS software was used to analysis data. Chi Square test equation is,

$$\chi^2 = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i}$$

O_i = frequency of ith section observation

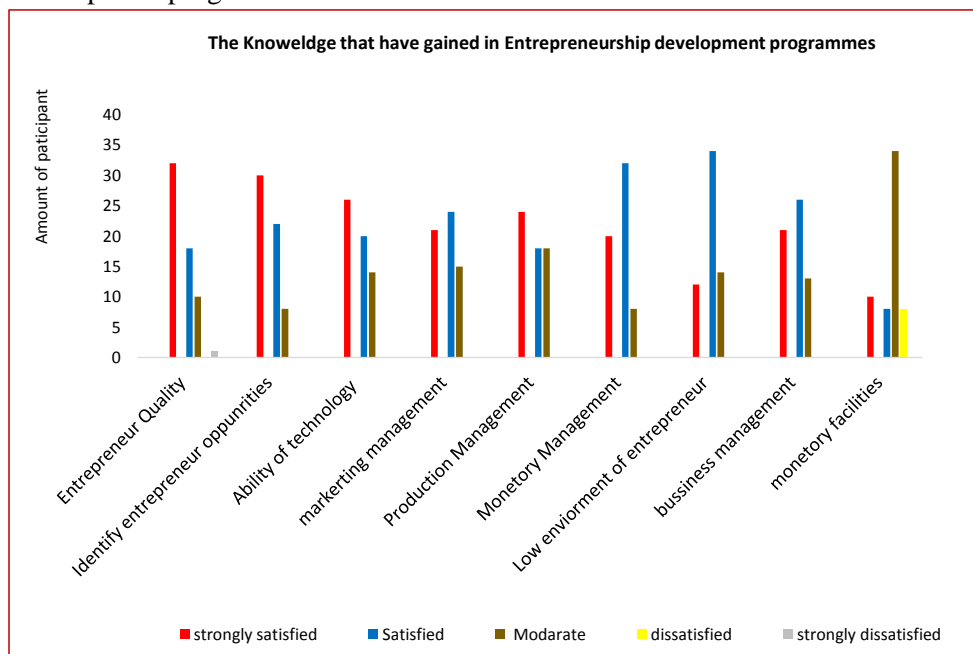
E_i = compatible expect frequency

K = number of section

Result and Analysis

According to the data which collected by this study, the percentage of participants which selected programmes are way to Business (75%), Business management (16.7%), Accounts (11.7), marketing management (13.3), and Costing (13.3). Then the knowledge obtained by the participant from this Entrepreneurship development programmes represent in below 1.1 figure

Figure 1: Knowledge gained by the participant through the Entrepreneurship development programmes



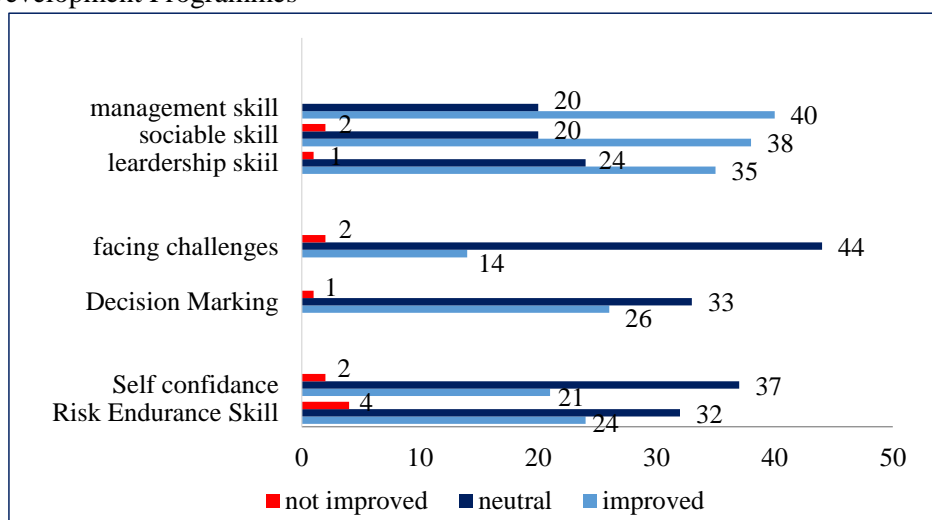
Source: Survey Data, 2014

According to the above figure majority of People strongly satisfied about Entrepreneur Quality that have gained through Entrepreneurship Development Programmes. This implies that Entrepreneurship Development Programmes have given good knowledge about flexibility, good social behavior, open mind and own responsibilities. There has no any person who strongly dissatisfied about Entrepreneur Qualities that have gained through Entrepreneurship Development Programmes. It known that the Entrepreneurship Development Programmes more contribute to motivate newcomers who prefer to be an entrepreneur. People who satisfied about technological and monetary abilities is high. The people do not have proper knowledge about marketing management and monetary facilities.

The objectives of the production management are managing Machine, Man, Money, Material and Method. The production management knowledge is very useful to manage scare resources with efficiency to arrive production target. Therefore, the people who participated to Entrepreneurship Development Programmes, strongly satisfied about production management knowledge that have gained the Entrepreneurship Development Programmes. Lack of financial management knowledge conduce to unsuccessful entrepreneurships. Therefore, financial

management knowledge is very essential to entrepreneurship. So, majority of participants were satisfied about financial management knowledge that have gained through Entrepreneurship Development Programmes. Figure 1.1 shows that the knowledge about Low environment and business management need to enhance. However these all things implies that the Entrepreneurship Development Programmes more contribute to develop entrepreneurship.

Figure 2: Skills that have improved by the participant through Entrepreneurship Development Programmes



People can improve their skills and knowledge entrepreneurship about entrepreneur through Entrepreneurship Development Programmes. If people want to be an entrepreneur he or she must improve some skills. Those are Management skills, Sociable skill, Self-confidence, Risk endurance skill, facing challenges, leadership skills and decision marking skills. Therefore, Entrepreneurship Development Programmes attempt to improve the skills of peoples who prefer to be an entrepreneur. Figure 1.2 shows that the Self-confidence, Risk endurance skill, facing challenges and decision marking skills must be improve than the other skills. When consider the decision marking skill, there has 55% people who have neutral intention. Leadership Skills, Sociable Skills and management skills have improved well rather than other skills.

The time period of the Entrepreneurship Development Programmes affect to knowledge and skills of participants. The 1.1 graph shows that the time period of considered Entrepreneurship Development Programmes in this study.

Table 1: Time Period of the Entrepreneurship Development Programmes

	Range	Minimum Value	Maximum Value	Mean Value	Standard Deviation	Skewness	Mode
Time Period of the Programmes	3	2	5	2'78	0'940	1'339	2

Table 1 show that maximum time period of the Entrepreneurship development programmes is 06 days. Minimum time period is 02 days. Mean value is 2.78. It implies that Entrepreneurship development programmes normally conduct in 03 days. Standard Deviation is 0.940. Therefore, the time period of Entrepreneurship development programmes has disperse with small range from mean. It implies that the time period of the Entrepreneurship development programmes is very short. The positive skewness describes that the majority of Entrepreneurship development programmes has conducted less than 03 days. Therefore, the short time period of Entrepreneurship development programmes is constraint to develop Entrepreneurship.

There has developed hypothesis to chi square test,

H_0 : not start an enterprises after the completed Entrepreneurship development programmes

H_1 : start an enterprises after the completed Entrepreneurship development programmes

According to the chi square test first experimented independence between Participation to Entrepreneurship development programmes and start an enterprise after the completed Entrepreneurship development programmes. The significant value was 0.008. It is less than 0.05. Therefore, null hypothesis (H_0) rejected. It describes that Entrepreneurship development programmes contribute to be an entrepreneur to the participants who engaged in Entrepreneurship development programmes under the 95% significant level.

When considering the employed and unemployed persons of this sample, 76.7% persons were employed and 23.3 persons were unemployed. The problems of entrepreneur of this study are lack of capital investment, insufficient knowledge about finance, management, Accounts, Technical and lack of trained employee. There have 34% entrepreneurs who has lack of knowledge about finance and 28% participants has lack of knowledge about marketing. Therefore, government

intervention is more important to give subsidies and other benefits for solve financial and marketing problems.

Conclusion

The study focus on evaluate Entrepreneurship development programmes in Sri Lanka and identify the contribution of Entrepreneurship development programmes to generate entrepreneur in Sri Lanka. Therefore, Entrepreneurship development programmes are one of the major strategic for reduce unemployment Problem in Sri Lanka. It improves the knowledge and skills of Participants who engaged to Entrepreneurship development programmes. Government must intervene sufficiency to implement to Entrepreneurship development programmes and should increase the time period of Entrepreneurship development programmes in Sri Lanka. Therefore, the study elaborates that the Entrepreneurship development programmes in Sri Lanka should improve furthermore.

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Relationship between Trade Openness and Economic Growth in Sri Lanka: Time Series Analysis

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Abstract

This paper examines the relationship between trade openness and economic growth in Sri Lanka. The importance of the trade liberalization has been overlooked by many countries in the past mainly due to political reasons. However, this has changed along with the globalization and disintegration of the socialist block of countries. Now, it is accepted as a crucial factor in accelerating economic growth, especially in the developing countries. The economic liberation could be considered as a turning point of FDI policies in the recent history of the countries even though it has been consequently checked by political uncertainties, especially the civil war. Sri Lanka is a small open economy, so that FDI make considerable impacts on its macroeconomic variables. In case of the exchange rate, interest rate, external reserves, outcome of BOP, money supply, inflation, economic growth, employment generation and external borrowings trade liberalization is important. Objectives of this study are to examine the relationship between trade openness and economic growth in Sri Lanka. The proposed in study is based on various publications of the Central Bank, custom records, and articles. The time period covered by this study is in post liberalized period of Sri Lanka. The collected data is basically presented quantitatively and Time series analysis is applied for this purpose. Where necessary qualitative approaches were also used as a complementary method of analysis. Findings suggest that trade openness have a positive impact on economic growth in Sri Lanka. External reserves of the country are mainly influenced by openness and as a result of that the exchange rate, money supply, economic growth, employment generation, and inflation are also affected.

Key Words: *Exports, Economic Growth, Imports*

Background of the Study

Sri Lanka was the very first South Asian Country to liberalise its trading economy to the rest of the world in 1977. Current economic theories emphasis countries with

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trade liberalization, receive significance loans and aids from rest of the world. In the case of a liberalized economy investment may be financed through both domestic savings and foreign capital flows, including FDI. The countries suffering from lower levels of domestic savings and capital are facing a choice of foreign debt and FDI inflows. Despite the positive influence of foreign debt in terms of capital inflow, it bears some risks of repayment. Therefore, debt is less preferred to FDI.

For twenty-two years that mean till 1999 Sri Lankan trade regime remained amongst the most liberal in the South Asian region. Past empirical studies reveal that the Sri Lankan economy largely benefited from its liberalization at that period of time. Up to 1999, external trade only affected by import duty. But in 2000 after the Sri Lankan government introduced a number of additional tariffs to international trade this condition is being reversed. Mainly because of Cess, Port and Airport Development Levy (PAL) and the Special Commodity Levy (SCL).

Motivation of the Paper

During the last three decades, these NICs have approximately doubled their living standards in every ten years. China is the most recent country to join this group. China's experience during 1980s and 1990s tends to support the argument that openness to trade is an instrument for achieving more speedy and efficient growth and better distribution of resources.

Researchers have investigated to answer the question of how the trade liberalization is linked with economic growth of a country. However, researches carried out on this field have produced a mixed bag of results all over the world.

These results have created the issue more complex in the world. Therefore, this study attempts to find empirical evidences on the relationship between international trade and economic growth of Sri Lanka.

Research Problem and Research Objective

There are many studies researching that net outcomes of the trade openness. The empirical findings indicated that trade openness had a positive and significant effect on economic growth of a particular country. And also some researchers argue that trade openness has failed due to a combination of external and internal inconveniences of a country. Along with that there is a need to examine the relationship between trade openness and economic growth in Sri Lanka. General objective of this study is to examine the relationship between trade openness and

economic growths in Sri Lanka during 1977- 2015. Two hypotheses are used to test this relationship.

Null Hypothesis $H_0 = \beta_1 \leq 0$

Alternative Hypothesis $H_A = \beta_1 > 0$

Null Hypothesis reflects that Trade Openness has not positive relationship with Economic Growth of Sri Lanka. And Alternative Hypothesis is Trade Openness has positive relationship with Economic Growth of Sri Lanka.

Literature Review

There are large number of studies which have been carried out to find the relationship between trade liberalization and economic growth. These all studies had been end up with the mix bag of conclusions of the world economy. Some studies have shown that trade liberalization has increased the performance of exports and enhance the international connotation of the host economy and ultimately increasing the national income. On the other hand, some studies have not identified significant relationship between trade liberalization and growth of a particular country.

Herath (2009) has study about the research article which with title of Impact of Trade Liberalization on Economic Growth of Sri Lanka: An Econometric Investigation. One of the major hypotheses of the study is to test the relationship between trade liberalization and the Sri Lanka's economic growth during the pre and post liberalization era. Findings of the study confirm a positive significant relationship between trade liberalization and economic growth of the country. The study encompassed five decades which belong to two trade regimes, pre and post liberalization period, in Sri Lanka. Findings of the study are on the relationships between trade liberalization, economic growth of Sri Lanka. And also other factors affecting these relationships are taken into consideration in the study.

In the world Bank publication Nash and Thomas, 1991; and Papageorgiou et al 1991 also investigated about the relevant topic. Study was depended on the comparison of gross domestic growth between closed and opened economies or before and after trade liberalization. These studies have identified a year of liberalization and after observing higher GDP growth rate after the reforms and concluded that trade liberalization leads to higher growth.

Nath and Al-mamun analyzed trade and economic growth in Bangladesh using a vector auto regression (VAR) model to show that trade has increased the economic growth in Bangladesh.

Nirodha , Benaissa and Jeff Johnson (2013) a co-integrating analysis. This study investigated the empirical evidence on the relationship between trade liberalization, trade openness, and economic growth using time series models. Moreover, the study examined the impacts of investment, Free Trade Agreements and policy reforms on real GDP growth. The empirical results were based on Johansen Co-integration test, Grangers causality, and error correction models. Results show that trade liberalization and trade openness has no significant effects on economic growth, although they are positively related to the economic growth. Free Trade policies would be beneficial for the economy if those policies made a significant impact on real GDP by allocating domestic resources efficiently.

Methodology

The well-defined methodology has been used to explore the above objective. Secondary data is used for the study. The data are taken from various sources such as Central Bank Reports of Sri Lanka and UNCTAD (United Nations Conference on Trade and Development) Reports. The time period is from 1977- 2015. Openness in trade refers to the degrees to which countries or economies permit or have trade with other countries or economies. The trading activities include import and export, borrowing and lending, and repatriation of funds abroad. It is measured like following.

$$Openness = \frac{Export + Import}{GDP}$$

In this study dependent variable is Gross Domestic Production as well as trade openness, Gross capital formation and inflation used as independent variables. Data is analysed using E-views 7 where the causality between dependent and independent variables are analyzed for the period concerned. In this study, the unit root test (the Augmented Dickey – Fuller Test (ADF) was used. And the long run appearance of the selective stationary variables estimates is from the Johansen Co-integration test. And Granger Causality test is used to find the causality among variables. Ordinary Least Square method (OLS) is used to estimate and explain the regression model of the study. This method is used to estimate and explain the regression model of the study.

Discussion and Findings

All the variables are stationary at first difference form.

Co – integration Test

Following is the result of Johansen Co- integration test.

Table 1: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Trace Eigenvalue	Statistic	0.05 Critical Value	Prob.**
None *	0.553305	55.20527	47.85613	0.0088
At most 1	0.416235	26.19364	29.79707	0.1230
At most 2	0.122681	6.816408	15.49471	0.5991
At most 3	0.056784	2.104549	3.841466	0.1469

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.553305	29.01164	27.58434	0.0326
At most 1	0.416235	19.37723	21.13162	0.0864
At most 2	0.122681	4.711859	14.26460	0.7777
At most 3	0.056784	2.104549	3.841466	0.1469

(Source: eviews7)

These result reject the ‘none’ and interpret that there is a long run relationship among these variables at the 0.05 level.

Ordinary Least Square Method

According to the research, the equation can be rewritten as:

$$GDP = \alpha_0 + \beta_1 OPN + \beta_2 GFCF + \beta_3 INF + \varepsilon$$

GDP= 6.633565 + 0.182056(LOPN) + 0.778408(LGFCF) – 0.005508(LINF)
 SE (0.771282) (0.157017) (0.037752) (0.003845)
 (Source: eviews7)

In this equation Gross Domestic Production is the dependent variable while Trade Openness, Gross Fixed Capital Formation, and Inflation are considered as independent variables.

Trade openness positively relate with GDP but not statistically significant. If trade openness increases with 100% the GDP will increase by 18.20% with respect to the openness. It may also conclude that trade openness is a significant variable for interpretation of the GDP's growth. According to the β_2 value of the GFCF, that is 0.7784 and it suggests that there is a positive relationship with the GDP and Sri Lankan capital formation. Simply when we assume that Gross Capital Formation level of the country will increase with 100%, as a result of it the GDP growth will be increased by 77.8%. Inflation and GDP has negative relationship as mentioned in the equation. The coefficient of the inflation is -0.0055. If inflation decreases with 100%, the GDP will increase by 0.5%. Higher inflation must be a significant cause for the GDP decrease in the long run. In this model, R square is 0.96 (96%), it shows that model is accurate. Out of the 100% variation of the GDP growth, all these variables explain the 98% of that variation with this model. Only other factors explain the 2% variation of the GDP variation. The conclusion of this model is this is an appropriate model for the investigation of GDP growth in Sri Lanka.

Table 2: Granger causality Test

Direction of the causality	Probability	Lags	Decision	Outcome
OPN → GDP	0.0502	1	Reject null	OPN causes GDP
GDP → OPN	0.3947	1	Don't reject null	GDP does not causes OPN
GFCF → GDP	0.8103	1	Don't reject null	GFCF does not causes GDP
GDP → GFCF	0.0014	1	Reject null	GDP causes GFCF
INF → GDP	0.4788	1	Don't reject null	INF does not causes GDP
GDP → INF	0.0517	1	Reject null	GDP causes INF
GFCF → OPN	0.0721	1	Don't reject null	GFCF does not causes OPN
OPN → GFCF	0.3143	1	Don't reject null	OPN does not causes GFCF
INF → OPN	0.1166	1	Don't reject null	INF does not causes OPN
OPN → INF	0.3431	1	Don't reject null	OPN does not causes INF
INF → GFCF	0.4648	1	Don't reject null	INF does not causes GFCF
GFCF → INF	0.0971	1	Don't reject null	GFCF does not causes INF

Source: reviews7

Above results indicate that trade openness cause to GDP while GDP is not a cause to country's trade openness. It emphasises that trade openness is very imperative to GDP of Sri Lanka.

And also GDP of the country causes to the GFCF of the country. Not only to the GFCF, has GDP also affected to the inflation of the Sri Lanka.

Conclusion

Many researchers who engaged with the international trade area have been in the inadequate debate regarding the impact of trade openness on economic growth of a host economy. The abstruse findings reveal that trade openness has a positive impact on economic growth while some studies conclude the opposite.

This study implies that trade openness have a positive impact on economic growth in Sri Lanka. But it is not statistically significant. Then the study highlighted that elimination of trade barriers such as import and export tariffs, technical barriers which upturned compensations of trade openness in Sri Lanka. And also in order to achieve positive balance of trade, Sri Lanka must focus on to expand the domestic production and enlarge the export supply capacity in the country.

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Preferential Trade Liberalisation through Bilateral or Regional Agreements: Need for a National Strategic Approach for ETCA and Beyond

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JEL Codes: F13, F15, F53, F55

Abstract

Sri Lanka is negotiating bilateral and multilateral trade agreements with a number of countries and regions. This is in an apparent attempt to secure better market access in those countries. Attempts are also made to enter into new agreements which would expand the coverage of existing trade agreements to include service trade as well. The proposed Economic and Technical Cooperation Agreement (ETCA) with India, going beyond the currently operational India-Sri Lanka Free Trade Agreement (ISFTA), is an example. A research was conducted to examine the different dimensions of Sri Lanka entering into such agreements, potential risks and possible precautions, in view of preventing undesirable outcomes. Particular focus was the proposed ETCA, within the present economic and geo-political conjuncture. The outcomes of the study highlighted the necessity for Sri Lanka to have a “development strategy” prior to any consideration of bilateral or multilateral trade agreements. Though the partner countries possibly have large markets, such as that of India, entering into such market have to be strategically planned, and it is unlikely that the trade agreements without such foundation strategy would be successful. The hitherto unresolved issues pertaining to Indo-Sri Lanka Free Trade Agreement (ISFTA) have to be resolved with priority as no further opening without such rectification is likely to be fruitless. The regulatory mechanism needs to be rectified prior to signing any trade agreements, as any regulations passed after signing a trade agreement is likely to become unenforceable. The study also pointed out the necessity to have termination clauses built-in so that the sovereign right of the people of Sri Lanka to vote at an election for a change in economic policies, including the policy on foreign trade, would be safeguarded and upheld.

Key words: *Preferential Trade Agreements, Sri Lanka, Liberalisation, National Economics*

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Introduction

In a bid to expand her export potential and economic growth horizons, Sri Lanka intends to enter into trade and economic cooperation agreements with a number of countries in the near future. These would include an “Economic and Technical Cooperation Agreement” (ETCA) covering liberalisation of services with India, and trade agreements with Singapore and China. This is amidst wide-spread attempts among countries, including those in the developed world, to enter into bilateral and regional trade agreements, and Sri Lanka having also entered into bilateral trade agreements with India (ISFTA), Pakistan (PSLFTA), and regional agreements with South Asian nations (SAFTA) and Asia-Pacific countries (APTA), in addition to the World Trade Organisation (WTO) framework.

The liberal economic policy prescription, calling for “free trade regimes”, presumes that elimination of market distortions would enable local producers to have quality inputs at competitive prices, and make export items competitive in export markets. This underpins the philosophy behind the General Agreement on Tariffs and Trade (GATT), the General Agreement on Trade in Services (GATS) and the WTO conditions. However, the world is witnessing a different pattern where countries opt for preferential trade agreements in view of exploiting export markets at preferential terms compared to their competitors, which is not in conformity with the principle of trade on a competitive basis. In such an environment, it is only natural that Sri Lanka, having only a limited domestic market constraining production economies of scale, looks for such bilateral and regional agreements with countries having sizable markets such as India and China.

This paper focuses on Sri Lanka’s entry in to a further trade liberalisation agreement with India through the proposed ETCA, examines the relevant political economic conjuncture, and attempts to weigh pros and cons of entering in to such an agreement. It also discusses a strategic approach which Sri Lanka may adopt with regard to such trade agreements in general.

Materials and Methods

The shape of ETCA or its terms and conditions are not formally known as yet. Only a broad statement of structure is being discussed, and thus, the analysis had to be innovative and exploratory, with possible scenarios being foreseen and logically established. Data and information required were gathered mainly from secondary sources, such as previous research, and documents that were made available to

professional groupings, seminars and discussions, and media. The research adopted a political economic analytical methodology.

Results and Analysis

The available documents and political statements made by the authorities suggest that the proposed ETCA would aim at (a) further streamlining trading of goods under the ISFTA, (b) bilateral opening-up of identified services, (c) bilateral investment promotion, and (d) technical cooperation. It appears to be the re-emergence, in a different form, of the previously proposed Comprehensive Economic Partnership Agreement (CEPA) with India, which was subsequently not pursued due to strong opposition from professionals. The Government's official statements appear to deny that it would include "Mode IV" liberalisation, the most controversial feature of CEPA, but research finds conflicting indications embedded in statements issued at the Indian end (Sen, 2016).²

For what purpose?

The present research could not find any explicit set of benefits Sri Lanka intends to secure by entering into ETCA which could not be realised otherwise. The exploitation of Indian market for Sri Lanka's goods and services, if intended, without having a scrupulously carved out "Win India Strategy", would be futile. This is further substantiated by the experience gained with ISFTA on export of goods which was not encouraging (Gunaruwan & De Alwis, 2014). Therefore, entering into a much deeper and complex ETCA, including service sector liberalisation also, without first rectifying the weaknesses in the ISFTA including Non-Tariff Barriers and other restrictions (Moramudali, 2015),³ and gaining confidence that Sri Lanka could have fair treatment vis-à-vis Indian market (as much as Indian exporters have in the Sri Lankan market), would be fruitless (Kumarasinghe, 2016).

² Statements made by India that the country "...is not interested in negotiating any further on goods till there is progress in the area of liberalising movement of professionals... in *"The Hindu"* on 9th Feb 2016, further substantiates this concern. (Sen, 2016)

³ "...NTBs faced by the Sri Lankan exporters remain unattended and unresolved even after those were brought to their notice. Therefore, negotiating for any further expansion of bilateral liberalization with India (CEPA, ETCA or any other agreement) sans the resolution of all present NTBs would amount to nothing but adding more rungs to a ladder which already has very weak rungs that can break at any given time..." (Moramudali U, 2015)

Table 1: Non-Tariff Barriers (NTBs) against Sri Lankan Exports to India

Product/s Involved	Measure
Marble & Granite Slabs	Minimum floor price (US\$ 80) was imposed on 26/08/ 2013.
Fresh fruits and highly perishable items.	Excessive time taken for lab testing.
MDF Boards	Anti-Dumping Duty [Case: Merbok MDF Lanka Pvt Ltd]
Apparels	Quota restrictions [Case: Hirdaramani Group]
Coconut Milk Powder	Penalised genuine products with due specification on discretionary product testing /errors by FSSAI accredited labs
Biscuits	Exemptions to local (Indian) companies, hindering SL products entering the market; and Arbitrary penalty on bulk quantities.
Tea	Excessive delays in testing and complex labeling procedures
Compound Chocolate	Restrictions imposed under FSSAI regulations on importation of compound chocolates. [Case : Anod Cocoa (Pvt) Ltd]
Frozen meat items	Long delay in issuing product approval licenses
Cu wires/Cables	Port restrictions on exports
All products	Non recognition of SL Certificate of Origin

Source: Moramudali (2015)

The Sri Lankan approach appears to be attempting to use the proposed ETCA to resolve pending issues pertaining to ISFTA.⁴ This approach cannot be considered rational, as it is tantamount to entering into a more complex and widely ramified implications in the hope of finding solutions to problems associated with the implementation of a much simpler and straight-forward agreement, to which the Government hitherto has demonstrated its incapacity. It is futile to assume that this incapability of negotiation and resolving impending issues, which the Government

⁴ This is mirrored in the report carried by the Indian Express : “....The Lankan Deputy Minister of Foreign Affairs, Harsha de Silva, told Express that while there is no formal document yet, some issues which had plagued the India-Lanka Free Trade Agreement (ISLFTA) are expected to be addressed in the ETCA. Among these are the Non-Tariff Barriers in India; the need for an agreement on Mutual Recognition of Standards; and the need to lift restrictions on ports of entry.....” (Indian Express, 23 February 2016).

of Sri Lanka has hitherto displayed through the implementation of the ISFTA, would disappear when a much more complex agreement is entered into.⁵

On the other hand, if the opening of Sri Lankan doors to Indian human resources is intending to resolve the issue of shortage of skills in certain segments, two important mismatches could be observed in such a strategy: First, a negative development economic implication that would be associated with such a strategy. This is because, that would amount to ignoring the opportunity of using the unsatisfied demand as the stimulus for investing in such economic activity, which would be nothing but foregoing the scope for Keynesian economic push and clamping the “multiplier effect” otherwise possible through local development of such skills. Second, there is no reason why such a filling of the resource gap, even if opted for in spite of the above mentioned weakness, cannot be achieved through the existing work permit system which enables entry of an identified and pre-determined number of professionals for a limited period. The mere fact that Sri Lanka appears to be entering into ETCA negotiations with no clarity as to what is intended as benefits raises an added concern as to whether Sri Lanka is not forced to it by Indian pressure.

Domains ear-marked, for whose interest?

The analysis took note of the two domains widely spoken of as being prompted for opening up, namely (a) Information Technology (IT) and (b) Ports and Shipping related services. Concerns were expressed as to whether these were considered because of the strategic and geo-political interests of India rather than on mere commercial or trade-based interests. Sri Lanka’s locational advantage at the southern tip of Indian sub-continent is extremely strategic not only due to its close proximity to East-West maritime silk route, but also as a position of regional political and military strength. The possibility of India being interested in making her presence, and even eventual domination, felt in Sri Lanka’s strategic maritime nodes cannot be excluded. The IT industry would be a potential “winner” for Sri Lanka.⁶ Her IT/BPM industry has set its vision to achieve by 2022, USD 5 billion in exports, generating 200,000 jobs and creating 1,000 start-ups. Furthermore,

⁵ *It is difficult to visualise how a fair and effective dispute resolution including potentially complex issues pertaining to service trade could take place after signing an ETCA when Sri Lanka is yet to demonstrate any ability to prevent poaching in the north Sri Lanka seas by Indian fishermen.*

⁶ *“Sri Lanka offers a unique mix of extremely low costs- among the lowest anywhere- combined with highly educated, English speaking population with sophisticated technical skills, and a business environment and infrastructure that is superior to most of the low cost countries” (A T Kearney, 2012).*

contrary to the image the country had during the period of conflict, Sri Lanka now is among the safest, lowest risk emerging markets both in terms of personal safety and business security. Therefore, the government should focus on developing local IT industry which was praised by many renowned personalities in the field, instead of importing IT professionals. Opening up the sector to India, particularly if permitted under Mode IV, would lead to filling the resource gap by an influx of Indian professionals, dampening the scope for local IT skill development business, and affecting the industry's long-term prospects if such influx becomes lower than acceptable quality (Wickremasinghe, 2016).

Is the “house in order”?

Quality is probably the most critical concern if service liberalisation takes effect through ETCA, given the quasi-absence of systems, standards or rules and regulations in the Sri Lankan market, save in very few domains, to screen for the quality of such service providers. Research revealed that the Indian market is heavily protected by such rules and regulations. Opening up trade in services between India and Sri Lanka in such a context is likely to permit a one-way flow as the Sri Lankan structure has no such rules, regulations, or prohibitions. Free trade and free movement of people have to be “monitored”, which requires an appropriate institutional framework in operation, and even Euro zone faces problems owing to the absence of required institutional setting for these purposes (Stieglitz, 2016) . Sri Lanka cannot be an exception, indicating that a blind and unprepared opening for free trade could induce negative repercussions.

It is understood that laws, rules, regulations or standards that a partner country would enact subsequent to a bilateral trade agreement coming into effect would not be applicable to businesses conducted under such agreement. Therefore, Sri Lanka should scrupulously define norms, rules and regulations to ensure quality and standards of service imports or human capital inflows, as demanded by professional bodies under the banner of “Put the house in order first”.⁷

Impact on our export competitiveness?

Bilateral trade agreements are market distorting, and therefore in contradiction with the liberal economic prescription that trade should be conducted on a levelled

⁷ Professional bodies, including the Organisation of Professional Associations (OPA), United Professionals' Movement (UPM) and Government Medical Officers' Association (GMOA), under the name of “putting the house in order”, have considered it imperative and called for a comprehensive policy framework and setting up of standards, rules and regulations, prior to any discussion on bilateral or regional service trade agreements.

playing field among all potential suppliers (Abeyratne, 2013).⁸ Preferential treatment for suppliers belonging to one country or a region would constrain the likelihood of the right quality product with best price winning the market, and would induce inefficiency. If Sri Lanka's inputs for export processing industries are impacted, this could negatively affect their quality and could even damage export competitiveness, particularly vis-à-vis the European and North American markets which are very much quality conscious.

Sacrificing much for nothing?

The study also addressed the question of the sustainability of any competitive edge over other competing supplier countries which Sri Lankan export products or services would gain in the Indian market through ETCA. This is because India may sign similar agreements with other countries, including Sri Lanka's competitors, and it would only be a matter of time that those competitors would secure similar preferential treatments, thus nullifying any advantage Sri Lanka would initially gain in the Indian market by signing ETCA. Any comparative tariff advantage Sri Lanka would gain in the Indian market through ETCA is therefore bound to be temporary. But, in the meantime, Sri Lanka through the process of ETCA would have opened up its service market to India, and would have already faced all the related socio-political and economic disadvantages or incurred all such costs. Hence, in the long run, this may even amount to be sacrificing much for nothing sustainable in return.

Conclusions and Recommendations

The findings of this study reveal that the proposed ETCA with India (or any other trade agreement with any other nation) would not be without risks or down-sides. The case with India is crucial because of proximity, past experience, and contemporary geo-politics in the region. Therefore, the study concludes that the Government should not rush into further deepening the bilateral liberalisation of trade in goods and services with India, or sealing long-term binding trade agreements with any other country, but should carefully study the pros and cons, anchoring strongly on a futuristic strategic framework within which national interests are safeguarded in the pursuit of export expansion.

⁸ Professor Sirimal Abeyratne, analysing the potential of Sri Lanka entering into Indian Supply Chains, says that “.. bilateral FTAslead to distortions in specialization and trade.... partnerswould be given an uncompetitive advantage” (Abeyratne, 2013)

The study also indicates that the internal rules, regulations and standards are not adequately geared to ensure quality and standards of imports of goods or services, and also the inflow of professionals (if Mode IV is permitted). Therefore the Government should focus on developing such regulatory imperative and on putting the house in order before discussing bilateral or multilateral trade agreements.

The insights resulting from this research suggest that the country should not enter into binding trade agreements with India or any other nation unless they become unavoidable in achieving desired national economic objectives. This is because these trade agreements would be “supra-national”, and would implicate a compromise of the sovereignty of people to change policies (including those on international trade) through their democratic choice. This is more so because such agreements are likely to be legally enforced outside the national judicial framework, thus compelling any grievances to be referred to international arbitration which is likely to be extremely expensive. It is therefore recommended that any trade agreement into which Sri Lanka intends to enter for unavoidable reasons would be sanctioned by a special majority in Parliament.⁹ It is inconceivable that the Constitution of Sri Lanka has such provisions to safeguard the citizen’s interests, sovereignty and national independence with regard to many other structural or legislative amendments, while not having any similar conditionality with regard to international agreements, which appear binding the country and its future generations for much longer periods than the tenure of any elected regime. It is also suggested that any international agreement, including bilateral or multilateral trade agreements, should have “exit” or “termination” clauses, to be availed in the event the necessity to get out of such agreement arises.

Finally, the results suggest that it would be strategically more appropriate for Sri Lanka to assign policy priority for developing her export competitiveness in general through industrial and service sector productivity, rather than through trade agreements.¹⁰ This is because, it is the international competitiveness of our products or services which would ensure sustainable growth of our export earnings and thereby our balance of payment stability, with or without preferential trade

⁹ *Even an approval by a special majority plus a referendum would warrant this sort of “international commitment”.*

¹⁰ *Professor Prema-Chandira Athukorala opines that FTAs are not the key to enhancing trade between countries and the FTA with India exist maybe for political reasons. According to him, only a very little faith could be placed in FTAs and Sri Lanka, instead of focusing on FTAs, needs to rationalise the tariff system in order to expand its opportunities to increase exports through becoming a part of global product sharing (Ceylon Today, 2016).*

agreements. In short, an effective industrial policy aiming at productivity enhancement through technology, inventions and innovations should be pursued as strategic priority, much ahead of seeking preferential entry to export markets through trade negotiations.

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The Impact of Credit Risk on Profitability of Commercial Banks in Sri Lanka

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Abstract

The credit creation is an important determinant of bank performance since it is generated through the financial intermediation which is the main income generating activity of commercial banks. The objective of this study is to empirically examine the impact of credit risk on profitability of commercial banks in Sri Lanka. The study used secondary data for the analysis and the relevant data collected from audited financial reports of five commercial banks and Central Bank annual reports covering the period of ten years from 2005-2015. The analysis of data is based on descriptive statistics and panel regression model and the results showed that credit risk indicators; inflation, non performing loan ratio, total assets to GDP, total loans to deposit ratio, and total assets of commercial banks have significant impact on profitability of commercial banks in Sri Lanka. Findings of the study, reveals that bank specific risk factors has significant impact on bank performance in Sri Lanka. Therefore, study provides important implications for policy makers while enlightening substantial scope for future research.

Key Words: *commercial banks, profitability, credit risk, panel regression, Sri Lanka*

Introduction

Financial institutions facilitate economic growth and development through financial intermediation. Among the financial institutions, commercial banks are the biggest financial institutions facilitating major share of financial intermediation and are considered as the core of financial system. Moreover, commercial banks are the foundation of the payment system in many economies particularly in developing countries by playing intermediary role between depositors and borrowers ((Felix Ayadi et al., 2008). The intermediary role of commercial bank explains the core function of commercial banks which forward under the concept of traditional banking. However, lending by itself generate risk when the borrower fails to meet his obligations. The risks associated with lending is called credit risk that is recognized as most important risks among other types such as liquidity risk,

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operation risks, market risks (Perera et al., 2014, Yusuf, 2003). The credit creation is an important determinant of bank performance since it is generated through the financial intermediation which is the main income generating activity of commercial banks. According to the Kargi (2011) creation of credit is the main income generating activity for the banks but this involves huge risks to both lender and the borrower. If the banks are failing to manage credit risk may pay high costs of the same in the shape of bankruptcy since the banks that are highly exposed to credit risk face reduction in profitability (Arif, A., et al 2012). Uncertainty and the financial crisis in the global economy has created a pressure on credit risk and ultimately caused to profitability of commercial banks (Bayyoud & Sayyad, 2015). Not only that most of the studies in general confirmed that risk management is vital for any organization in the current business environment to achieve its objectives in fair manner (Smith et al., 1990., Fatemi and Fooladi, 2006).

The risks are inherent in all aspects of commercial banks operations. Therefore, banking in modern economy is all about risk management (Thiagarajan and Ramachandran 2011) Managing risk is important to any type of bank regardless of their nature, size or location. Moreover, recent studies done on this area reveal that poor assets quality, excessive credit expansion, in appropriate risks management practices are the main reasons for the financial crisis. The importance of managing credit risks is highlighted by Basel committee on banking supervision and in recent accord, Basel III identified the responsibility of managing credit risks in financial crisis (Jayadev, 2013).

Empirical literature on credit risk suggests that there are two main determinants of credit risks in banks. The First determinant is called as bank specific variables (BSV). BSV has a significant relationship with credit risk on commercial bank (Chen & Pan 2012, Kargi 2011). Second determinant of credit risk is macroeconomic variables such as growth of GDP, money supply, interest rate and inflation (Thiagarajan and Ramachandran 2011), According to Arif, Afrar and Afzal 2012, the economic environment acts as an important factor in the credit risk mitigation. Moreover, the downturn in economic activities negatively affects cash flows of borrowers which may cause to default of bank loan.

In the broad empirical literature there are extensive studies done on credit risk and the profitability of commercial banks Most of the studies confirmed the existence of inverse relationship between credit risk and profitability of commercial banks. (Poudel 2012, Honsa et.al 2009, Chen and Pan 2012, Kargi 2011, Naceur 2003, Thiagarajan et al 2011). Though, relatively large number of studies confirmed the

negative association between credit risk and profitability, generalizing it into whole system is quite difficult since number of other studies come across with different opinions. But, some other studies confirmed the positive association between credit risk and profitability (Kithinji 2010).

Further, the empirical literature on credit risk and profitability becomes more complicated with the findings of Hanseef et.al (2012) the study done banking sector in Pakistan. This study regressed the non performing loan (NPL) against the profitability of banking sector during the period 2005 to 2009 in a sample of five commercial banks in Pakistan. The results of this study reveals that the profitability of commercial banks has not no significant relationship with NPL. Therefore, empirical literature on this issue provides inconclusive results and hence that can be investigated on empirical ground as a case study. Hence, the purpose of study is to investigate the relationship between at credit risk and the profitability of commercial banks in the context of Sri Lankan commercial banking sector. The findings of the study will enrich the existing literature gap on credit risk and profitability in Sri Lanka.

Literature Review

The literature on credit risk assessment is extensive and growing. In the broad literature has given attention on risk management, risk assessment and its determinants. In today's business world risk management is recognized as an intergral part of good management practices which provides systematic approach of management policies. Since commercial banks expose to numerous kinds of risks, inadequate risk management not only hamper the profitability but also causing economic slowdown. According to Kithinji (2011) risk management is defined as the process that bank puts in place to control its financial exposures. Banks need to manage credit risk inherent in the entire credit portfolio as well as in individual credits or transactions.

Credit risk management is one of the most important issues in banking sector due to weight its carries in assuring bank survival. Managing credit risk in the bank loan portfolio is vital because default of proportionately larger clients whose businesses are highly correlated with each may lead to insolvency of banks. Therefore, risk diversification is essential for a bank which means lending to customer or customers in different industries.

Markowitz (1959) developed the portfolio theory which indicates the importance of diversifying the individual assets (loans) risk. According to Markowitz the choice

between risky assets are on the basis of their risk and return. The expected return of an asset is used as an indicator of profitability. So, the expected return is the possible outcomes weighted by their profitability of occurrence. or standard deviation is used as an indicator of risk. The decision rule for evaluating risky alternative can be solely based on this risk (variance) and return (expected rate of return). This return –risk or expected return –variance rule is called as E-V rule.

Kargi (2011) evaluates the impact of credit risk on the profitability of Nigerian banks. Financial ratios are used as measures of bank performance and credit risk and data is collected from the annual reports and accounts of sampled banks from 2004-2008 and analyzes using descriptive, correlation and regression techniques. The findings reveal that credit risk management has a significant impact on the profitability of Nigerian banks. It concludes that banks' profitability is inversely influenced by the levels of loans and advances, non-performing loans and deposits thereby exposing them to great risk of illiquidity and distress.

Gul, Irshad, Zaman (2011) examines the relationship between bank-specific and macro-economic characteristics over bank profitability by using data of top fifteen Pakistani commercial banks over the period 2005-2009 using pooled OLS regression to investigate the impact of SIZE (natural log of total assets), CAPITAL (equity/assets), LOAN (total loan/total assets), DEPOSITS (total deposits/total assets), economic growth, inflation and market capitalization on major profitability indicators i.e., return on asset (ROA), return on equity (ROE), return on capital employed (ROCE) and net interest margin (NIM) separately. They found that that SIZE, LOAN, DEPOSITS, INF and GDP have a positive relationship with ROA, while CAPITAL and MC have a negative relationship with ROA. It depicts that the larger banks are better placed than smaller banks in harnessing economies of scale in transactions to the plain effect that they will tend to enjoy a higher level of profits.

Kithinji (2010) assesses the effect of credit risk management on the profitability of commercial banks in Kenya. Data on the amount of credit, level of non-performing loans and profits were collected for the period 2004 to 2008. The findings reveal that the bulk of the profits of commercial banks are not influenced by the amount of credit and non-performing loans, therefore suggesting that other variables other than credit and non-performing loans impact on profits.

Kosmidou (2008) investigates the determinants of banks' profitability in Greece during the period of European Union financial integration (1990-2002). The study

is to examine in to what extent the profits of Greek Commercial banks are influenced by internal factors as bank specific characteristics and to what extent by external factors (macro economics, financial industry structure). ROAA or return on average assets is the dependent variable and ratio of loan loss reserves to gross loans, equity to total assets, cost to income ratio, loans to deposit ratio and size factor are considered as the internal factors while annual change in GDP, the annual inflation rate, growth of money supply, ratio of total assets of deposit money banks divided by GDP, the ratio of stock market capitalization to total assets of deposit money banks are used as independent variables. According to the analysis the impact of loan loss reserves to loans, equity to assets on ROAA is statistically significant and positive while liquidity is positive and insignificant. The relationship between size and bank performance is found positive. In the macroeconomic variables which observe that growth of GDP is positive and significant, and banking sector assets to GDP, market capitalization to assets, are negatively affect the profitability and it's statistically significant.

Naceur (2003) examines the determinants of the Tunisian banking industry profitability using bank specific, financial structure (ratio of overhead to total assets, equity capital to total assets, bank loans to total assets, non-interest bearing assets to total assets and log of bank assets) and macroeconomic indicators (inflation, GDP per capita growth) on banks' net interest margins (NIM) and profitability (ROA) for 1980-2000 period. The results show high net interest margin and high profitability tend to be associated with banks hold a relatively high amount of capital and with larger overhead. Size is negative and significant which indicates scale diseconomies. It further reveals that the macro indicators have no impact on bank's net interest margin and profitability.

Another research carried out by Thiagarajan, Ayyappan and Ramachandran (2011) examine the determinants of the credit risk in the Indian commercial banking sector by using an econometric model by utilizing a panel data at bank level for 22 public sector banks and 15 private sector banks for the period from 2001 to 2011. They have used non performing loans to total loans as dependent variable to measure credit risk and loan growth rate, bank branch growth, Lagged NPA, lagged loan growth rate, lagged bank branch growth, expense to total assets, along with two macroeconomics variables inflation rate and, GDP. Panel data for the variables analyzed using a linear regression model and compared the contribution of the determinants between private and public sector banks. The study reveals that lagged NPA is the major contributing factor for the current NPA. So they suggest that the

commercial banks must have prudent credit policies to avert any ill affect of the credit risk.

Material and Methods

The study reveals apparent relationship between credit risk and profitability of commercial banking sector using secondary data in five selected domestic commercial banks in Sri Lanka. The literature Variance ore provides a number of factors which determines the credit risk of commercial banks. Most of the previous studies identified non performing loans, bank loan and bank deposits and macroeconomic condition as the major determinants of credit risk of commercial banks (Gul et. al . 2011,Kargi 2011,Kithinji 2010, Naceur 2003, Kosmidou 2008 The present study extensively use the model adopted by Gul, Irshad and zaman 2011 on credit risk management. Accordingly, the current study identified the bank specific factors such as non performing loans to total loans ratio, provision for loan losses for total loans, loan to total assets, total loans to total deposits, natural log of total assets, and macro economic variables such as growth rate of gdp, average inflation rate, and total assets in the banking sector to gdp to develop regression model which utilized the panel data. The profitability of commercial banks measured using return on average assets of commercial banks. The relevant data were obtained from the audited financial statements of commercial banks and the central bank annual reports for the period of 2005 – 2015.The analysis was done using SPSS software and descriptive statistics and regression analysis was performed. The extensive model can be written as follows.

$$Y = \alpha + \beta_1 \text{NPLR} + \beta_2 \text{PLL} + \beta_3 \text{LOAN} + \beta_4 \text{DEPO} + \beta_5 \text{LNTA} + \beta_6 \text{INF} + \beta_7 \text{GDP} + \beta_8 \text{ASSETS} + \varepsilon$$

Y: ROAA – Net Profit after tax/ Average total Assets –Profitability indicator

NPLR: Non performing loans / Total loans

PLL: Provision for loan losses / Total loans

LOAN: Total Loans / Total assets

DEPO: Total Loans / Total deposits

LNTA: Natural log of total assets

INF: Annual inflation rate

GDP: GDP growth rate

ASSETS: Total assets of banking sector / GDP

ε : Error term

Results and Discussion

Table 1 shows the descriptive statistics for all the variables. All the variables except bank assets to GDP have low standard deviations which implied the consistency of the data set. A total loan to total assets (LOAN) in the commercial bank is about 60 per cent. This indicate that the credit is given by commercial banks are relatively high in Sri Lanka and more than 50% of the assets in Sri Lankan commercial banks are contributed to financing activities. Nearly 9% of total loans are the non performing loans in Sri Lankan commercial banks. This is relatively low as compared to the amount of financing which is measured by total loans to total assets. A total loans to total assets (LOAN) in the commercial banks is about 60%. This indicates that the credit is given by commercial banks are relatively high in Sri Lanka and more than 50% of the assets in Sri Lankan commercial banks are contributed by financing different activities. The size factor is also one of the internal variable which affects the commercial bank profitability which is measured by taking a natural log of total assets (LNTA) which is about 11% in average.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Return on average assets	50	0.10	2.01	1.1133	0.41578
Non performing loan ratio	50	2.24	29.38	8.9450	5.62735
Provision for loan losses	50	0.07	3.00	1.1263	0.74223
Total loans/ Total assets	50	48.80	70.20	60.1833	5.55863
Total Loans/ Total Deposits	50	62.50	95.10	79.8417	8.03037
Natural log of total assets	50	8.10	13.60	10.7683	4.11448
GDP growth rate	50	3.54	830	6.1860	1.52912
Inflation rate	50	3.42	22.56	9.95560	5.38241
Total assets of the banking sector/GDP	50	441.61	530.8/0	448.427	26.27375

Correlation refers to the degree of relationship between two variables. Results indicate that GDP, LOAN, LNTA have positively correlated with ROAA and all other variables are negatively correlated with ROAA. The Correlation matrix showed in the below Table 1 shows the relationship between each variable. For

example there is strong relationship between NPLR and PLL with a correlation of +0.698. This is practical in the industry because when a bank had to bear a significant amount of nonperforming loans in the past years it will allocate a higher provision for loan losses as a safeguard measure. Another strong positive relationship exists between the LOAN and DEPO independent variables. LOAN is calculated as total loans to total assets where as DEPO is calculated as total loans to total deposits. Both these ratios contain total loans as the numerator which will lead to higher value in a fraction. This is the reason that when DEPO or LOAN increases other also respond in the same way.

In order to get the realistic decision strongly related independent variables should be detected and omitted before the regression analysis by using multicollinearity test. The reduced form equation used for the extensive regression analysis.

Table 2 Correlation

Variable	ROAA	GDP	INF	ASSETS	NPLR	PLL	LOAN	DEPO	LNTA
ROAA	1	0.332	-	-0.078	-0.689	-	-0.035	0.083	0.131
GDP	0.332	1	0.092	0.254	-0.365	0.587	0.308	0.388	0.181
INF	-0.171	0.092	1	-0.102	-0.148	0.301	0.262	0.412	0.084
ASSETS	-0.078	0.254	-	1	-0.072	0.039	0.126	0.119	-0.033
NPLR	-0.689	-	-	-0.072	1	0.009	-0.009	-0.216	-0.355
PLL	-0.587	-	-	0.009	0.698	1	-0.008	-0.046	-0.186
LOAN	-0.035	0.308	0.263	0.126	-0.099	-	1	0.822	0.212
DEPO	0.083	0.388	0.412	0.119	-0.219	0.008	0.822	1	0.373
LNTA	0.132	0.181	0.084	-0.033	-0.355	0.046	0.212	0.373	1
						0.186			

According to the Table 3, the regression results show that PLL, LOAN, GDP variables are insignificant at 5% level of significant. Among the explanatory variables, INF, ASSETS, NPL, DEPO and LNTA will have significant relationship with bank profitability. INF and NPL variables are highly significant level on the bank profitability.

Table 3: Regression Results

Variable	Unstandardized Coefficient		Standardized Coefficient		
	B	Std Error	Beta	t Stat	sig
(constant)	3.209	0.733	-0.123	4.376	0.0000
GDP growth rate	0.034	0.027	-0.123	1.267	0.2150
Inflation Rate	-0.028	0.007	-0.363	-3.844	0.0000
Total assets /GDP	-0.003	0.001	-0.205	-2.343	0.0230
Nonperforming Loan ratio	-0.046	0.009	-0.627	-4.948	0.0000
Provision for loan losses	-0.082	0.067	-0.146	-1.232	0.2240
Total Loans/ Total Assets	-0.02	0.011	-0.273	-1.808	0.0780
Total Loans / Total Deposits	0.019	0.009	0.362	2.079	0.0430
Natural log of Assets	-0.02	0.01	-0.194	-2.014	0.0490
R ²					0.651
Adjusted R ²					0.597
F stat		11.906			0.000

The results indicate that a significant share of the variation in credit risk on commercial banks can be explained by five variables, namely, average inflation, non performing loan ratio, total assets to GDP , total loans to deposit ratio, and natural log of total assets . These variables will have a significant impact on banks profitability. An overall, these variables account for about 65 per cent of the variability in credit risk of commercial banks. (R² = 0.651). This result confirms the findings of previous studies. It is important to point out that the value of F statics is 11.906 and the respective p value is 0.000 which indicates the overall model is significant and validity and stability of the model is relevant for the study. Further, it is important to point out that the variable inflation rate and non performing loan ratio are highly significant by presenting a negative impact on bank performance. It is observed that remaining variables, namely provision for loan losses, total loans to total assets, and growth of GDP are not significant in the model.

Conclusion and Recommendation

This study investigates the impact of credit risk on the profitability of commercial banks in Sri Lanka for the recent ten year period. The results of this study confirmed that credit risk has a significant impact on profitability of commercial banks in Sri Lanka. According to the results Sri Lankan banks should consider more on how to reduce non-performing loans, and increase deposits and assets while increasing the efficiency of the system of the banking sector to increase profits. The finding has made number of implications for policy makers and practioners in the

banking system in promoting resource allocation through financial intermediation by ensuring profitability of banking sector and growth potential of the country.

When considering the credit risk, non-performing loans is the main credit risk indicator which leads to reduce banks profitability. Therefore, it is needed to be effectively monitored and internal corrective measurements are needed to be taken on timely manner to avert any catastrophic effects of the credit risk which leads to decrease bank profits. As such, bank management needs to be more cautious setting up a good credit policy to enable bank to carefully monitor credit throughout the process of credit. Another important finding of the study is the size factor of banks. Natural logarithm of total assets (LNTA) which measures size of the bank is negative and significant impact on profitability. This indicates the scale inefficiencies in Sri Lankan commercial banks which may need to be considered. It highlighted the importance of reducing the size of the large banks to the optimal level in order to reduce the diseconomies of the scale. Moreover, findings of the study confirmed the importance maintaining macroeconomic stability to maintain sound financial system.

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The importance of water management in overcoming the developmental challenges faced by Sri Lanka

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Abstract

The proper management of water resources available to a nation is vital for its sustainability and development. The ancient civilizations all over the world provide ample examples for the universality of the above fact. Therefore, it is an essential task to identify effective water management techniques to minimize the adverse effects of climate change and maintain high quality of life of general public, despite harsh weather conditions. The lack of well-developed water policies, along with complications of natural resource boundaries, corruption of government services has given rise to much administrative inefficiency. Mismanagement of water resources in the dry zone and dilapidation of irrigation facilities has contributed to the decline of total agricultural production of the country. The imbalances in natural water bodies due to unregulated human activities, has sabotaged the natural water cycle. To ensure the efficient allocation and preservation of water resources, novel solutions have to be created incorporating the knowledge from the past experiences, perspectives of different user groups and modern technological advancements. Continuous research and development must be carried out while exploring the feasibility of new policy implications to be included in government decisions. It is the key to achieving millennial developmental goals.

Keywords: *Water, Management, Natural, Resources, Development*

Introduction

Water is a finite natural resource essential for the survival of all life. The earliest human civilizations such as Indus in India, Tigris and Euphrates in Mesopotamia and the Nile in Egypt, emerged alongside fertile river valleys. The primordial cities and states were concentrated in water enriched areas where the dawn of culture took place. Therefore, since the beginning of time water followed through a natural path and a cultural path, and Sri Lanka was no exception to this universality.

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Historical Context

Sri Lankans were one of the first nations in the world to innovate technologies of creating reserves of water for agriculture. The ancient kings of Sri Lanka built reservoirs both large and small to conserve water, based on the infamous sentiment, “not to let a single drop of rain water flow away to ocean without being utilized for a purpose”. The small tank cascades system of Sri Lanka has been designated as one of the globally significant agricultural systems of the world, which was constructed on sustainable socio-ecological infra-structure. Before the days of colonials, small tank management was traditionally carried out by the community through type of a feudal system, known as the “*rajakari*” system, while the surrounding ecology provided the eco system services in the form of sustaining the water nutrient cycle. The aforementioned agricultural community was essentially established on a Buddhist cultural background complete with unique customs, rituals and ceremonies. Ancient Sinhalese considered water to be symbolic of life, fertility and purification. Apart from being a physical factor for cultivation of the staple food, water had numerous imbedded cultural values, and these fundamental ethics preserved the harmonious functioning of society.

During the colonial era, British rulers abolished the “*Rajakari*” system due to political reasons, and the focus was transferred from traditional paddy cultivation into plantation agriculture. In the absence of an alternative system for preservation of water reservoirs, the tank system collapsed. The changes in the traditional socio economic structures lead to distortion of self-sufficient agricultural systems in Sri Lanka and for over a half a century, there was no system for maintaining the irrigation facilities and practices inherited over generations of Sinhalese monarchs. The community became unsustainable. Subsequently, the British rulers identified the importance of an efficient agricultural system for their colony and initiated the restoration of once neglected irrigation facilities. In 1890 The Department of Irrigation was established with the aim of improving the local agriculture.

Present Challenges

Presently, decades after the independence, the Department of Agriculture Development, the Department of Irrigation and the Mahaweli Development Authority are responsible for maintenance of irrigation facilities. However, the dramatic changes in demography, culture, society, and global climate changes along with the materialization of modern developmental goals, have had a severe effect on the natural environment of the country. The management of the most prominent natural resources of the country, water, has become a daunting task. The general

lack of appreciation of water resources of the country among the majority of the public, arising from the misconception that water is an eminent resource in Sri Lanka, is one of the major challenges for the conservation of water.

Water is both an economic good and a basic human need. Therefore, water has to be managed such that water resources are economically distributed while the basic human needs of the general public are adequately met. Lack of understanding of the notion of “water policy” complicates the process of allocation and management of water. The existing popular impression is that water management appeals only to irrigation water. But, irrigation policy can be considered as one crucial micro economic component under the vast macroeconomic policy of water management. Some other microeconomic aspects of water management such as domestic water policy, industrial water policy, hydro electricity generation, fisheries management, wet land systems and wildlife conservation, along with the irrigation water policy forms the aggregate water policy of the country.

However, the current Sri Lankan government seems to be lacking well developed policies and guidelines of water priorities in bulk allocation of water, generating a number of conflicts. The problems of inequitable distribution of water across the head end and the tail end of the canal system, the justifiability of doctrine of prior appropriation and issues in upstream and downstream dependency have complicated the allocation of water between different user groups. Reaching consensus among different parties has proved to be a challenge. The loopholes in laws governing the misuse of water resources through political strength and licensing of ground water extraction, benefits the formidable parties of the society and deprived the feeble parties of their water rights unfairly. Deducing the suitability of a water law principle to be used in a certain situation is made difficult by the insufficient information available to policy makers. In Sri Lanka land use is not homogeneous, thus agricultural areas and residential areas are not clearly defined, creating a problem for water management.

The administrative divisions and subnational boundaries of Sri Lanka were demarcated by British during the colonial era for convenience of governance. But they were not mapped out according to geographical locations of river basins. These boundaries continue to exist until today, and no post-independence government had taken the initiative to reassign them according to availability of natural resources, partly owing to efforts of avoiding a potential public opposition towards alteration of boundaries which continued in operation through generations. Yet, these irregularities of lines have caused an incoordination in allocation of responsibilities

on water supply and flood management among local authorities. The responsibilities are being shifted from one agency to another without properly outlined jurisdiction. Another drawback of these demarcations is ethnic issues coming into play, while sharing water of a rivers flowing across regions inhabited by people of different ethnicities. The lack of neutral principles of water sharing based on natural resource boundaries is creating a multitude of inefficiencies.

The corruption of political leaders and government officials in government institutions is also an obstacle for efficient management of water resources. The reluctance of politicians to be guided by highly educated and skilled consultants and specialists in various scientific fields has proved to be costly for the progression of the country. A number of feasible water management projects with high estimated productivity levels, have not been materialized due to self-interest seeking behavior and negligence of administrators. The mismanagement of public funds and international monetary aid by officials as well as administrative and operative incompetency has deprived the country of tremendous economic growth through exploitation of natural abundance of water.

Historical spatial distribution maps of rainfall have suggested Sri Lanka to be among the Asian countries with highest spatial variability in rainfall. Furthermore, the past few years has observed an increase in the total annual rainfall. These phenomena have affected the ground water availability which is largely obscure to researchers. Due to the rain fall variability and climate change, the country's dry zone agriculture system has become unsustainable. For nearly a decade annual drought conditions have been observed in the dry zone of Sri Lanka. The recent studies have shown that the deficiency of water and unpredictable weather conditions has led to irregularities in traditional paddy cultivation seasons of Sri Lanka "Yala and Maha". Climate change has posed a considerable threat to small tank management systems. Many small tanks in the ancient small tank cascades system has been dilapidated over lack of renovation and maintenance services. Additionally, there exist an under assumption of none-irrigation benefits of the small tanks system. All the above factors has collectively contributed to a decrease of the total food production in the dry zone, which accounts for the larger extent of the country's total gross value of agricultural production; as well as to a decline of the quality of life among the inhabitants of the dry zone.

The irrigation basically involves the diversion of natural water bodies from their natural course and away from natural eco systems into populated areas. It has to be done with great care of nature, since irrigation activities might have a negative

impact on ecology and natural water cycle. The encroachment of humans into wildlife areas in search of agricultural land has posed a threat to sustaining plant and animal life and preserving biodiversity. The mismanagement of brackish water in farming systems has caused imbalances of natural freshwater bodies. The human induced salinization in freshwater bodies, due to agricultural and industrial activities, has hindered the freshwater supply for day to day human activities, especially in the north central province of Sri Lanka. Worldwide deforestation is also central to the disruption of natural water cycle. In absence of plant and vegetation to maintain soil integrity, forested land can rapidly be transformed into barren lands that lack moisture, essential for sustainability of local lakes and rivers. The ground water extraction has become the most convenient and popular solution to overcome the deficit of drinking water arising from all the aforementioned complications. Yet, the sustainability of this technique is questionable due to increasing water pollution levels and the threat of seawater intrusions in freshwater. Therefore, solution to the crisis remains in the realm of proper management of natural resources.

Suggestion of solutions

The difficulty in public policy is weighing the pros and cons properly. The public policy must be coordinated and formed in such a manner with benefits to everyone. In Sri Lanka, principles and guidelines recognizing water priorities needs to be developed and laid down in policies. A system of water rights has to be defined and the water laws have to be updated, to ensure allocation of water according to urgency and justifiability of the users' requirements, in order to prevent user conflicts and achieve equitable distribution of water. The extractions of surface and underground water must to be regulated and monitored by authorities. An aggregate water policy has to address the abstraction of different utilities of water. Measures of water availability for potential uses of water in various regions of the country, has to be recorded in an extensive database. Therefore, it is worthwhile to conduct a comprehensive research on the shortcomings of the current water policy so as to formulate new policies of better management of water resources.

Water management has an inherent hydro political aspect based on assignments of political boundaries. If the government is reluctant to alter these boundaries according to natural resources boundaries on political grounds, the feasibility of super imposing natural resource management boundaries while leaving the existent distinct administrative boundaries intact, can be considered. Consequently, the management of water and land resources will be made more systematic and efficient. Water treaties can be established between regions sharing a common

river. Benefits and shortcomings for the parties involved in the treaty needs to be discussed and agreed upon and relevant compensation programs needs to be prepared. When formulating treaties and policies, an importance should be given to the preservation of cultural values that were passed down through generations. Adopting a neutral principle to divide the country to a set of regions based on natural resource management, might also help deter the rise of ethnic issues in natural resource sharing, in the more heterogeneous Sri Lankan society.

The education system needs to be updated to educate the younger generation about the importance of proper natural resource management. Responsibility areas of government agencies have to be clearly defined. Independent bodies should monitor the efficiency and transparency of government institutions to prevent issues of frauds. Addressing externalities must be done with creation of information. The availability of statistics of various environmental and demographic aspects of the country will prevent the manipulation of natural resources for personal innuendos. Statistics collection agency must be able to record collection data almost immediately and the data has to be shared with independent research institutions. The Sri Lankan government can establish an independent institution for public policy studies and policy formulation to carry out researches in relation to all economic planning activities to improve the productivity and timeliness of the government decisions. Policy implications of studies can be extracted out and sent to authorities for further consideration in activities of administrations and law enforcement.

The solutions for problems occurring with high rainfall variability must be accompanied with conducting case studies and identifying water priorities. Inefficient water management worsens the problem of droughts, while in scenarios of high rainfall; excess water must be managed. Hence, river activities must be closely observed for proper planning. Renovations of small tanks and canals must be carried out along with that of the large reservoirs. Currently, all the small tanks in the country have been mapped and employing the data collected on rain fall distribution, rainfall intensity and evaporation level, the total quantities of received water and retained water can be ascertained. Imposition of natural resource management boundaries, to those measurements of water, can shed light on to the availability of water in respective natural resource management regions. A cost benefits analysis can be conducted for the water management policies of the different regions of Sri Lanka. Particularly in the dry zone, small tank cascades system can be multi-purpose and multi-functional, and the magnitude of requirement of water for different uses, has to be determined separately. Surveys

can be carried out to measure the requirement of water by various crops as well. The cultivation of crops with a low requirement of water may replace the cultivation of crops with a high requirement of water, under dry weather conditions, and vice versa. Therefore, the farmers might benefit from diversification rather than from specializing, since specializing may prove to be unsustainable due to climate change. The above mentioned strategy will ensure the harvesting of maximum amount of agricultural production, despite the variations of the climate. Consequently, a government subsidy dependent system can be reinstated with a self-reliant system, while gradually advancing the overall economic development of the community.

The irrigation methodologies of ancient kings of Sri Lanka emerged as solutions to contemporary water management issues. Over thousands of years, due to myriad of events such as social upheavals following foreign invasions, diseases, famines and the migration of kingdoms towards the wet zone, the invaluable knowledge of ancient water engineers was lost and what remains accessible today is remnants of a vast wisdom. Ancient knowledge and modern science and technology have to be combined to invent authentic solutions to address current issues that threaten to overthrow the balance between humans and nature. Free markets are inefficient in allocation of natural resources. For the sustainable management of natural resources, the behavior of the public needs to be changed to adhere to common interest above self-interest. Social behavior has to be induced to prevent externalities. Thus, incentive compatible policies have to be implemented. Politicians must be advised honestly and fearlessly by the policy makers on most appropriate course of action. The current development is as uneven as the distribution of water resources. The economic development of Sri Lanka is mostly observant in the wet zone where there is an abundance of water resources, amply reflecting the importance of water for development.

Sri Lanka can learn from techniques and innovations utilized by other countries of the world. Water management technologies in Israel, that are used to exploit 130 mm of annual rainfall in Israel, can be applied manipulate the 1240 mm of average annual rainfall in the Northern Province of Sri Lanka. Murray Darling river Basin in Australia, which initially consisted of a single use agricultural system for the livelihood of returning soldiers of world war two, which has been later transformed in to a system of multiple uses such as hydro power generation, commercial fisheries, industrial and domestic water supply, recreational uses, environmental maintenance of wetlands as well as archaeological site research, can be another fitting example. Sri Lanka has more than a hundred rivers crisscrossing across the

dry zone. Although the composition of the policy has to be adopted according to the Sri Lankan culture, the Australian water solutions can be easily translated to match the Sri Lankan context.

Conclusion

All over the world water resources are degrading due to environmental pollution. Contamination of inland water bodies, due to industrial pollutants has become a threat to all life forms. The greenhouse effect and the subsequent global warming, owing to industrial activities will be responsible for drastic climate changes in time to come. Ocean levels are rising due to meltdown of glaciers and islands all over the world are menaced by being flooded by ocean. Extreme weather conditions such as droughts and floods are more frequent than ever before in the history. Some of the knowledge from the past has become obsolete, making the past an inappropriate indication of the future, giving rise to the question of uncertainty. Therefore, past knowledge must be applied to the context of changing society. Novel knowledge has to be created through modern technological tools and scientific observations. Seemingly minor policy reforms can dramatically improve the living conditions of the general public. Since, no policy is sustainable in the long run; every policy needs to be regularly reviewed continuous for amendments to adapt to changing societal and environmental conditions. A community is consisted of different people with unique characteristics, values and past experience. A successful policy is one that takes all the perspectives into consideration. The ultimate objective of water policy is proper and planned management of water resources. Thus, a well-balanced water policy will be crucial to ensure the harmonious co-existence between humans and nature, while being a universal factor that will determine the progression of human civilization.

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An extension to theory of Planned Behavior: Explaining Entrepreneurial Intentions of Undergraduates

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Abstract

Entrepreneurship will result in employment opportunity creation which in turn will generate income along with improved standards of living with multiplying effects on the economy. In particular, based on the idea that the entrepreneurial intention is one of the key elements in explaining firm-creation activity, this study attempted to investigate various factors affecting entrepreneurial intentions of Sri Lankan state university undergraduates also by examining the role of entrepreneurial education in the public universities. The study is predominantly quantitative in nature. A conceptual framework was devised based on the previous research work in the area of entrepreneurial intention, which comprised of various factors affecting entrepreneurial intentions. Accordingly, attitude towards entrepreneurship, perceived behavioural control, subjective norms, internal locus of control and risk taking propensity were identified as factors affecting entrepreneurial intention, while this relationship was expected to be moderated by entrepreneurial education. The Entrepreneurial Intentions Questionnaire has been administered among 486 final year undergraduates across the country to draw conclusions about the state university undergraduates. Moreover, 8 structured interviews were carried out to triangulate and enhance the confidence of research findings. Structural Equations Modeling (SEM) was used to do key estimates. SPSS 20.0 and AMOS 20 were employed as data analyzing software packages. Attitude towards entrepreneurship, perceived behavioural control, entrepreneurial education, subjective norms and risk taking propensity emerged as most important factors determining the level of entrepreneurial intention. Most importantly, it was evident that entrepreneurial intention increases with the level of entrepreneurship education. Thus the researcher believes, by raising awareness and building necessary skills at all levels of education, economic potentials can be unleashed with an innovative generation of entrepreneurially-minded people.

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Key Words: *Entrepreneurial Intentions, Structural Equation Modeling, Subjective Norms, Perceived Behavioral Control, Entrepreneurship Education*

Introduction and Research Problem

When discussing about entrepreneurship, intention based models are expected to bestow a suitable approach due to the increased predictability in these models on entrepreneurial performance. Intentions can be defined as a state of mind that directs an individual's actions and attitudes towards accomplishing a particular objective (Bird, 1988). Thus according to Krueger et al. (2000) intentions are the best predictor of a planned behaviour. Shapero's SEE (Shapero, 1982) and Ajzen's TPB (Ajzen, 1991) are known to be the two best models on this aspect. Shapero's model incorporates three components that influence entrepreneurial intentions as perceived desirability, perceived feasibility and a propensity to act. Ajzen's TPB explicates the human behaviour by understanding their intentions toward that behaviour. The theory assumes intention as the immediate antecedent of behaviour and subjective norm (i.e. the social pressure to perform the behaviour), perceived behavioural control (i.e. a self-evaluation of one's own competence with regard to the task or behaviour), attitude towards behaviour (i.e. the degree to which individuals perceive desirable or undesirable appraisal of the behaviour) are antecedents to intention. Explaining and reasoning out the human behaviour is one of the complex tasks. Behavioural dispositions which include social attitude and personality trait have played an important role in these attempts to predict and explain human behaviour. However in accordance with the arguments developed by Ajzen&Fishbein (1980), as cited in Ajzen (1991), broad attitudes and personality traits have an indirect impact on specific behaviours only influencing some of the factors that are more closely linked to the behaviour in question. This utilized an extended version of Ajzen's TPB analysing the entrepreneurial intentions of Sri Lanka State university undergraduates.

Conceptualization & Methodology

The theory of planned behavior postulates three conceptually independent determinants namely attitude towards the behaviour, subjective norms and perceived behavioural control of intention as key determinants of entrepreneurial intent.

Attitude of an individual is the positive or negative thoughts concerning the performance of the behaviour. Swan et al. (2007, p. 92) as cited in (Engle, et al., 2008) support this first of Ajzen's drivers of intent (attitude towards the behaviour)

by agreeing to the fact that attitudes have an important place in psychological science and “people’s views do matter” and claiming that the task of future research is to further examine the issues surrounding these views. The exploitation of an entrepreneurial opportunity depends on entrepreneurs’ perceptions regarding its expected value. Ajzen (2005) as cited in (Malebana, 2014) argues that people develop attitudes from the beliefs they hold about the consequences of performing the behaviour. Prior research has revealed that the attitude towards entrepreneurship is influenced by salient beliefs with regards to autonomy, authority, economic opportunity and self-actualization. Schwarz et al. (2009), in his study, which had conducted by taking university students, also confirmed that the intention to start a business is influenced by students’ attitudes towards entrepreneurship. Thus, it is logically appealing to hypothesize that attitude towards entrepreneurship (ATE) positively influences entrepreneurial intentions of Sri Lankan state university undergraduates too, (H1 - Attitude towards entrepreneurship positively influences entrepreneurial intentions).

Perceived behavioural control is the Ajzen’s (1991) third antecedent of behavioural intention. It overlaps Bandura’s view of perceived self-efficacy, the perceived ability to execute target behaviour (Ajzen 1987). The term self-efficacy is derived from Bandura's (1977) social learning theory and refers to a person's belief in his or her capability to perform a given task. Previous empirical studies in this area have shown that individual behaviour is highly influenced by confidence in his/her ability to perform the behaviour necessary to be successful (Bandura et al., 1980; Swan et al., 2007; Engle, et al., 2008; Ranmuthugala, Sathkumara, & Perera, 2014). Thus, this relationship may exist in Sri Lankan state university undergraduates as well, (H2 - Perceived behavioural control positively influences entrepreneurial intentions).

Subjective norms refer to the social and cultural pressure to perform a specific behaviour. This is the second antecedent of behavioral intention according to Ajzen (1991). This indicates the approval of person’s parents, spouse, close friends, co-workers and even pioneers who have succeeded earlier in entrepreneurship career. Kolvereid (1996) argues that the opinions of important others (i.e. family members, close friends and other influential people such as teachers, successful entrepreneurs, enterprise advisors, etc.) are believed to shape the formation of many entrepreneurial intentions as cited in Solesvik (2013). Moreover, a study done by Alam, Jani& Omar (2011) identifies family support, social ties and internal motivation to have a significant and positive impact on the success of women entrepreneurs in small businesses in the context of Malaysia. Furthermore, the

influence of subjective norms on the intention to start a business is supported in number of studies that have been conducted by Souitaris et al. (2007); Gird and Bagraim (2008); Basu and Virick (2008); Engle et al. (2010); Mueller (2011); Iakovleva et al. (2011); Angriawan et al. (2012) and Otuya et al. (2013) as cited in (Malebana, 2014). Furthermore, in his study, which had been conducted by employing South African university students, it was confirmed that subjective norms as a strong predictor towards entrepreneurial intentions, (H3 - Subjective norms positively influence entrepreneurial intentions).

According to Douglas & Shepherd (1999), people with higher levels of risk tolerance are more motivated to be self-employed (as cited in Solesvik, 2013, p.257). According to Mill (1984), who introduced the term “entrepreneurship” in to economics, risk-bearing is the key in distinguishing entrepreneurs from managers (quoted in Cunnigham and Lischeron, 1991, as cited in Ertuna&Gurel, 2011). Even if the risk-taking propensity is often mentioned as a determinant of entrepreneurial intentions (e.g. Bygrave, 1989), several empirical studies suggest that small business entrepreneurs do not have positive attitudes towards risk and do not consider themselves as risk takers (Davidsson, 1989; Baron, 1998), nor do they seem to differ from other groups in more objective tests on risk taking (Brockhaus, 1980 as cited in Dinis, Paco, Ferreira, Raposo, & Rodrigues, 2013). Thus, it is still not clear in the literature whether there actually is a relationship between the propensity to risk-taking and entrepreneurial intentions, (H4 - The propensity to take risk influences entrepreneurial intentions).

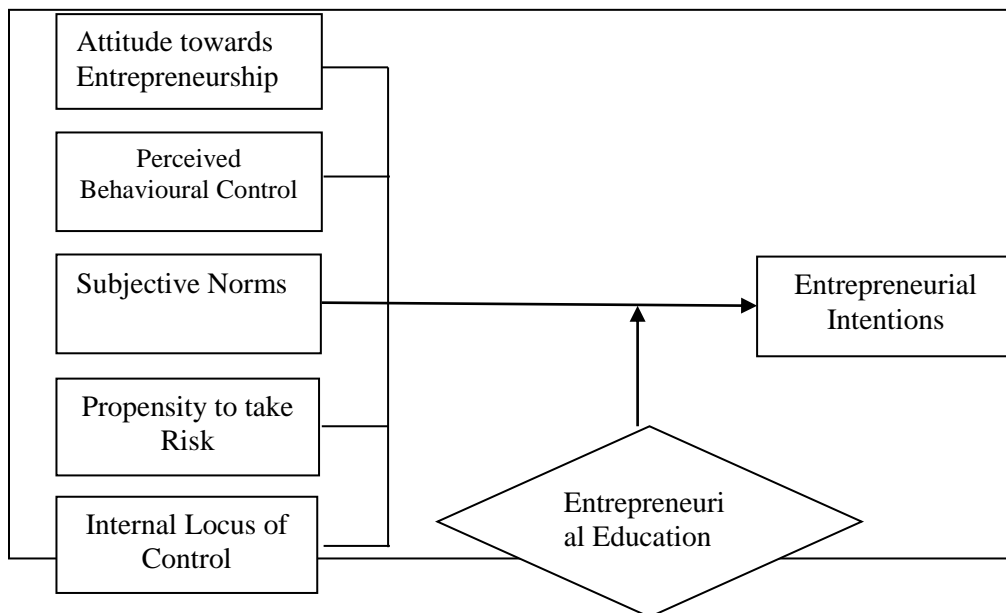
Internal locus of control represents the degree to which individuals believe that their achievements are dependent on their own behaviour. While “internals” believe that they are in control of their lives, “externals” believe that external forces such as destiny, luck and powerful others are in charge (Begley and Boyd, 1987 as cited in Ertuna & Gurel, 2011). Individuals corresponding consider that the accomplishment of goals or objectives depends more on their own ability and actions, rather than luck or other people’s efforts (Kuip and Verheul, 2003) as cited in (Dinis, Paco, Ferreira, Raposo, & Rodrigues, 2013). Several research results suggest that internal locus of control is an entrepreneurial characteristic (Koh, 1996; Mueller and Thomas, 2001; Robinson et al., 1991, as cited in Ertuna & Gurel, 2011), (H5 - Internal locus of control positively influences entrepreneurial intentions).

“Education is undoubtedly an important determinant of the successful/unsuccessful entrepreneurs” (Lekovic, Maric, Djurovic, & Berber, 2013). While some researchers claim that formal education lessens the entrepreneurial desire of the

individual (e.g., Shapero, 1980), there are others who say that people's entrepreneurial intentions actually increase with education (e.g., Davidsson, (1995) as cited in Ertuna & Gurel, 2011). A study conducted by Rosti & Chelli (2009), by taking an Italian students sample, revealed that education significantly increases the probability of entering to self-employment in both male and female graduates. These contradictory findings indicate even though there has been significant amount of research regarding the impact of education on entrepreneurial behavior, influence of education on entrepreneurial perceptions still requires research attention. Dickson et al. (2008) as cited in (Nabi & Linan, 2011), have reviewed the literature on finding that entrepreneurship education is related to becoming an entrepreneur and for entrepreneurial success. Ertuna& Gruel (2011), taking a Turkish sample, have conducted a research about the impact of entrepreneurial education on intentions, which has found that entrepreneurial education moderates the intention to be an entrepreneur. In order to elucidate this aspect in the Sri Lankan context the sixth hypothesis is used, (H6 - Entrepreneurial education moderates the relationship between entrepreneurial traits and entrepreneurial intention).

As per the afore-described theoretical framework, this study employs an extended version of TPB developed by Ajzen (1991) and the schematic diagram of the conceptual model of this study is as follows:

Figure 1: Conceptual Framework



Source: Author

Statements of Hypothesis

- H1: Attitude towards entrepreneurship positively influences entrepreneurial intentions
- H2 Perceived behavioural control positively influences entrepreneurial intentions
- H3 - Subjective norms positively influence entrepreneurial intentions
- H4 - Propensity to take risk influences entrepreneurial Intentions
- H5 - Internal locus of control positively influences entrepreneurial Intentions
- H6 - Entrepreneurial education moderate the relationship between entrepreneurial traits and entrepreneurial intentions

The study is predominantly quantitative in nature. The entrepreneurial intentions questionnaire (EIQ) has been carefully developed and administered among 486 final year undergraduates across the country to draw conclusions about the Sri Lankan state university undergraduates. A joint sampling technique comprising of quota sampling, judgmental sampling and convenient sampling was used to select 486 final year undergraduates for the study. Sampling frame has been carefully selected in a way that it represents the whole state university sector. The universities whose annual intake is more than 1500 viz. Colombo, Peradeniya, Sri Jayewardenepura, Kelaniya, Ruhuna, Jaffna and Moratuwa universities and UvaWellassa university which offers industry oriented degree programmes have been selected to the sampling frame. A previously validated tool by Dinis, Paco, Ferreira, Raposo, & Rodrigues, 2013), (Solesvik, 2013) and (Linan& Chen, 2006) developed using 7 point Likert scale questions was employed to measure the levels of entrepreneurial intentions, attitude towards entrepreneurship, perceived behavioural control and subjective norms, risk taking propensity and locus of control. Cronbach's Alpha was used to measure the internal consistency as the questionnaire includes multiple Likert scale questions to measure a single construct. Accordingly, the reliability of each of the constructs was measured with Cronbach's Alpha for the data set.

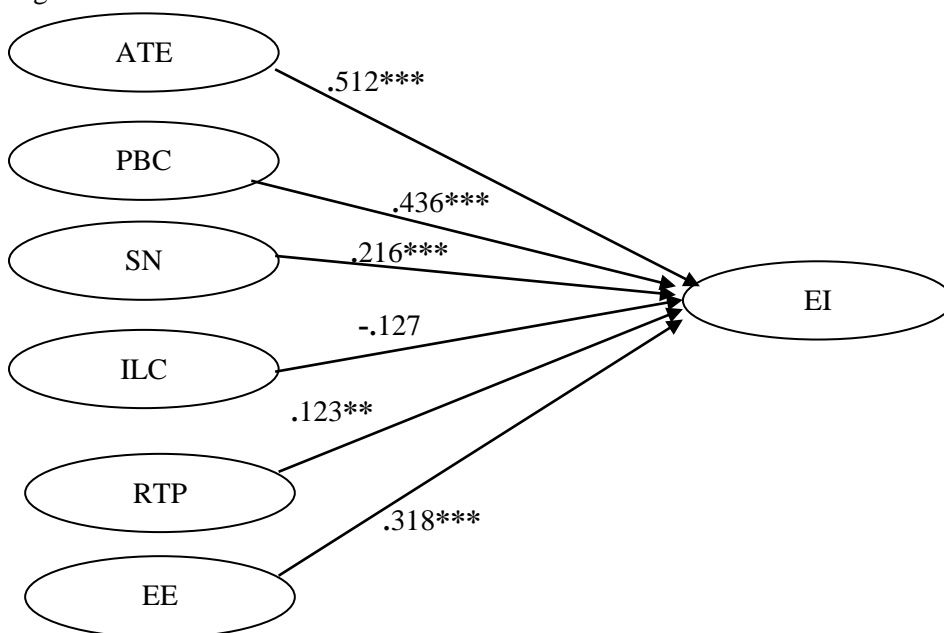
Results and Findings

Majority of respondents were females which constitute 55.6 percent of the study sample while males representing 44.4 percent. The sample was drawn from the final year undergraduates and in cases of absences of enough elements in the sample, their immediate juniors were selected as respondents. Thus, more than 95 percent of the participants were 23 years old and above. Moreover, the vast majority of the respondents were Sinhala Buddhists while having some representative from the other ethnic groups as well. Participation of males to the survey was 216 while

female participation was 270. Undergraduate males recorded a mean score of 4.60 for entrepreneurial intentions while female recorded 4.22.

Structural Equation Modeling (SEM) was employed to analysis of the hypotheses. The following diagram shows standardized estimates of the structural model.

Figure 2: Standardized estimates of the structural model



Source: Author

EI - Entrepreneurial Intentions; ATE - Attitude towards Entrepreneurship; PBC - Perceived Behavioural Control; SN - Subjective Norms; RTP - Risk taking Propensity; ILC - Internal Locus of Control; EE - Entrepreneurial Education
 *** - Significant at 0.1% level; ** - Significant at 1% level

The structural equation modeling results revealed that the proposed model had an acceptable fit to the data. Even though the Chi-Square (χ^2) value was not significant, the χ^2 to degrees of freedom ratio recorded a value of 3.554, which is in the acceptable range between 2 to 5 indicates an acceptable fit between the hypothetical model and the sample data (Wheaton et al, (1977) as cited in Hooper et al, 2008, Marsh &Hocevar, 1985).RMSEA recorded a value of 0.096 (< 0.1) indicating a reasonable error of approximation. Meanwhile, the baseline comparison indices (TLI = 0.71, CFI = 0.73) related to the structural model

exhibited values close to 0.9 indicating a tolerable fit between the hypothetical model and the sample data.

According to the path coefficients of the structural model, there is a significant association (path coefficient = 0.512, critical ratio = 10.4, $p < .001$,) between Attitude Towards Entrepreneurship (ATE) and Entrepreneurial Intentions (EI). Therefore, hypothesis 1, which states the attitude towards entrepreneurship positively influences entrepreneurial intentions, can be accepted. Moreover, a significant association (path coefficient = 0.436, critical ratio = 8.215, $p < .001$) can also be noted between Perceived Behavioural Control (PBC) and Entrepreneurial Intentions (EI). Therefore hypothesis 2, which states that perceived behavioural control is positively related to entrepreneurial intentions, can also be accepted. Furthermore, a significant association (path coefficient = 0.216, critical ratio = 3.348, $p < .001$) can also be noted between Subjective Norms (SN) and Entrepreneurial Intentions (EI). Therefore hypothesis 3, which states that subjective positively influences entrepreneurial intentions, can also be accepted. Even though the path coefficient, critical ratio and the level of significance in the relationship between Risk Taking Propensity (RTP) and Entrepreneurial Intentions (EI) is not as large as previous relationships, there is a reasonable association (path coefficient = 0.123, critical ratio = 2.854, $p < .01$) between the variables. Therefore, hypothesis 4, risk taking propensity is positively related to entrepreneurial intentions, can also be accepted. Meanwhile, no significant association was witnessed (path coefficient = -0.127, critical ratio < 1.96, $p > .05$) between Internal Locus of Control (ILC) and Entrepreneurial Intentions (EI). Thus, hypothesis 5, internal locus of control positively influences entrepreneurial intentions, cannot be accepted. Furthermore, the interaction of Entrepreneurial Education (EE) and Perceived Behavioral Control (PBC) was found to be significant at 5%.

Discussion and Conclusions

The empirical evidence through structural equation modelling revealed that there is a positive relationship between the five independent variables, namely attitude towards entrepreneurship, perceived behavioural control, entrepreneurial education, subjective norms and risk taking propensity and entrepreneurial intentions. Of the above five independent variables, attitude towards entrepreneurship showed the strongest relationship, followed by perceived behavioural control, entrepreneurial education, subjective norms and risk taking propensity. In addition, it was also observed that entrepreneurial education weakly interact with perceived behavioural control and entrepreneurial intentions. Most importantly, this study empirically

verified applicability of TPB in Sri Lankan context in explaining entrepreneurial intentions of state university undergraduates. Furthermore, with the importance of entrepreneurial education revealed by this study, it is imperative to take appropriate measures to uplift entrepreneurial education in the country.

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Youth Participation in the Informal Labour Market: The Case of the Northern Province of Sri Lanka

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Abstract

The informal employment represents an important part of the economy and certainly of the labour market in many countries especially developing countries. Northern and the Eastern provinces were severely affected by the protracted armed conflict in Sri Lanka. As a result livelihood of the people had been totally devastated. Thus, Contribution of Informal employment is inevitable in the Northern Province particularly in the post-war employment. In this background, the current study was carried out. The study found that although informal employment has been declining in during the study period, still it covers a larger share of youth; accordingly it reduces the youth unemployment rate in Sri Lanka. Informal jobs are predominant economic activity among the poor educated whereas highly educated tend to engage in the formal employment. Informal employment rate among male youth declines faster than females during the study period both in the National as well as in the Northern Provincial level. This study recommends that it is necessary to reduce the size of informal employment through formalization in order to have regulative employment system through which social and economic benefits would be assured for the disadvantaged employees

Keywords: *Employment, Informal Employment, Informal sector, Northern Province of Sri Lanka*

Introduction

Informal employment has become an important source of livelihood for people all over the world. As in other developing countries a major portion of the work force in Sri Lanka are engaged in the informal sector. The main importance of informal sector is the sector as source of innovation, creativity, Capital saving and growing production. (Younus, 1977). It is the main source that provide income and employment to many of who cannot get employment in the formal sector. The sector provides employment more over necessary goods and services

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for the lower income groups (ILO, 1972). According to Llanes M and Barbour A, Hatcher M, (2007), the positive consequences of the informal economy are that it: Increases income and Increases self-confidence, Improves skills, Expand work experience, Develops the habit of work, Leads to minimize cost of product, sustain economic activity, provides employment, Offers flexible working hours and conditions, Has reduced barriers to entry, promotes entrepreneurial spirit, Supports the formal employment.

Sri Lanka has been regarded as a model of a country with successful social policies, yet for decades it has faced major challenges in providing employment and satisfying other aspirations of youth. Although the labor force has become more educated, and this trend is particularly marked for youth, the main source of employment for both youth and adults remains the informal sector. Moreover, the importance of the informal sector as a source of employment has increased since the mid-1990s (Ramani, 2013).

Today, there is renewed interest in the informal employment worldwide. It plays a major role in employment creation, production and income generation while the formal sector of the country cannot absorb all the labour force of the country into employments. Informal employment has been rapidly expanded as an important sector both in terms of employment and contribution to national output. More than 70 per cent of Sri Lanka's labour force is employed in the informal sector, which comprises various economic activities in agriculture, fishing, livestock rearing, micro and small -scale enterprises, petty trade, and other small commercial activities (Arunatilake, 2010).

Statement of Research Problem

Approximately 26 per cent of the Sri Lankan population is comprised of Youth (CBSL-2012). However, most of them are engaging in the informal employments which are characterized by low productivity, insecurity and vulnerability. Hence, the paper attempts to answer the basic research question "Why Youth of the Northern Province more enter into such informal employment? This question was answered by critically analyzing the informal employment among youth.

Research Objectives

This study aimed at finding out the role of Informal employment in the Northern Province. Northern and the Eastern provinces were severely affected by the protracted armed conflict in Sri Lanka. The final battlefield of the civil war took

place in the Northern Province ultimately where the war was brought to an end. Importantly Informal employment plays an important role in the Northern Province as NGOs and government institutions have been continuously engaging in reducing poverty and restoring livelihoods. Therefore, larger proportion of youth tend to start their own income generating activities with institutional supports.

Thus, Contribution of Informal employment is inevitable in the Northern Province particularly in the post-war employment. However, Informal employment is considered as an inferior employment or informal jobs. Hence, analyzing the contribution of the Informal employment of the youth and evaluating the characteristics of Informal employment in the Northern Province were the objectives of this study.

Significance of the Research

There has been increasing volume of research on “Youth Informal Employment” more particularly of empirical research both at the global and national level. In Sri Lanka There is a lack of research has been done mostly for Sri Lanka. However at the a province level there is very few of such research more particularly in case of Northern Province after the post –war context. Therefore, this study attempts to fill the research gap by adding few insights towards the vast literature of youth informal employability. The paper tries to study nature and characteristics of youth employment in the informal sector of the Northern Province.

Review of Literature

The traditional approach to informality hinges on a dualistic model of the economy. Lewis (1954) , in his seminal work “Economic Development with Unlimited Supplies of Labor”, first presented the Dualistic Labor Market theory as a general model of development in less developed countries (1954). His model divides the economy into two sectors: a modern, industrial sector and a traditional, agricultural sector. In this model, informal employment is regarded as a transitory phase and the traditional sector is expected to contract as labour transfer to the modern formal sector.

Aikaeli & Mkenda(2014) analyzed the determinants of informal employment in Tanzania’s construction industry. They found that the higher earnings in informal jobs compared to those in formal ones, given the professional status of micro and small entrepreneurs, was one of the major incentives to choose informal rather than formal employment. Choice of informal employment was lack of capital, which

deters micro and small entrepreneurs from starting large formal firms but instead resort to unregistered petty undertakings. Another factor that low education was one of the key reasons workers was hired informally by formal firms and the possibility of the formal firms to hire these employees at low wages. Finally more females were employed informally than men, most likely in jobs related to office handling and clerical matters.

Arunathilaka and Jayawardena (2010) focused on why people choose to participate in the informal sector in Sri Lanka using household survey data from two time periods. A multitude of factors relating to individual preferences, location characteristics and labour market condition affect the occupational choice of individuals. Thus participation in the informal sector was due to a mix of market considerations and skill mismatches. They argued that improving economic development in a more equitable manner across geographical regions, on the one hand ,and improving the quality and relevance of educational opportunities on the other.

Chandrasiri (2008) wrote a research article where he indicated to quantify relative size of the informal economy in Sri Lanka considering structural feature of the labour market and existing employment statistics. In Sri Lanka, the informal economy covers wide range of economic activities representing rural, urban and estate sectors. It is also widely spread across different sub-sectors of the national economy.

Diego et.al (2012) examined micro –determinants of informal employments in the Middle East and North Africa(MENA). They found that the size of the public sector and the size of the agriculture sector were perhaps the strongest correlates of informality in the region. Returns to education were very low in the informal sector. Age ,gender and education important correlates of informality.

Heltberg & Vodopivec (2009) indicated “Sri Lanka’s labor market was characterized by a counterproductive duality between formal and informal sector. The legislation applies only in the small, formal segment of the private sector, and similarly social dialogue operates only in a limited, protected segment of the labor market”. They found that the restrictive employment protection legislation most likely limits job creation and access to good jobs and formal wage setting mechanisms increase returns to formal sector workers and thus not only contribute to labor markets segmentation but also generate queening for formal sector jobs and thus contribute to unemployment. They indicated that the labor

market policies as a cause of unemployment in Sri Lanka, particularly TEWA (Termination of Employment Wage Act) regulations and wage setting institutions have adversely affected equity, productivity and economic growth.

Muttukrishna, S (2006) did an exploratory study on the extent and causes of informal economy in the conflict region of Sri Lanka. The extent of informal economy in monetary terms in the conflict region was estimated to be roughly 30% of the Provincial Gross Domestic Product of the North & East Province in 2004. Lack of government's administration, law enforcement and judicial services, and economic sanctions were identified as the primary causes of informal economy in the conflict region. It was argued that informal economy in conflict-affected countries /regions was transnational by nature and therefore policies to combat the informal economy needs international cooperation.

Ramani Gunathilaka (2008) focused on the nature of informal employment in Sri Lanka along three dimension: Its extent and nature, the characteristics of workers that increase the probability of engaging in informal employment rather than in formal employment, and the determinants of informal employees wages when compared with formal employees wages. She found that the gender bias in informal employment appears to favour males rather than females and Males were more likely to be informally employed, as were young people and older workers. The more educated one was the less likely one was to be informally employed and the relationship was monotonic. Likewise, the better educated and skilled employees were less likely to be in informal employment than in formal employment. Managers and other skilled occupation categories were likely to be informally engaged relative to production workers. Only service and agricultural workers were more likely to be informally employed. Males get higher wages in both the formal and informal sectors. Youth and seniority also make for higher returns. Ethnicity is not a significant determinant of wages other than for the ethnic other category which commands higher wages in formal employment than reference group, Sinhalese. Thus there is no evidence of ethnic discrimination in wages. Greater educational attainment leads to significantly higher wages in formal employment, while the results are not significant for informal employees.

Rukundo (2015) did research on the topic of Understanding informal sector Employment in Rwanda. He demonstrated empirically that if the level of education was increased, informality would decrease slightly. Further, results indicate differences in employment status between informal and formal sector. The findings, therefore lead to two main conclusions; education determines individuals'

employment in the informal sector and as wages increase, employment in the informal sector reduces. The informal sector employees were the majority youth, for their living, a basis for further policy initiatives on improving the informal sector employment.

Wambui R. Wamuthenya (2010) did the research on the topic of “Determinants of employment in the formal and informal sectors of the urban areas of Kenya”. He applied a multinominal logit model and economic theory to labour force survey (LFS) data, examined the determinants of formal and informal sector employment in the urban areas of Kenya. He found that the determinants of employment in public, private and informal sectors of Kenya’s urban labour market vary by age cohort and gender. Special emphasis was placed on the importance of gender, marital status, household headship and education variables, of which the first three illustrate the disadvantaged position of women in the labour market. Education had the strongest impact on formal sector employment, yet most women work in the informal sector despite significant improvements in their education attainment. Two observations merit concern, high youth unemployment and gender imbalance in access to employment.

Zhou (2002) investigated the factors determining youth earnings in the formal sector in Harare. He used human capital theory, primary data and econometrics tools. He found that human capital variables were important to determinants of youth earnings in the formal sector which included the number of years spent in education, the highest level of education achieved and the choice of subject at GCE “O” level.

Defining Sector of Enterprise and Nature of Employment

Although the term “the informal employment” has been very widely used, measuring the Informal employment is very complex one. In general terms, the informal sector is broadly defined as the collection of firms, workers, and activities that operate outside the legal and regulatory frameworks. The reality is that different types of informality co-exist and not a single definition is likely to be a self-contained characterization of the sector.

With the available information in the labour force survey from 2011 to 2014, there are two main lenses through which informality can be studied: firms and workers. In this research, the separation of the firm whether it is informal or formal sector was measured based on the three selected variables in the labour force survey: registration of the enterprise; account keeping practice of the enterprise; and the size

of the enterprise. If the first two variables are outside the legal and regulatory frameworks, while the total number of workers (the third variable) is less than 5, the enterprise would be defined as an informal sector enterprise. Likewise when it comes to the workers conditions, formal employment/jobs are defined based on two variables: leave encashment and the contribution to a pension scheme or provident fund on worker's behalf by the enterprise/firm. Although appointment letter (written contract) is an important factor that influences on the employment type, the labour force surveys which were used in this study, do not consist of such information before 2013. Hence, the workers' employment whether it is formal employment or informal employment was defined by the above mentioned two variables.

The 17th International Conference of Labor Statisticians (ICLS) defined informal employment as the total number of informal jobs, whether carried out in formal sector enterprises, informal sector enterprises, or households. In detail, Informal jobs are characterized by an employment relationship, which is in law or in practice not subject to national labor legislation, income taxation, social protection or entitlement to certain employment benefits. Informal jobs include domestic work, casual or temporary works, industrial outwork, and jobs at unregistered or undeclared firms.

Methodology

The study area, Northern Province comprises five districts: Jaffna, Killinochchi, Mannar, Mullaitivu and Vavuniya districts. The study was administrated with four years of micro level data, obtained from the Labour Force Survey (LFS) from 2011 to 2014. The study was done with descriptive statistical analysis by facilitating basic tables, graphical displays –line graphs percentage values to explore the above statistical relationship as a preliminary analysis to present the data. This study used only youth who fall between 15 years to 29 years, and the researcher purposively omitted fulltime students as this study analyses the status of youth employment. Hence, the data for this study covers the currently (2015) existing data from 2011 to 2014. With such limitations, sample was extracted from the Micro level data as 9703 in 2011, 10213 in 2012, 12601 in 2013 and 12606 in 2014.

Discussions and Findings

Sector of enterprise is characterized into two types: Formal sector and Informal sector. Likewise nature of employment also was divided into two types: Formal

employment and Informal employment. The conditions to categorize Employment and Sector, were already mentioned.

The research findings show that rate of informal employment is decreasing continuously in the Northern Province as well as Sri Lanka. That is, 82.5 per cent of total employment of youth in 2011 declined to 78.4 in 2014 in Sri Lanka. And, in the Northern Province 97.6 per cent of total youth employment was informal employment in 2011 and it declined to 93.0 per cent in 2014. The results reveal that decline in the engagement of youth in the informal employment in the Northern Province is slightly quicker than the National level, larger share of youth are doing Informal employment in the Northern Province than Sri Lanka's overall rate. Sri Lanka's overall rate of informal employment is lacking behind the Northern province by 14.6 per cent in 2014.

Likewise, when it comes to the employment sector, Informal sector of employment is declining both in the National level as well as Provincial level. However, percentage of youth who work in the Informal Sector employments in the Northern Province is higher than Sri Lanka. The statistics show that youth's employment participation in the informal in Sri Lanka declined by 6.2 per cent from 68.6 per cent in 2011 to 62.4 per cent in 2014 where as it declined by 12.7 from 92.9 in 2011 to 80.2 in 2014. It shows that although the decline is two times higher in the Northern province than Sri Lanka, still Northern Province have larger share of youth who engage in Informal sector employment. As at 2014, youth's employment in the informal sector is 17.8 per cent higher than Sri Lanka.

Informal employments are available in formal sector where as Formal employments are available in the Informal sector. According to the data, 18.1 per cent of informal employments in Sri Lanka was in the formal sector in 2011 and it increased by 3.8 per cent in 2014. Likewise, in the Northern Province, it increased by 10.2 per cent from 4.8 per cent in 2011 to 15.0 per cent in 2014. Further, participation of formal employees in the informal decreased in Sri Lanka as declined by 0.6 per cent from 6.1 per cent in 2011 to 5.5 per cent in 2014 whereas it increased rapidly in the Northern Province as it increased by 16.7 per cent from 2011 to 2014. The statistics show that Informal employments in the formal sector are increasing in Sri Lanka as well as in the Northern Province of Sri Lanka. And formal jobs in the informal sector decrease in Sri Lanka while it rapidly increases in the Northern Province. These results clearly show that workers who work in the informal employments prefer to work in the formal sector in Sri Lanka as well as Northern province whereas those who work in the informal sector prefer to have formal jobs

in the Northern Province in contrast to Sri Lanka's overall result. Hence, formalization of enterprises and employments is increasing in the Northern, which clearly admit that youth's aspiration towards formal jobs as well as formal sector increases.

Informal employment rate declined by 18.8 per cent from 95.3 per cent to 76.5 in the Mannar district; by 17.9 per cent from 89.1 per cent to 71.2 per cent in the Jaffna district; by 11.5 per cent from 97.4 to 85.9 in the Mullaitivu district; by 3.8 per cent from 81.9 per cent to 79.2 per cent in the Vavuniya district. Although informal employment rate declined by 6.6 per cent in the Kilinochchi district from 2011 to 2014, it can be observed that it started increasing as it was 80.5 per cent in 2013 and increased to 81.9 per cent in 2014. That is, Informal Employment is continuously decreasing in the Northern Province. However, Rate of informal employment declines very fast in the Jaffna and the Mannar districts. In the Vavuniya district, the decline is very slow. And, interestingly, Informal employment rate started increase in the Kilinochchi district only as at 2014.

It is obvious that proportion of unpaid family workers declined from 9.2 per cent to 3.5 per cent from 2011 to 2014 in the Northern Province, where it reduced from 12.9 percent to 8.8. per cent in Sri Lanka. Likewise, own account workers also declined from 24.1 per cent to 16.1 during the same period in the Northern Province while it declined from 17.6 percent to 15.1 percent in Sri Lanka.

In the case of level of education, there is clear evidence on the relationship between the level of education and informal employment. Informal jobs are predominant economic activity among the poor educated whereas highly educated tend to engage in the formal employment. Particularly, youth who have collegiate and above educational qualification prefer or are provided to do formal jobs where as those who have junior secondary or below educated youth are probably do informal jobs.

Informal employment rate among male youth declines faster than females during the study period both in the National as well as in the Northern Provincial level. And, it is also noteworthy that decline of males youth's informal employment is lacking behind the national level where as female youth's informal employment rate declining faster than the national level. In Sri Lanka, 80.6 per cent of males who engaged in the informal employment in 2011 and it declined by 17.9 per cent in 2014 where as 93.3 per cent in 2011 declined by 13.2 per cent in the Northern Province during the same period of time. 64.4 per cent of females who engaged in the informal employment in 2011 and it declined by 1.7 per cent in 2014 where as

76.9 per cent in 2011 declined by 74.0 per cent in the Northern Province during the same period of time. However, compared to national level, larger share of males as well as females in the Northern Province do informal employment activities.

Age is also another determinant of informal employment. The study categorized the youth into three categories: 15 – 19 age; 20 – 24 age; 25 – 29 age. As at 2014 data, the first age category of youth highly characterized by doing Informal Jobs around 87 per cent of in Sri Lanka and 94.3 per cent in the Northern Province do informal jobs. In the second category also, 73.4 per cent in Sri Lanka and 83.1 in the Northern Province do informal jobs but when it comes to the third category of youth, it is the group that lowest share of youth do informal employments in Sri Lanka as well as in the Northern province. Hence, as age increases, youth have some opportunities to do formalized employments.

In the Northern Province as well as Sri Lanka, Informal employment largely covers five industries: Craft and related workers; Skilled agricultural and fishery workers; Service Workers, and Shop and Market Sales Workers; Elementary occupations; Plant and machine operators and assemblers;

During the period from 2011 to 2014, the Share of Craft and related workers in informal employment increased by 1.1 per cent from 21.0 per cent to 21.1 per cent in the country while it increased by 4.9 per cent from 18.5 to 23.6 per cent in the Northern Province.

Skilled agricultural and fishery industry in the country covered 34.3 per cent of informal employment in 2011 and it declined to 19.4 per cent in 2014 while in the Northern Province, it declined from 24.0 per cent to 15.9 per cent. It shows that the contribution of Skilled agricultural and fishery in the informal employment declined by 14.9 per cent in the country while it declined by 8.1 per cent in the Northern Province.

Contribution of Service Workers, and Shop and Market Sales Workers increased in the Northern Province and Sri Lanka. That is, it increased by 2.8 per cent from 13.4 per cent to 15.2 per cent in Sri Lanka while it increased by 2.6 per cent from 12.8 per cent to 15.4 per cent in the Northern Province.

However, contribution of Elementary occupations in dramatically increased in the Northern Province than the National level. That is, it increased by 2.8 per cent from

17.0 per cent to 19.8 per cent in Sri Lanka while it increased by 6.9 per cent from 7.3 per cent to 14.2 per cent in the Northern Province.

Contribution of Plant and machine operators and assemblers to the informal employment increased in the country by 1.9 per cent from 10.0 per cent to 11.1 per cent while it increased by 2.1 per cent from 7.3 per cent to 9.4 per cent.

Conclusion

The study revealed that although informal employment has been declining in during the study period, still it covers a larger share of youth; accordingly it reduces the youth unemployment rate in Sri Lanka. Particularly informal employment covers larger proportion of youth in the Northern Province than the entire country. The rate of informal employment declines very fast in the Jaffna and the Mannar districts. In the Vavuniya district, the decline is very slow. And, interestingly, Informal employment rate started increase in the Kilinochchi district only as at 2014. In the Northern Province as well as Sri Lanka. Informal Employment largely covers five industries: Craft and related workers; Skilled agricultural and fishery workers; Service Workers, and Shop and Market Sales Workers; Elementary occupations; Plant and machine operators and assemblers. Informal employment rate among male youth declines faster than females during the study period both in the National as well as in the Northern Provincial level. Although the decline is two times higher in the Northern Province than Sri Lanka, still Northern Province have larger share of youth who engage in Informal sector employment. Informal employments are available in formal sector where as Formal employments are available in the Informal sector. These results clearly show that workers who work in the informal employments prefer to work in the formal sector in Sri Lanka as well as Northern Province whereas those who work in the informal sector prefer to have formal jobs in the Northern Province in contrast to Sri Lanka's overall result. Informal jobs are predominant economic activity among the poor educated whereas highly educated tend to engage in the formal employment. Informal employment rate among male youth declines faster than females during the study period both in the National as well as in the Northern Provincial level.

Recommendation

This study found that although informal employment plays an important role in reducing unemployment rate, the economic condition of informal workers is lacking behind formal workers. Job insecurity and economic vulnerability associated with informal should be taken into serious consideration.

Since larger majority of youth in the Northern Province engage in informal employments, larger number of employed youth encounter economic hardships. The results are important for policy makers and development partners to develop appropriate policy options in the future. Particularly, Poor level of education, Poor economic strength, Physical and Mental incapability, Absence of vocational training, Gender discrimination are some causes that make a larger workforce to engage in IE.

As the literature survey claims, Informality is a matter of concern among policymakers and the business community throughout the world. Impacts on productivity and growth, losses in fiscal revenues, and equity issues related to the existence of unprotected workers lacking health insurance and pension protection are important concerns associated with a significant share of the labor force operating informally. As many research shows the informal employment in developing and transitional countries like Sri Lanka has significant role on economic development. Therefore, it is necessary to reduce the size of informal employment through formalization in order to have regulative employment system through which social and economic benefits would be assured for the disadvantaged employees.

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Relevance of Development Assistance to the Economy and Its Impact after Sri Lanka's Elevation to the Upper Middle Income Status

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Abstract

Development assistance can be considered as an essential necessity for the economic growth and sustainable development of a country. As a middle income country Sri Lanka received huge amount of development assistance to overcome the economic obstacles. Therefore this study mainly focused on the relevance of development assistance to the economy of Sri Lanka and the possible impact after Sri Lanka's elevation to the upper middle income status in the future. Furthermore this study examines the forcible impacts which Sri Lanka should face in the eve of upgrading in to the upper middle income status. This study was conducted mainly through secondary data and the data were collected through annual Central Bank reports, publications of IBRD, IMF and ADB, reports of External Resource Department of Sri Lanka, journal articles and etc. For the convenience of the study, a case study has been conducted to examine how countries overcome the middle income trap and how acted to stay confident in elevation to upper middle income status. According to the results and finding of the study, the main obstacle which Sri Lanka faces in elevating to the upper middle income status is the middle income trap. In which flow of development assistance is limited and maintaining better economic standards will be difficult. Moreover, reduction of concessional financing, lack flow of loans, imperative taxation, reduction of investments and changes in political and foreign policy structures also have a considerable impact on the elevation period to the upper middle income status. Finally this study concludes that Sri Lanka should secure approaches to be confident in the period of elevation to the upper middle income status. This study recommends expanding the public sector, economic reforms and attracting FDIs, developing Government thrust for international trade, strengthen investments, concentrate on fiscal affairs under public finance management, maintain human and physical capital, reform education system, technological advancement and good governance and rule of law.

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Introduction

Development assistance can be defined as foreign aid, foreign loans, grants and etc. The flow of development assistance is an essential need for the most developing countries due to certain circumstances. Development assistance began shortly after the World War II and its primary goal was to spur the economic growth of the countries. For example, five of the World Bank's first six loans were given to the Western European countries. At first, development assistance was largely confined to raising aggregate national income. But over the years concept of development assistance has been changed while growth is essential in the development process. With the rapid population growth, attention was turned to per capita income. The unequal income distribution paved the way for international financial institutions and governments to response to the prevailing challenges. In recent years, the goals of development assistance have come to embrace the elimination of poverty, inequality, illiteracy, poor health, poor infrastructure, education, insecurity of income and etc. Development assistance has helped most developing countries to improve the investment climate through building the factors that contributes to investment growth and empowering people through education, health and social protection. Even the countries were able to close the economic gap between the rich countries.

As a middle income country, Sri Lanka received large portions of development assistance from the beginning. According to the World Bank, middle income countries are those with a Gross National Income (GNI) per capita between USD 1,036 and USD 12,615. The middle income category in turn divided into two sub categories; Lower Middle Income (\$1,036-\$4,085), Upper Middle Income (\$4,086-\$12,615). But different lending agencies have different mechanisms to indicate the income levels to define economic status of the countries.

Table 1

Institution	Low Income	Lower Middle Income	Upper Middle Income	High Income
ADB	<2000 \$	2000 \$ to 7250 \$	7250 \$ to 11750 \$	>11750 \$
World Bank 2012 (WB Atlas Method)	<1035 \$	1036 \$ to 4085 \$	4086 \$ to 12615 \$	>12616 \$
World Bank 2011	<1005 \$	1006 \$ to 3975 \$	3976 \$ to 12275 \$	>12276 \$

However development assistance is playing a major role in Sri Lankan economic field in responding to the obstacles prevailing in the sectors such as infrastructure, education, health, elimination of poverty, and etc. Asian Development Bank, World Bank, Japan, China, UN agencies, Western countries and Middle East countries are the major donors of loans and grants to Sri Lanka. As a result, Sri Lankan economy rebounded strongly in 2013 with an annual GDP growth of 7.3% and per capita income increased into US\$ 3280. Sri Lankan government and policy makers believed that Sri Lanka will transit from the lower middle income country to an upper middle income country in 2016. They expected the economy to grow 7.8% in 2015 and gradually expand it into 8.5% in 2016.

Sri Lanka is already in lower middle income country category, it has just graduated from a poor country to a lower middle income country a few years ago. First Sri Lanka has to go a long way to consolidate its position as a lower middle income country and move to climb the ladder of upper middle income country and finally in to a sustainable rich country. But it's not a very clear straight forward process without facing midway hassles. The main midway hassle is the "middle income trap" and which make countries difficult to move forward. Middle income trap is the inability of move up in value chain and generate a sizeable mass of companies with high productivity, producing high-value goods. Nobel Prize winning economist Michael Spence (2010) used to call it "the middle income transition" rather than middle income trap. The policy makers are critical about fact that "will Sri Lanka be trapped in a lower middle income trap before its elevation in to an upper middle income country".

Problem statement

As a developing country, the relevance of development assistance to the economy of Sri Lanka is relatively critical. On the other hand, its impact on the transition of Sri Lankan economy from Lower Income Country to an Upper Middle Income country is the main obstacle in Sri Lankan economy. Therefore, this paper will also take into consideration about the challenges that Sri Lanka should face within the transition period as an Upper Middle Income country with lack of flaw of development assistance. The main objective of the paper is to examine whether Sri Lanka's transition to upper middle income status will be affected by development assistance.

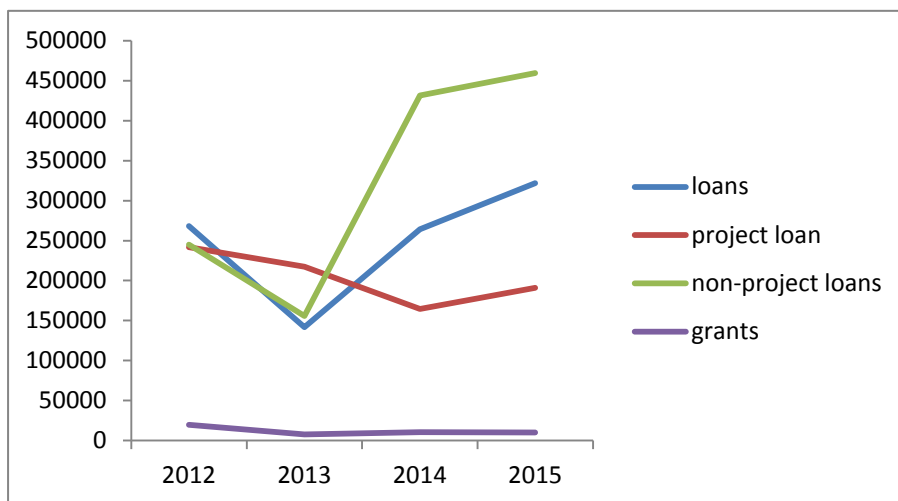
Methodology

This paper is mainly based on secondary data, in which the impact of development assistance to the Sri Lankan economy and future trends can be observed. Basically it uses the data published in annual reports of Central Bank of Sri Lanka, reports of Foreign Ministry, reports of External Resource Department, IPS publications and annual reports of IBRD, IMF and ADB. As the paper is based on time series data, few variables like the major donors, total amounts, trends, future possibilities, challenges are expected to be discussed. Simple and advanced statistical techniques are applied in the paper to identify the main objectives of the working title. Impact and trends of the development assistance to the economy of Sri Lanka is assessed by comparing the received amounts of development assistance in previous years and comparing the economic standards with other lower middle income countries. The possibilities of development assistance to Sri Lanka after being a upper middle income country is assessed by the economic rates of upper middle income countries and their mechanisms to beat the middle income trap. For that purpose a case study has been conducted to examine the mechanisms that have been used by other countries to beat the middle income trap. The major variables are analyzed using descriptive statistical measures and graphical presentation methods.

Results and Analysis

According to the collected data of the study, the per capita income of Sri Lanka is increasing gradually. In 2013 the per capita income was only 3610 US\$ and in 2014 it was 3853 US\$. But in 2015 the per capita income further increased into 3924 US\$ and most economists believed that in 2016 the per capita income will be over 4000 US\$. When considering the growth of per capita income and the flow of development assistance there is a significant reduction in receiving development assistance. According to the Central Bank report the growth of per capita income has clearly affected the flow of development assistance of Sri Lanka. The loans and non-project loan categories are regularly increasing while the project loans and grants are decreasing. Borrowing of loans and non-project loans under high interest rates may further increase the payment of interests.

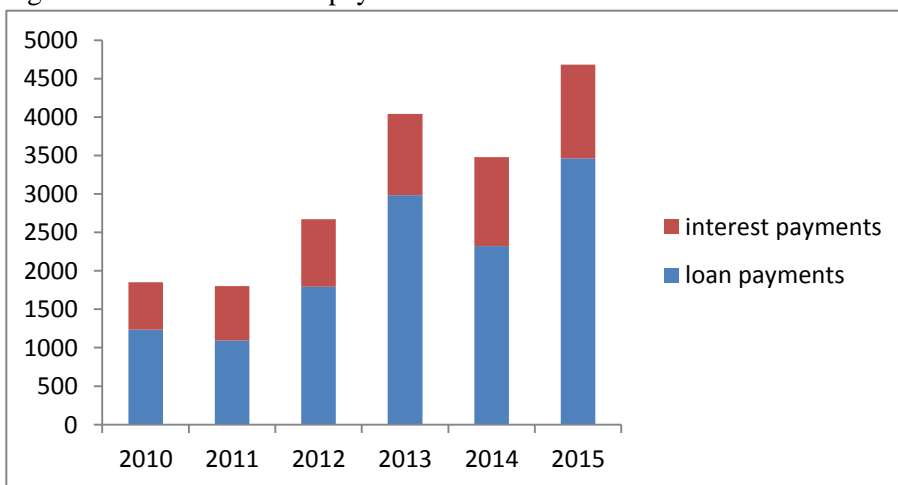
Figure 1: Flow of development assistance



Source: central Bank report, 2014

Moreover, the prevailing debt amounts are high in number and the interest payments are also increasing gradually.

Figure 2: Loan and interest payments



Source: Central Bank report, 2014

The growth of loan payments and interest payments clearly has become a burden for the economy of Sri Lanka. Therefore, there is a great possibility that Sri Lanka will be trapped in the middle income trap when transitioning from a lower middle income country to an upper middle income country. Apart from that main obstacle the study

identified other several challenges which may Sri Lanka face in the transition period into an upper middle income country.

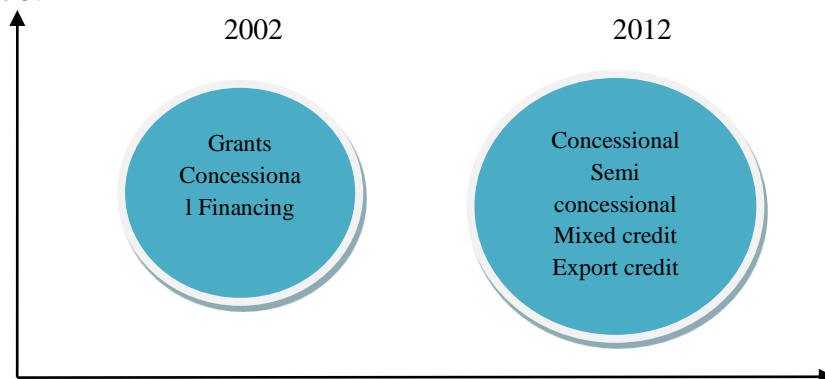
Limited development assistance

Sri Lanka already faces limitations in receiving development assistance as a MIC. Some argues that foreign aid and grants should be provided for poorest countries to overcome and question why development assistance should be given to MICs. But there are others who argue that providing aid to MICs are legitimate which is necessary to meet Millennium Development Goals and eradicate poverty. Therefore the transition period will be hard to meet the financial challenges.

Reduction of concessional financing

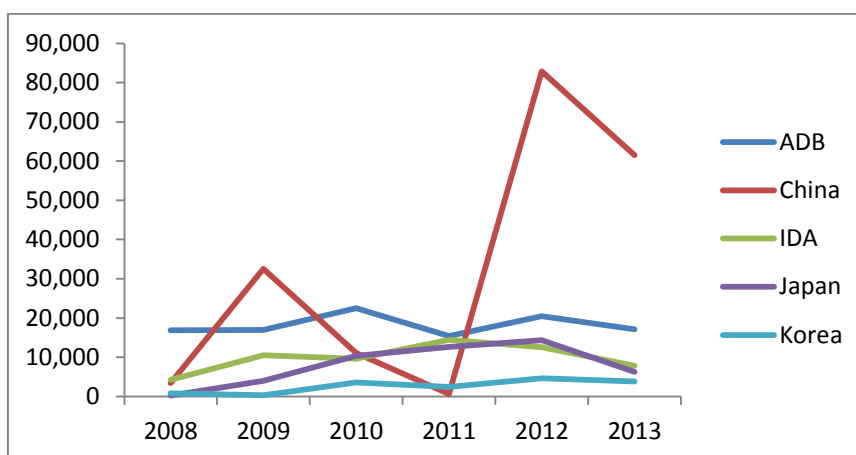
As Sri Lanka elevates as a lower middle income country with increased demand for public investment the concessional financing of the country has enjoyed over the past years is on the decline. The concessional financing has been extended by development partners like ADB, IFAD, UNDP, OPEC fund, European Investment bank, Japan, Korea, France, Austria, Germany, Denmark, USA, and Middle East. India and China provided in the form of outright grants, credits with longer maturities with a longer grace period and low interest or as mixed credit combining loans and grants. However, at present Sri Lanka has access to limited range of concessional funding from IDA, ADB, UN agencies, selected bilateral development partners and dedicated development funds. According to the IPS discussions with several aid missions it's revealed the perspectives and upcoming trends in development assistance to Sri Lanka. The Deputy Head of Mission of a leading European aid donor has revealed that "since 2010, Sri Lanka no longer qualifies for bilateral development assistance due to lower middle income status of the country".

Figure 3:



Source: Performance report 2013, Department of External Financing

Figure 4: Lack flow of loans



Source: Central Bank report, 2014

The loan flow to Sri Lanka reflects a decline since 2012. Most of the development projects of the country mainly finance through these loans. If this trend going to continue for next 2 years, Sri Lanka should seek better alternatives to fulfill the requirements for the goal of becoming an upper middle income country. On the other hand, the interest payment for the loans is increasing year by year.

Table 1:

year	Interest payments US\$ million
2009	357
2010	619
2011	707
2012	881
2013	1126

Source: Central Bank report 2013

Imperative taxation

Lately, Sri Lanka realized the benefit of increasing its volumes of borrowing from international debt capital markets. According to Lewis (1984), “an increasing share of tax revenue in national income or in GDP is an instrumental objective of economic development policy”. High income countries maintains rising shares of tax revenue and government expenditure to income. As a developing country, Sri Lanka should spend more on public infrastructure, education, health and welfare. In order to improve the living standards of its people developing countries including Sri Lanka can increase their tax ratio. According to the benchmark tax GDP ratio middle income country can increase their tax ratio up to 25% and Sri Lanka was just

12.4%. Sri Lanka performs poor collection of taxes with ¼ of direct taxes and rest from indirect taxes like VAT.

Reduction of investments in education and health

Since several decades, Sri Lanka continues as the key provider of social services such as education and health. But these two sectors were the least invested sectors during last few years. Investment in education is low and has declined over time up to 2.3% in public expenditure in education during 2000-2010. In 2012, the total expenditure in education is 1.9% of GDP and it was a very limited portion compared to the lower income countries. Upper middle income country spent 5% of GDP and lower middle income country spent 4% of GDP for the improvement of education. On the other hand, only 10% of the schools in urban areas were capable of offering the students to study science in Advanced level. Total expenditure on health remained below 5% of GDP during 1995-2008 and it's in a comparatively lower position compared to the global average expenditure on health. The requirements of health sector were fulfilled by the private sector. Education and health sector are the main resources which in turn produce an educated skillful healthy work force.

Political and foreign policy structure

After the 30 years war the internal ethnic crisis, human right violations, murdering journalists, corruption, unequal distribution, and election structure have badly affected the image of the country in the international arena. The withdrawal of GSP+ concession and other economic constrains have been emerged as a result of above mentioned factors. It directly affected the flow of development assistance to Sri Lanka. The dramatic changes in the political and foreign policy structures of Sri Lanka directly influence the economic growth and investment and financial receives. If Sri Lanka can buildup a better image in the international arena with remarkable political achievements and foreign policy settings, Sri Lanka will be able to capture the requirements to fuel the transition period into an upper middle income country.

Case study

Furthermore, according to the case study of South Korea on shifting into an upper middle income country through the lower middle income country, South Korea establishment of five year plans intended as guide lines to coordinate public and private efforts to improve the performance of the country.

South Korea is a successful model and an exceptional case of swift transition to an advanced economy among the East Asian countries. In 1960, the per capita income

of South Korea was only US\$ 2000 and in 2008 it was around US\$ 28,000 with elevation to a developed country. The South Korea's quick transition in to a advanced country can be divided into 3 stages.

The first stage began in 1962, with the establishment of five year plans intended as guide lines to coordinate public and private efforts to improve the performance of the country. As a result, since 1997 the annual growth rate of 7% boomed the economic progress of South Korea. This stage was further strengthened by high level of savings, investments; determined industrial policy framework which inspired the technological upgrade to align exports with South Korea's evolving comparative advantages. During that period, South Korean government outlawed unions and created conditions for labor market with cheap and abundant labor.

The second stage covered the financial crisis prevailed in 1997-1998, which slow down the economic progress and increased the unemployment rate. The economic indicators like balanced fiscal and current accounts, a low public debt (8% of GDP IN 1996), high domestic savings, investments (38% of GDP) and imbalances had accumulated in the domestic private financial markets. Short term private external debt to international reserves was remained in a high ration and over investment in manufacturing sectors that had displayed an excess capacity even before the crisis. On the other hand, non regulated process of financial liberalization that induced over indebtedness on the part of the private sector. South Korean financial crisis involved crisis for many banks and businesses and paved the way to a broader economic crisis. The economic outcome during this period increase unemployment and poverty.

The third stage of the South Korean economy was characterized by the recovery of the financial crisis. In 1999, South Korea GDP growth recorded as 10.7%, which became the highest GDP growth in East Asia since 1988. Exports went up by close to 9 percent in 1999 and 18.2 percent in 2000. Unemployment dropped from 6.8 percent in 1998 to 4.5 percent by the end of 1999. The share of poor households fell from 23.2 percent in 1998 to 18.0 percent in 1999. Subsequently, the South Korean economy was able to sustain an annual growth rate of 5 percent from 1998 to 2008. Counter cyclical monetary and fiscal policies, growth in export sector, high inflows of foreign direct investments recovered the South Korea's financial crisis. In addition, the country implemented economic reforms that included measures to restructure the business sector, banking, public sector and labor market.

However, after a decade of rapid growth, South Korean economy was not immune to the current global recession. In 2008, exports were down 19.5% and they

continued to drop until mid-2009. The economy grew by just 2.3 % in 2008. But it recovered in 2010 to a growth rate of 6.2%, similar to the one achieved before the crisis. This swift recovery in the South Korean economy has been led by rapid growth in exports due to the depreciation of the South Korea, strong demand in China and an effective and aggressive monetary and fiscal policy response.

Table 3: Economic Indicators of South Korea

period	Economic indicators							
	GDP per capita income US\$		GDP growth (%)	Fiscal balance (% GDP)	Public debt (% GDP)	Current account (% GDP)	Inflation (%)	Exports (% GDP)
1962-1997	1962- 1,704 1997- 18,239		8.0%	-1.0%	13.4%	-1.4%	14.10%	24.40%
1998	16,867		-6.9%	0.9%	14.30%	11.30%	5.80%	44.30%
1999-2008	18,366 26,875		5.3%	2.3%	22.90%	1.80%	2.40%	39.50%
2009	26,850		0.2%	0.0%	32.60%	5.20%	3.40%	49.90%
2010	28,389		6.1%	1.4%	32.10%	2.60%	2.20%	54.80%
2010-2015	38,734		2013-3%	-1.5%	-33.8%	0.7060%	5%	53.92%

Source: IMF, World Bank, Economic outlook data

This effort was further strengthened by high level of savings, investments; determined industrial policy framework which inspired the technological upgrade to align exports with South Korea's evolving comparative advantages.

Conclusion

Sri Lanka's performance in many areas including education, health, skills development, infrastructure development, irrigation and poverty reduction has been exceptional in comparison with the other countries in the region due to the flow of development assistance. But according to the discussions and data analysis the flow of development assistance to Sri Lanka will be limited in the eve of elevation to an upper middle income country. The decreasing trend of flow of development assistance can be seen in distribution of development partners. Most of the lending agencies and countries argue that why we should give development assistance to MICs rather than LDCs. On the other hand, Sri Lanka has gained remarkable positions in most of the world indicators including education and health compared to other South Asian countries. Sri Lankan government have implemented new initiatives to overcome this obstacles to prosper its main goal of being an upper middle income country avoiding middle income trap and lack flow of income to balance the lack of development assistance funds.

Recommendations

To overcome the challenges of elevating Sri Lanka as an upper middle income country and to seek alternative income flows due to the reduction of development assistance the following policy options can be implemented.

Maintenance of human and physical capital and reforming the education system

The maintenance of a proper balance between the development of human infrastructure and the physical infrastructure is a one policy option to overcome the middle income trap. Physical infrastructure is necessary for a developing country to become a rich country. Physical infrastructure consisting of roads, ports, airports, power-plants contributes a lot for the economic growth. Human infrastructure means human skills, talents, knowledge, and health. A perfect combination of human and physical infrastructure is essential for the economic growth. Recently, Sri Lankan government paid much attention for the connective infrastructure projects, which inter connect the roads, ports and airports. But sectors like education and health should be given equal priority as the physical infrastructure. Falling investments in education has become a serious obstacle to improve human infrastructure in the recent years. Public expenditure in education has fallen from an average 2.3% of GDP during the 2000 to 2010 period, to 1.8% of GDP in 2012. The average upper middle-income country spends 5% of GDP, and the average lower middle-income country spends 4% of GDP on education. Over 100,000 A/L qualified students were not able to attend the state universities and dropouts of schools have been increased. One way to address the issue is to look at the possibilities in bringing vocational training, develop soft skills, technological skills and carrier guidance, and develop infrastructure to promote education system. Reforms in the education system through quantitative expansion and a qualitative improvement will generate educational development, scientific and technological development.

Expansion of public sector and government thrust for international trade

The private sector growth is essential to long-term development while the state can have some success in financing and inducing factor accumulation. Even when a state-dominated economy manages large quantities of investment, the quality of that investment is low. The economic strategies must have its core as a focus on building a good climate for private sector investment, productivity and employment creation by all firms small and large. However, the government should organize elements of investment climate such as macroeconomic stability, trade openness, governance, institutions and infrastructure. Diversifying its export base and explore of new markets for exports should be given high priority. Apart from the main

export items of Sri Lanka; tea, rubber, appeals the export base should be diversifies with competitive quality and price. New innovations of present export items can explore new markets for the exports. According to the Central Bank annual report of 2013, Sri Lanka's exports as a percentage of GDP is only 23.05% while the validity of the growth rates remain in a low level.

Economic reforms and attracting FDIs

Under economic reforms, there are 2 major commandments to address the middle income trap, such as creating an environment for structural transformation and introducing an efficient regulatory mechanism. Besides a quality finance sector provides flamboyant financial facilities to any country to channel savings into productive investment sectors. Flamboyant financial facilities mean active and productive participation in leading financial institutions, to avoid financial crisis. Sri Lanka can support foreign investors with accessing and processing all the logistics necessary to setup business in Sri Lanka including applying for project approvals, granting incentives, arranging services like water, power, waste treatment, telecommunication and business friendly regulations for foreign direct investors.

Strengthening investments and concentrate on fiscal affairs under public finance management

Investors can be strengthened by several mechanisms such as tax incentives, land and infrastructure, and facilities. Tax incentives- tax holidays, exemptions from tax on dividends, qualifying payment reliefs, custom duty/VAT/PAL exemptions on import of capital goods, customs duty exemptions on raw materials for export-oriented companies. Land and infrastructure- integrated infrastructure coupled with parking, water, electricity, waste water management and energy. Under public finance management, greater attention should be paid for the fiscal affairs of the country. The belief of fiscal authorities that they can continue to borrow and finance profligate government expenditure programs to cater to what is known as “the gallery” of a nation, without damaging the long-term health of an economy, has driven many countries to their limit. Fortunately, Sri Lankan fiscal authorities which are deeply immersed in a debt recycling crisis have reduced the debt/GDP ratio by a few notches without disciplining the overall consumption expenditure of the budget. Public finance management is the most appropriate that Sri Lanka should improve to avoid the middle income trap.

Technological advancement and good governance and rule of law

Its relatively easy for a poor country to become a middle income country with cheap labor, attracted FDI, widened markets for products, extension of trade concessions,

and low level of technology. When lower middle income country gradually upgrade in to the ladder of upper middle income country, they cannot compete with the rich countries which are having high level of technological standards. Production sector, education, telecommunication, technical development, health care, mass media and whole of the sectors in the development agenda in Sri Lanka can be improved through technological advancement. As a result, Sri Lanka will be able to overcome the middle income trap. Good governance also reduces the costs of capital to businesses, and contributes to macroeconomic stability

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Economics of Flood Damage Prevention Investment in Colombo Metro Area: Strategic Perspectives Explored through a Viability Threshold Analysis

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JEL Codes: C53, C54, O22, Q54, R11

Abstract

Flooding has become an increasingly difficult problem to manage, particularly in the urban city settings situated in low-lying flood plains around the world. Countries have spent significant amounts of investment on urban flood prevention; yet the problem persists, inflicting, from time to time, significant flood damage costs. Colombo is no exception. A research was conducted to study the recent flood prevention intervention project proposed for the Colombo Metropolitan Area (CMA), with a view to ascertain viable levels of investment, and to propose strategies for the consideration by the Government. Secondary data on probabilistic distribution of flood damage cost estimates were used to work out the expected flood damage, firstly by estimating the area under the flood damage cost curve, and cross-checked by conducting a Monte-Carlo simulation exercise. Rational investment caps were established by expressing the variability of Economic Net Present Value as a function of Investment. The study also analysed the behaviour of the investment requirements to prevent flood damage, from average flood damage level to flood damage mitigation with increasingly greater degree of confidence. The results enables rational bench-marking of capital expenditure on flood prevention. They demonstrate how sub-optimal and economically wasteful flood prevention interventions could be, unless they are planned to satisfy rational ceilings. High scales of investment for greater levels of confidence in flood damage prevention might be unavoidable for political imperatives; thus, the study finds it more economical to relocate residents in all low-lying areas, and to preserve those as environmentally sensitive green patches in view of minimising flood damage with greater levels of confidence and at least possible economic costs.

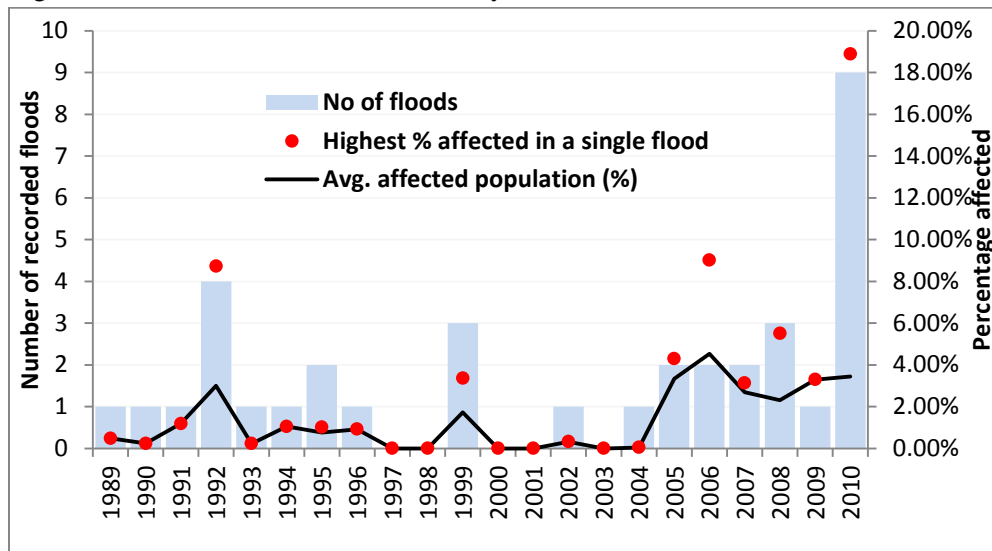
Key Words: *Flood Damage, Economics of Preventive Interventions, Investment Viability Threshold Analysis, Colombo Metro Area*

Introduction

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Colombo is situated in a flood plain, and therefore faces frequent floods. Being the most populated and most built-up city in Sri Lanka, such incidences of flooding in the Colombo Metro Area (CMA) are associated with significant socio-economic costs.² This is why many flood prevention measures were implemented in the past, including the erection of bunds along the river. Recently, a comprehensive flood prevention project was proposed in 2002 with the support of Japan International Cooperation Agency (JICA), and another project was implemented with World Bank assistance in 2012. The World Bank study, based on data sourced from the United Nations Development Programme (UNDP), compiled the number of flood occurrences each year over the period of 22 years from 1989 to 2010, their cost implications (World-Bank, 2012); the results of which analysis are depicted in the Figure 1.

Figure 1: Flood occurrences and intensity - CMA³



Source : Computed using UNDP Database. (World-Bank, 2012)

Flood levels, expressed in their “return periods” are indicative of their degree of severity. Floods with a two-year return period, for instance, mean that this type of flood occurs almost every other year, and thus are much less severe than, say, a flood with a 100 year return period, which is rare and generally occurs once in a

² Population density in the area is 16 times that of the national average. Almost 50% of the country’s GDP is estimated to be generated within the Western Province, of which a large majority comes from Colombo.

³ Colombo, Thimbirigasyaya, Kollonnawa, Sri Jayawardenapura Kotte, Dehiwela, Ratmalana DS Divisions

century. Needless to say therefore that not all flood damage can be prevented through flood control investment; any such designing of flood control measures for rare but severe occurrences are bound to be extremely costly, and thus unviable.

This paper summarises the findings of a research, built on the above data and information, to appraise flood prevention economics for the Colombo Metro Area (CMA),⁴ with a view to ascertain viable levels of investment, and to propose strategies for the consideration by the Government.

Materials and Methods

Flood control has become an increasingly important objective in the urban settings where high population densities have led to low lying areas also being brought under human settlements and economic activities. Inundation of industrial and commercial establishments imply significant economic costs, while flooding of residential areas lead to disturbance of social life. Experience indicates that the tangible flood damage costs in coastal cities of middle-income countries are high and rising (World-Bank, 2012). For instance, in Metro Manila, the tangible costs of flooding could range from USD 30 to USD 126 per capita (2008 prices), while cost of floods would range from 0.5 to 3 percent of GDP in Thailand (ADB, JICA and World Bank, 2010). Such costs are a significant impediment to socio-economic progress of such developing countries, and Sri Lanka is no exception.

Avoided cost of flood damage corresponds to “benefits” of undertaking flood control measures. Such benefits in Colombo, a highly urbanised and commercialised setting, are potentially high, and would stem largely from the prevention of damage to residential and commercial properties, urban infrastructure and economic livelihoods. The main benefit categories, as identified in the World Bank study (2012) are summarized in the Table 1.

⁴ For the purposes of this study, the CMA is defined as the Colombo, Thimbirigasyaya, Kotte, Kolonnawa Divisional Secretariat Divisions, and the Dehiwala-Mount Lavinia Municipal Council area.

Table 1: Expected Benefits of Flood Control in the CMA

Tangible benefits	
Benefit to residential properties.	Reduced damage to residential buildings, and the associated increase in property value, generally constitutes the major portion of the benefits of flood control and drainage investments.
Benefit to agriculture, commercial and industrial properties.	Economic losses due to immobilization of factors of production, inundation of paddy fields, business establishments and factories are often recorded in Colombo during floods.
Benefit to public infrastructure	The recent 2010 floods witnessed damage to power lines, to telecommunication network, and railway infrastructure as well.
Reduction in emergency costs.	Flood relief payments and the resettlement costs generally follow almost every noticeable flood, and swallow a significant share of public resources.
Reduction in traffic costs.	The roads in the Colombo area are frequently flooded, resulting in slowing of traffic flows, causing severe congestion.
Social benefits.	The social costs, including health, education and welfare, are high in particular in the Under-Served Settlements located on low-lying lands and highly exposed to environmental risks related to flooding.
Enhancement in the CMA's development potential and image.	By improving the city's environment, the investments will spur new business opportunities, and housing in the area will become more desirable. A large portion of these benefits will be capitalized into land value appreciation.
Non-tangible benefits	
Recreational benefits	The investments will increase the recreational value of the Colombo's canal system
Aesthetic value	The investment will lead to improvement in the aesthetic value of the environment
Biodiversity	Flood control will contribute to the preservation of eco-system

Source: Sri Lanka- Metro Colombo Urban Development Project, World Bank, 2012

The estimates of these probable flood damages, made by JICA (2002) and updated by the World Bank (2012), were used as base data for the analysis. Expected flood damage was estimated by working out the area under the flood damage cost curve expressed as a function of flood retention periods (Vojinovic, et al., 2008), (Arnell, 1989). The expected flood damage so estimated was cross-checked by conducting a Monte-Carlo simulation exercise.

Deviating away from the conventional means of viability assessment where investment estimates are known, the study examined the variability of Economic Net Present Value as a function of Investment, in order to suggest rational investment caps. The study also analysed the behaviour of the investment requirements to prevent flood damage, from average flood damage level to flood damage mitigation with increasingly greater degree of confidence.

Analysis and Results

The probabilistic distribution of flood damage cost estimates, used as the base data for the analysis, is summarised in Table 2.

Table 2: Flood Damage Costs corresponding to Flood Intensity in CMA

Flood Return Period (Years)	Damage to CMC Area (Rs Mn)	Damage to Non- CMC area (Rs Mn)	Total Damage to CMA (Rs Mn)
2	124	807	931
5	178	1342	1520
10	234	1869	2104
25	333	3552	3884
50	436	6305	6740

Source: JICA estimates, updated for 2011 by World Bank study team

This estimate of flood damage cost distribution was used to work out the expected flood damage, firstly by calculating the area under the probabilistic distribution curve, and thereafter by Monte-Carlo simulation of flood incidences with 5000 iterations.

The two estimates yielded quite closer estimates. It was noted, however, that the simulation exercise only could handle a discrete set of probabilistic occurrences, whereas the area under the curve calculation could account for the continuum of probability distribution, which could explain the marginal difference of result, as summarised in the Table 3.

Table 3: Expected Flood Damage Estimates and Standard Deviations

Parameter	Calculating the area under the probabilistic curve	Monte-Carlo simulation (5000 iterations)
Expected Flood Damage cost (Rs Bn)	1060	890
Standard Deviation	1134	1220

Source: Author's estimates

A Benefit-Cost Analysis was performed, first using the Expected value of flood damage cost, and thereafter by considering increased level of confidence of flood damage avoidance. A 40 year project life horizon was assumed with no residual worth of assets. Flood avoidance benefits were expected to grow at an annual rate of 4% in real terms.⁵ A maintenance expenditure was assumed to be 3% of investment value. Flood prevention intervention was considered capable of preventing the entirety of damages reflected in the flood damage profile.⁶ Market cost estimates were converted to economic values using the Aggregate Conversion Factor (ACF).⁷ An economic rate of discounting of 10% was employed.⁸

Instead of computing the economic viability of a given investment estimate, the study adopted several scenarios of discounted investment levels to work out the corresponding economic Net Present Value estimates of expected flood damage avoidance. The results are depicted in the Figure 2.

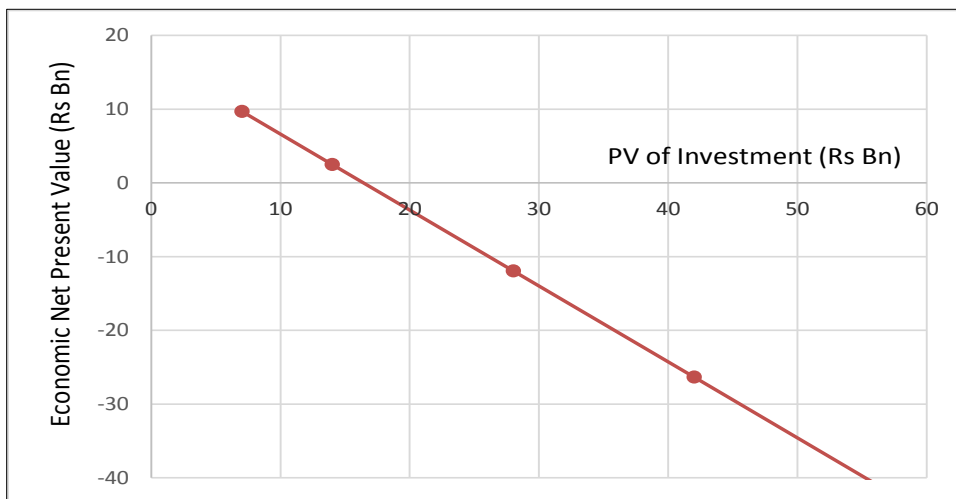
⁵ World Bank study projected a 3.75% annual real growth of average flood damage costs.

⁶ This assumption leads to "over-estimation" of benefits, as in reality, any finite flood prevention investment, designed for a targeted flood level, would not be capable of preventing damages that would be caused by floods with higher return periods.

⁷ Aggregate Conversion Factor is the ratio between Exports (X) plus Imports (M) in Border Prices and X plus M after adjusting for taxes and subsidies. In other words, $ACF = (M + X) / [M(1 + tm) + X(1 + tw)]$. (Weiss, 1987) page 27. ACF for Sri Lanka was thus estimated to be 0.95 using data presented in the Central Bank Annual Reports (CBSL, 2012).

⁸ World Bank study team in 2012 said that 10% to 12% would be appropriate discount rates for economic analysis. They have finally resolved to use 10%.

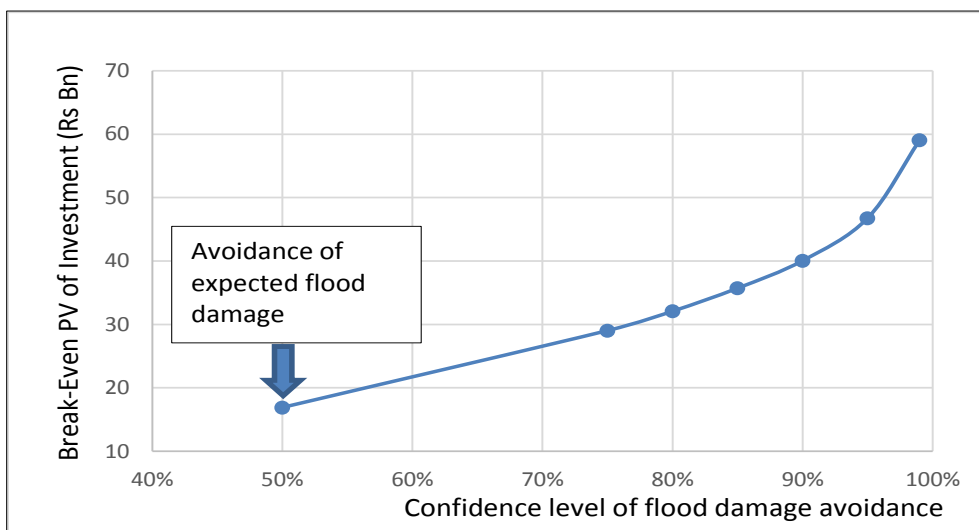
Figure 2: Variability of Economic NPV as a function of Discounted Investment for the Expected Flood Damage Scenario



Source: Author computations

The expected flood damage being just the mean occurrence of a stochastic variable of flood damage, the study went into examine how different the Investment requirement would be for flood damage avoidance at different levels of confidence; the results are depicted in Figure 3.

Figure 3: Investment needs for varying confidence levels of flood damage avoidance



Source: Author's computations

Discussion

The results indicate that any spending of capital investments over and above Rs 17 Billion (or USD 120 Million at 2015 exchange rate) in Discounted Present Value terms for the avoidance of expected flood damage would be economically sub-optimal. This threshold limit would be slightly lower (around Rs 14 Bn, or USD 100 Mn) if expected flood damage estimates obtained through Monte-Carlo simulation method were to be used.

Nevertheless, a desire to have a greater degree of confidence in flood damage avoidance could not be ruled out; hence, the sensitivity analysis presented in the Figure 3 was performed. Accordingly, the growth of investment requirement corresponding to increased confidence levels of damage avoidance would be somewhat linear up to 75% and accelerating beyond. For instance, an investment of Rs 20 Billion would be excessive and could not be justified for the avoidance of expected flood damage, while even double that would be justified if a damage avoidance confidence level of 90% is sought.

These inferences are of high policy relevance. First, they provide a mechanism for rational bench-marking of capital expenditure on flood prevention in the Metro Colombo Area, while establishing an economic analytical framework that could be used in flood prevention expenditure planning in general. Second, they demonstrate how sub-optimal and thereby economically wasteful flood prevention interventions could be, unless they are planned to satisfy rational ceilings.⁹ Third, the justifiability of high scales of investment for greater levels of confidence in flood damage prevention, might be politically relevant regardless of their economic rationality. This is because a high flood incidence, even if rare, would inundate low-lying settlements which are more likely to be substantial vote banks towards which Governments would be politically sensitive.

A strategic way out may be to relocate residents in all low-lying areas, and leave those as environmentally sensitive green patches. This is enabled by the fact that severity of flood damage, and thereby the associated costs, arise not only owing to high flood levels, but also because of exposure of people, goods, property and economic activity centres to flooding. Relocation of settlements from vulnerable areas would reduce or completely eliminate the possibility of exposure, and thus, a

⁹ *Not all levels of floods could be prevented even if extremely high levels of investment are made. Thus, it becomes clear that flood prevention "at any cost" would not be economically justifiable, and such measures of intervention need to be made with a high degree of capital efficacy.*

greater degree of damage prevention could be expected at a much lesser scales of capital expenditure. Under such a scenario, very high levels of confidence in flood damage avoidance could be ensured without having to spend an additional (over and above that amount justified for expected damage avoidance) sum of Rs 20 Billion. If such savings are diverted to pay an incentive for resettlement, 20000 families could be paid Rs 1 Mn each. This amount or the number of incentivised families could be nearly doubled if the investment requirement to avoid expected flood damage also is added to such resettlement fund, enabled by the fact that low-lying areas devoid of settlements would automatically bring down even the expected flood damage to very low levels.

Conclusions and Recommendations

This study brought forward suggestive evidence to conclude that there may be more economically advantageous methods of addressing Colombo's flooding problem than the present method of trying to prevent flood damage through capital investments in engineering and technical means of damage control. Such preventive interventions are likely to be costly, disappointing, and also capital wasteful. A better and more sustainable strategy for flood management in the Colombo area would be to remove residential houses and industrial establishments from sensitive areas and to resettle them in safer locations. As the study reveals, at least a significant share of such relocation expenses could be sourced from savings on flood prevention capital expenditure which would become unnecessary under the proposed strategy.

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The Conceptual Policy Framework for Computer Lab: Special Reference in University of Kelaniya Sri Lanka

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Abstract

Effective utilization of computer resources in an academic institution is an important aspect as the resources are limited to large number of users. A computer lab is a specified space that provides computer services to a defined community. The significance of this study is to the computer lab, the institution, and the users are in variety of stages. Thereby this study emphasizes on maintain effective practices regularly in order eliminate time-by-time maintenance. The key objective of this study is to develop a policy framework for effective utilization of computer lab resources in order to make sure the problems associated with computer users regarding the use of computer labs. The awareness of Clear Screen Policy and problems associated in maintaining Clear Desk Policy were measured by a questionnaire prepared originally for the study as there are limited researches in similar interest. Questionnaire has edited after the pilot survey in order to ensure the sufficient responses towards the study. The study emphasized on selecting computer users to the sample by simple random sampling technique which is included to the probability sampling techniques. Thereby 300 individuals from both staff and student categories were selected at the premises. The research has used both primary data and secondary data to gather information from the sample selected. To gain the objectives of the research Descriptive analysis, Chi-square test, one way ANOVA were used to analysis of data. Therefore, the findings of the study conclude that there is significant relationships between gender and awareness of Clear Screen Policy as well as between lab user category whether student or staff member and Clear Screen Policy. On the same time the results found that inappropriate appearance of working table make most effect on computer users. Thereby the recommendations were given to the authorized personnel in the university to ensure effective utilization of computer lab resources by stipulating policy frameworks as Clear Screen Policy and Clear Desk Policy.

Key Words: *Computer Lab, Clear Desk Policy, Clear Screen Policy, Policy Framework*

Introduction

Computer labs, or computer clusters, give many people access to computer programs and to internet. Schools, public libraries, universities, hotels and

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government offices and companies set up computer labs that contain a large quantity of computers, printers, scanners and other equipment. These computers are usually hooked up to a central server and maintained by an Information Technology (IT) Department (Gough, 2016). Lab computers are used often by people with varying degrees of computer training. This means they are at risk from disorder working table in the Computer labs. One must maintain lab computers regularly in order to ensure that they don't crash prematurely (Jarvis, 2006). Computer lab maintenance procedures may differ slightly depending upon whether you have PC computers. As the computer lab becomes a more integral part of elementary education, the computer lab becomes the hub of activity. The Computer Lab provides an environment where users may get support and assistance with computer related issues. The Lab Assistant is primarily responsible for enforcing Computer Lab Policies and Procedures (Carranza, 2003). Noncompliance with the policies and procedures will be grounds for revoking lab privileges and may result in referral for disciplinary action.

Policy and Computer Lab environmental interventional have been an important part of the University Labs. The Computer Lab aims to provide basic, functional computer services for users who may not have access to such technology at home or elsewhere (Hartley, Mike, Lise, & Simon, 2012). When using Computer lab, users were facing lots of problems. The computer labs are available for University students to complete class assignments. All students are asked to respect the rights of others in order to have a quiet environment to complete their assignments. When students work in the computer lab they haven't a clear screen on their table. Lots of computer labs are appearing disorder. Lots of wire and other things are appear on the table. Those things are disturbing for students and other lab access users. Another thing is student require notes, research, planning sheets etc. all kinds of information for the student to refer while they were working. But in here students can't keep their all kinds of books, papers and other things on their table because the table is full with the lots of wire, switch and other things. According to this problem students can't work smoothly throughout.

In this research, researcher emphasize on creating a policy framework for the disorder computer labs. Researchers apply this investigation in the University of Kelaniya Faculty of Social Science Laboratory. The study was thoroughly undertaken by the researcher by focusing on the problem of the kind of policy framework suited the Computer labs. The more researchers have done research on computer lab maintain and rules but no one has done a research about disorder Computer Lab Policy.

Review of Literature

The main intention of the study is on effective implementation of Clear Screen Policy and Clean Desk Policy in Computer labs. The Clear Screen Policy directs a computer user to lock their computers when leaving their desk and on the same time to log off the computer when leaving. This Clear Screen Policy ensures the protection of contents of the computer from prying eyes and the unauthorized use. Clear Screen Policy is closely associated with Clean Desk Policy which instructs computer users to clear their desks where the areas free of notes, removable media and etc. at the end of a working session. Clean Desk Policy helps to save both time and money, make good impression, and discourage prime eyes.

Methodology

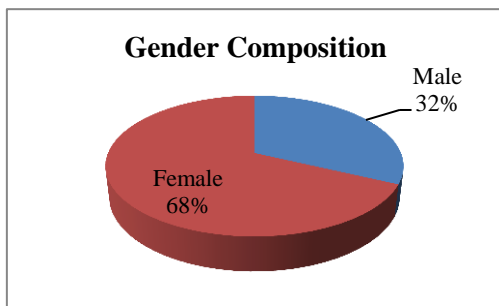
The main concern of this paper is to address the disorder problems in Computer labs and create a policy frame and make the awareness of effective use of clear screen policy in order to eliminate the disorder problems. Some results of the pilot survey that conducted among lab users of Faculty of Social Science, University of Kelaniya and the survey was set up after a pilot study. Both secondary (literature review and desk research) and primary data were gathered. Data were obtained from the responses of 300 lab users selected by simple random sampling technique. The questionnaire method and interview method were used to collect data and also used five likert scale for data processing. Data were analyzed by the use of SPSS 21.0 using descriptive statistics, chi-square test and one way ANOVA. Certain conclusions were made from the study after carrying out detailed scientific analysis of data using appropriate statistical tools. Based on the findings of the pilot survey concludes that the most lab users' are facing the problem of disorder computer lab. Therefore the research has been further involved in SWOT Analysis to identify the possibility to create a policy frame work. In addition, the researcher is made recommendation to increase perfect arrange lab policy with Clear Screen Policy and Clear Desk Policy. According to the results of pilot study, the questionnaire built up to fulfill the objectives has been amended according to the requirements of the questionnaire in order to maintain the completeness and consistency. Students and staff approached the lab were first informed about survey's objectives and answering procedure. Those willing to participate were given the questionnaire, and invited to fill it in during their study at the lab premises, so that the answers would reflect their immediate experiences. Questionnaires have been distributed on both weekdays and weekends, in different hours of the day. Responses formats were either closed ended (dichotomous, multiple choices) in ranking scale. The questionnaire addressed which problems are effective in the Computer labs. The

study has mainly included to an explanatory research style and inductive research approach. The main interest driving the data analysis was to unfold people's thoughts and problems in a qualitative way, rather than to establish quantitative relations and identify independent and dependent variables.

Results

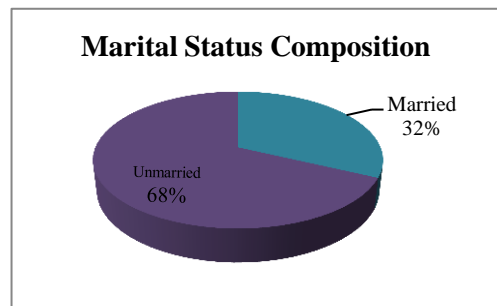
The demographic characteristics of the respondents show that 32 percent of respondents were male while rest of 68 percent was female. And 62% were unmarried, and 49.7% were staff users. The higher Lab using age of respondents was 22-25 years.

Figure 1: Gender Composition of respondents



Source: Sample Survey, 2016

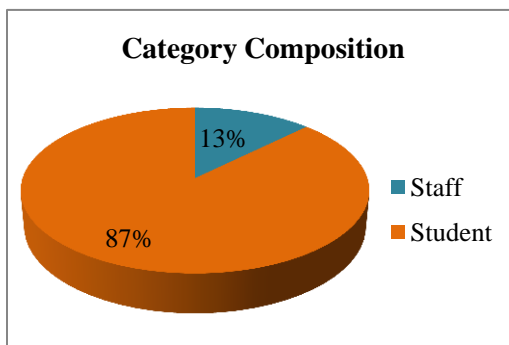
Figure 2: Marital Status Composition of respondents



Source: Sample Survey, 2016

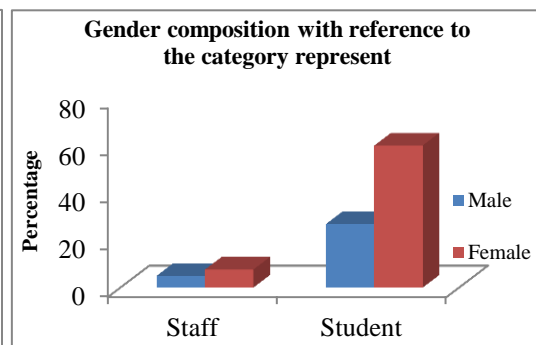
The study implies that 87 percent of respondents are students and only 13 percent of respondents are included to staff.

Figure 3: Category Composition of respondents



Source: Sample Survey, 2016

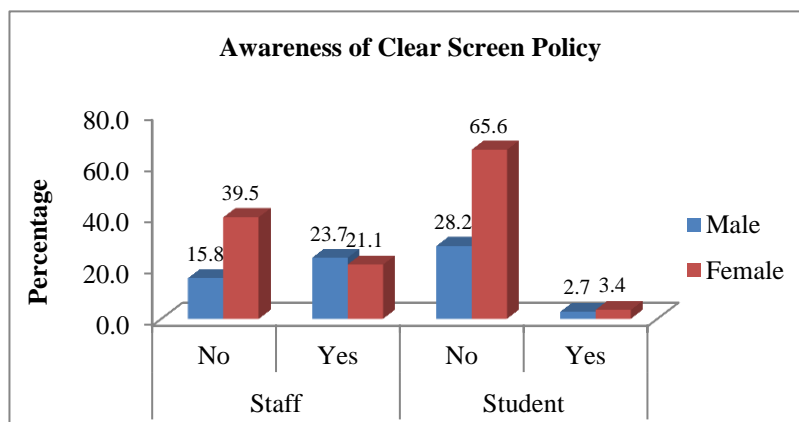
Figure 4: Gender Composition with reference to the category represents



Source: Sample Survey, 2016

When considering the awareness of respondents towards Clear Screen Policy can be summarized as follows.

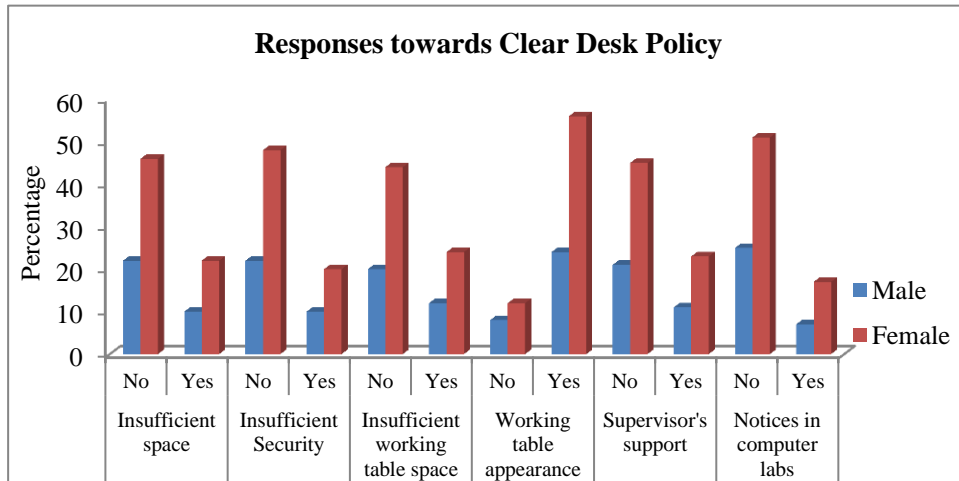
Figure 5: Awareness of Clear Screen Policy



Source: Sample Survey, 2016

The results show that there majority of both staff and student's categories are unaware of Clear Screen Policy and its importance in securing data and managing data. Computer users are unaware about Clear Screen Policy regardless of their Gender difference. Thereby the instructions towards Clear Screen Policy are important to make sure an effective utilization of computer resources with a computer lab. On the same time the attitudes towards Clear Desk Policy also measured and following results were gained. The chi-square test for the relationship between gender differences and awareness of Clear Screen Policy has rejected the null hypothesis at 5 percent level of significance as it is recorded as 0.02 sig value which is less than 0.05. Also the chi-square test ensures the relationship between category of the computer user and awareness of Clear Screen Policy as its sig value recorded as 0.000 which is less than 0.01 percent level of significance. Thereby the study concludes that there is a difference between staff and students in awareness of Clear Screen Policy that requires different policy frameworks in order to develop an effective use of computer lab.

Figure 6: Responses towards Clear Desk Policy



Source: Sample Survey, 2016

Table 01: Results of ANOVA

		ANOVA					
		Sum of Squares	df	Mean Square	F	Sig.	
CL Space is not Enough	Between Groups	.168	1	.168	.768	.382	
	Within Groups	65.112	298	.218			
	Total	65.280	299				
Working Table Appearance is not Good it's full with wire and other things.	Between Groups	1.930	1	1.930	9.420	.002	
	Within Groups	61.070	298	.205			
	Total	63.000	299				
Working Table Space is not Enough	Between Groups	.008	1	.008	.033	.856	
	Within Groups	69.112	298	.232			
	Total	69.120	299				
CL Security is not Enough	Between Groups	.433	1	.433	2.714	.101	
	Within Groups	47.567	298	.160			
	Total	48.000	299				
CL Supervisors are not helpful	Between Groups	.026	1	.026	.115	.735	
	Within Groups	67.294	298	.226			
	Total	67.320	299				
There are lot of Noices in the CL	Between Groups	.003	1	.003	.019	.891	
	Within Groups	54.717	298	.184			
	Total	54.720	299				

Source: Sample Survey, 2016

One way ANOVA test was used to address the most effective problems of the computer lab users when they are associates with their works at the computer lab. The analysis implies that some problems are significant but “inappropriate appearance of working table” is the strongly significant problem. The ANOVA table shows that overall significance of the problems which effecting computer lab usage. It is statistically significant “P” value means “Sig” named in table is less than 0.05 in significant test. The significance level is 0.002 in the data set; the most affective problem is “working table appearance is not good it’s full with wire and other things”.

With reference to the analysis, the problem of lack of having a calm environment in computer lab is also taken into consideration as considered as on disorder working table problem in computer labs. Therefore the requirement of SWOT Analysis to identify the possibility for create a policy framework has been emerged.

Recommendation & Conclusion

According to Results there are lots of problems that mainly affected the computer users in the computer lab. The research has concluded with the problems of inappropriate appearance of working tables, and unawareness of importance of logging out from the computer when leaving. The problem of working table appearance is the highly significant problem. Computer Lab fulfills many educational functions and psychological needs of students. Thereby the effectiveness of the utilization of computer lab resources should be taken into consideration when stipulating strategies for the computer labs that existing or when building up newly. As the results of the study implies two different levels of awareness among staff and students, it is recommended to have two different policies to ensure the awareness about Clear Screen Policy. The Clear Screen Policy is a simple and practical policy to be implemented. Majority of computer users are not involve in accustomed to logging off and/ or shutting down their computer when leaving their desks for short breaks or long breaks. This policy is difficult to commence thereby the authorized personnel should enforce the importance of having a clear screen policy and then computer users will eventually make it into a habit. There can be recommended some important guidelines in executing Clear Screen Policy in university computer labs as written commands to follow the policy, encourage keyboard shortcuts, and brief instructions on importance of following the policy in order to ensure their information and works from prying eyes and unauthorized users.

On the other hand all respondents were similarly affected by the inappropriate appearance of working table where computer table and other devices are not in appropriate places on the table and make a system for use wires and how they connect under the table without disturbance. Thereby the recommendations for the policy makers are to make sure the elimination of above identified problems with Clear Desk Policy and some tips are to written instructions, and random checks for smooth implementation of the policy. However further researchers are encourages to develop a policy framework for all the problems associated with the computer lab users regarding Clear Screen Policy and Clear Desk Policy. University authorized persons can develop and execute this policy. The university authority should take a step to increase the Clear Screen Policy and Clear Desk Policy when in building a new computer lab and develop existing labs.

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A Study on Industrial development in the Northern and the Eastern Provinces in Post-war Period.

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Abstract

The government established several development projects in the Northern and Eastern provinces in the post-war era in order to recover the war torn economy. These development projects aimed to create more job opportunities and to promote the industrialization of the area. Further, the development projects were expected to increase production and people's income in these regions, and so help to reduce poverty and income disparities.

Keywords: *development, former war zones, industrial development, post war period, skilled labour, unemployment*

Introduction

Industrialization is a leading strategy towards economic development in developing countries since world war II. The 26 years of civil war ended in 2009 and post-war reconstruction work was initiated by the government in the hope of achieving a long lasting peace through economic development. The government followed a comprehensive policy framework to initiate the process of post-war reconstruction under the Presidential Task Force and its two multi-pronged regional development strategies, namely Negenahira Navodaya (Re-Awakening of East) and Uthuru Wasanthaya (Northern Spring). Although the majority of the labour force in former war zones belong to agriculture sector, the previous government had taken a policy decision to develop the industrial sector in order to rapid development as well as overcome to unemployment issue in the area.

The present developed countries in the Europe are the pioneers of industrialization in the world (Szirmai,2009). Later, in the nineteen century, the United States overtook the European countries as a modern developed economy. In developing areas in the world, industrialization was experienced since end of the 19 th century from the regions of Latin America and Asia and East Asia. Since the world war II

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industrial sector has become a leading sector in many developing areas in the world (Maddison, 2001). Industrialization contributes as a driving force for foreign direct investment, technology, and growth of labour productivity which correlates with rapid economic development in globalization (Bairoch & Kozul Wright, 1996).

Objective of the study

The aim of this study was to explore the government work on industrial development and its effect to the economy of the war affected zones from 2009 to 2013. In other words this study will be looked into industrial development and its relations to the former war zones economy for the first five years of post war period.

Methodology

This study was mainly conducted on primary and secondary data. Primary data was collected from the in depth interviews of affected people from the former war zones in Jaffna, Vauniya, Trincomalee and Batticaloa districts in Sri Lanka and other related government officers who involve in post war development activities in the Northern and the Eastern provinces. The secondary data was collected from the government reports, related articles and documents.

Restoration of former Industries in the North and the East

Generally, the Jaffna peninsula and the Eastern cities had several macro level industries which were abandoned during the war (Table 01 shows some of those industries and their current status). In order to achieve rapid economic development in the former war affected areas, the government had made a policy decision to restore those industries to their former status. According to reports, some of them have already restarted soon after the war ended (see Table 01) but the rest have still not resumed production. Further, the government has planned to establish a new industrial estate in Atchuveli in Jaffna that will consist of fifty factories.² The government will provide all infrastructural facilities to the investors and financial assistance will be available from the banks.³

² “Over 50 companies to invest in Atchuveli industrial estate”, *Daily News*, 10 December 2013. <<http://www.dailynews.lk/business/over-50-companies-invest-achchuveli-industrial-estate#sthash.8oH3Afl.dpuf>> [Accessed 15 January 2014]

³ *Ibid.*

Table 1 : The macro industries situated in the North and the East (Before the war and now)

District	Industry	Production	Location	Current Status
1.Ampara	Sugar factory	Sugar	Hingurana	Operating
2.Batticaloa	Paper Mill	Paper	Valaichchenai	Operating
3.Jaffna	Cement factory	Cement	KKS	Not Operating
4.Jaffna	Industrial zone	Small and medium level industries	Atchuvvely	Not operating
5. Jaffna	Palmyrah distilleries	Alcohol	Thikkam	Operating
6.Jaffna	Boatyard	Boats	Karainagar	Not operating
7. Jaffna	Fishing net	Fishing net	Gurunagar	Operating
8. Kilinochchi	Chemical industry	Chemicals	Paranthan	Not operating
9.Kilinochchi	Saltern	Salt	Elephant Pass	Not operating
10. Mullaithivu	Tiles industry	Tiles	Oddusuddan	Not operating
11. Mannar	Canned fish Industry	Canned fish	Pesalai	Not operating
12.Mannar	Ice factory	Ice	Pesalai	Operating
13.Trincomalee	Sugar factory	Sugar	Kantalai	Not operating
14.Trincomalee	Mineral Factory	Ilmenite	Pulmoddai	Operating

(From Kelegama, Saman. (Quoted Provincial Planning Secretary's Office, North-East Provincial Council) "Economic Development in the North and the East in Sri Lanka. " *Economic Review* 35, no. 11-12 (2010): 14-20.)

The Board of Investment of Sri Lanka (BOI) was entrusted with the establishment of the new industries in the area. The Chairman of the BOI points out,

“Work has begun in locating industries in areas such as Trincomalee. Government initiatives are also underway reviving the Atchuvvely industrial zone in the Jaffna peninsula. I must add that four apparel factories are to be established and they will employ 4,000 workers. This will uplift the lives of many people in the area.”⁴

The Secretary to the PTF pointed out that there are 87 BOI approved projects in the Jaffna area, mostly garments and the assembling factories. To develop the vocational talent of the youth in the North, a vocational training school will be established with the assistance of the Government of Germany.⁵

⁴ “BOI invites expats to invest in North – East”, *Sunday Observer*, 13 July 2010

⁵ Interview with the Secretary to the PTF.

In addition to developing economic hubs, the government policy was extended to renovating the religious places as a measure to promote social development. The government believes that these works would help to achieve social reconciliation in the post-war society. The following section briefly presents the government works on renovation of the religious places.

Implementing New Economic Development Projects

The government established several development projects in the Northern and Eastern provinces in the post-war era in order to recover the war torn economy. As mentioned earlier these development projects aimed to create more job opportunities and to promote the industrialization of the area. Further, the development projects were expected to increase production and people's income in these regions, and so help to reduce poverty and income disparities.

It was observed that several development projects were still under construction because most of them are mega projects with lead times of 2-5 years. However, on the whole, development indicators for the country show a gradual growth of the economy of the Northern and the Eastern provinces since the war ended. For instance, the Eastern province contributed around 14% to the national GDP in the early 1980s before the war began; later it had decreased to 8% because of the conflict situation in the province.⁶ Likewise, the lowest national GDP reached in the Northern Province was around 2.5%, which increased to 2.9% during the ceasefire agreement period in 2002-2004.⁷ Ironically, the economy of the Northern Province was kept separate from the national economy during that period for the benefit of the LTTE, who did this to enhance their position and as a war strategy.⁸ The contribution to the national economy from both provinces has been increasing since 2009 (see table 2). The Secretary to the PTF pointed out that the former war affected areas are developing rapidly after the government economic policy was implemented.

“In the post-war period, the government aimed to develop the Northern as well as the Eastern Province by initiating various development projects and investments. You can see a number of constructions that have been implemented in both regions

⁶ “Bigger Contribution from North-East for National Development”, *The Sunday Observer*, 28 November, 2010.

⁷ *Ibid.*

⁸ During that period the Northern Province was under the control of the LTTE. Further, the Asian tsunami also contributed to the decline of the economy of the North and the East in 2004.

that have contributed to create an economic resurgence in the past four years. These projects will contribute toward decrease in unemployment, and reduce the incidence of poverty in future. We hope a number of BOI projects will also be initiated in the near future, creating more employment opportunities.”⁹

The senior deputy director of the Jaffna regional office of the Board of Investment (BOI) pointed out that they have taken steps to establish garment factories to solve the high rate of unemployment.¹⁰ According to that, the BOI has approved the establishment of six garment factories in the Northern Province to provide 6000 job opportunities to the people in the area.¹¹ Further, the BOI has identified ten areas for development/investment and they have started 572 small and medium projects in the Northern Province.¹²

Tourism in the Eastern Province makes a significant contribution to the economy of the region.¹³ Mr. Ravi pointed out that new hotel projects funded by the government in the coastal areas of Passikudah, Nilaveli and Arugam Bay have contributed to create new jobs and significant revenue to the province.¹⁴ According to a local tour guide, who was very pleased with the new situation prevailing in the Eastern Province, there has been an appreciable rise in the number of foreign and local tourists visiting these areas in the post-war period.¹⁵ A Manager of a tourist hotel stressed that it is hard to reserve a room in Passikudah and Kalkudah areas in the weekends, since all the hotels are booked heavily.¹⁶

Even though new avenues of income generation have been opened in the North and the East, it can be seen that the majority of the people who resettled in the Northern

⁹Interviewed with the Secretary to the PTF.

¹⁰Zahrah Imtiaz, “Unemployment”, *The Ceylon Today*, 12 October, 2014

¹¹*Ibid.*, MAS has started 2 garment factories providing 1750 jobs in Kilinochchi, Omega line factory providing 1200 jobs in Vavuniya, Hidrami group providing 1000 jobs in Vavuniya and 1000 jobs in Mullaitthivu, Timex and Ferguson started two factories providing 1000 job opportunities. Further, BOI approved another five mega investment in Jaffna.

¹²“BOI Regional Office in Jaffna” <<http://www.slideshare.net/havmbi/boi-regional-office-jaffna-investment-northern-of-srilanka>> [Accessed 21 October 2014]

¹³The Tourism has become a major sector in the Country’s economy in the post war era. Ministry of Planning noted; “Tourism is emerging as an important foreign exchange earner and employment generating industry in Sri Lanka with strong potential to grow with backward linkages to all sectors in the economy. Reflecting a new dimension in the tourism industry with the dawn of the peace, Sri Lanka has shown a significant turnaround in terms of tourist arrivals as well as earnings from the tourism” (Annual Report 2012, Ministry of Finance and Planning, Sri Lanka).

¹⁴Field interviewed with Mr. M. Ravi on 17 January 2014 in Batticaloa

¹⁵Field interview with Tourist Guide (FI-10) on 29 December, 2014 in Jaffna.

¹⁶Field interview with hotel manager (FI-46) on 25 August, 2014 in Kalkudah.

provinces are still facing several difficulties since they are unable to obtain employment in the newly developed industrial sector as a result of inadequate skills. A resettled farmer in Olumadu village pointed out, “My 20 year old daughter supports my farming, since she doesn’t have any vocational training or other qualifications to work in a place outside or even to find a job in a factory.”¹⁷

This situation has arisen largely as a result of multiple displacements. Also, the victims of the protracted war were not able to follow a proper education or skill acquisition nor vocational training.¹⁸ On the other hand, the senior deputy director of the BOI in Jaffna pointed out that even though they established the garment factories people do not work in those zones because educated young people and others who have got some vocational training are struggling to leave Jaffna.¹⁹ Therefore, it will be hard to find and hire skilled labour in the Northern Province due to this reason. However, Mr. Harumi Ao, former Chief Representative of the JICA office in Sri Lanka, pointed out that skills relevant to the agricultural sector can be applied to certain other sectors too.²⁰

The economic boom in the area has not benefitted all the resettled families, since they do not have the required vocational skills to work in the new industries established in the Northern zones. On the other hand, the government has not revealed its policy on abandoned industries that were in operation for a long time before the war. They had benefitted a number of skilled workers in the conflict affected areas at an earlier period. As shown in Table 4.8 in the previous chapter, eight macro level factories were not being operated in the Northern and the Eastern provinces; employment in these factories had supported a number of families in the past. The Chairman of the Chamber of Commerce in Jaffna pointed out that there was no need to build new factories in Jaffna if the government could restore the old factories which had benefitted a number of families.²¹ He posed the following

¹⁷Field interview (FI 38) in Olumadu, Vavuniya North.

¹⁸The government has taken action to establish a Technical institution in Kilinochchi in the Northern Province in order to develop the vocational training of Northern youths. See “German Technical Institution in Kilinochchi”, Sunday Observer, 08 June 2014; “Vocational Training in the North of Sri Lanka” <<http://www.giz.de>> [Accessed 06 August 2014]

¹⁹ZahrahImtiaz (2014) *op cit*. Many youths who are educated or vocationally trained in the Northern Province are aiming to leave the country since most of their relatives, friends and neighbors are living in foreign countries. The Tamil Diaspora also supports their community in this regard.

²⁰ See Harumi Ao, “Considering the Challenges for Sri Lanka Five years after the End of the Conflict”, <<http://www.jica.go.jp>> [Accessed 17 June 2014]

²¹ZahrahImtiaz (2014) *op cit*.

questioned: “Why cannot the government simply restart the old factories? We had salterns, chemical, paper, tile and cement factories. Why are they still shut down?”²²

This is an important issue of concern to the hundreds of people who are waiting to restart their jobs in the former factories, which had contributed to industrial production in the provinces. Although there are no reliable unemployment figures available for the Northern and the Eastern Provinces for the recent period,²³ the GDPs of both provinces have distinctly increased since the war ended (see Table 02). Likewise, the provincial GDPs relating to production in the agriculture, industry and service sectors have been increasing dramatically since 2009 (See Table 03).

Table 2: Contribution to the GDP (%) from the Northern and the Eastern Provinces for the period 2009-2013.

Year	Northern Province %	Eastern Province %	Total %
2009	3.2	5.8	9.0
2010	3.4	6.0	9.4
2011	3.7	5.8	9.5
2012	3.7	6.3	10.0
2013	3.6	6.3	9.9

Source: ‘Provincial gross domestic product by industrial origin at current prices 2009/2013’, *Annual Report-2014 Central Bank of Sri Lanka*(Colombo:CBSL,2014) statistical appendix, Table

²²*Ibid.*

²³*The official National accounts are not available for the war affected period of the Northern and the Eastern Provinces. However, unemployment rate of Sri Lanka as a percentage of the labor force has decreased from 5.8 in 2009 to 4.2 in 2011 (Central Bank of Sri Lanka, 2012).*

Table 3: Provincial GDP by Industrial Origin 2009-2013 (Rs. Mn)

Province - Year	Agriculture	Industry	Service
Northern			
2009	28,852	14,534	112,711
2010	30,970	28,836	129,933
2011	58,423	42,275	136,814
2012	59,911	49,667	168,450
2013	66,630	68,176	176,736
Eastern			
2009	63,879	93,667	121,817
2010	73,959	98,357	161,652
2011	61,056	109,115	209,113
2012	85,452	150,339	242,610
2013	92,840	181,383	268,676

Source: *Annual Report-2014 Central Bank of Sri Lanka*(Colombo:CBSL,2014) statistical appendix, Table 2

The government initiatives on reconstruction and economic development have much potential for the rapid growth of the economy in both provinces as can be seen by the increase in GDP since 2009. These works on post-war economic development were highly commended by several international dignitaries who visited Sri Lanka in the post-war era.²⁴ Human Rights Commissioner Mrs. Navaneedam Pillay, who visited Sri Lanka in September 2013 stated,

“The reconstruction achievements, made with the help of donor countries, UN agencies and NGOs are indeed impressive. In both the Eastern and Northern provinces, large numbers of new roads, bridges, houses, medical facilities and schools have been built or rebuilt; electricity and water supplies have been greatly improved; and most of the land mines have been removed.”²⁵

Seeking to restore peace in the country, the proposed framework has achieved much with the reconstruction and development of the socio-economic sectors of the war affected areas. The government gave significant consideration to implement the physical reconstruction work during the past five years of the post-war period. Those physical reconstructions represented one aspect of the post-conflict peacebuilding process, which aimed to restore the material assets of the affected areas as that would help to rebuild the shattered economy.²⁶ Although, there are

²⁴ “‘FairDinkum’ Say the Aussies”, *Daily News*, 28 January 2014; “World Bank VP Cheers: Highly Impressed”, *Daily News*, 28 January 2014.

²⁵ “Statement by UN Human Rights Commissioner, Navi Pillay”, *The Sunday Times*, 01 September 2013.

²⁶ See Jelena Smoljan, “The Relationship between Peacebuilding and Development.” *Conflict, Security and Development* 03, no. 2 (2003): 233-50.

some negative issues related to peace dividends, the study observed that the war affected provinces have achieved significant progress in the physical aspects of post-war reconstruction. The theory of post-conflict peacebuilding has recommended reconstruction and development as an important task to bring back the war affected community to their normal life in the social and economic fields. This does not mean physical reconstruction of the war devastated areas only, but also addressing the root causes of the conflict.

Conclusion

Although there are no reliable unemployment figures available for the Northern and the Eastern Provinces for the recent period,²⁷ the GDPs of both provinces have distinctly increased since the war ended (see Table 02). Likewise, the provincial GDPs relating to production in the industry and service sectors have been increasing dramatically rather than traditional agricultural sector since 2009 and industrial sector has a significant development. (See Table 03). The government policy should be aimed for increasing of industrial development since it will be facilitated for rapid economic development in war affected areas. The reported economic boom in the area has not benefitted all the resettled families, since they do not have the required vocational skills to work in the new industries established in the Northern zones. On the other hand, the government has not revealed its policy on abandoned industries that were in operation for a long time before the war. They had benefitted a number of skilled workers in the conflict affected areas at an earlier period. This situation has arisen largely as a result of multiple displacements. Also, the victims of the protracted war were not able to follow a proper education or skill acquisition nor vocational training.²⁸

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²⁷The official National accounts are not available for the war affected period of the Northern and the Eastern Provinces. However, unemployment rate of Sri Lanka as a percentage of the labor force has decreased from 5.8 in 2009 to 4.2 in 2011 (Central Bank of Sri Lanka, 2012).

²⁸The government has taken action to establish a Technical institution in Kilinochchi in the Northern Province in order to develop the vocational training of Northern youths. See "German Technical Institution in Kilinochchi", *Sunday Observer*, 08 June 2014; "Vocational Training in the North of Sri Lanka" <<http://www.giz.de>> [Accessed 06 August 2014]

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Changes in Determinants of Poverty in Sri Lanka within last two decades: A household level Analysis

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Abstract

The successive governments in Sri Lanka have given top priority to welfare programs while improving other aspects of the economy over time since independence. Thus, poverty has declined significantly, in particular within last two decades. The Household Income and Expenditure Survey (HIES) 2012/13 indicates that the poverty headcount ratio has dropped tremendously to a single digit level; 6.7 per cent. However, regional disparities are high. As such people just above the poverty line are highly likely to drop back due to various policy shocks. Analysis of the determinants of household poverty is imperative in order to develop strategies for efficient and effective intervention schemes aimed at poverty reduction. Thus, analytical work on determinants of poverty and their changes overtime is a timely need in the context of Sri Lanka as most of the studies are descriptive and focused on measurement issues. Therefore, this paper attempts to identify and analyse the main factors which have determined household poverty in Sri Lanka within the last two decades using four comparable HIES data. Probit regression models have been employed to examine the poverty determinants and their changes over the past two decades. The results indicate that education and remittance were the main factors that reduced poverty in Sri Lanka over the last two decades. Significant variations were identified regarding the direction and magnitude of the poverty determinants in each economic sector.

Key Words: *Poverty determinants, poverty changes, probit regression, last two decades, Sri Lanka*

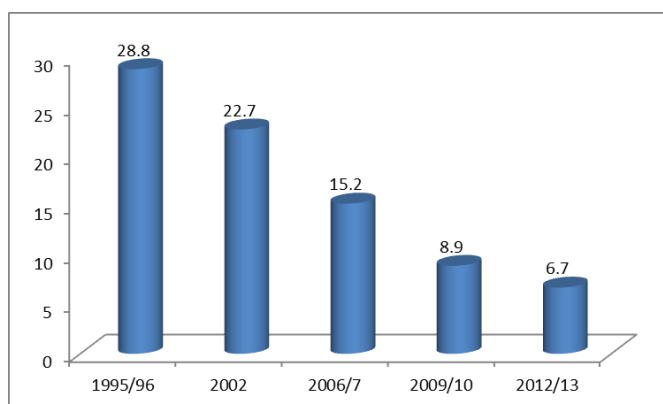
Introduction

According to the Food and Agriculture Organization (FAO), most of the poor live in rural areas, often in isolated conditions, where they face problems including poor natural resources, underdeveloped infrastructural facilities, lack of access to markets, fluctuating commodity prices, lack of employment opportunities, and vulnerability to natural disasters (FAO, 2010). This plethora of problems means that the definition of poverty is broader and more complex than simply lack of money,

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and the multidimensional nature of poverty is increasingly recognized. Eradicating poverty is a difficult and complex challenge for any developing country like Sri Lanka. However, as the successive governments in Sri Lanka have given top priority to welfare programs while improving other aspects of the economy over time, poverty has declined significantly within last two decades. The Household Income and Expenditure Survey (2012/13) indicates that the poverty headcount ratio has dropped tremendously to a single digit level; 6.7 per cent (Figure 01). However, regional disparities are high. As such people just above the poverty line are highly likely to drop back due to various policy shocks. Therefore poverty studies in Sri Lanka are still needed a considerable attention for the policy making. 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.

Figure 1: Poverty trends in Sri Lanka



Source: Dept. of Census and statistics

Differences in the concepts and definitions used and differences in data sources and measurement assumptions caused for the changes of the poverty profile in each country, whereas, poverty data itself may not represent the real picture of poverty in a country. 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. Thus, analytical work on determinants of poverty and their changes overtime is a timely need in the context of Sri Lanka as most of the studies are descriptive and focused on measurement issues.

Literature Review

Considerable analytical efforts have been made within last two decades in poverty related literature directed toward driving good practices in measuring poverty in all its dimensions and generating the data required. Those studies primarily focus on 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 are 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. Although there is a rich literature on poverty focusing on the measurement of poverty and related issues, there are very limited studies on poverty determinants in Sri Lanka (De Silva, 2008; Gunawardena, 2004). However, till now there has been no appropriate attempt to identify the changes of poverty determinants over time and over the economic sectors in Sri Lanka and the present study attempts to fill this gap.

Objectives of the Study

This paper attempts to identify and analyse the main factors which have determined household poverty in Sri Lanka within the last two decades, using four comparable household surveys conducted in 1990/91, 1995/96, 2006/07 and 2009/10.

Methodology

Since the aim of this study was to identify the factors which determine the probability of a household being poor in Sri Lanka, the response variable was considered as a binary variable. A probability model was one of the appropriate regression techniques for this analysis due to the discrete dichotomous nature of the dependent variable which examines the poverty status of the household (Wodon, 1997). Although some arguments indicate that taking a dependent variable as a binary variable will lose some information and that the resulting logit or probit regression is relatively sensitive to specification errors, Spector and Mazzeo (1980) pointed out that probit analysis proves a better predictor than OLS when the dependent variable is dichotomous. They further mentioned that the non-linearity of the probit model also has intuitive appeal because it allows for some interaction among independent variables (World Bank, 2005). A probit regression model is

employed for this analysis as logit and probit models produce quite similar results²(Amemiya, 1981). The only difference between the two methods is the probability distribution functions that they use: while logit includes the logistic probability distribution function, probit includes the cumulative normal probability distribution function. Thus, either logit or probit regression analysis can be used for this type of analysis where the dependent variable is dichotomous. This study employs data from four comparable Household Income and Expenditure Surveys (HIES) conducted by the Department of Census and Statistics Sri Lanka. Although HIES data provides continuous data for household expenditure, poverty needed to be viewed as a discrete choice because the main purpose of this analysis was to examine poverty determinants in Sri Lanka.

In the probit regression, the household is considered as poor if the per capita expenditure per head per month is below the estimated official/national poverty line³. If the household is poor, it takes the value 1, otherwise zero. Thus, the predicted values of the dependent variable lie between zero and one. Therefore, the predicted values are interpreted as probabilities. Selected variables (Annex 01) were fitted into probit regression models to examine the poverty determinants of the past two decades. The advantage of this approach is that due to the discrete dichotomous nature of the dependant variable, the coefficients examine the probability of poverty status in a household as the right-hand side variables change.

The functional form of the probit model is as follows:

$$Y_i^* = X_i\beta + \varepsilon_i \dots\dots\dots(1)$$

where Y_i^* is the latent variable which indicates the propensity to have $Y=1$ (i.e. for the household to be below the poverty line), X_i is a matrix of explanatory variables ($K \times 1$ regressor vector; K is the number of parameters), β is a vector of parameters to be estimated and ε_i is the error term (residuals) which is assumed to be normally distributed. A binary variable can be defined as:

$s_i = 1$ if $Y_i < z$,

$s_i = 0$ otherwise

z is the national poverty line. The binary model then becomes:

² Ameniya (1981, p1487) suggested that ‘in the univariate dichotomous model, it does not matter much whether one uses a probit or logit model, except in cases where data are heavily concentrated in the tails...’

³ The official poverty line for Sri Lanka (national and sub -national levels) was first constructed in 2002 by the Department of Census and Statistics and is updated every year (Nanayakkara, 2006).

$$\text{Prob}(s_i=1) = F(z - \beta X_i) \dots \dots \dots (2)$$

F is the cumulative normal probability function.

Most of the categorical independent variables such as employment of the household head, ethnicity of the head of the household and location of the household were fitted to the regression model by converting to dummy variables.

Results and Discussion

Table 01 demonstrates the results of the probit regression (marginal effect) for poverty determinants, and their changes in Sri Lanka from 1990 to 2010. Almost all the independent variables are statistically significant in the models and are economically meaningful. The results indicate that additional years of education of the head of the household and of the other members of the household had a greater impact on poverty reduction in the early survey periods than in the 2010 survey. Theoretically, the educational attainment of the head of the household and of other household members is strongly associated with poverty. The results of the probit regression analysis established an inverse relationship which indicated that when the education level (number of years of schooling) of the head of the household increases, the likelihood of the household being poor is decreased. Similarly, increases in the education level of the other members of the household reduce poverty in that particular household, *ceteris paribus*. The results indicate that additional years of education of the head of the household and of the other members of the household had a greater impact on poverty reduction in the early survey periods than in the 2010 survey. Previous research in Sri Lanka has also shown that a household is significantly less likely to be poor when the head of the household has more than 12 years of school education (World Bank, 2007)⁴. Himaz and Aturupane (2011) noted a distinct jump in household poverty reduction for an extra year of education at the levels where national exams are completed. Research in other countries also shows that education of the head of the household is negatively correlated with poverty (Datt & Jolliffe D., 1999; Mok et al., 2007). Therefore, it can be concluded that education variables are significant in the model and that education helps to reduce the likelihood of being poor, indicating that education is a strong poverty determinant in Sri Lanka.

The local remittance variable was insignificant only in 1990/91 and the spouse employed variable was insignificant only in 2009/10. However, structural beta changes can be seen clearly over the years for both positive and negative correlates. Also, changes in the direction of impact of the determinants (sign of the variables)

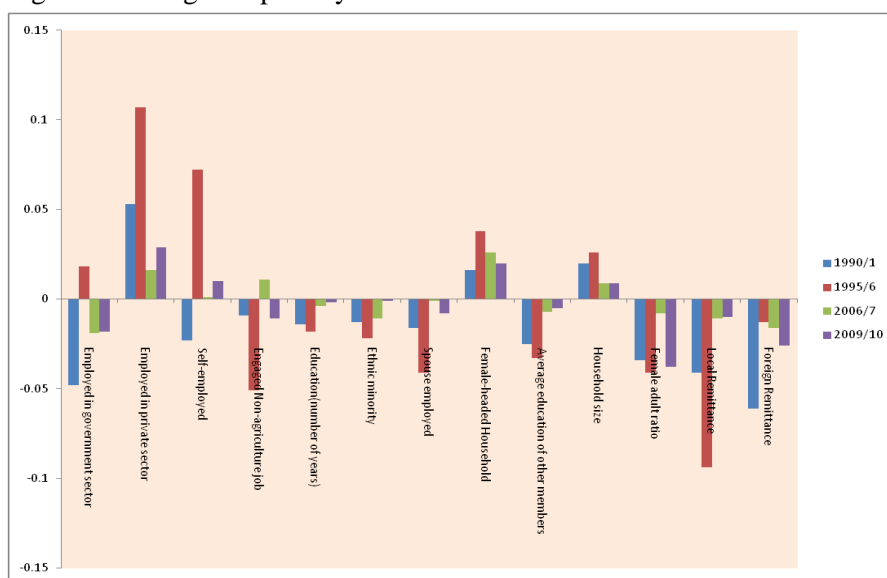
⁴ This study has used 2002 HIES data for the calculations

can be examined over the years. Among all these poverty determinants, foreign remittance has been the most influential factor for reducing poverty in Sri Lanka within the last two decades, although the magnitude of this factor has declined over the years.

In contrast, the dependency ratio, the indicator for female-headed households, the household head being employed in the private sector or self-employed, and household size are the factors which are positively correlated with household poverty in Sri Lanka over the last two decades. Considering geographical variables, both rural and estate sector households are more likely to be poor in Sri Lanka relative to the urban sector households. This is because regional disparities in terms of economic as well as social factors are high in Sri Lanka and thus, the location of the household partially determines poverty. Estimates from the model demonstrate that female-headed households are more likely to be poor in Sri Lanka, *ceteris paribus*, though this impact on poverty is diminishing over time.

Interestingly, results indicate that non-Sinhalese households were less likely to be poor compared to the Sinhalese majority in Sri Lanka until 2006/7. However, the situation has changed over time and non-Sinhalese were more likely to be poor by 2009/10 (Figure 02)

Figure 2: Changes in poverty determinants over time in Sri Lanka: 1990-2010



Source: Compiled by Author using probit marginal values

Table 1: The determinants of household poverty in Sri Lanka: 1990-2010 probit regression estimates (marginal effects)

Poverty determinants	1990/91	1995/6	2006/7	2009/10
Household Head:				
Age	-0.001 (14.00)**	-0.003 (21.15)**	-0.000 (2.50)*	-0.000 (1.99)*
Employed in government sector	-0.069 (12.99)**	-0.053 (5.82)**	-0.039 (7.91)**	-0.035 (10.05)**
Employed in private sector	0.085 (17.92)**	0.165 (29.51)**	0.041 (13.85)**	0.037 (13.93)**
Self-employed	-0.023 (6.11)**	0.051 (9.96)**	0.007 (2.31)*	0.007 (2.74)**
Engaged in non-agricultural job	-0.017 (4.85)**	-0.085 (18.57)**	-0.014 (5.90)**	-0.025 (12.42)**
Education (number of years)	-0.015 (35.89)**	-0.029 (50.42)**	-0.011 (36.78)**	-0.002 (8.16)**
Ethnicity (Non-Sinhalese=1)	-0.020 (4.92)**	-0.063 (10.62)**	-0.043 (17.09)**	0.006 (3.02)**
Household Demography :				
Spouse employed	-0.012 (3.80)**	-0.012 (2.80)**	0.008 (3.31)**	-0.002 (0.84)
Female-headed household	0.033 (4.23)**	0.033 (5.91)**	0.021 (7.10)**	0.018 (7.80)**
Average education of other members (No of years)	-0.024 (37.29)**	-0.041 (47.23)**	-0.017 (36.11)**	-0.006 (14.44)**
Household size	0.038 (60.10)**	0.066 (65.73)**	0.026 (49.13)**	0.019 (45.47)**
Female adult ratio	-0.039 (2.78)**	-0.095 (6.46)**	-0.015 (1.62)	-0.048 (6.85)**
Dependency ratio	0.126 (17.56)**	0.191 (17.20)**	0.027 (4.95)**	0.037 (7.69)**
Remittances:				
Local Remittance	-0.008 (0.96)	-0.192 (21.70)**	-0.032 (7.88)**	-0.013 (3.88)**
Foreign Remittance Region:	-0.087 (13.44)**	-0.085 (8.54)**	-0.050 (12.32)**	-0.044 (16.15)**
Rural	0.067 (20.75)**	0.235 (45.06)**	0.076 (28.98)**	-0.015 (4.89)**
Estate	-0.069 (9.98)**	0.155 (16.74)**	0.154 (26.25)**	
Urban				-0.051 (18.54)**
Observations	89967	88935	75822	79585

Source: Author calculations using HIES data, Sri Lanka.

Note: Dependent variable: expenditure per capita per month is used to form the dummy variable (poor =1). Robust z statistics in parentheses * significant at 5%; ** significant at 1%

One of the possible reasons for this change is the inclusion of the North and East provinces, where the majority of the non-Sinhalese population is located, in the HIES for the first time in 2009/10⁵. The sample selection procedure and survey periods have been comparable in each Household Income and Expenditure Survey from 1990 to 2010. The limitation of the HIES data in 1990/91, 1995/6, 2006/7 was that they did not achieve national coverage. HIES in 1990/91 excluded 8 districts including Jaffna, Vauniya, Batticaloa, Ampara, Trincomalee, Mannar, Killinochchi and Mullathivu in the North and East due to the conditions surrounding the ethnic conflict. Although the 2009/10 HIES survey covered the entire country in the collection process, it excluded three districts; Mannar, Killinochchi and Mullathivu in Northern Province due to massive mine clearance and resettlement activities. Therefore, for comparability of the data we removed the five districts: Jaffna, Vauniya, Batticaloa, Ampara, Trincomalee, which were excluded in the earlier surveys, to explore the robustness of the 2010 results using the same spatial coverage and for overall comparability. However, the significant changes of the structural beta of the covariates or the changes of the magnitudes were not examined in the results.

Conclusion and recommendations

In conclusion, the covariates of educational attainment of the household head and other members of the household, receipt of foreign and local remittances, higher female adult ratio, and the household head being employed in a government job are the significant positive factors that have reduced poverty in Sri Lanka within the last two decades. Although the magnitude of the covariates has declined over the years, the magnitudes of the covariates of female adult ratio and receipt of local remittances increased over the period 1990–2010. The factors of larger household size, female-headed households and the household head being employed in private jobs or self-employed contribute to increased poverty in Sri Lanka.

Econometric analysis of household survey data indicated that education and remittances were the main factors that reduced poverty in Sri Lanka over the last two decades. Significant variations were identified regarding the direction and magnitude of the poverty determinants in each economic sector.

⁵ Due to the civil conflict went on in Sri Lanka for years HIES were conducted excluding North and East provinces.

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Annex 1 : List of Variables

Variable	Discription
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-agriculture 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 schooling
Household size	Number of household members living in the household
Female adult ratio	Number of female above the age 15 over household size
Dependency ratio	number of children below the age of 15 and elderly above 60
Remittance:	
Local Remittance	1 if household receive local remittances
Foreign Remittance	1 if household receive foreign remittance
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

An Econometric Application for Economical Thinking of Sport :The probability estimation)Forecasting of getting out in ODI Cricket (of getting out in ODI Cricket

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Abstract

The responsibility of a batsmen in the pitch is getting more runs at given number of balls (300) in an inning. Higher strike rate makes better score for batting team, so anticipation of each player on the pitch is getting high runs during his batting time. The anticipation of bowlers on the fielding side are to make restrictions to batmen against higher runs. There are two different ways to make constraints on getting runs; one of them is setting up a good arrangement in fielding side which makes difficulties to have runs. Second is getting them out by bowlers. The second approach makes better advantage than first because getting a wicket (getting out) reduces the number of playing chances for the batting team with reducing a ball to be faced. If the bowling side succeeds to have ten wickets (all out) in the batting team, the inning would be mature. The inning will be finished though batting team has 300 balls to be faced, if they failed to secure their ten wickets before 300 balls are finished. Getting a wicket in an inning makes it worse for the batting team and makes it better for the bowling side. This reason formulates the significance of getting out in a cricket game. Each fair ball has a probability to have runs (0.1.2.3.4 or 6) or probability of getting out. This study is focused on estimating the probability of getting out in terms of managerial aspect of the team captain. Therefore, this paper presents an investigation of probability distribution of getting out in one- day international cricket (ODI). The research problem which drives the entire work in this paper is that “how probability of getting out is distributed in certain condition of a match”. Probability of getting out is determined by many independent variables. In this study, it is limited to two variables called number of wickets in hand and balls remaining which prominently used in Duckworth-Lewis method .The findings of this research can be used to determine batting strategy at different situation in the game .

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Keywords: *probability distribution, getting out, ODI cricket, probit regression*

Introduction/Background

Cricket is a game which is played by 11 players for each side on a pitch. Bowlers from the fielding side should bowl a set of six balls called overs. Batsmen in the batting side should be played as pair in pitch. One of them should face the bowlers and the other should stay at the bowler side. After hitting the balls, they can score a run. The responsibility of batsmen in pitch is getting more runs at given number of balls (300) in an inning. Higher strike rate makes better score for batting team, so anticipation of each player on the pitch is getting high runs during his batting time. The anticipation of bowlers on the fielding side are to make restrictions to batmen against higher runs. There are two different ways to make constraints on getting runs; one of them is setting up a good arrangement in fielding side which makes difficulties to have runs. Second is getting them out by bowlers. The second approach makes better advantage than first because getting a wicket (getting out) reduces the number of playing chances for the batting team with reducing a ball to be faced. If the bowling side succeeds to have ten wickets (all out) in the batting team, the inning would be mature. The inning will be finished though batting team has 300 balls to be faced, if they failed to secure their ten wickets before 300 balls are finished. Getting a wicket in an inning makes it worse for the batting team and makes it better for the bowling side. This reason formulates the significance of getting out in a cricket game. Each fair ball has a probability to have runs (0.1.2.3.4 or 6) or probability of getting out. This study is focused on estimating the probability of getting out in terms of managerial aspect of the team captain. Managerial decision making contains a number of subject disciplines, out of them statistics plays a major role.

Statistical Approaches for Decision Making in Cricket

Match prediction is the most important part of the decision making stage of cricket administration, and gambling in cricket games as well. There are a number of variables that can have an impact on the decision making process. The range of variables that could independently explain a statistically significant proportion of variation associated with the predicted runs totals and match outcome were created. Such variables include home ground advantage, past performance, match experience, performance at the specific venue, etc.

The game of cricket was a statistician's dream and over the decades, summery statistics have been produced and published in many sporting chronicles (Lewis,

2005). Especially cricket was a good platform for statisticians to make research in contemporary statistical application. Many data fields are raised in cricket such as the number of runs, wickets and catches in game which are the measurement of player performance.

The winning predication is another part of statistical intervention to the sport. Winning the toss might be a key factor to winning of the game in some cases. If any team wins the toss, the team should make a decision regarding batting first or bowling first. This is a strategic opportunity for the team who wins the toss. Peter Dawson, Bruce Morley, David Paton, and Dennis Thomas, (2008) have estimated conditional logic models of outcomes using data from day-night internationals played between 1979 and 2005, other things equal. They found that winning the toss and batting increases the probability of winning by 31% in contrast, winning the toss does not appear to confer any advantage of the team choose to bowl first.

Players' career prediction and evaluation is the most important part in the management of cricket. In international cricket, the *batting average* has been used to select the best batsman in cricket, Sir Donald Bradman was the batsman who had the highest test average (99.94) ever. But Vani, Borooah and Mangan (2010) argued that selecting a best batsman based on average scores is not appropriate due to two reasons. First, it does not take into account the consistency of scores across innings: a batsman might have a high career average but with low scores interspersed with high ones; another might have a lower average but with much less variation in his scores. Second, it pays no attention to the "value" of the player's runs to the team. So they have suggested a new batting average to revise the ranking of top fifty batsmen in the history of test cricket (Vani K. Borooah and John E. Mangan, 2010). Lewis (2005) extended his work toward the player's performances in one day cricket by using well known Duck Worth and Lewis method. It was very straightforward work because that proposed measures could impact in evaluating players' performance for a particular match, a series of matches, or in the longer term over players' career. Swartz (2006) devised a statistical method to compute the probability of each outcome for each batsman with corrections based on wickets and balls remaining. They have used non parametric approach to get batting average and batting performances (Kimber and Hansford, 1993).

But arguably the probability of getting out depends on runs required. On the other hand, runs per ball faced (strike rate) is more important than runs scored in terms of getting out. if batsman tries to increase the strike rate (the number of runs per ball) the higher will be the probability of getting out. In ODI, any improvement in

expected returns (Strike rate) will be associated with higher risk (probability of getting out) (Barr and Kantor, 2004).

The application of dynamic programming is becoming more important in problem solving in sport. There are different attempts among scholars reading application of dynamic programming in cricket. Clarke (1998) shows the potential of dynamic programming on cricket prediction. He measures the extent to which batsmen achieve the required run rate properly.

Basically getting out in the cricket match is dependent on the conditions like numbers of wickets in hand, numbers of ball to be delivered, target to be archived (required rate)...etc. Remaining balls and wickets in hand were the two factor which being used in Duck Worth- Lewis model. They have employed these two factors to predict the match performances.

In some cases, there are more wickets to be fallen but only a few balls remain to be delivered. There is an argument that it is better to save the wicket than having a favorable gap between balls remaining and runs to be scored. Sometimes the captain of the particular team will advocate saving wickets than balls in the beginning of the match.

If it is the second inning of the match, different strategies can be employed to achieve the target properly. Depending on the target, these strategies can be changed. Different captains in the cricket field have employed the particular strategies based on their experiences. But they have not used a statistical model to predict which strategy should be employed in relevant cases. Which factor should be considered greatly than the other, there should be a mechanism to make decision in ongoing match?

In order to batting order, target scores and also strength of opposition team may impact to the probability of getting out. But in this study it is limited to factors such as wickets in hand and balls remaining.

In order to achieve the objective of the study, it employs a regression model to measure the predictable capacity of each factors. The depended variable of regression model is getting out or not, this is a binary responded variable. So binary logit model has been used to estimate the parameters which belongs to each factor. To identify the significant difference between each factor, a step wise log likelihood is used as the estimation method. Regression estimation is based on maximum

likelihood method. Model validity can be measured by looking at -2log likelihood ration of each step of the regression procedure.

Method :Estimating the Wickets Process)Probability of Getting Out)

$p(b, w))$

The purpose of estimating wicket process is to estimate the probability of losing a wicket (getting out) in the next ball. If the batting team has remaining b deliveries in its inning and w wickets in hand, the probability estimation function is as shown in equation (1.0). Fair delivery can cause two particular outcomes namely, out or not. That is considered as the dependent variable in the wicket process (Probability of getting out). The regular probit regression model was used to estimate the probability of getting out as the dependent variable functions as a binary respond variable. The wicket process is based on the Cater and Guthrie (CG) (2004) work which has been introduced for the target resetting to overcome the shortcoming of DL method. The CG model is an extended work for Preston and Thomas (2003) model. The unobserved variable for probability of getting out $y_{b,w}^*$ is defined by

$$y_{b,w}^* = \alpha_0 + \alpha_1 b + \alpha_2 w + \alpha_3 b^2 + \theta_{b,w} \quad (1)$$

Where, $\alpha_0, \alpha_1, \alpha_2$ and α_3 are constants, and $\theta_{b,w}$ is a random variable drawn from the standard normal distribution. The method assumes that a wicket falls if and only if $y_{b,w}^* > 0$, which occurs with probability $p(b, w) = \Phi(-\alpha_0 - \alpha_1 b - \alpha_2 w - \alpha_3 b^2)$ where Φ the cumulative distribution functions for the standard normal distribution is.

Let y_b be an indicator variable which takes the value 1 if a wicket falls and 0 if a wicket does not fall.

Underlying latent model shown below.

$$y_i = \begin{cases} 1, & y_i^* > 0 \\ 0, & y_i^* \leq 0 \end{cases}$$

It is assumed that the outcomes of different deliveries are independent, and the likelihood function is

$$\prod_{n=1}^{300} \Phi(-\alpha_0 - \alpha_1 b - \alpha_2 w - \alpha_3 b^2)^{y_b} (1 - \Phi(-\alpha_0 - \alpha_1 b - \alpha_2 w - \alpha_3 b^2))^{1-y_b} \quad (2)$$

This can be converted in to log-likelihood function as below:

$$LLF = \sum_{n=1}^{300} [y_b \log \Phi(-\alpha_0 - \alpha_1 b - \alpha_2 w - \alpha_3 b^2) + (1 - y_b) \log(1 - \Phi(-\alpha_0 - \alpha_1 b - \alpha_2 w - \alpha_3 b^2))] \quad (3)$$

It is assumed that outcomes are independent across different innings and chose $\alpha_0, \alpha_1, \alpha_2, \alpha_3$ in order to maximize $\sum_{i=1}^n LLF_i$, where LLF_i the log-likelihood function for each innings. Second inning of 25 ODI matches of 2011 World Cup are used to estimation. Table 1.0 shows the list of the 25 matches used in the analysis process.

Table 1: Matches list of 2011 World Cup (only test countries)

1 st Match, Group B: Bangladesh v India	33 rd Match, Group A: Pakistan v Zimbabwe
4 th Match, Group A: Australia v Zimbabwe	36 th Match, Group B: England v West Indies
7 th Match, Group B: South Africa v West Indies	38 th Match, Group A: New Zealand v Sri Lanka
8 th Match, Group A: Australia v New Zealand	39 th Match, Group B: Bangladesh v South Africa
10 th Match, Group A: Sri Lanka v Pakistan	40 th Match, Group A: Australia v Pakistan
18 th Match, Group A: New Zealand v Zimbabwe	42 nd Match, Group B: India v West Indies
19 th Match, Group B: Bangladesh v West Indies	1 st Quarter-Final: Pakistan v West Indies
21 st Match, Group B: England v South Africa	2 nd Quarter-Final: India v Australia
24 th Match, Group A: New Zealand v Pakistan	3 rd Quarter-Final: New Zealand v South Africa
6 th Match, Group A: Sri Lanka v Zimbabwe	4 th Quarter-Final: Sri Lanka v England
28 th Match, Group B: Bangladesh v England	1 st Semi-Final: Sri Lanka v New Zealand
29 th Match, Group B: India v South Africa	2 nd Semi-Final: India v Pakistan
	Final: India v Sri Lanka

Source: Elaborated by researcher

Results and discussion

Stepwise probit regressions were estimated for all 25 matches separately and the models are selected at 1% significant level². The model fit information of a randomly selected match which is not statistically significant at 1% level is shown below. The purpose of giving this information of the data set is to introducing the selecting criteria of data set for the estimation of probability of wickets process. Model fit information shows that some of the matches were not significant at 1% level. Therefore the selecting criteria should be established before selecting the

² Depending on accuracy of the predication capability, the estimation is based on 1% significant level

matches for estimating the wicket process. For example, table 2.0 shows the model fit information of estimation of probit regression of the data set of 1st match of Group B, Bangladesh vs. India which is not significant at 1% level.

Table 2: Model Fitting Information of 1st Match Group B Bangladesh v India

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	42.879			
Final	38.419	4.460	3	.216

Link function: Probit.

Source: Appendix 03

According to Table 2.0, the “P” (Sig) value of the overall model is 0.216, which is greater than 0.01 level of significance. Table 3.0 is an example for a data set which is significant at 1% level of significance. “P” (Sig) value of the estimated model is less than 1% ($0.006 < 0.01$). Thus the model is significant at 1% level.

Table 3: Model Fitting Information of 1st Semi-Final Sri Lanka v New Zealand

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Intercept Only	87.619			
Final	75.163	12.456	3	.006

Link function: Probit.

Source: Appendix 03

After estimating the probit regression model of the *wicket process* (1.0) for all data set separately (for 25 matches in 2011 World Cup), only 8 matches were selected for the estimation of the probability of wicket process based on the above selecting criteria. The matches which are considered for the parameter estimation of the model (1.0) are shown below in Table 4.0

Every match in the above table is considered in estimation of the binary probit model which is denoted by equation (1.0). The stepwise procedure of the regression analysis produced the model estimation of *wicket process*.

Table 4: Matches list which are significant at 1 % level

1 st Semi-Final Sri Lanka v New Zealand
11 th Match Group B India v England
21 st Match Group B England v South Africa
24 th Match Group A New Zealand v Pakistan
33 rd Match Group A Pakistan v Zimbabwe
36 th Match Group B England v West Indies
40 th Match Group A Australia v Pakistan
42 nd Match Group B India v West Indies

Source: By researcher

The parameter estimation of wicket process are done on eight matches using SPSS 19.0. The first column of Table 5.0 shows the stepwise estimated threshold value of the probit regression model. Where α_1 is estimated parameter of the variable called *balls remaining*. Likewise, α_2 is the estimated parameter of variable called *wickets in hand*, and α_3 is the estimated parameter of the variable called *squared of balls remaining*. Standard error of the parameters are given in the parenthesis. The third step gives the best model which contains three predictors (independent variables) records least LLF value (-32.468) than the other model.

Table 5: Estimation of the parameters of wicket process

α_0	α_1	α_2	α_3	LLF
0.622774 (1.314)	-0.01251 (0.005)	0.034231 (0.409)	0.0000971 (0.000)	-32.468
0.469182 (-0.52)	0.008 (0.005)	-0.402 (0.182)		-37.931
1.27 (-0.264)	-0.005 (-0.002)			-39.614

Source: Appendix 0 4.1

According to the parameter estimation, decreasing value of LLF means the predication capability of each added variable at each stage. They are significantly increased. The final model for the wicket process can be constructed as follows:

$$y_{b,w}^* = 0.622774 - 0.01251b + 0.034231w + 0.0000971b^2 + \theta_{b,w}, \quad \theta_{b,w} \sim N(0,1)$$

The estimated value of α_1 (-0.01251) shows that there is a negative relationship between *balls remaining* and probability of *getting out*. When the number of *balls in hand* increases the probability of *getting out* is decreased. The value of latent variable $y_{b,w}^*$ less than 0, means that, there is a probability of survive (not to getting out) at next ball and the value of $y_{b,w}^*$ is greater than 0, means otherwise. In this study, *out* is coded by “1” but SPSS gives threshold value as “0”. It means that the threshold value “0” stands for *not out*³. If the estimated threshold value is negative, the whole equation should be subtracted from 1 ($1 - y_{b,w}^*$ = probability of getting out) to get the probability of *getting out*. The final step of the wicket process is shown below:

$$p(b, w) = \Phi(-0.622774 + 0.01251b - 0.03423w - 0.0000971b^2)$$

Based on the model 1.0, the probability of getting out $p(b, w)$ can be calculated. For an example, when 5 *wickets in hand* and 120 *balls remaining* in the second inning, the probability of getting out is:

$$p(b, w) = \Phi(-0.622774 + 0.01251 \times 120 - 0.03423 \times 5 - 0.0000971 \times 14400)$$

$$p(b, w) = \Phi(-0.695259)$$

$$p(b, w) = 0.24345$$

The estimated value of the hypothetical example shows that there is a 0.243 probability of getting out at the next ball under the condition of 5 *wickets in hand* and 120 *balls remaining*.

The probability of losing a wicket at different stages can be calculated using the above equation. Table 6.0 below shows the estimated probabilities of losing a wicket at different stages. Each column of table 6.0 shows the different probabilities of getting out at specified number of wickets in hand and at different level of balls remaining. Each row shows the different probabilities of getting out at specific number of balls remaining and different level of wickets in hand. Each cell

³ “Out” is coded by “1” and “not out” coded by “0”

in the table shows the calculated probabilities of *getting out*⁴. For example when 30 balls are remaining (1st Rows in table 6.0) and a team has 2 wickets in hand (2nd column in table 5.5.6) the value of corresponding cell is 0.343. This value indicates that there is a 0.343 probability to getting out in next ball at the condition of 2 wickets in hand and 30 balls remaining.

Table 6: Estimated probabilities of getting out at different stages of balls remaining and wickets in hand

	Wickets in hand									
Balls Remaining	1	2	3	4	5	6	7	8	9	10
30	0.356	0.343	0.331	0.318	0.306	0.294	0.283	0.271	0.260	0.249
60	0.399	0.385	0.372	0.360	0.347	0.334	0.322	0.310	0.298	0.286
90	0.374	0.362	0.349	0.336	0.324	0.312	0.300	0.288	0.276	0.265
120	0.288	0.277	0.265	0.254	0.243	0.233	0.223	0.212	0.203	0.193
150	0.166	0.157	0.149	0.141	0.134	0.126	0.120	0.113	0.106	0.100
180	0.059	0.055	0.052	0.048	0.045	0.042	0.039	0.036	0.033	0.031
210	0.010	0.009	0.008	0.008	0.007	0.006	0.006	0.005	0.005	0.004
240	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
270	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Source: Estimation by Researcher

The marginal probability behavior between numbers of wickets in hand at different level of balls remaining can be calculated by subtracting the value of a particular cell horizontally from the value of the previous cell. For example, the marginal probability of getting out between wicket 1 and 2 in hand at 30 balls remaining is 0.0122. The above procedure can be applied to any level of balls remaining. The example calculations are shown in table 7.0 below:

⁴ It has been used customized calculator in Micro Soft Excel 2010

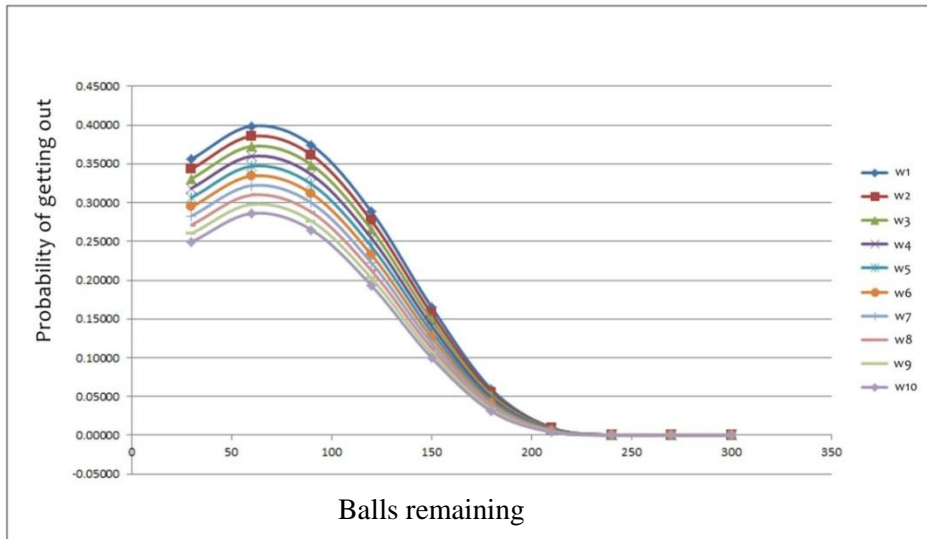
Table 7: Marginal effect calculation of wicket process

Wickets	Probability Changes		
	30 balls	60 balls	210 balls
1-2	0.01267	0.01315	0.00088
2-3	0.0125	0.01302	0.00081
3-4	0.01232	0.01288	0.00075
4-5	0.01211	0.01272	0.00068
5-6	0.01191	0.01255	0.00064
6-7	0.01169	0.01236	0.00058
7-8	0.01146	0.01218	0.00053
8-9	0.01123	0.01196	0.00049
9-10	0.01098	0.01176	0.00044

Source: Estimation by Researcher

According to Table 6.0, greater the number of wickets in hand, less probability it is for getting out at any stage of *balls remaining* in the innings. When the remaining balls record comparatively a lesser number, it makes 0.01 probability changes between each level of wickets in hand, but when it is at a greater number of balls in hand, it records comparatively lesser probability changes (marginal effect), than a lesser number of balls in hand. Table 7.0 clearly makes sense of the marginal effect of the probability of getting out at different levels of *balls remaining*. The marginal effect of the probability of getting out gradually decreases when the number of *balls remaining* increases. Graph 1.0 is a graphical representation of the data given in table 6.0. The vertical axis represents the probability of getting out and the horizontal axis represents the *balls remaining* (balls in hand) position.

Figure 1: Probability distribution of getting out at different level of balls remaining

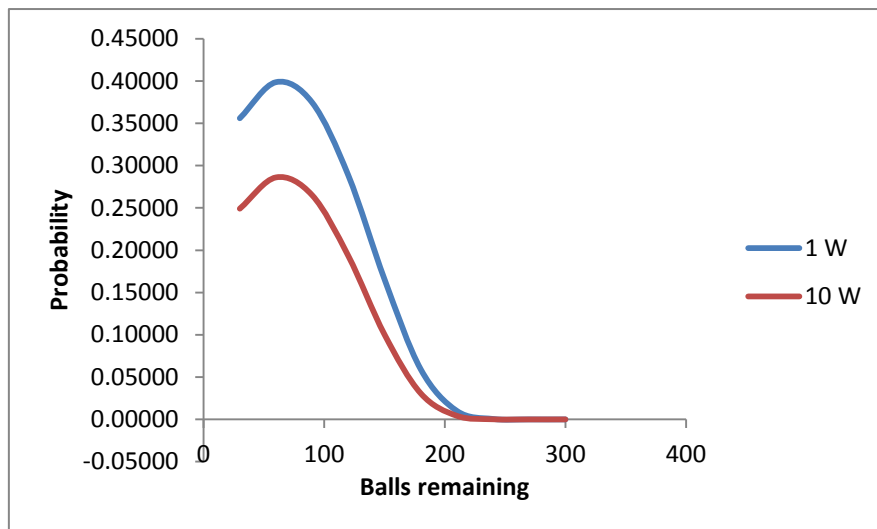


Source: Table 6.0 (Estimation by Researcher)

The Figure 1 shows the probability distribution of *getting out* at different levels of *wickets in hand* in relation to different number of *balls remaining*. At the position of 100 balls remaining it makes larger gaps between each curve than the position of 150 balls remaining. On the other hand, the highest probability of *getting out* records at the stage of one *wicket in hand*.

Figure 2 shown below illustrates the probability distributions differences at different conditions of an inning. In fact, when the match is interrupted by rain, different conditions)wickets in hand and balls remaining (may significantly impact on the runs scoring process. For example, as shown in Figure 2 the balls remaining position of 60 shows the highest gap of probability of getting out between the positions of 1 wicket in hand and 10 wickets in hand .The coloured curves in the graph stand for the different number of wickets in hand.

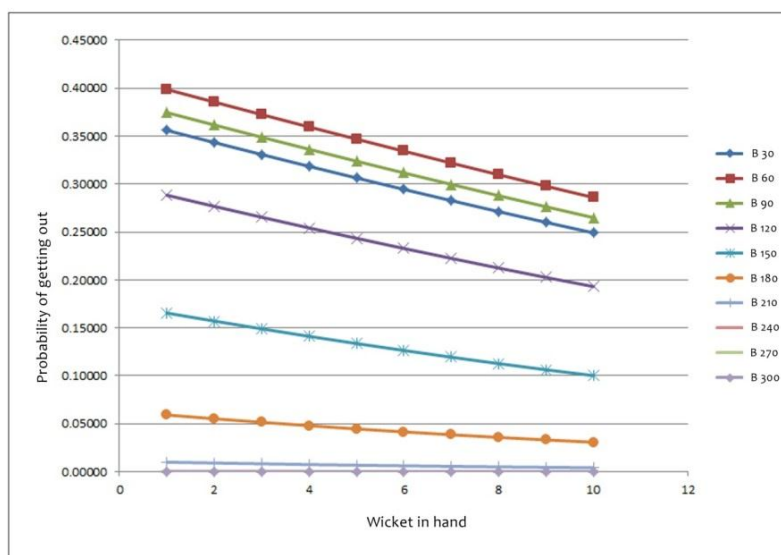
Figure 2: Probability differences of getting out when 1 wicket in hand and 10 wickets in hand at different level of balls remaining



Source: Table 6.0

The Figure 3 shows the probability distribution of getting out at different level of *balls remaining*. The vertical axis stands for the probability of getting out and horizontal axis standards for the *wickets in hand*.

Figure 3: Probability distribution of getting out at different level of wickets hand



Source: Table 6.0 (Estimation by Researcher)

The graph implies that the probability of losing a wicket is comparatively higher when it comes to the position of 60 *balls remaining*, regardless of the position of number of *wickets in hand*. Furthermore, graph 3.0 graphically proves the negative relationship between the probability of getting out and the wickets in hand regardless of the position of balls *remaining*.

The analysis mentioned above regarding wicket process shows the diverse behavior of the probability of *getting out* at different conditions when a match is interrupted by rain. In the fair target resetting method, the decision should be accurate to real behavior of the match.

Conclusion and Remarks

This paper suggested a decision making model for the team captains of ODI. It is implied that the probability of getting out associates with variables called *wickets in hand* and *balls remaining* significantly. The different situation of a batting inning is created basically by two factors mentioned in the model. To improve the objective batting strategy selections other than subjective, these findings should be incorporated with the subjective decision of the team captain.

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Comparative Economics of Planning for Public Transport Provision to Address Transport Connectivity Issues of a Rural Setting: The Case of Kalyanipura – WeliOya

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JEL Codes: L91, L98, O18, R41, R42

Abstract

Rural villagers face many challenges associated with accessibility and connectivity compared to the urban communities. Constraints in rural transport infrastructure and services often limit their accessibility of necessary services. The paper examines this issue in the context of a rural village setting of Kalyanipura, Weli-Oya, in Mullathivu District, a Sinhala village destroyed by LTTE in 1984, which was resettled after 2009. A survey was conducted in the village in early 2016 particularly focusing on mobility parameters and to identify the problems and to throw light on possible solutions to resolve infrastructure gaps faced by the village, which resulted in an assessment of the transport connectivity problem. The findings reveal that the problem is two-fold, namely low income levels and low travel demand. As the villagers do not have capacity to afford private transport options most economically viable option would be the public bus. Alternative ways of providing this service were subject to examination. Given that the prevailing travel demands are inadequate to meet the variable cost, the option with lowest costs would be more attractive as that would necessitate lesser compensative grant payable to the operator to financially sustain the operation. It was thus concluded that the option of de-routing the current bus operation to Gajabapura to run via Kalyanipura would be very much more economical to the operator as well as to the national or provincial transport authorities than planning a dedicated bus service to Kalyanipura.

Key words: *Transport Planning, Transport Costing, Rural Mobility, Public Transportation*

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Introduction

Rural communities face series of challenges associated with meeting basic needs; accessibility to places, facilities and utilities being the most pressing. Transportation being the service which provides access to places, such as welfare service provision centres,² it is evident that connectivity gaps constrain the welfare of deep rural settlements, and constitute one of the root causes of rural poverty.

In this context, it is noteworthy that there is a significant difference of “poverty” between urban and rural communities where the former is essentially “purchasing-power” driven, while the latter goes much deeper into the very availability of supply or physical access. Better rural transport is a fundamental requirement in reduction of poverty and isolation. Moreover it assists in promoting economic growth.

The transport connectivity issues faced by rural communities were appraised through a case study on Kalyanipura, Weli-Oya, in the Mullathivu District. The village is a rural enclave in the North-Eastern area of Sri Lanka, which is facing severe transport connectivity problems. The village, formally known as *Dollar-Farm*, was brutally destroyed by the LTTE terrorists in 1984 and resettled in 2009 after the defeat of terrorism. Settlers have already started abandoning the village; only less than 40 families of around 100 families settled in 2009 still manage to live at Kalyanipura. The lack of reasonable transport connectivity appeared to have been among the most prominent cause for its unattractiveness, and giving rise to the villagers abandoning the village.

A survey was conducted in early 2016 in the village to identify the problems and to throw light on possible solutions to resolve infrastructure gaps faced by the village, which resulted in an assessment of the transport connectivity problem and the economic impediments of providing private transport solutions owing to insufficient affordability (Gunaruwan & Dilrukshi, 2016).

The study was extended to analyse alternative strategies that might be available to provide transport solution to Kalyanipura village. It examined the viability of

² *Schools, hospitals, administrative offices, etc*

addressing the affordable mobility gaps of the village through introduction of a public bus service, and assessed comparative economics of associated service provision alternatives. This paper summarizes the outcomes of the research and its policy relevant recommendations.

Literature Review

The transportation problem faced by the villagers is principally arising because of distances to places and facilities; in other words, owing to proximity or facility for spatial interaction (Gutierrez, 2009) and shaped by their demographic characteristics. Lack of appropriate mobility, as viewed by Kenyon et al (2002), would have a strong impact on rural people.

According to Hine. J, 2014, an inefficient and unsafe transport system has key adverse knock-on effects on livelihoods, the delivery of health and education, social interaction and the development of agriculture and the service sector. The greatest concerns of rural women are how to get to a health center or hospital in an emergency, particularly relating to childbirth. Furthermore, school enrolment and attendance at primary schools in remote rural areas would be affected by longer travel distances: evidence suggests that travel distance to school is an important factor influencing school attendance (Porter et al., 2011). Long journey distances are likely to have gender-specific effects as well, where the impact on girls' education is likely to be much severe than boys'. Once girls reach puberty, they may be considered at greater risk when traveling over long distances to schools (Porter, 2013). This inevitably causes low literacy among villagers, an uncontested impediment to eradicating rural poverty and exclusion. Constraints in rural transport infrastructure often impose limits to welfare of farming communities. For instance, lack of low cost and efficient goods transport services from villages to market centers became a critical issue faced by the rural farmer population (Silva. R, 2014). Mobility service gaps, caused by inadequate transport connectivity, can be identified as an important issue behind these unfavourable conditions.

Literature also speaks for welfare gains realized through improved and affordable transport connectivity. BMZ, 2013 and Rubel, 1990 emphasized that improved rural transport infrastructure provides greater mobility and access to services such as

education and health at affordable costs as well as it enables access to jobs while enhancing the movement of agricultural products. A study on Sri Lanka's exceptional performance with regard to physical quality of life of her citizens in spite of low income levels revealed that affordable mobility provided by the State bus service has been instrumental towards the achievement, possibly to the same extent as welfare service providers (healthcare and education) themselves (Gunaruwan and Jayasekera, 2015).

Materials and Methods

The village socio-economic characteristics and utility service supply gaps that had been identified through a semi-structured survey conducted in the Kalyanipura village in early 2016 were used as the base data for this extended research. Information pertaining to service supply needs with particular attention on mobility parameters were examined. Affordability considerations of villagers and incremental service supply costs were comparatively assessed. Bus operating cost data required for the assessment were sourced from the SLTB, as the most pragmatic scenario for analysis appeared to be a bus operation planned and operated by the Sri Lanka Transport Board (SLTB) through its Kebithigollewa Depot. Transport costing and implicit opportunity cost threshold analysis were adopted as analytical methods. Most appropriate affordable mobility solution practically implementable at the village setting was sought through the analysis. Tabular form was deployed in presenting the results.

Analysis and Findings

The preliminary results of the survey revealed that transport infrastructure service gaps impose limitations to the wellbeing of rural settlers at Kalyanipura in terms of meeting their basic needs and accessing welfare service centres. Lack of appropriate mobility, as viewed by Kenyon et al (2002), appeared to have had a strong impact on rural people at Kalyanipura, who rarely could afford to use private motorized mobility means. Inability to move their produce at least to "pola" have deprived them reasonable access to markets, thus preventing them from realising the otherwise potential revenue streams, further impoverishing the farmers (23% of the villagers). Labourers (7% of the villagers) and others (12%) also have to go on push-cycles or walk to their work places (only one family reported possessing a motor-cycle). School children and the elders accompanying them have to daily travel significant distances from their residences to their schools: thirteen students travel nearly 2.5 km to primary school and those attending to secondary school have

to walk or to cycle around 7.5 km to fetch a bus to school located in the town. This mobility issue causes wastes of study and leisure time of students while affecting income generating capacity of the adults. It is also possible that the high unemployment levels (50% of Villagers) are influenced by this constraint. It might also be this mobility constraint which might have been behind, inter-alia, the low child birth rate recorded in the village: Only one child birth had been reported recently as the women once get pregnant they used to move out of the village.

It is therefore clear that the existing problem of transport service gap is socio-economically harmful, and that policy priority has to be assigned to solve it if the village life is to be sustained. The socio economic and demographic data collected however reveals that any rational and practicable solution to this problem would position between the two delicate parameters, namely (a) poor income levels of villagers, making any private transport modal ownership and operating cost unaffordable,³ and (b) distances from the town and the sparsely populated nature of the village, pushing the costs of any public transport operation costly and less financially attractive to the operators. Therefore, any intervention to solve the problem should necessarily be “low cost”, so that the passengers could benefit from the services at affordable costs while any burden on the service provider or the public coffers of operating mobility solution could be kept at minimum possible levels.

The present study adopted the analytical results presented in Gunaruwan & Dilrukshi(2016), with regard to different modal options and their incremental costs, enabling perception of the levels of travel time savings and corresponding economics (in terms of generalized costs) which would differentiate among such modal options. Accordingly, there would be a total travel demand of 26700 passenger kilometers per month, estimated based on the assumptions that the travel demand would arise due to children traveling to schools 5 days a week, and adults travelling to town at least once a month for marketing, or accessing healthcare, bank or other government services. The saving of travel time realizable by resorting to motor bicycle and public bus options in meeting such travel demand would therefore be 1335 hours and 1558 hours respectively, each compared to the currently used push bicycle mode. Moreover, travelling by motor bicycles would enable saving 223 hours per month compared to motor bicycle option. Based on the estimate that the monthly operating cost to meet the total travel demand by motor

³ According to Gunaruwan & Dilrukshi (2016), all families except one are having a monthly income less than or equal to Rs 10000.

bicycle⁴ and public bus options are Rs 75000 and Rs 37000 respectively, an estimate was made that a villager in average should have a value of time saving of at least Rs 48 per hour for motor-bicycle travel cost to be economically justified; yet, little over half of that would justify the operating cost of bus travel that has to be incurred to secure such time savings (Gunaruwan and Dilrukshi, 2016). Therefore, it is clear that economically most rational mode of motorised mobility that could be provided for Kalyanipura villagers would be public bus transport facility.

Next, the research went into examining the supply economics, by way of comparing alternative modes of bus transport service provision and to appraise their comparative economics. The possibility of introducing a bus by the private sector, however, was not considered in this analysis because SLTB operation would imply much lesser specific capital costs and would have greater deployment flexibility of a bus for the purpose from its fleet in Kebithigollewa Depot.⁵ A proposed operation of a new bus service from Sampath Nuwara to Kalyanipura three times daily, two school trips in the morning and afternoon, and one trip in the evening was thus appraised; the total operation involving 126 bus kilometres daily.

Based on the operating statistics of Kebithigollewa SLTB Depot in 2014, it could be worked out that this bus operation would cost Rs 5890 per day (or nearly Rs 2.12 Mn per year), and would require 1.41 Million passenger kilometers of travel demand annually if this cost is to be met through bus operating income from passenger tickets. Assuming an average spread out of passengers in all buses operated, this would require a near 78% of minimum load factor realized, which is not a practically achievable scenario for a rural route (Hine, 2014). Besides, the break-even passenger demand would be nearly 4.4 times the total estimated passenger travel demand of 26700 passenger kilometers per month worked out for Kalyanipura.⁶

The study also worked out the uneconomic route operating compensative grant that would be required to meet the revenue gap based on the actual cost of operation and the practically feasible travel demand estimates, and found it to be Rs 1.64 Million per year payable to the Kebithigollewa Depot by the National Transport Commission or the relevant Provincial Council.

⁴ Assuming an average occupancy of a motor cycle of 1.5 passengers

⁵ This aspect could be further examined and verified.

⁶ Gunaruwan & Dilrukshi (2016) assumed that school trip demand arises 5 days a week, and each adult would travel to town at least once a month for various reasons.

Alternative ways available for this service provision were therefore examined. It was brought to the notice of the study team that a bus is currently operating to Gajabapura, which does not pass through Kalyanipura village. This bus, currently plying through a forest patch of nearly 4 km without serving any passenger clientele, could well run through Kalyanipura by travelling nearly 6 additional kilometers of each trip. The option of re routing the existing bus service to run via kalyanipura generates an additional cost 0.61 million rupees and 0.40Mn passenger kilometers would require covering up that variable cost. However, it is less than the cost of introducing a new bus service to Kalyanipura.

The study examined the comparative economics of this option, and found to be much more attractive for both the supplier and the national or provincial authorities. The comparative results are presented in the Table 1.

Table 1: Costs and Operating Indicators of Bus Service Provision Options

Cost / Operating Parameters	Dedicated Bus Service to Kalyanipura	Existing service re-routed to run via Kalyanipura
Supplementary Bus Operation	42km x 3 trips/day = 126 Km /Day	6km x 2 way x3 trips = 36 Km/Day
Variable Cost of supplementary Bus Operation per Year	Rs 2.12 Mn	Rs 0.61 Mn
Additional (or new) passenger km of travel demand needed to cover Variable Cost	1.4 Mn (4.41 times the actual travel demand)	0.40 Mn (1.26 times the actual travel demand)
Compensation payable to the Depot by the authorities to sustain the bus operation	Rs 1,639,980 per Year	Rs.125,280 per Year

Source: Author Estimates

It was thus revealed that the option of de-routing the current bus operation to Gajabapura to run via Kalyanipura would be very much more economical to the

operator as well as to the national or provincial transport authorities than planning a dedicated bus service to Kalyanipura.⁷

The study also found that a narrow culvert en-route to Kalyanipura has to be broadened if the 42 seater bus currently operated to Gajabapura is to serve Kalyanipura as well on its run, because a smaller bus, which could operate on the route, might cause welfare loss to the existing clientele of the bus to Gajabapura.

Conclusions and Recommendations

The research examined the economics of the alternatives in providing a bus service to an isolated rural village setting, namely Kalyanipura in Weli-Oya. Introducing a public bus service was found a potentially affordable mobility solution for the villagers due to their income constraints. The importance of serving the purpose through the most economical means also was revealed through the study: A dedicated new bus service would require 13 times more compensative grant payable by the authorities to the Kebithigollewa Depot compared to re-routing the existing bus service to Gajabapura to run through Kalyanipura village. If serving the village once in every journey (instead of going through the village both on up and down journeys) is adequate to meet the purpose, it would be even less costly, to the extent that no compensative grant at all would possibly be required by the Depot. In such a case, the Depot would be able to fully cover the cost of additional trip distance through the incremental earnings from passengers to and from Kalyanipura.

It is therefore recommended that the authorities examine the road infrastructure gaps, if any, that might be preventing the 42 seater bus taking the route via Kalyanipura and solve such problems, enabling the implementation of the most economically efficient bus transport service option to provide affordable mobility to the villagers of Kalyanipura, Weli-Oya. Such examination also should also capture (i) the likelihood that the passengers presently using the bus to Gajabapura having to incur increased travel time costs owing to the proposed de-routing, and (ii) the possibility of this new bus service inducing more settlers who have left the village to come back, resulting in increased patronage of the bus and reduction of compensative grants required to meet operating economics of the bus service; not addressing such aspects is perceived as a shortcoming of the present study. Such furtherance is likely call for more intensive primary data gathering on the present clientele of the bus as well as on the settlers who have already left the village.

⁷ However, this de-routing causes existing passengers using Gajabapura bus to spend additional travel time. This externality not being captured is a shortcoming of this research.

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Author Index

A.M.N.J.Abeykoon	39
Apeksha Embuldeniya	31
Athula Ranasinghe	82
Chinthaka Jayasundara.....	82
H. S.G. Fernando	104
K.W.K. Gimhani	46
Kasundi Mallawaarachchi.....	74
M. H. SaumyaDilrukshi.....	172
M. Ganeshamoorthy	20
N. Balamurali.....	91
Osantha Nayanapriya Thalpwila	135
P. A. L Oshani	156
P.K.G.C.Pitigala.....	127
Priyanga Dunusinghe	91
R.A Rathnasiri	63
A. R. N. D. Ramanayaka.....	156
S. J. Francis.....	46
Sasini T.K.Kulatunga	1
Seetha P. B. Ranathunga.....	145
W. M. Semansinghe.....	156
T Lalithasiri Gunaruwan	12, 54, 117,172