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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 has successfully organized International Conference of the Sri Lanka Forum of University Economists for the fifth time with the aim of bringing together the Economics scholars to present and discuss their research findings. This conference examines intra-disciplinary and interdisciplinary research findings with the view of applying them to real world situations.

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 international conference will undoubtedly provide a platform for academics, researchers, policy makers, practitioners and other interested parties to interact and share views on issues of mutual importance for policy making to the nation. A glance at the contents of reviewed abstracts illustrates that important aspects in the field of Economics are addressed. I am therefore very happy to send this message to this conference that stimulates a new research culture in the country and promotes interaction between the economist and policy implementation.

Many have contributed immensely to the success of the conference. I take this opportunity to thank Prof. A.H.M.H. Abhayarathne, the Dean of the Faculty of Social Sciences, Prof. Upali Hettiarachchi, The Head of the Department of Economics, Dr. Seetha Bandara, the coordinator of the Conference and all others who contributed immensely to make this event a success. I also congratulate the local and foreign researchers who submitted research articles to this conference.
I wish this conference all success.

Senior Professor Sunanda Madduma Bandara
Vice Chancellor
University of Kenaniya

Message from the Dean, Faculty of Social Sciences
University of Kelaniya

It is with great pleasure to offer my congratulations as the Dean of the Faculty of Social Sciences, on the occasion of 5th International Conference of the Sri Lanka Forum of University Economists, Sri Lanka Economics Research Conference (SLERC) 2016 published by Sri Lanka Forum of University Economists.

This is a very good platform for researchers in Economics to share their research encounter in front of an assembly of academics. As the dean of the faculty, I am very proud to say that we have taken many steps towards promoting research culture among academia and undergraduates of the Faculty of Social Sciences .I firmly believe that economics is important for many areas of society .It can help improve living standards and make society a better place.

I would like to pass my sincere gratitude and warm wishes to the organizing committee of SLERC 2016, research presenters, academic and non – academic staff members of the University of Kelaniya who were the pillars of strength in making this event a success for the SLERC.

Prof A.H.M.H.Abayarathna
Dean, Faculty of Social Sciences
University of Kelaniya

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

As the head of the department, I would like to convey my heartiest wishes on the occasion of the 5th International Conference of the Sri Lanka Forum of University Economists organized by the Department of Economics, University of Kelaniya.

This symposium, SLERC 2016 serves as a springboard to illuminate inner aptness and adroitness of researchers which paves the way to publish successful researches.

It is comprehensible that this is an output of a collective effort of those who dedicated their valuable time. 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 you all the very best in making this event.

Prof Upali Hettiarachchi
Head, Department of Economics,
University of Kelaniya

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

Dear Colleagues and Friends, On behalf of the Sri Lanka Forum of University Economists and the Organising Committee of International Conference on *a Paradigm Shift to Thoughts and Policies: The Need of the Hour for Developing Economies 2016*, I am delighted to invite you to join us in this International Conference to be held in University of Kelaniya, Sri Lanka, and wish to extend a warm welcome.

Developing Economies like Sri Lanka encompass a wide array of economic and social problems that are unique, widespread, and more difficult to treat and control, which is particularly true of Sri Lanka and South Asian regions. Millions are known to suffer from these problems, some of which are classified as neglected within Sri Lanka. This conference expects to focus on current issues in the diagnosis, management and prevention of all economic problems.

The Organising Committee intends to bring global representation to a wide array of core issues relevant to the economy of Sri Lanka and of the South Asian region. The conference consists of plenary sessions, symposia, and paper- and poster-presentations. Our aim is to create a forum for the exchange of ideas and the spread of knowledge on economic issues among the South Asian economies.

We extend a warm welcome yet again and invite you to experience Sri Lankan hospitality and friendliness which will be extended to all delegates and accompanying persons. The venue, Clarion luxury hotel, is conveniently located kiribathgoda town center in Kelaniuya. This will be the perfect launching point for delegates to discover the fast developing city of Colombo, and Sri Lanka, the tiny island in the South Indian Ocean which is a land of contrasting landscapes, rainforests, diverse wildlife and endless sandy beaches. We look forward to meeting you at the International Conference on 22nd – 23rd December 2016 in Kelaniya, Sri Lanka.

With warm regards,

Prof. H. M. Nawarathna Banda,
Co-Chairperson - Organising Committee
SLFUE- University of Kelaniya.

Message from the Keynote Speaker

Sri Lanka Economic Research Conference (SLERC) 2016
University of Kelaniya

It is with utmost delight, that I observe that the Sri Lanka Forum of University Economists' ever growing effort has borne fruit once more, and has led to another successful research conference where the work of many brilliant economists, at furthering the theoretical constructs of our discipline and at contributing to economic policy formulation and implementation, will be deliberated and brainstormed. It brings a sense of humbling gratification to see that the Department of Economics of the University of Kelaniya, where my own beginnings lie in developing myself as an economist, and to which I believe I contributed with my best as a faculty member, is remarkably spearheading this important occasion.

The selected theme for this conference "A Paradigm Shift of Thoughts and Policies: The Need of the Hour for Developing Economies" makes it evident that the SLFUE and the conference organizers are thinking ahead, and have recognized that an inevitable paradigm shift is unfolding in the environments of the developing economies. This paradigm shift, if harnessed properly in its early stages by Sri Lanka and other developing countries, can be maneuvered to reach the economic and social prosperity goals, which we struggled hard to achieve during the previous paradigms.

Economic growth per se, led by increased participation in global trade, has not been able to lift masses out of poverty in developing economies in the last two decades. In 2015, the United Nations repackaged the millennium development goals into a border set of "sustainable development goals", which is one example of the paradigm shift in global thinking taking place.

In Sri Lanka, the GDP growth rates that are moderating, escalating budget deficits, large balance of payment deficits, an ageing workforce without appropriate social security nets and ever growing domestic and foreign debt, obviates the need to for our country to formulate and implement pragmatic policies, grounded on the fundamentals of the new paradigm, so that the future generations will be compelled to compromise on their quality of life. Though our economy constantly grew, our exports as a percentage of GDP decreased from 33% in 2000 to 12% in 2015 (Source: Central Bank of Sri Lanka, Annual Reports). Given the increasing call for

protectionism and unwinding of debt-driven consumption in the advanced economies, it will not be possible for Sri Lanka and other developing economies to rely solely in exports to the advanced world and remittances by migrant labor, to achieve economic and social development targets in the future.

Therefore, developing countries like Sri Lanka will have to develop their own sources of demand. The poor, who are mostly employed in the agriculture sector, will be a lucrative potential source of demand. Therefore, it is imperative that productive capacities in sectors that are not internationally traded, such as agriculture, are developed in tandem with productive capacities in the internationally traded sectors. Adequate attention must be provided also to the SME sector, where the potential for innovation is located. It will help develop new sources of demand in the economy for manufacturing and services sectors and bring down cost of living of the work force by lowering spending on food & beverages in relation to income, while contributing to sustainable social development.

At this juncture of the changing international economic system, it is essential that research supports policy decision making. It is also essential that sound theory backs the development of appropriate analytical tools that can be used in the unique context of developing countries.

I congratulate all those who contributed to making this endeavor of a fifth international research conference, a reality.

Dr. S.M.Punchibandara
Senior Advisor and Consultant
Agriculture and Rural Development, JICA

Message From The Coordinator And Editorial Preface

Sri Lanka Economics Research Conference (SLERC) 2016

These are the Conference Proceedings of the 5th International Conference of the Sri Lanka Forum of University Economists (SLFUE). As the coordinator of SLFUE for 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. Let me congratulate all the authors whose research papers were selected by the independent double blind reviewing process: there were 64 extended abstracts which were successful in this respect, and were selected for publication. While it is regrettable that our review also resulted in the disqualification of several papers due to their inability to meet the standard 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.

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, other tools on hand, and the knowledge of how to combine them to create useful products and services. Economists seek to measure wellbeing, to learn how wellbeing may increase overtime, and to evaluate differences in the wellbeing of the rich and of the poor. Hence, rigorous and exciting research is being done in economics. Through affiliated programs, seminars, workshops, and programs in graduate study, leading scholars in the fields of economics converge from around the world to present ideas and pursue research. Research, both collective and individual, can affect the economy.

At SLERC 2016, under the timely theme, '*A Paradigm Shift of Thoughts and Policies: The Need of the Hour for Developing Economies*', we have created a wonderful platform for university economists and the other researchers in the field of economics and related studies nationally and internationally to share new knowledge and to enhance research capabilities by networking with the experts in the field of Economics. Further we have successfully organised a special panel discussion on "*Economic Development Planning in Sri Lanka: Lessons Learnt and the Way Forward*" involving well-known economists in the field as a brainstorming exercise.

I am certain that all presenters and participants will immensely benefit from the technical sessions and the panel discussion at the 5th International Conference of the Sri Lanka Forum of University Economists. Further, I expect 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.

We convey our gratitude and appreciate the continuous encouragement and guidance of Senior Professor Sunanda Madduma Bandara, the Vice Chancellor, and University of Kelaniya. I also wish to convey our gratitude to the Dean of the Faculty of Social Sciences, Professor A. H. M. H. Abayarathne, and Head, Department of Economics, and Conference Chair, Senior Professor Upali Hettiarachchi, and the organising committee for their hard work to make this event a success.

I wish all the success to the presenters and the Sri Lanka Economic Research Conference 2016 and await the fruits of all the hard work done by SLFUE.

Seetha P. B. Ranathunga (PhD, Waikato, NZ)
Chief Editor and Coordinator – SLERC 2016
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SRI LANKA ECONOMIC RESEARCH CONFERENCE 2016

5th International Conference of Sri Lanka Forum of University Economists

Organized by

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Faculty of Social Sciences
University of Kelaniya, Sri Lanka

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Table of Content

Agriculture and Regional Development..... 1

Impact of Climate Change Calamity on Rice Productivity using Vector Autoregression (Var): Case of Sindh Province, Pakistan 3

Linkages of Farmers' Knowledge and Sunflower Production in Sindh, Pakistan 7

Resource-use Pattern in Paddy Cultivation in Sri Lanka: a Production Function Approach 11

Price Volatility of Vegetable Farming in Sri Lanka: With special reference in up country Vegetable Farming in Nuwara Eliya District in Sri Lanka: 17

A Meta analysis of Contingent Valuation in Environmental Quality Studies 21

'Reflects The Hidden': Measuring Sri Lankan Shadow Economy 27

Contemporary Studies..... 33

Informal Employment among Youth in the Post-War Northern Economy 35

Short- Term Forecasting Of Tourist Arrivals to Sri Lanka from Asian Region 39

Government Tax Revenue, Expenditure, and Debt in Sri Lanka: A Vector Autoregressive Model Analysis 45

Unpacking Inequality in Gendered Household Asset Ownership: The Case of Eastern Sri Lanka 55

Motives of Demand for Life Insurance: the case of North-Central Province in Sri Lanka 59

Financial Sector Development 65

Unsatisfactory Performance of Sri Lanka's State-Owned Enterprises: Causality Diagnostics in Management Autonomy and Accountability 67

Circular Model for Forecasting Returns of Bank, Finance, & Insurance Sector of the Sri Lankan Stock Market 73

The Global Financial Crisis and the Technical Efficiency of Commercial Banks in Sri Lanka: A Data Envelopment Analysis 79

Impact of Major Macroeconomics Variables on Stock Prices in Sri Lanka: A Time Series Analysis 83

Appraising Economic Performance of Government Departments: A Case for Preparing Accrual Based Accounts 93

An Extension of theTheory of Planned Behavior: Explaining Entrepreneurial Intentions of Undergraduates 99

Health Economics..... 105

Impact of Biomass Cooking on Women's Health in Rural Sri Lanka 107

Use of Agrochemicals on Cost of Family Health with reference to Giradurukotte Divisional Secretariat 113

The Impact of Diabetes on Worker Performance in the Public Sector: the Case of a Selected Area in Jaffna City 117

Industrial Development 123

A Study of Industrial Development in the Northern and Eastern Provinces during the Post-war Period 125

Contribution of Occupational Health and Safety Practices on Non-managerial Employee Productivity in the Apparel Industry of Sri Lanka 131

An Assessment of Factors Affecting Voluntary Labor Turnover Intention in Apparel Industry (with special reference to MAS Holdings (Pvt) Ltd;Mihintale) 137

Evaluation of Entrepreneurship Development Programmes in Sri Lanka 141

Poverty and Rural Development 145

Changes in Determinants of Poverty in Sri Lanka within the Last Two Decades: A Household-level Analysis 147

Can Graduates Increase Earnings by Acquiring Multiple Qualifications? 153

Rural-Urban Differences in Savings Practices and Attitudes: With Special Reference to Matara District 159

Trade and Development 163

Relationship between Trade Openness and Economic Growth in Sri Lanka: a Time Series Analysis 165

Preferential Trade Liberalisation through Bilateral or Regional Agreements: Need for a National Strategic Approach for ETCA and Beyond 171

Application of Econometrics in Sport: A Probability Estimation of Getting 'Out' in ODI Cricket 177

The Demand for Consumer Durables in Post Liberalisation Sri Lanka 183

The Impact of Credit Risk on the Profitability of Commercial Banks in Sri Lanka 189

The Impact of Media Convergence on Customer Satisfaction with special reference to Bank of Ceylon, Malabe 195

Relevance of Development Assistance to the Economy and Its Impact after Sri Lanka's Elevation to Upper Middle Income Status 201

Telecommunication, Transportation and Public Policy 211

The Determinants of Personal Telecommunication Expenditure of Rural Youth with Special Reference to Balangoda Divisional Secretariat 213

Comparative Economics of Planning Public Transport Provision to Address Transport Connectivity Issues in a Rural Setting: The Case of Kalyanipura – Weli Oya 225

Service Quality Factors affecting Passenger Satisfaction in Public Bus Transportation: a case study of Kegalle District Passenger Bus Transportation Service Sector reforms for Economic Development 231

The Conceptual Policy Framework for Computer Lab: Special Reference in University Kelaniya Sri Lanka 237

The Impact of Interior and Exterior Designs on Demand for Hotels 243

Economics of Flood Damage Prevention Investment in Colombo Metro Area: Strategic Perspectives Explored through a Viability Threshold Analysis 249

Probing the Recent Decade of Violent Conflict Globally and in Muslim Countries 255

Importance of Water Management in Overcoming Developmental Challenges Faced by Sri Lanka 261

Agriculture and Regional Development

Impact of Climate Change Calamity on Rice Productivity using Vector Autoregression (Var): Case of Sindh Province, Pakistan

Mumtaz Joyo[1], Nanik Ram[2] , Muhammad Ismail Kumbhar[3] and Naeem Ahmed Qureshi[4]

Unusual changes in weather pattern are generally referred to as climate change defined as a rise in the average surface temperature of Earth. This is also acknowledged as global warming. Climate can be termed as change in weather pattern. Climate is a product of weather, so when changes are encountered in expected weather, this is called climate change. During 2010, Pakistan topped the list of countries worst affected by climate linked calamities. Similarly during 2011, the country ranked third. Because of rapid and parallel variations in the demographic and topographic scenery of the country, it is considered amongst highly vulnerable countries facing adverse impacts of climate change. The aim of the present research is to estimate the dependent variable i.e., the drastic and considerable decline in rice productivity due to known or fixed values of explanatory variables: temperature and precipitation/rainfall level.

Rice is typically the most popular among all crops cultivated in Asia due to large scale production and the land usage of around 90%. It is consumed at a similar level: rice is a popular staple in the region as well as among almost half (50%) the world's population as well as more than 70 percent (75%) of the poor.

In Sindh province of Pakistan, rice is cultivated on nearly 2 million acres with per acre outputs of 45 to 50 mounds. Approximately half of the rural labour force engages in rice cultivation and produce 35 percent of the country's total rice production: 3.5. million tons annually. The favorable conditions on which its growth is based are the moderate temperature and availability of water I n Sindhi. Rice is a tropical crop and needs high temperatures over a period of approximately 4 to 6 months. These
temperatures need to exceed 80 degrees fahrenheit (°F) and should in no way fall short of 70 degrees (°F) for the rapidly growing varieties.

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In the province of Sindh, Sukkur is well-known for its quality rice closely followed by Larkana and other rice bowls in Khairpur, Nawabshah, and Hyderabad districts respectively. The main strains of rice common to the province of Sindh are Kangni, Beghi, Irri-8 etc. The Irri variety thrives in Pakistan due to high exposure to sun shine rays and rich irrigation. Irri yields three to four times the productivity of other domestic varieties when appropriately directed, thus enabling the country to amplify rice yield with high production. For 2015, rice earned through export resulted in foreign exchange of around US$ 1.53 billion; 20 percent short 2014. The present research estimates the dependent variable i.e. rice crop of Sindh in Pakistan. The rice yield/productivity depends on associated explanatory factors or variables i.e. temperature and precipitation and other factors are agricultural credit, rice procurement price, fertiliser, and land and water availability. Time series data for the last 20 years (1994-95 to 2014-15) has been processed using the Vector Auto Regression *(VAR)* model.

The research is based on two methodological approaches to determining the impact of climate change using temperature and precipitation levels: two variables affecting rice productivity and other production practices in cultivating rice. The method applies two different tools: the exploratory research method with the *vector auto regression (VAR)* is an econometric model, denoted *VAR(p),* as used to capture the linear interdependencies among multiple time series model based approach. The research results is based on the developed equation for the study that *Rice productivity* = $ß_1 – ß_{2Temp} + ß_{3Precip} + ß_{4Acrdt} + ß_{5rpp} + ß_{6Fert} + ß_{7Tech} + ß_{8Lr} + ß_{9Wa} + U_i$, while The1results of econometric VAR model inference to central research parameters, that is rice output (Rp), average precipitation (Preci.), agricultural land under the rice crop, average temp., (Temp.) and water availability (Wa). The statistical values of t-statistics for given variables are less significant with the more value of F-statistics so that statistically signifies model's for all lag terms. The coefficient value (R) squared has in linking 0 to 1 which define the validity of fit of model. Look upon VAR lag 2 since the points of Schwarz Sc an Akaike AIC of the data used as lag 2 is lesser than that of lag 3, lag 4 and so on, as a result the minor values Schwarz Sc 19.23172 and Akaike AIC 17.11070 for lag 2 help to model highly preferable. Consequently, the VAR equation model for lag 2 for the research is highly suitable as other lag points/values. The *ADF* test shows the variables of model to be non- stationary at conventional levels of significance (at 5% level of significance) and point to that the parameters are stationary at number one difference, that highlight the all parameters are in order 1, in other side water adequacy data has in the stationary form eventually. Rice production during 2015-16 was forecasted at 6.9 million tones, unchanged from the current year's production as per the *VAR* interpretation. Area is not expected to be different from

the 2014-15. Yield is forecasted as 42.6 (*40kgs/hectare)*, which is a good yield, but not a historical improvement because of climatic uncertainty. The production through 2015 is also adjusted upwards in accordance with the figures provided by the country, given earlier rice production data. The main reason for enhanced crop output is the greater land area used to grow rice. Although better than the crops yielded during successive floods several years back, these crops have been less productive due to shifts in temperature and precipitation levels. A fear started to grow after the monsoon floods that the rice crop would be adversely affected, especially in areas where, the Basmati variety is grown. On the contrary, the increase in production shows that the initial flood damage reports were exaggerated and the floods, in fact, benefited the rice crop. The econometric results illustrated that the increase in temperatures and a decreased precipitation, negatively impact rice productivity in Sindh, where yield/productivity will decrease by 7.3% in the short-run and 13.3% in the long-run with an increase in temperature by 1°C and similarly 10% decrease in precipitation. Further, results show that decline in the productivity of the crop in the study area would be an alarming situation and the big threat to rice productivity. The results and predicted values after analysis also show that the raise in temperature will decrease the rice productivity. The coefficient for the precipitation level and temperature were depressing as well as insignificant with a signifying negative link between planting periods and their productivity or yield.

Well-defined planning and sagacious policies will be crucial to adaptation among rice growers. New hybrid and climatic resistant controlled varieties with higher heat and malnourishment tolerance may be introduced. Lastly, the government could organise irrigation with other advanced projects. The high temperature regions and inadequate irrigation system need modern irrigation technologies to increase agricultural productivity.

Key words: Climate Change, Rice, Productivity, Vector Auto-regression (VAR) and Sindh.

Linkages of Farmers' Knowledge and Sunflower Production in Sindh, Pakistan

Fahmida Abbassi[1] and Mansoor Ahmed. Koondhar[2]

The economy of Pakistan is agrarian in nature and the backbone of the country's economy.Over the past couple of yeasr the net import bill for edible oil has increased considerably, resulting in an alarming situation and posing a huge burden on the country's reserves. In the country the Agriculture is the largest sector and has remained the mainstay of economy: contributing to 20.9% of Gross Domestic Product (GDP) and providing employment to 43.5 percent of the population. Agriculture also provides inputs for agro based industry (GOP, 2015).

Sunflower is an important oilseed crop of Pakistan. The main objective of this study is to demonstrate the case of crop production and protection technologies and management practices adopted by farmers in the latest release of the different agro-climatic zones and agriculture fields. The cropped area for sunflower stood at 353 thousand hectares during 2014/15 against last year's area of 384 thousand hectares showing a decrease of 2.7 percent. Sunflower production for the 2014/15 stood at 178 thousand tonnes of seeds and 68 thousand tonnes in oil production (GOP, 2015). The major oilseed crops grown in the country include Sunflower, Canola, Rapeseed/Mustard and Cotton. During 2013/14 total availability of edible oil was 3.20 million tonnes. Local production of edible oil contributed 0.573 million tonnes while import of edible oil/oilseeds was 2.627 million tonnes. The edible oil import bill during 2013/14 was Rs. 246.895 billion (US$ 2.50 billion). During 2014/15, 1.789 million tonnes of edible oil of value Rs. 139.344 (US$ 1.377 billion) has been imported showing an increase of 4.07 percent against the same period 2013-14. Local production of edible oil during 2014/15 is estimated at 0.546 million tonnes. Total availability of edible oil from all sources is provisionally estimated at 2.335 million tonnes during 2014/15. The area and production of oilseed crops during 2013/14 and 2014/15.

Due to a slump in the international market for edible oil and oilseeds, local traders offered between Rs. 2,050/- and Rs. 2,100/- per 40 kg of canola crop produce in 2014/15. Low prices in local market discouraged the oilseeds growers resulting in a decline in edible oil production. Last year the average price of oilseeds

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(Canola/sunflower) prevailed between Rs. 2,500/- and Rs. 2,800/- per 40 kg (GOP, 2015).

The major objective of this study is to identify the factors affecting yield and timely decisions in the sunflower market and bottlenecks in production. The results revealed that lower level of adoption of improved agricultural technology innovation and diffusion as a key aspect in improving agricultural production at a faster rate. A large number of technology developments in the agricultural sector have not been accepted by the farmers to the greatest extent possible. For the use of new crop production techniques, frontline demonstrations were found useful.

The methodology used for the survey was to collect data and information from farmers. A list of participants in the frontline demonstration was obtained. Highest number of participants was observed from Golarachi. Seventy growers were selected by random sampling technique. Out of 70 samples, 40 were participants farmers and 30 were non-participants farmers. Growers were randomly selected based on the highest number of respondents who participated in a demonstration from a particular village. Hence, this taluka was selected for the study purpose due to the large area under sunflower cultivation there, and being the area most suitable (given its moderate weather) for the sunflower production.

In Pakistan, Sindh grows Sunflowers, but accounts for only 19 percent of total Sunflower area as compared with other provinces. The sample was selected randomly from 10 villages in Golarchi town/taluka, Sindh province of Pakistan for the study. All the data were summarised and scrutinised carefully and recorded in Statistical Package for Social Science (SPSS).

Among salient findings were the fact that 92.50 percent of participant farmers had knowledge regarding recommended variety, whereas 66.67 percent of non-participant farmers did not. In case of seed rate 87.50 per cent of participant farmers and 43.33 percent of non-participant farmers had correct knowledge. A majority (82.50 percent) of participant farmers and more than half (60.00%) of non-participant farmers also were aware of spacing, whereas, 80.00 and 90.00 percent of participant farmers and 80.00 and 63.33 percent of non-participant farmers had knowledge about the practices like intercultural operations and plant protection measures, respectively. It is evident that 88.33 percent of participant farmers and 63.33 percent of non-participant farmers adopted the recommended variety/hybrid. In case of spacing 52.50 percent of participant farmers and 30.00 percent of non-participant farmers fully adopted, whereas 47.50 per cent of participant farmers and 70.00 per cent of non-participant farmers partially adopted. Regarding FYM

application, 47.50, 42.50 and 10.00 percent of participant farmers and 53.33, 26.67 and 20.00 percent of non-participant farmers were credited with full adoption, partial adoption and non-adoption, respectively. Overall in the study area farmers marketed more than 80 percent of the total produce to private agencies, and the rest was sold to local market Waparries (Local traders/commission agents).

It could be observed that the Benefit Cost (B:C) ratio of the participant farmer was 2.57:1, whereas, it was 1.32:1 in case of non-participant farmers. Almost all the farmers described a variety of marketing constraints; about one-third respondents reported the monopoly of PASSCO with the minor role of private sector. Delayed payments, unfair deductions from produce and underweighting problems were recorded by 40.7, 46.2 and 42.5 percent growers, respectively. It is clear from the results that, the benefit cost ratios of participant farmers were higher than the non-participant farmers. The contents clearly indicate that, irrespective of participation, farmers clearly expressed that non availability of seeds, high seed cost, high cost of fertilisers, non-availability of fertilisers at times and high cost of plant protection chemicals and plant protection measures are the major constraints in sunflower production.

The suggested recommendation is that information/knowledge regarding production practices are disseminated among farmers where scientific and technical application are often absent. Technical information about recommended production practices and related marketing issues should be transferred to farmers. Therefore administrators, planners and executers must give the focal importance to executing frontline demonstrations, and special orientation training should be given to the departmental staff to further train progressive farmers and grassroots extension workers through their demonstrations. Consequently, the administrators and implementing officers should also keep in mind the role of demonstrators in motivating even non-participant farmers to fully adopt the recommended technologies to increase the income in a sustainable manner.

Key words: Sunflower, Production, Development, Knowledge, and Sindh

Resource-use Pattern in Paddy Cultivation in Sri Lanka: a Production Function Approach

Hemali Kanthilanka[1] and JeevikaWeerahewa[2]

Introduction

Rice has been the staple food of Sri Lankans for centuries. Paddy cultivation is part and parcel of the Sri Lankan culture, and the role of the rice sub-sector in achieving food security, both at the national and household level, has been duly recognised by successive Governments. Paddy production, rice processing, marketing and distribution and rice imports have been regulated in varying degrees over time by successive Governments to enhance domestic rice production by ensuring a fair price for producers and/or to protect consumers from adverse effects of increasing prices of rice.

Most paddy farmers in Sri Lanka cultivate small parcels of land. A large majority of small-holder paddy farmers are concentrated in irrigation settlements in the dry zone and pockets of the wet zone. Large paddy fields are predominant in the Eastern Province of the country where paddy cultivation is done on a commercial scale. According to previous studies, Sri Lanka has comparative advantage in growing paddy in irrigated areas (Tibbatuwawa and Weerahewa, 2004, Rafeek and Samarathunga, 2000). Small-holders cultivate paddy using family labour mainly for consumption purposes and the surplus is marketed.

The resource use pattern in paddy production has been subjected to investigation by a number of authors. Abeysekara (1972) revealed that paddy production in 1971 *Maha* was highly responsive to land, labour and fertiliser, whereas paddy production was negatively affected by other agro-chemical application. Furthermore, coefficient estimates revealed that paddy production technology was characterised by increasing returns to scale. Karunarathna and Herath (1989) found that there are significant differences between yields in *Maha* and *Yala. Yala* cultivation is significantly affected by land, fertiliser application, agrochemical and family labour while the extent of land and fertiliser use affect paddy production in *Yala*. In both seasons hired labour does not have a significant effect on production. Udayanganie *et al* (2006) revealed that the extent of cultivation, fertiliser usage and pesticide usage significantly influenced paddy production during the 2003/4 *Maha* season.

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According to Kemah and Thiruchelvam (2008) there are significant differences in resource use for paddy in Anuradhapura across major, medium and minor irrigation regimes. Under major irrigation schemes seed, fertiliser, labour and power have significant effects on paddy productivity with elasticity values of 0.129, 0.2198, -0.313 and 0.864 respectively. Under medium irrigation conditions labour was found not to be significant. While, minor irrigation cultivation responded only to fertiliser and power. Bandara *et al.* (2012) revealed that Trincomalee paddy production under minor irrigation was more responsive to land, labour, hired labour, fertiliser, chemical, machinery and off-farm income. Bhavan and Maheswaranthan (2012) revealed that in Batticaloa paddy production is significantly affected by land, fertiliser application and pesticide application with 0.0001, 0.492 and 0.359 elasticity values.

It is review that data used for the analysis were from smaller geographical areas during the given years or a season and hence the results cannot be generalised for the country. The policy agenda towards agriculture of the country is gradually changing and a direct impact on input market is observed. For example fertiliser subsidy has converted to cash transfer system and imports of pesticide (Eg: Glyphosate) has been banned. Further, huge labour migration out of agriculture is also evident since other industrial development is given priority in development activity in Sri Lanka. Against this backdrop, the investigation of resource supply and usage in agriculture, especially in paddy production, at national level is a timely and valuable area of research. The objective of this study is to examine the resource-use pattern in paddy production in Sri Lanka for 2005-2015. It uses data from major paddy growing areas of the country covering both *Yala* and *Maha* seasons, as well as areas both rain fed and irrigated.

Methodology

A multiplicative function was specified in the following form to depict the technical relationship between input and output.

$$Y = \alpha\, MC^{\beta_1} SD^{\beta_2} LB^{\beta_3} UR^{\beta_4} TSP^{\beta_5} MOP^{\beta_6} EXP^{T\beta_7} EXP^{S\beta_8} EXP^{I\beta_9}$$

Where,
Y: Average yield (kg/acre)
T: Trend (2005=1,…,2015=11)
S: Season (0=*Maha*, 1=*Yala*)
I: Irrigation schema (0=Rain Fed, 1=Irrigated)
MC: Real Machinery Cost (Rs./acre)
SD: Seed Rate (Kg/acre)

LB: Labour (Man days/acre)
UR: Urea (Kg/acre)
TSP: Triple Super Phosphate (Kg/acre)
MOP: Murat of Potash (Kg/acre)

The above data for the period from 2005 to 2015 was gathered from the Cost of Cultivation (COC) reports from the Department of Agriculture. The reports are issued twice a year for *Maha* and *Yala* separately. Both cost and quantity of various resources used in paddy cultivation are included. Three-stage sampling procedure is adapted in selecting farmers, where, at the first stage representative districts are selected based on distribution of cultivated extent under different irrigation regimes (irrigated and rain fed), secondly Agrarian Service Centers (ASC) which cover at least 51% of total cultivated extent within districts are selected . Finally specified numbers of farmers (50 farmers up to year 2008 and from 2009, 30 farmers) are randomly selected from identified Agrarian Service Centers (ASC) for the gathering of data and then district average values of inputs and outputs of paddy production are included in the COC reports. The reports contain both dry zone and wet zone paddy-producing districts, covering specific agr-ecological zones (AEZ) in Sri Lanka. The different districts included in the reports are namely Ampara (East and West), Anuradhapura, Hambantota, Kurunagala (Irrigated and RF), Mannar, Polonnaruwa, Mahaweli (B, C, H), Trincomalee, Gampaha, Kalurata, and Kandy. The unit of observation is the District and number of observation units was 243. The function was estimated using a robust estimation to correct for heteroskedasticity treating the dataset as an unbalanced panel.

Results and discussion

Descriptive statistics

According to descriptive statistics, average productivity of paddy cultivation was found as 1897.14 kg per acre (CV=0.23). Machinery usage for the cultivation is given as expenditure on machinery and average machinery cost was Rs 5097.61 per acre with a coefficient of variation of 0.23, indicating huge variation in the investments on machinery in paddy production in Sri Lanka. Seed is the most basic input in production and seed paddy rate has been found to vary among observations with an average seed rate of 49.8kg per acre (CV=0.26). Labour in paddy cultivation is recognised as a combination of family and hired labour. On average a paddy producer employs 25 man days (CV=0.30) during a given season.
Fertiliser application is essential for the supply of nutrients and the proper growth of paddy in order to ensure maximum potential productivity. Urea, TSP and MOP are identified as major fertiliser groups applied in paddy cultivation as supplements of

N, P and K nutrients respectively. Among others, the quantity of urea application is primary with average application level of 92.5 kg per acre (CV=0.25). On the other hand, TSP application is on average 31.86kg per acre (CV=0.23) while MOP application is 32.76kg per acre (CV=0.22) by an average farmer cultivating paddy in Sri Lanka.

Estimates of production function analysis

The results of the estimation of the production function indicate that the model specified explains 77.56 percent of the variability as per the R-square value. The season of cultivation, method of irrigation, seed rate applied and urea application have a statistically significant and positive effect on paddy productivity. The coefficients of the multiplicative function are the input-use elasticities. Among all inputs employed in paddy production, urea application is elastic with value of 0.228. Next to this, the seed rate is shown as the second mostelastic factor in paddy production. TSP application and labour are inelastic. The elasticity values for all the inputs are presented in Table 1. They imply that returns to scale or the sum of factor elasticities in paddy production was 0.423, suggesting that when all inputs are increased by one per cent, the resulting paddy production would change by less than one percent.

Table 01: Estimates of Production Function

Variable name	Mean	SD	Coefficient	Robust S.E	t value
Machinery Cost	5097.6	1166.49	0.032	0.083	0.38
Seed	49.81	12.93	0.215**	0.050	4.26
Labour	25.0	7.5	-0.006	0.074	-0.09
Urea	92.48	23.11	0.229**	0.053	4.34
MOP	32.72	7.2	0.030	0.050	0.60
TSP	31.86	7.2	-0.075	0.054	-1.39
Trend			0.007	0.004	1.65
Season			0.027*	0.016	1.66
Irrigation			0.335**	0.037	9.03
Constant			5.261*	1.045	5.03

*: Significant at 10%, **: Significant at 5%

Conclusions

Over time, resource use has differed, and it is recognised that only machinery cost is increasing, while labour shows a decreasing trend similar to all fertiliser categories

(urea, TSP and MOP). Seed rate fluctuation is minimum and follows constant levels in paddy production.

The results of the estimation reveal that resource use pattern in paddy cultivation is characterised by decreasing returns to scale, and seed rate and urea application have positive and significant effects on paddy productivity: suggesting that further application of urea and seeds would result in higher yields. When controlled for other inputs, paddy productivity is higher in *Yala* than that *Maha,* and irrigated areas are more productive than rain-fed: areas suggesting that expansion of cultivation in irrigated areas in *Yala* would result in better yields.

Key words: Paddy production, Production function, Elasticity, Sri Lanka

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Price Volatility of Vegetable Farming in Sri Lanka: With special reference in up country Vegetable Farming in Nuwara Eliya District in Sri Lanka:

G. M. Henegedara[1] and A. M. N. J. Abeykoon[2]

Introduction

Price fluctuations and changes in farm income becomes one of the core issues for sustaining small farmers in developing countries. Gravity of the issue varies from countries to country as the nature of production and the remedies followed to mitigate the issue. As the agro based economy that cultivate almost all the food requirements i.e. paddy and vegetables, Sri Lanka is also seriously affected by price fluctuations for long period. It has greatly influenced in livelihood of small farmers as well as the domestic food consumption leading to make macro-economic imbalances. Nearly 700,000 farmers in Sri Lanka were engaged in paddy and vegetable farming in 2015 and the median monthly income of rural sector was Rs, 23,126 in 2012. On the other hand, nearly 40 percent of consumers' monthly income is spending for food consumption especially for food items i.e. rice and vegetables (Department of Census and Statistics, 2012/13). Thus any effect of change in prices of food crops were badly influenced on income and living pattern of producers and the consumers of the country.

The factors influenced in price variation of food crops were mainly related with physical and climatic factors, and decisions taken by growers accordingly (Lekhi, R. K. and Singh, J. 2004). The literature of price behavior and supply response for food crop agriculture showed that prices of agricultural commodities determined on the variation of supply pattern, which occurred due to production gap associated with seasonality and time lag existed for producing agricultural commodities (Ellis, F. 1994). Cobweb theorem is one of the diagnostic tool used for analyzing price fluctuation in agricultural commodities. The theory explains price instability under three scenarios i.e. convergent fluctuations, divergent fluctuations and constant fluctuations. Though theory provide sufficient coverage to explain the kinked output path of agricultural commodities, the empirical evidences with respect to the price and supply variations in paddy and vegetable farming in Sri Lanka reflects that convergent and constant fluctuations exist in vegetable and paddy farming despite technological innovations initiated by policy makers (Gunawardena, P. J., and

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Chandrasiri, A. 1980). Hence the price instability has negatively affected for deteriorating farm income and sustainable farming.

Objectives

The main objective of the study is to examine the oscillation pattern of vegetable farming in Sri Lanka in view of reviewing factors influenced for the price volatility and its impact on vegetable supply to the market. The analysis was focused on examine Cob –Web theorem presented by Nicholas Kaldor in 1934 and exploring the issues that affected for sustainable farming.

Methodology

The methodology of the study was based on the deductive method in relation to statistical analysis centered on primary and secondary sources of information. Primary data were collected from 70 farmers who cultivated vegetable crops in Kandapola Divisional secretariat area of Nuwara Eliya District. Non random sampling method Used for selecting sample and a questionnaire was used for collecting primary data. Secondary data were collected from the annual reports of Central Bank and the reports of Census and Statistics department. Bar chart, pie chart and line chart were used for represent the data. Descriptive statistics and SPSS software were used to analysis data.

Analysis

The linear regression model were developed to examine to objective of this study. The model is,

$$Y_i = ß_0 + ß_1X_{1i} + ß_2X_{2i} + ß_3X_{3i} + ß_4X_{4i} + ß_5X_{5i} + U_i$$

Y_i = Sale Price of vegetable that cultivated as the main crop in the respective season
X_{1i} = Sale Price of vegetable that cultivated as the main crop in the last season
X_{2i} = Main vegetable cultivated in the respective season
X_{3i} = Market Price of vegetable that cultivated as the main crop in the respective season
X_{4i} = Total cost of production of vegetables cultivated in the respective season
X_{5i} = Number of cultivated crops
U_i = Error term

In the model, there are five independent variables in the right-hand side of the equation against the sale Price of the crop that cultivated as the main vegetable crop in respective season, which is the depend variable used to archive the objective of the study.

Table 1: Model Summary

		Change Statistics			
R	R Square	F Change	df1	df2	Sig. F Change
.929[a]	.864	81.167	5	64	.000

The model summary in table 1 indicates that change of F statistic (0.000) is statically significant at 5% significant Level. It means that fitness of the model is statistically significant at highest Level. The Value of R Square is 0.864 it implies that total variation of dependent variable adequately explained by the independent variables included in the model.

Table 2: coefficient

	Coefficients		
Model	B	t	Sig.
(Constant)	.946	.137	.892
Sale Price of main vegetable in the last season	.445	7.142	.000
Main vegetable cultivated in the respective season	-1.684	-1.348	.183
Market Price of vegetable that cultivated as the main crop in the respective season	.408	4.344	.000
Total cost of production of vegetables cultivated in the respective season	1.20	.721	.474
Number of cultivated crops	-1.787	-.814	.419

According to the Table 2 the model is,

$Y = 0.946 + 0.445X_1 – 1.684X_2 + 0.408X_3 + 1.204X_4 – 1.787X_5$

Table 2 represent that $ß_1$ and $ß_2$ are statistically significant at 5% significant level and $ß_3$, ß4, $ß_5$ are not statistically significant at 5% significant level. Therefore the Sale Price of vegetable that cultivated as the main crop in the last season is more affected to Sale Price of vegetable that cultivated as the main crop in the respective season than the other independent variables.

Findings

The results empirically proved the cobweb theorem indicating that present market prices of up country vegetables were determined on the sale prices of previous season. It also revealed that majority of farmers are small producers that behave as price takers rather than price determinants. Cultivation is featured with mixed cropping system determine on harvesting time and quick return rather than organized and planned cultivation. It also found that such type of mixed cropping pattern minimized the risk of cultivation in very small farms.

Key words: Price volatility, vegetable farming, small Farmers, Supply and demand

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A Meta analysis of Contingent Valuation in Environmental Quality Studies

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Introduction

Environmental quality is one of the major apprehensions in today's climate change forums. The importance of environmental quality has been questioned in many papers with respect to the well being of humans. From a welfare perspective, ecosystems provide countless goods and services. The objective of this meta-analysis of contingent valuation (CV) studies is to assess the marginal value of the different environmental management programmes providing certain environmental goods and services. There is much literature with respect to the CV of different environmental quality studies. In a similar fashion, the present study fits the results of multiple valuation studies of environmental quality management programmes.

Data Description

An exhaustive search of studies has been conducted in different databases including ECONLIT, EVRI, ENVALUE, and AGECONSEARCH. All studies are primary studies with the application of CV approach in environmental quality management. As a consequence of limited availability, the final data used for the Meta analysis comes from 42 studies (Refer to the table 1 in the Appendix). Homogenising all information, values were transformed to a standard measure, per year or one-time payment, per household and per individual, and transferred into current US dollars. The majority of the previous meta-analyses have used the mean instead of the median estimates (Smith and Osborne, 1996; Loomis and White, 1996; Horowitz and McConnell, 2002). However, with the objective of assessing whether there are differences in the factors affecting both welfare measures, two common models are estimated. The Willingness to Pay (WTP) values are expressed as in 2016 US$ updating them through purchasing power parity (PPP) rates.

Model Specification

The dependent variable in the Meta Regression (MR) function is a vector for WTP values, labeled as y. Given that in previous studies of MR, the independent variables were categorised into environmental goods/services, environmental quality characteristics, study characteristics, and socio-economics following Brender *et. al.* (2006), the following semi-log MR function was estimated.

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The following baseline and extended models were established for estimating the regression coefficients for independent variables.

$$\ln y = \alpha + \beta_1 Env\_good_j + \beta_2 Env\_serv_j + \beta_3 Envn\_Qty_j + \beta_4 socio\_econ + e_j$$

The empirical estimation for the extended model is defined as;

$$\ln y = \alpha + \beta_1 Env\_good_j + \beta_2 Env\_serv_j + \beta_3 Envn\_Qty_j + \beta_4 stud\_char + \beta_5 study\_purpose + \beta_6 socio\_econ + e_j$$

The use of an extended model is useful since it controls for many independent variables in the estimation than the baseline model does. For the extended model, the same types of explanatory variables are included as in the previous models, in addition to a new set of variables.

Results

The following table (2) (refer Appendix) provides the variable description and summary statistics in the study. It presents the explanation of dependent and exploratory variables.

Regression results are displayed in Tables 3 and 4 (Refer Appendix). The first table presents the results for the baseline model. The model fits the data with adjusted R^2 of 0.783, explaining 78% of the variability of dependent variable by the independence variables. In all regressions, the estimated coefficients measure the percentage change in the dependent variable, given a one-unit change in explanatory variables. The results reinforce several consistent findings across the mean WTP regressions. In certain instances, the direct use of environment goods and services play a statistically significant role when valuing environment quality management programmes. In addition, other socio-economic variables such as the country's GDP and the period of study are also positive and statistically significant in determining WTP estimates. Furthermore, the extend of land has a negative impact on WTP estimates. In addition, agricultural quality, forest, man-made environment, water quality studies show significant positive relationships with WTP estimates.

Table 4 contains the results of the extended model, with the mean WTP as the dependent variable. The results show that the model fits the data quite well, with an adjusted R^2 of 0.69. Regarding the main variables of interest, a positive effect of the different environmental goods values on WTP estimates can be identified. The report, journal, Sweden, and GDP variables have a positive effect on the mean WTP and statistically significant at the 5% significance level. Variables such as specific valuation method and environmental services carry a positive coefficient but are not

statistically significant. In testing restrictions in the extended model, the result was an F statistic of 9.79 with degrees of freedom of (5, 42) and a p-value of 0.0000. This joint null hypothesis that these five variables are not significant could be rejected at the 1% level, justifying their inclusion in the regression. An environmental prevention programme that implies an avoidance of damage to general environmental quality carries a positive effect on WTP at the 5% level of significance. This provides that programmes with the objective of environmental protection generate a WTP estimate higher than those that made improvement outside the stated purpose of protecting environmental quality. Furthermore, the zero eutrophication and sustainable forestry have a positive and statistically significant at 5% results imply that the programmes with those objectives produce positive results in estimating the WTP.

In particular, agricultural landscape quality, forest quality, man-made environmental quality and wetland quality are significant at 5% level in the extended model, but wetland quality is negatively related to WTP estimates. It implies that the environmental quality programmes are highly associated with WTP measures in those studies. Moreover, the study characteristics also show positive relationship in estimating the WTP values including sample, method of WTP estimation and value function, and those are also significant positively at 5% level. Finally, the margin is predicted using Delta method that accounts for 3.142 (p=0.0000).

The environmental quality variables are shown a significant impact on estimating the WTP of the programmes. However, the positive and negative relationships of the environmental goods and services can be illustrated with the following graphs. Graphs 2 and 3 (Appendix) present the density of studies with respect to WTP values.

The positive relationship between the distribution of environmental goods and WTP values can be predicted by the individual density function of Graph 2,while a negative relationship between the distribution of the environmental services and WTP values can be predicted in the individual density function of the graph 3.

The estimation inputs cell frequencies for each study the mean and standard deviation in each group (for numerical outcomes), or the effect estimate and standard error from each study. Further it provides a comprehensive range of methods for meta-analysis, including inverse-variance–weighted meta-analysis, and creates new variables containing the treatment effect estimate and its standard error for each study. All the meta-analysis calculations available are based on standard methods (Deeks, Altman, and Bradburn, 2001).

The overall effect of WTP on the sample sizes of the studies is 3.01: ranging from -55.99 to 62.01 under 95% confidence interval. Testing I^2 for heterogeneity shows 0.08% given that the better study results of low variability among the studies. The overall effect for the response rate is 3.23 ranging from -17 to +23.47. Testing I^2 for heterogeneity shows 0.14% given that the better study results of low variability among the studies.

Conclusion

This study presents a comprehensive review of CV in environmental quality studies through a meta-regression accounting for the identification of the main determinants of programme valuation of ecosystem services. In this meta-analysis, the marginal value was estimated for different management programmes that provide a variety of environmental goods and services. The results show that the estimates for environmental quality management programmes are sensitive to the programme's objectives, particularly when linked to the provision of environmental goods and services. Other variables such as the type of forest, location, survey mode, or the type of respondent were also found to significantly affect the WTP estimates. From the study, it can be recommended that the environmental policy programmes related to the quality of the environment need to be adequately addressed in the wetlands, as well as with respect to the quality of air, water and forests.

Keywords: Meta-analysis, Environmental Quality, Contingent Valuation

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‘Reflects The Hidden’: Measuring Sri Lankan Shadow Economy

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Introduction

The existence of a large shadow economy typically poses difficulties in any stage of development in a country, irrespective of the process development in a adopted by it. This may distort and undermine the true picture of public finance and discourage the labor force in the formal economy. As a result of this, workers and producers in the shadow economy do not pay taxes but use public services. These free riders reduce the quantity and quality of public goods and services. Moreover, they pose obstructions to people who pay taxes and discourage them from acting in accordance with law. Impacts on taxation and unemployment are key determinants (Dell’Anno and Solomon, 2008, Schneider et.al, 2010, Davidescu and Dobre, 2012) in measuring the size of shadow economy. In the context of Sri Lanka, Samaranayake and Dayaratna-Banda (2015) had made an attempt to estimate the size of theshadow economy as a percentage of GDP. Within that they found ‘underemployment’ to be a factor which determines the nature of shadow economy. Moreover, unemployment rates are failed to reflect the true extent of the employment problem in today’s socio-economic conditions (Sengenberger, 2011). In fact, unlike developed economies, developing nations generally experience issues with the underutilization of skills of their labour forces. This may lead to the absorption of underutilized workers in to the shadow economy. However, a robust theoretical justification for this treatment of the rate of underemployment as a causal factor is necessary. The theoretical reasoning by Samaranayake (2016) proposes the use of the rate of underemployment as a novel determinant in estimating the Sri Lankan shadow economy.

Objective

The objective of this study is to estimate Sri Lankan shadow economy for the period 1990-2015, using the rate of underemployment as a novel determinant.

Methodology

This study used Structural Equation Methodology (SEM) to estimate the size of shadow economy for the period 1990-2015. Methodology includes Multiple

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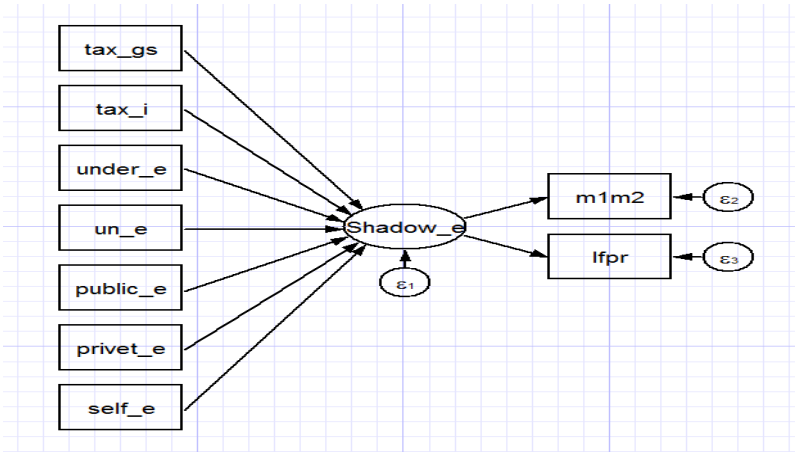
Indicator Multiple Cause[2] (MIMIC) models with two types of equations, the structural equation and the measurement equation. The path diagram of the Structural Model has been developed through combining both equations to explain the unobserved variable. Structural equation consist seven causal variables and measurement equation with two indicators.

Figure 1: The MIMIC model path diagram with causal variables and indicators



Source: Author Preparation

Required data were obtained from Annual Reports of the Central Bank of Sri Lanka, from the World Bank Data base, and from the Annual Reports on the Labor Force Survey conducted by the Department of Census and Statistics. The models were estimated using STATA-13 statistical software. The best structural models were chosen to calculate shadow economy as a percentage of Sri Lankan GDP from benchmark equation. This equation can be simplified as below,

$$[\tilde{\eta}_t \times [\eta^*{}_{base} / \tilde{\eta}_{base}]] = \hat{\boldsymbol{\eta}}_{\boldsymbol{t}} \qquad (2)$$

Where $\tilde{\eta}_t$ for value of structural calculation as a percentage of GDP from the selected MIMIC model for year t, $\eta^*{}_{base}$ for average size of the previous estimations of shadow economy in the base year, $\tilde{\eta}_{base}$ for value of the structural calculation from the selected MIMIC model for the base year and $\hat{\eta}_t$ for size of the shadow economy as a percentage of GDP in Sri Lanka.

[2]The Multiple indicator multiple cause model (MIMIC) has its basis from factor analysis of psychometrics and its revelation in economics is through the latent variable models of Zellner and Goldberger in 1970's.

This study introduces underemployment as a determinant (causal variable) for thedevelopment of a path diagram to estimate the size of shadow economy in Sri Lanka. Study uses values for each proposed determinant from 1990 to 2015. But data for the rate of underemployment was available only during the 2006 to 2014 period from the Annual Labour Force Survey (LFS) reports of Department of Census and Statistics. Therefore, data series for underemployment rate is predicted on average for other time periods (from 1990-2005 and 2015) using simple calculations.

$$\sqrt{\frac{\sum_{i=2006}^{2013}(UNDER\_E_i - UNDER\_E_{i+1})^2}{n}} = \mathbf{D}\ldots\ldots\ldots (1)$$

$$Estimation\,(E_i) = \begin{cases} UNDER\_E_{i+1} + D \;if\; i < 2006 \\ UNDER\_E_{i-1} - D \;if\; i = 2015 \end{cases}$$

The above equation is used to calculate average estimates for the rate of under employment as a prediction while use the trend of given values from 2006-2014. Here, E_i are the estimations for missing values of underemployment where *'i'* represent each year. Within the equation, 'D' is used as an average for lags of given values over time, and '*n*' as the number of lags of given years before the estimations.

Results and Discussion

The approximate data set with both estimated and given values for underemployment from 1990 to 2015 varies between 14 to 2 with a decreasing trend due to the average lag (D) 0.55 for differences in underemployment rates during the given years. Thereafter, each and every causal variables and measurement variable is tested for the unit root test (ADF) and all are stationary under I (1) process.

After setting all variables accurately, 16 different MIMIC models have been run to find the fitted models. Proxies of model selection criteria are taxation on goods and services, taxation on income and profits and underemployment. Results were assigned two fitted models (See annexure 1) to perform the benchmark calculations. MIMIC 5-1-2a is a model with five causal variables and two indicators which can depict the existence of the Sri Lankan shadow economy. All causal variable and indicators are significant under 99% of confidence level as in the results. Structural

results illustrate strong positive coefficients for under and self-employment. Even both types of taxation and unemployment demonstrate positive coefficients. On the other hand the shadow economy indicates a positive relationship to indicators LFPR and the M_1/M_2 ratio. MIMIC 7-1-2 includes seven causal variables and two indicators. Underemployment and self-employment are given strong positive coefficients similar to results of MIMIC 5-1-2a. Both types of taxation are given positive coefficients of below 95% confidence level. Unemployment, public employment and private employment are not significant under 95% of confidence level. Therefore, only four causal variables are considered under this model. On the other hand, the shadow economy indicates a positive relationship with LFPR and a negative relationship with the M_1/M_2 ratio.

Then the benchmark calculations obtain three sets of estimations to estimate the average size of the Sri Lankan shadow economy as a percentage of GDP. Calculations for both MIMIC models give similar results with a decreasing trend from 1990 to 2015. Estimates were distributed over 40 percent of GDP (See annexure 2).

Conclusion

Then the comparison of estimated values with the size of shadow economy is done separately with two types of taxes, underemployment and self-employment. Both estimates for shadow economy prove the theoretical implication of a positive relationship between taxation and shadow economy (See annexures 3&4). As a result, taxation on goods and services (indirect taxes) will make a significant impact on shadow economic activities, because higher the indirect taxes may lower the purchasing parity of people and majority of them fail to find alternatives within the formal economy to improve their income, the burden placed on the public will encourage them to complement formal-sector earnings by engaging in shadow economic activities.

Therefore the Government needs to think twice about the regressive tax system which has long persisted in Sri Lanka. In the context of taxes on goods and services, tends to implies positive impact as a causal variable to determine the size of shadow economy but relatively low in strength to determine the behaviour of estimated values. The positive impact from under-employment as a causal variable is very higher to determine the size of shadow economy and relatively good in strength (but not at all) to determine the behaviour of estimated values. Because estimated values for the shadow economy demonstrate a negative trend, the behaviour of both variables represent similar trends but with different slopes (See annexure 5). However, the current status of Sri Lankan labour market indicates a decreasing trend for underemployment. This appears a favourable trend which the Government should sustain in order to decrease the size of shadow economy.

The behaviour of self-employment and the size of shadow economy represent different trends but with high correlation (See annexure 6). The high coefficient with positive impact in determining the size of shadow economy describes more of the behaviour of estimated values. Therefore, the Government should continue their work to decrease the number of self-employed people from the informal sector and to encourage them to engage with the official market economy. On the other hand, self-employed people from official economy should be clearly accounted under the Government tax collectors, since the Government can then improve their tax income without posing a further burden on consumers with new tax reforms.

Keywords: Benchmark Calculations; MIMIC Models; Shadow Economy; Under-employment

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Contemporary Studies

Informal Employment among Youth in the Post-War Northern Economy

N. Balamurali[1] and Priyanga Dunusinghe[2]

Introduction

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 the other aspirations of youth. Although the labor force has become more educated, the main source of employment for both youth and adults remains the informal sector: a trend which is particularly marked among youth. 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 economy (IE) 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. IE 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).

This study aimed to find out the role of Informal Economy in the Northern Province. The Northern and the Eastern Provinces were severely affected by the protracted armed conflict in Sri Lanka. The final battlefield of the civil war was in the Northern Province. Hence, the unemployment related problems are common among youth in this region because a significant number of youth ex combatants were rehabilitated by the Government. Importantly, the IE plays an important role in the Northern Province as NGOs and Government institutions have been continuously engaging in reducing poverty and restoring livelihoods. Therefore, a larger proportion of youth tend to start their own income-generating activities with institutional support. This study started with the research problem when it was found that a larger share of employed youth in the Northern Province engages in IE. Hence, the researcher wanted to identify characteristics of youth who engage in the IE in the Northern Province'

Objective

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Contribution of the IE is inevitable in the Northern Province particularly in the post-war economy. However, IE is considered an inferior economic sector compared to the Formal Economy. Hence, analysing the contribution of the IE to youth employment in the Northern Province was the prime objective of this study.

Methodology

The study area, the Northern Province of Sri Lanka, 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) and percentage values to explore the above statistical relationship as a preliminary analysis to present the data. This study used only youth who are between 15 years to 29 years, and the researcher purposively omitted full-time 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 extracted from the micro level data was 9,703 in 2011, 10,213 in 2012, 12,601 in 2013 and 12,606 in 2014.

Results and Discussion

Contribution of IE in the Northern Province has been continuously declining during the last four years. However, IE still plays a significant role as 43.9 per cent of employed youth are engaged in the IE in the Northern Province where it is 35.2 per cent in the country in 2014. It admits that IE covers a larger share of workers in the Northern Province than at the national level. The contribution of IE gradually declined by 9.1 per cent and 7.3 per cent from 2011 to 2014 in the Northern Province and Sri Lanka respectively. Except the Mannar district, all the other districts in the Northern Province show a slight decline in the share of IE. In 2014, share of IE was 60.6 per cent in the Mannar district, and it was 46.7%, 43.4%, 41.7%, and 34.0% in the Mullaitivu, Kilinochchi, Jaffna and Vavuniya districts respectively. Hence, Vavuniya district represents the lowest share of IE in the Northern Province. It is obvious that the 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 the level of education, there is a clear evidence on the relationship between the level of education and IE. IE activity is

predominant among the poor educated whereas the highly educated tend to engage in the formal economy. Share of IE employment among female youth declined faster than males during the study period. That is, it declined by 5 per cent among male youth and 24 per cent among female youth. As at 2014, Share of IE was 47.4 for males and 42.5 for females. The study found that share of IE increases as age increases. Particularly it is relatively higher among youth who are between 25 and 29 years old. IE largely covers four industries in the Province as well as the country: skilled agricultural and fishery workers; craft and related workers; plant and machine operators and assemblers; and elementary occupations. Skilled agricultural and fishery industries in the country covered 43.9 percent of IE in 2011 and it declined to 31.1 in 2014 while in the Northern Province, it declined from 57.1 percent to 31.7 percent. It shows that the contribution of skilled agriculture and fisheries to the IE declined by 12.8 percent in the country while it declined by 25.4 percent in the Northern Province. During the period from 2011 to 2014, the share of craft and related workers in IE increased by 4.4 percent from 16 percent to 20.4 percent in the country while it increased by 3.7 percent from 14.6 to 18.3 percent in the Northern Province. Contribution of plant and machine operators and assemblers to the IE increased in the country by 1.3 percent from 11.9 percent to 13.2 percent while it dropped by 0.4 percent from 8.3 percent to 7.9 percent. However, the contribution of elementary occupations is dramatically increased in the Northern Province than the National level. That is, it increased by 8.8 per cent from 11.1 percent to 19.9 percent in Sri Lanka while it increased by 24.4 percent from 6.8 percent to 31.2 percent in the Northern Province. Informal workers earn a considerably lower income on average than formal workers. The average monthly income of informal workers is Rs. 13,378.46 where the formal workers' average income is Rs. 14,166.03. This study found that although IE plays an important role in reducing unemployment, the economic condition of informal workers is lagging behind formal workers. Job insecurity and economic vulnerability associated with IE should be taken into serious consideration.

Conclusion and Policy Recommendation

The study revealed that although IE has been declining during the study period, still it covers a larger share of youth, and accordingly reduces youth unemployment in Sri Lanka. Particularly IE covers a larger proportion of youth in the Northern Province than in the country as a whole. Four industries in the Province as well as across the country: skilled agricultural and fishery workers; craft and related workers; plant and machine operators and assemblers; and elementary occupations are the main industries that render IE a dominant economic source for youth in the Northern Province. Share of IE among female youth declines faster than males

during the study period. This reveals that female youth tend to undervalue IE or they are eagerly expecting formal economy. Vavuniya district represents the lowest proportion of IE whereas the Mannar district represent the largest proportion in the Northern Province. Youth participation in IE increases as with age. Particularly it is relatively higher among the youth who are between 25 and 29 years old. There is a clear evidence for the relationship between level of education and IE. IE seems to be the only option for less educated youth: a bulk of youth in IE are less educated. Although IE provides employment opportunities for a larger youth population, workers in IE earn considerably lower income on average than the formal workers do. That is, the economic condition of informal workers is lacking behind formal workers. Job insecurity and economic vulnerability associated with IE should be taken into serious consideration. Hence, IE should be promoted to a desirable level as currently it does not economically upgrade the youth population to a satisfactory economic level. Since a larger majority of youth in the Northern Province engage in IE, a larger number of youth employed in the IE encounter economic hardships. These 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.

Keywords: Economic Vulnerability, Informal Economy, NorthernProvince of Sri Lanka, Youth Unemployment.

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Short- Term Forecasting Of Tourist Arrivals to Sri Lanka from Asian Region

K.M.U.B Konarasinghe[1]

Introduction

Tourism has existed since the beginning of the time, motivated at first by food, water, safety, or acquisition of resources (trade). Today, tourism is a collection of activities, services, and industries which deliver a travel experience, including transportation, accommodations, eating and drinking establishments, retail shops, entertainment businesses, and other facilities and hospitality services provided for individuals or groups traveling away from home.

Tourism is one of the largest and fastest-growing industries in the world. According to World Travel and Tourism Council Reports (WTTC), the total contribution of travel and tourism to world GDP was 9.8% in 2014. Sri Lanka has a long history, as a highly attractive tourist destination due to various reasons. The Sri Lankan tourism industry has experienced a boom since 2008. The contribution of travel and tourism to the Sri Lankan GDP were LKR 462.1billion: 4.8% of the total in 2014 (WTTC, 2014). The Sri Lankan market receives tourists from all regions of the world, but is dominated by the Asian region.

Research Problem

Short term forecasting plays a vital role in the process of operational decision making in the tourism industry. Nisantha and Lelwala, (2011) (2011); Diunugala (2012); Konarasinghe (2015) and Konarasinghe (2016-a) have attempted to forecast total number of international tourist arrivals to Sri Lanka in the short-term. It is a known fact that expectations of tourists are not same for all regions. As such it is necessary to forecast the number of arrivals regionally, in order to satisfy the expectations of customers and to obtain the optimum benefits to the country. However, it was difficult to find any study which focused on regional forecasting of short-term arrivals.

Konarasinghe (2016-a, and 2016-b) confirmed that there is an increasing trend of tourist arrivals from the Asian region. Also, Konarasinghe (2016-b) has shown that the number of arrivals from the Asian region is significantly different to other regions.

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Objective of the Study

In view of the above, the study was focused on identifying suitable short term forecasting techniques to arrivals from Asian region to Sri Lanka.

Significance of the Study

Tourism is the third highest foreign income generator to the Sri Lankan economy (SLTDA, 2014). It provides diverse benefits to the country. The Sri Lankan economy can expect more benefits from the Asian arrivals due to the high headcount. However, these benefits will depend on effective forecasting. The results of this study could be applied to forecast arrivals from the Asian region. It will be a lighthouse for supply and demand management and policy development, and facilitates the satisfaction of customer needs and wants with optimum benefits.

Methodology

Monthly tourist arrival data from Asian region for the period from, January 2008 to December 2014 was obtained from Sri Lanka Tourism Development Authority (SLTDA). The Smoothing techniques; Moving Average (MA), Exponential Smoothing (ES) and Winter's Methods were tested in the model fitting process. The Residual plots, Anderson-Darling test and Auto-Correlation Function (ACF) were used as a model validation criterion. Mean Absolute Percentage Errors (MAPE) were used to select a suitable fitting model.

Results

Data analysis of the study consists six parts;

I Test Moving Average (MA) models
II Test Exponential smoothing models
Single Exponential Smoothing (SES)
Double Exponential Smoothing (DES)

Test Holts Winters three parameter model

Test Moving Average (MA) Model

The MA model is;

$$F_{t+1} = \frac{1}{n} \sum_{i=t+1-n}^{t} Y_i \qquad (1)$$

Where; Y_t = Observed value of time t, F_t= Forecasted value of time t

The model fitting process begins with Moving Average (MA) models. Single and centered MA were tested in various lengths. Table 1 shows the summary of output results. The MAPE of all the models is around 1.2%. The residuals of the models

were normally distributed but not independent (Correlated), as such MA does not meet the validation criterion.

Table 1: Model Summary of Moving Average Models

Model	MAPE	Normality (P–value)	Independence of Residuals
MA 2	1.21157	0.520	No
MA 4	1.20534	0.117	No
MA 2*3	1.25048	0.608	No
MA 2*4	1.26312	0.085	No

Test Exponential Smoothing Model The SES model is;

$$F_{t+1} = \alpha Y_t + (1-\alpha)F_t \quad (2)$$

Where, Y_t = observed value for time period t , F_t= fitted value for time period t, α = weighting factor.

The DES model is;

$$\begin{aligned} L_t &= \alpha Y_t + (1-\alpha)(L_{t-1} + T_{t-1}) \\ T_t &= \beta(L_t - L_{t-1}) + (1-\beta)T_{t-1} \\ \hat{Y}_t &= L_{t-1} + T_{t-1} \\ F_{t+m} &= L_t + mT_t \end{aligned} \quad (3)$$

Where, L_t : is the level at the end of period t , α is the weight of level, T_t = is the estimated trend at the end of period t, β is the weight of trend, m = is the forecast horizon. The SES and DES models were tested for various levels of the model parameters. The seasonal length is taken as 2.

Testing SES models are the second step of the smoothing techniques. SES models were tested for various α (level) values. The seasonal length is taken as 2. The residuals of each model were tested for normality and independence by Anderson-Darling test and ACF respectively.

Table 2: Model Summary of Single Exponential Smoothing Models

Model (α)	MAPE	Normality (P-Value)	Independence of Residuals
0.3	1.28653	0.327	No
0.4	1.23858	0.371	No
0.5	1.23793	0.537	No

Table 2 shows the summary of output results. MAPE of all the models is around 1.4%. The residuals of the models were normally distributed but not independent (Correlated).

Testing DES models is the third step of the smoothing techniques. DES models were tested for various α (level) and γ (trend) values using trial and error methods. The seasonal length is taken as 2. Residuals of each model were tested for normality and independence by Anderson-Darling test and ACF respectively. Table 3 shows the summary of output results. MAPE of all the models is below 1.6 %. The residuals of models, α = 0.77 and γ = 0.77 are not normally distributed P = 0.039 (P < α). But residuals are independent. The residuals of models, α = 0.72 and γ = 0.72 are normally distributed P = 0.079 (P < α) and residuals are independent too. Similar results shown by the model of α = 0.73 and γ = 0.73.

Table 3: Model Summary of Double Exponential Smoothing (DES)

Model (α)	Model (γ)	MAPE	Normality (P – Value)	Independence of Residuals
0.77	0.77	1.58463	0.039	Yes
0.72	0.72	1.54457	0.079	Yes
0.73	0.73	1.54890	0.067	Yes

The residual plots and ACF were obtained to test the modeling assumptions. Figure 3 is the of the residual plots and Figure 4 is the ACF belongs to the DES model with least MAPE. Histogram of the residual plot of figure 3 looks symmetrical, errors are symmetrically distributed. Normal probability plot of residuals and Anderson-Darling test confirm that errors normally distributed. The graph of residual versus fitted values shows that they are uncorrelated. The plot of the residuals versus order of the data shows residuals are random. ACF of figure 4 shows the spikes are not significant. It is another evidence for independence of the residuals. It is very clear that DES with α = 0.72 and γ = 0.72 is suitable for forecasting arrivals in the short term.

Figure 3: Residual Plots for DES model

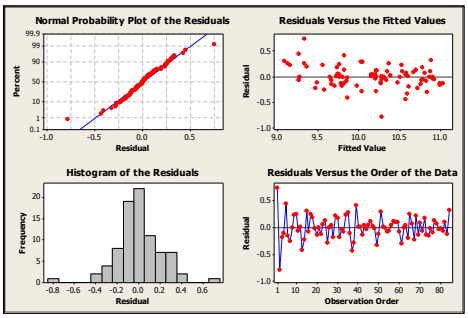
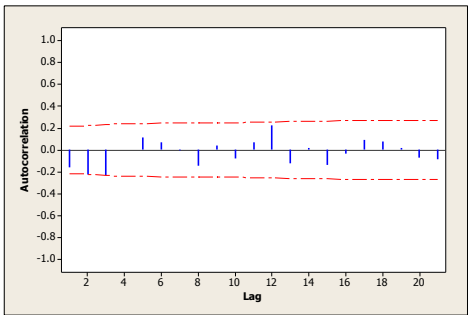


Figure 4: Autocorrelation Function for DES model**Test Holt's Winters Three-Parameter Model**



The Holt's Winter's three parameter multiplicative and additive models were tested for various α (level), γ (trend) and δ (seasonal) values using trial and error methods. The seasonal length is taken as 2. The measurement errors of all the fitted models were small, but assumptions of the residuals were not met.

Table 4 : Model Summary of Holt's Winters three parameter multiplicative models

Model (α)	Model (γ)	Model (δ)	MAPE	Normality (P–value)	Independence of Residuals
0.6	0.7	0.7	1.54322	0.132	No
0.8	0.28	0.28	1.30114	0.527	No
0.9	0.2	0.2	1.31861	0.845	No

The residuals of each model were tested for normality and independence by Anderson-Darling test and ACF respectively. Table 4 shows the summary of output results of Holt's Winters three parameter multiplicative models. MAPE of all models is below 1.5%. The residuals of the models were normally distributed but not independent (Correlated). Winter's additive models were tested after multiplicative models.

Table 5 shows the results of additive models. The MAPE of all models is around 1.3%. The residuals of the models were normally distributed but not independent (Correlated) as multiplicative models. It is clear that Holt's Winters three parameter models do not meet all model validation criterion.

Table 5: Model Summary of Holt's Winters three parameter additive models

Model (α)	Model (γ)	Model (δ)	MAPE	Normality (P–value)	Independence of Residuals
0.7	0.2	0.2	1.30491	0.322	No
0.82	0.22	0.22	1.30004	0.429	No
0.9	0.2	0.2	1.31465	0.820	No

Conclusion and Discussion

The study was a model based analysis on forecasting tourist arrivals to Sri Lanka. Smoothing techniques; Moving Average, Exponential, and Winter's Methods were tested in the model fitting process. The results of this study conclude that DES model with α = 0.72 and γ =0.72 have 1.5% of MAPE. Therefore, DES is the most suitable model for forecasting tourist arrivals from the Asian region. However, smoothing techniques can be accurately used only for short-term forecasting. Considering the non-stationary data series of this study ARIMA and SARIMA

cannot be used. It is recommended to test non-liner models and Circular model for better forecasting. Further, it is better to concern forecasting Western and Eastern Europe as well.

Keywords: Short- Term Forecasting, Smoothing Techniques

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Government Tax Revenue, Expenditure, and Debt in Sri Lanka: A Vector Autoregressive Model Analysis

S.S.Uthayakumar[17] and T.Selvamalai[18]

Introduction

Sri Lanka has been unable to constrain the growth of its debt to ensure that sufficient revenues remain available after debt service payments to finance other vital recurrent and development expenditures of the Government. In 1960, Government tax revenue, expenditure and debt were 17%, 27%, and 34% of GDP respectively. In 2015, Government tax, expenditure and debt were 12%, 20% and 76% respectively (Annual Report of Central Bank of Sri Lanka (ARCBSL), 2015). The tax revenue and Government expenditure as a percentage of GDP have decreased by 5% and 7% between 1960 and 2015, but Government debt as a percentage of GDP has increased by 42% during the same period. Between 1950 and 2015, the highest value of tax revenue as a percentage of GDP was 24% (in 1978) while the highest value of Government expenditure was 42.6% as a percentage of GDP in 1980, but the highest value of government debt was 109% of GDP in 1989. When considering the contemporary issues of economics the study should focus the relationship between these macroeconomic variables, tax revenue, Government expenditure, and Government debt.

Review of Literature

Keynesian economists say that Governments can control aggregate demand and the level of national income through spending and tax policies. The current budget balance of the Government is the difference between its spending and revenues. It is given by the following formula.

$$\boldsymbol{B_t = G_t - T_t} \qquad (\mathbf{1})$$

Where B_t is the balance at time *t*, G_t is the level of Government expenditure at time *t*, and is the tax revenue at time *t*. Government debt can be expressed by the following equation.

$$\boldsymbol{D_t = (1 + r)D_{t-1} + B_t} \qquad (\mathbf{2})$$

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Where D_t denotes Government debt at time *t* and *r* denotes rate of interest. Equation (2) can be rewritten as equation (3) by subsituting equation (1) for $\boldsymbol{B_t}$.

$$\boldsymbol{D_t = (1 + r)D_{t-1} + G_t - T_t} \qquad (3)$$

Equation (3) explains that Government debt is the accumulated total of all its budget deficits and surplus and associated interest payment involved in serving the debt.

Gisele Mah et al (2013) found that there was a significant positive relationship between gross Government debt and gross national expenditure. Ravinthirakumaran, K (2011) showed that bidirectional causality exists between Government revenue and expenditure and there is a long-run equilibrium between these two variables in Sri Lanka. In India, there was also bidirectional Granger causality between expenditure and revenue over the period 1980-2008 (Sikdar, S., & Mukhopadhayay, 2011). In Pakistan, there was a uni-directional causality between Government expenditure and revenue over the period 1979-2010 (Subhani, M.I, et al, 2012).

Objective of Study

The main objectives of the study are to find the impact of tax revenue on Government expenditure and debt and to find the causal relationships between these study variables. The study used time series data from 1950 to 2015 and it was gathered from Annual Report of Central Bank of Sri Lanka, 2015.

VAR Model (Methodology)

Vector autoregressive (VAR) models were popularized in econometrics by Sims (1980) as a natural generalisation of univariate autoregressive models. A VAR is a systems regression model that can be considered a kind of hybrid between the univariate time series models and the simultaneous equations models. VARs have often been advocated as an alternative to large-scale simultaneous equations structural models.

VAR models have several advantages. The researcher does not need to specify which variables are endogenous or exogenous (all are endogenous). VARs allow the value of a variable to depend on more than just its own lagged or combinations of white noise terms. There are no contemporaneous terms on the right-hand side (RHS) of the equations of VAR; it is possible to simply use OLS separately on each equation. When considering the interpretations of VAR model the both variance decomposition analysis and impulse response function are very important.

The purpose of this paper is to investigate the effect of tax revenue on government expenditure and debt in Sri Lanka between 1950 and 2015. An '*n*' periods lagged, the three-variable standard or restricted VAR model is specified:

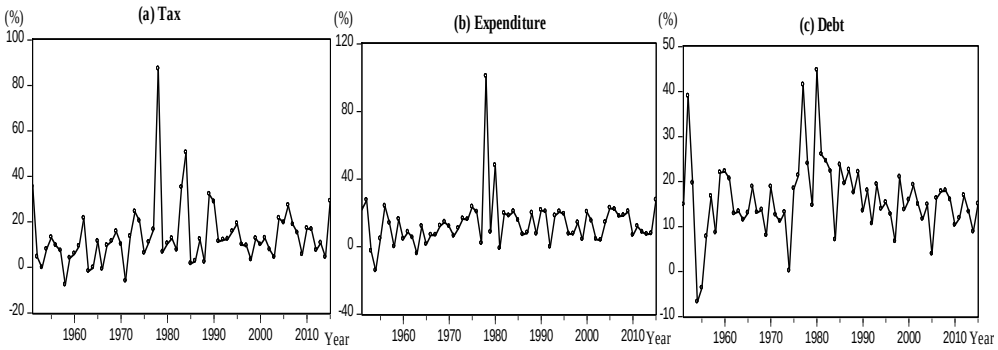
$$TX = p_0^{TX} + \sum_{i=1}^{n} \alpha_i^{TX} TX_{t-i} + \sum_{i=1}^{n} \theta_i^{TX} EP_{t-i} + \sum_{i=1}^{n} \delta_i^{TX} DT_{t-i} + u_t^{TX} \quad (1)$$

$$EP = p_0^{EP} + \sum_{i=1}^{n} \alpha_i^{EP} TX_{t-i} + \sum_{i=1}^{n} \theta_i^{EP} EP_{t-i} + \sum_{i=1}^{n} \delta_i^{EP} DT_{t-i} + u_t^{EP} \quad (2)$$

$$DT = p_0^{DT} + \sum_{i=1}^{n} \alpha_i^{DT} TX_{t-i} + \sum_{i=1}^{n} \theta_i^{DT} EP_{t-i} + \sum_{i=1}^{n} \delta_i^{DT} DT_{t-i} + u_t^{DT} \quad (3)$$

Where TX, EP, and DT denote tax revenue, Government expenditure and Government debt respectively. u_t^r is random errors and p_0^r is constant where r= TX, EP and DT. The equation 1, 2 and 3 shows the standard VAR model because there are no contemporaneous terms as explanatory variables in the right hand side (RHS). This VAR model can be interpreted into three ways: Variance decomposition analysis, Impulse response function, and Granger causality. The variance decomposition procedure measures the percentage share of each particular shock in variables. The response functions show the responses of the system to the period standard deviation shock in a single variable. The Granger causality test explains the causality of variables. All results were estimated by using EViews software. All data enter into the model as an annual frequency. Hence, the growth rates of these variables are following stationary. It is proved by graphically and statistically (see the Figure.1 and Table.1). In the statistical methods, the study applied augmented Dickey- Fuller unit root test to test the stationarity of the variables.

Figure 1 : Trends of growth rate of government tax revenue, expenditure, and Debt



Source: Author's Calculation based on ARCBSL, 2015.

Table 1: Results of augmented Dickey-Fuller (ADF) unit root test

Variables	Calculated t-value	Critical t-values	Stationarity
Growth rate of tax revenue	-7.2958	-2.9076	Yes
Growth rate of Government expenditure	-4.5663	-2.9084	Yes
Growth rate of Government debt	-5.9177	-2.9076	Yes

Source: Author's Calculation based on ARCBSL, 2015.

Figure 1 shows trends of Government tax revenue, expenditure and debt of Sri Lanka. In Figure.1, the plots of these variables against time demonstrate that series of variables follows stationary and there is no deterministic trend in series. It is proved statistically by using the constant specification of Augmented Dickey-Fuller (ADF) unit root test.

The results of augmented Dickey-Fuller (ADF) unit root test are given in Table.1. to test the stationarity of variables. These ADF unit root test results are given in Table 1. In Table 1, critical values which were provided by Mackinnon (1991) are given at 5% significance level. If the absolute value of calculated t-value is greater than the critical value at the particular significance level, then null hypothesis that series follows non-stationary can not be accepted. This means series is a stationary. Table 1 shows that series of all variables are stationary at 5% significance level because the absolute value of calculated t-value is greater than the critical value of that t-value at 5% significance level.

Results and Discussions

Table.2 Akaike Information Criteria and Optimal lag length selection

Lag	LogL	LR	AIC
0	-668.5170	NA	22.38390
1	-653.5249	27.98536	22.18416
2	-635.6960	31.49777*	21.88987*
3	-629.5837	10.18708	21.98612
4	-619.6128	15.62105	21.95376
5	-613.7110	8.656030	22.05703

Source: Author Calculation

Table.2 shows the Akaike information criteria of selection of the optimal lag length of VAR model. The optimal lag length is determined by the minimum value of Akaike information criteria (AIC). In Table.2, the value of AIC is given in the fourth column where the minimum value of AIC is 21.8898 at lag order two. Hence, the lag order two is the optimal lag length of VAR model. According to this lag selection criterion, vector autoregressive model has been estimated.

Table.3 shows the results of standard VAR model that is known as VAR (2) because the optimal lag length was two. In table.3, TX, EP, and DT are dependent variables. TX (-1), TX (-2), EP (-1), EP (-2), DT (-1), and D (-2) are independent variables and lagged variables of TX, EP, and DT. Tax revenue at lag order one (TX (-1)) had a positive and significant impact on contemporary tax revenue (TX) and Government expenditure (EP). But it had a negative and insignificant impact on contemporary Government debt (DT). The Government expenditure at lag order one (EP (-1)) had a negative and significant impact on current tax revenue (TX) and Government expenditure (EP) while it had a positive and insignificant impact on Government debt (DT). The Government debt at lag order one (DT (-1)) had a positive impact on the Government tax revenue and expenditure but no significant impact on current Government debt (see the Table.3)

When considering the impact of variable lag order two, only one case, Government expenditure at lag order two (EP (-2)) had a significant impact on current Government debt (DT). There were no other cases of the significant impact of study variable at lag order two (see Table.3).

Table.3 Results of Vector Autoregressive Model

Variables	TX	EP	DT
TX(-1)	0.373103	0.622268	-0.115802
	[2.00155]	[3.28450]	[-1.16407]
TX(-2)	-0.047462	0.231921	0.048561
	[-0.25538]	[1.22782]	[0.48961]
EP(-1)	-0.381844	-0.607890	0.160801
	[-2.03067]	[-3.18077]	[1.60237]
EP(-2)	-0.088927	0.061762	0.236229
	[-0.47413]	[0.32400]	[2.36003]
DT(-1)	0.673519	0.568652	0.138683
	[2.82376]	[2.34573]	[1.08949]
DT(-2)	0.005233	-0.346628	-0.081273
	[0.02174]	[-1.41701]	[-0.63274]
C	4.589626	6.138348	10.17562
	[0.97873]	[1.28792]	[4.06601]

Source: Author Calculation

Table.4. Breusch- Godfrey serial correlation

Null Hypothesis: no serial correlation
Sample: 1951 2015
Included observations: 63

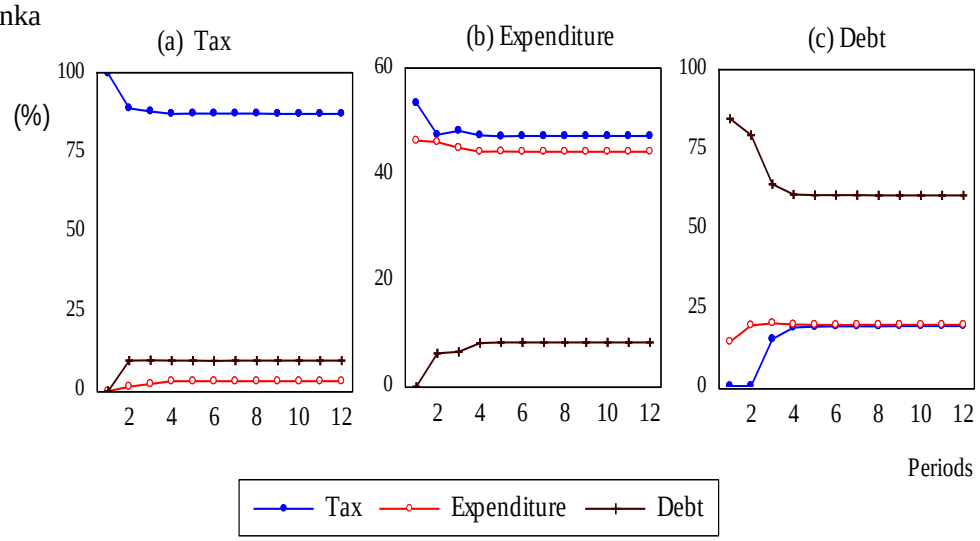
Lags	LM-Stat	Prob
1	12.72538	0.1754
2	14.65470	0.1009

Probs from chi-square with 9 df.

Table.4 shows the results of Breusch-Godfrey serial correlation LM statistics of the vector autoregressive model (VAR) model. If there is a serial correlation in the model then the estimated results might be biased. For the serial correlation test, the study included 63 observations. The last column of Table.4 shows the p-value of LM statistics. These p-values show that null hypothesis that there is no serial correlation in the VAR model can not be rejected at 5 % significance level. Hence, the estimated results of VAR model given in Table.3 are robustness at 5% significance level. The next sections are an interpretation of the vector autoregressive model. This interpretation has three parts as explained in the methodology section.

Variance Decomposition Analysis

Figure 2: Variance decomposition analysis for Tax, Expenditure, and Debt in Sri Lanka



Source: Author's Calculation

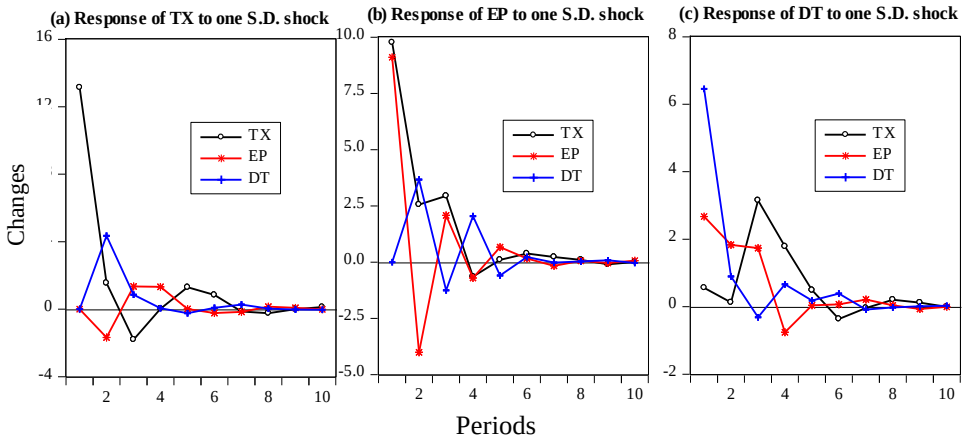
Figure 2 shows the decomposition of variance for the three cases: tax, expenditure, and debt. The variance-decomposition procedure measures the percentage share of each particular shock. The variance decompositions were calculated over 12 periods ahead for each variable and are reported in Table 5. After one period, there were stable forecast errors in TX explained by own shock and other shocks. The impact of shock (innovations) in EP on forecast error of TX remains same and negligible (nearly 3%). And also the impact of innovations in DT on forecast error of TX was very low (less than 10%). Whereas, the substantial or major portion forecast error (nearly 87%) is explained by its own innovations. Those results indicate that tax policy remained endogenous rather exogenous to the developments in the Sri Lankan economy in both short-run and long-run.

Now, we consider the forecast error of Expenditure (EP) in Sri Lanka. After one period, less than 50% of the forecast error in EP explained by own innovations and more than 50% of the forecast error in EP explained by external shocks. The impact of a shock in DT on forecast error of EP is very low, and it was less than 9% in all period of time. The own shock of EP and shock from TX are nearly same, and it is more than 44% of the forecast error in EP in all period of time. Therefore, the variance of EP depends on both own shock and external shocks which are more or less same weight.

The final case is decomposition of DT. Whereas over 79% of the forecast error in DT explained by its own innovations in the short term (two periods), this share drops below 65% over longer terms (3to 10 periods). The impact of a shock in TX on forecast error in DT was negligible (0.62%) in short-term (1 and 2 periods) but this share increased to 20% over longer terms periods (from period 3). These results say that impact of the external shock on forecast error in tax can be negligible but in the case of expenditure and debt that can not be negligible, however, the impact of the own shock on forecast error in all cases cannot be negligible.

Impulse Response Function

Figure 3: Impulse Response Functions of Government Tax Revenue, Expenditure, and Debt



Source: Author's Calculation

The response functions show the responses of the system to the period standard deviation shock in a single variable. The results are reported in Figure 3. In Figure 3, the first figure shows the responses of government tax revenue to one standard deviation shock in all three variables. In Figure 3, the second figure shows the response of Government expenditure to one standard deviation shock in Government tax revenue, expenditure, and debt. Similarly, the last figure of Figure 3 shows the responses of Government debt (DT) to one standard deviation shock in all three variables. These figures show that responses of the system to standard deviation shock in a single variable were meaning full in the short-run (up to five periods) and that are negligible in the long-run. In many periods, responses to one standard deviation shock are positive in all three cases, and negative responses are negligible compared to positive shock in case (a) and (c).

Granger Causality Test

Table 5: Results of Granger Causality Test

No.	Null Hypothesis	p-value
01	Tax revenue does not Granger Cause Expenditure	0.049
02	Expenditure does not Granger Cause Tax Revenue	0.608
03	Expenditure does not Granger Cause Debt	0.000
04	Debt does not Granger Cause Expenditure	0.598
05	Tax revenue does not Granger Cause Debt	0.004
06	Debt does not Granger Cause Tax revenue	0.083

Source: Author Calculation

Table 5 shows the results of the Granger Causality test. In Table 5, p-values of first two null hypotheses explain that there is uni-directional causality from Government tax revenue to expenditure in Sri Lanka. The p-values of third and fourth null hypotheses explain that there is uni-directional causality from government expenditure to Government debt at 5% significance level. The p-values of last two null hypotheses explain that there is also uni-directional causality from tax revenue to Government debt at 5% significance level but there is a bi-directional causality relation between these government tax revenue and debt at 10% significance level in Sri Lanka.

Conclusions

Results of variance decomposition analysis concluded that impact of the external shock on forecast error in tax can be negligible but it can be negligible in the case of government expenditure and debt. Further, the impact of the own shock on forecast error in all cases can not be negligible. The results of impulse response function concluded that responses of the system to standard deviation shock in a single variable were meaningful only in the short-run (up to five periods). The results of Granger Causality test concluded that Government tax revenue did Granger-cause Government expenditure and debt in Sri Lanka not vice versa at 5% significance level. And there was a uni-directional causal relation from Government expenditure to debt at 5% significance level. Further, at 10% significance level, there was a bi-directional Granger Causality between Government tax revenue and debt in Sri Lanka.

Key Words: Tax, Expenditure, Debt, Vector Autoregressive (VAR) Model, Impulse Response Function.

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Unpacking Inequality in Gendered Household Asset Ownership: The Case of Eastern Sri Lanka

Sasini T.K. Kulatunga[1]

Introduction

For almost three decades, Eastern Province has been the threat of a civil war of a; protracted and violent nature. In recent years the Province has been growing at an average of 6.1% (2009-2014) and by 2014 accounted for 5.9% of the total GDP of Sri Lanka. However, female headed in the post war region have been found to be more economically vulnerable when compared with male headed households (International Labour Organization, 2013; United Nations Sri Lanka & CEPA, 2015). This study probes whether there are any inequalities beyond income and expenditure based assessments across diverse groups of male and female headed households and presents empirical evidence to household assets based welfare outcomes in the post war region.

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 an in-depth understanding of 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 in eight Grama Niradhari divisions in the Eastern Province districts of Trincomalee, Batticoloa and Ampara. The sample is a random selection of households proportionate to the ethnic compositions of the Province and disproportionate across gendered household headship. Disproportionality across gendered headship was necessary to prevent under representation of lone mother households in the sample.

Applying procedures proposed by L.M. Asselin (2009, 2002) and Asselin and Anh (2008) by way of 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 a ten (10) row vector of determinants in linear form.

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

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

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 indicating ethnicity, X_{3i}: dummy for number of girl children in family (more than 2 or not), X_{4i}: : dummy for number of boy children in family (more than 2 or not), X_{5i}: dummy for cohabitation,X_{6i}: dummy for household in a military controlled area during war or not, X_{7i}: dummy for district , X_{8i}:dummy for household unemployment 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 was carried out by applying the Oaxaca-Blinder (Oaxaca 1973) decomposition. Asset gap equation in terms of the mean (average) between the two household types was indicated in the form,

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

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

The generalised form of the counter factual 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 estimate of the RIF regression. The counter fractal 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 ($A_\tau^{Male} - A_\tau^{Female}$) could 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 dominance[2] 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 Graph 1) (Graph 1 about here)

The mean overall gap between the male and female household asset welfare (computed from equation 3) stands at 38.9% 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. From the mean decomposition results it is clear that the status of cohabitation (de jure or facto) contributes to most of the explained differences in the endowments. Being Sinhalese reduces the gendered asset gap (negative composition effect and structural effect), meaning the asset gaps between male and female headed households of Sinhalese will report the least asset gap in comparison to other ethnicities. Increase in the number of girl children in the household also reduces the gap yet from the main regression results it was clear that girl children as opposed to male children reduce the asset accumulation. This result can be partially explained by the prevalence male child labor practices which in term is a source of resource accumulation to households in the region.

Decomposing across quintiles, the paper finds that the household asset gaps are greater among the asset poor (lower quintiles) groups. Detailed decompositions reveal that the pronounced asset gap composition effects at the lower tail (20^{th}) of the distribution stems largely from differences in age, and lack of access to satisfactory levels of public goods and service. In higher quintiles the gap is largely driven by status of cohabitation (80^{th} quintile). (See Graph 2) (Graph 2 about here)

Conclusion

In conclusion, this 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 stem from household structures, regional factors and the general lack of capabilities. The extent of structural biases are extensive to the effect that presence of male children or a male partner within the household positively influences increases in asset based welfare, even in higher asset quintiles of the distribution. Unless policy directions are corrected to take into considerations the existing gendered household disparities,

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

females and lone mother/single women households will continue to be marginalised in the post war economy of the Eastern province of Sri Lanka.

Key terms: Post conflict development, Sri Lanka, Assets, Gender asset gaps, Gender

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Motives of Demand for Life Insurance: the case of North-Central Province in Sri Lanka

Aminda Methsila Perera[1]

Introduction

Life insurance is a tool that helps people in meeting their critical needs and leading a comfortable life even when their benefactors are not around. This is because the insurer will pay the beneficiary of policyholder a predetermined sum of money after his/her death, or in the event he/she is bedridden with a critical illness. Life insurance is therefore, more than anything, a form of protection from the uncertainties of life.

With this understanding, during the last few years the life insurance industry has taken several initiatives to develop business by expanding and improving quality of their distribution network. During 2015, the life insurance industry recorded a commendable growth of 20.14% compared to the 7.01% growth recorded in 2014 (IBSL, 2015). This is the highest year-on-year growth recorded by life insurers during the last five years. However, compared to other emerging economies, life insurance penetration levels in Sri Lanka continue to be low with a GDP ratio being 1.09%, and life penetration level as a percentage of GDP has increased only marginally from 0.43 to 0.48 (IBSL, 2015).

As Sri Lanka moves forward to being a middle-income country, with a corresponding increase in GDP, it is imperative that the insurance sector, being one of the pillars of the financial sector of this country, rises to meet the challenges of the future (IBSL, 2015). This underlines the importance of understanding the determinants of the demand for life insurance in Sri Lanka.

As per the literature, motives of life insurance purchasing decisions are among the most discussed research topics of this decade. In the past two decades, many emerging economies have witnessed strong growth in their life insurance industries (Tienyu, and Simon, 2003). Most of these studies have focused on cross-country studies or well-established markets in developed countries. Yet, there has been only limited investigation of the demand for life insurance in less developed countries or emerging economies (Dale and Lila, 1990; Wang, 2010). Academic literature is very scanty with respect to insurance purchase or selection in emerging economies such as Sri Lanka.

The primary purpose of this article is to investigate the motives determining the nature of life assurance demanded on an aggregate basis in NCP of Sri Lanka.

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Aligning with most empirical research on the demand for life insurance, this study also has concentrated on certain population subgroups (i.e. urban individuals in NCP) and utilised cross sectional data.

Methodology

The Theoretical Framework

"Individuals who have purchased a life insurance policy for themselves" is used as the basis to identify the group of respondents. The resulting groups are further characterised based on their demographic variables. Five motives extracted from literature, which are explained below, were used as independent variables.

Demand for insurance = f (PFL, LIH, PDE, AFS, and BPM) ……(01)

Where:

PFL = Protecting family and loved ones
LIH = Leaving an inheritance
PDE = Paying off debts and other expenses
AFS = Adding more financial security
BPM = Bringing peace of mind

Data Collection and Analysis

Primary data were collected from 300 policyholders, drawn purposively from the urban areas in NCP from February to June 2016, using face-to-face interviews directed by a structured and pre-tested questionnaire. The questionnaire contained two sections: sections A and B. Section A contained 15 questions pertaining to the demographic profile of respondents and insurance policy details. Section B aimed to assess the consumers' principal motives for purchasing life insurance using a 5-point Likert scale ranging from "*strongly disagree*" (1) to "*strongly agree*" (5).

Thirty questions were designed to measure the five motives and they were further broken into subscales that contain an equal number of items (n=6) respectively. Factor analysis, using varimax rotation (Gupta, and Aggarwal, 2013) proposed a four-factor solution for this study. Twelve incomplete questionnaires were excluded and analysis was carried out for the rest using SPSS (Version 20). Cronbach alpha was estimated for each scale to assess internal consistency. The Cronbach's Alphas of the dimensions were all above 0.6, which indicated high reliability. An analysis of variance (ANOVA) was conducted to compare the means of the samples. Mean scores of five motives were compared using F-test statistics followed by Tukey's HSD test.

Results and Discussion

Out of 288 respondents, 64% were males and 36% were females. 28% of the respondents were less than or equal to 25 years of age, 48% were between 26 and

39 years, while only 24% were more than or equal to 40 years of age. A majority of the sample (77%) had been educated up to secondary level and 44% indicated that their monthly income is between Rs. 26,000 and Rs. 50,000 (Table 1).

Table 1: Demographic statistics of the sample

Parameter		Frequency	%	Parameter		Frequency	%
Gender	Male	184	63.9	Education	GCE (OL)	38	13.2
	Female	104	36.1		GCE (AL)	220	76.4
Age	≤ 25	80	27.8		Professional	18	6.3
	26-39	130	47.9		Degree	12	4.2
	≥ 40	70	24.3	Income	≤ 25	24	8.3
Status	Married	60	20.8	(‘000)	26 - 50	127	44.1
	UM	228	79.2		51 - 100	123	42.7
					≥ 101	14	4.9

The attractiveness of life insurance for respondents was measured in relation to five aspects. Respondents revealed that they would be more attracted to purchase life assurance if it *protects their family and loved ones* ($\bar{x}$ = 4.19, SD = .613). This is followed by *adding financial security* ($\bar{x}$ = 4.01, SD = .625), *bringing peace of mind* ($\bar{x}$ = 3.93, SD = .510), *paying off debts and other expenses* ($\bar{x}$ = 3.87, SD = .520), and *leaving an inheritance* ($\bar{x}$ = 3.70, SD = .700).

In order to identify respondent similarities/differences on the basis of demographics and motives for purchasing life assurance, a cross-tabulation was performed (Table 3).

Table 2: Motives for Purchasing Life Insurance

Parameter		Frequency	%	Mean	SD
PEL	Protecting family and loved ones	117	40.6	4.188	.6131
LIH	Leaving an inheritance	48	16.7	3.698	.7002
PDE	Paying off debts and other expenses	19	6.6	3.865	.5204
ASF	Adding more financial security	79	27.4	4.014	.6245
BPM	Bringing peace of mind	25	8.7	3.931	.5099
Overall Mean 2.469					
Overall SD 1.462					

Results reveal that most unmarried male buyers, who belongs to 26-39 years age category, studied up to secondary education, and earning Rs. 51,000 – 100,000 monthly, are concerned about their family, and the protection of loved ones. In contrast, married female buyers who belong to the same age category, studied up to GCE (OL), and earned ≤ Rs. 25,000 monthly, were more concerned about their life insurance adding more financial security to their lives. This shows the different motives of urban individuals for buying life insurance in NCP.

Table 3: Cross Tabulation: Demographics vs. Motives (Percentage)

Parameter		Purchasing Motive					Total
		PEL	LIH	PDE	ASF	BPM	
Gender	Male	57.6	15.2	4.9	15.8	6.5	100.0
	Female	10.6	19.2	9.6	48.1	12.5	100.0
Age	≤ 25	31.3	21.3	6.3	28.8	12.5	100.0
	26-39	49.3	9.4	5.8	35.5	-	100.0
	≥ 40	34.3	25.7	8.6	10.0	21.4	100.0
Education	GCE (OL)	21.1	21.1	5.3	52.6	-	100.0
	GCE (AL)	45.5	17.3	6.8	25.5	5.0	100.0
	Professional	27.8	-	-	16.7	55.6	100.0
	Degree	33.3	16.7	16.7	-	33.3	100.0
Marital Status	Married	36.7	13.3	5.0	33.3	11.7	100.0
	Unmarried	41.7	17.5	7.0	25.9	7.9	100.0
Monthly Income	≤ 25	20.8	-	8.3	70.8	-	100.0
	26 – 50	31.5	22.8	8.7	29.1	7.9	100.0
	51 – 100	55.6	13.7	4.3	21.4	5.1	100.0
	≥ 101	35.0	15.0	5.0	-	45.0	100.0

An analysis of variance (ANOVA) was also conducted to compare the means of the samples. A normality test for these figures also conducted before using ANOVA. Significant variation found between the gender and the motives for purchasing life insurance (F = 69.429, p <.001).

Conclusion

The principal findings are that gender, age, education, marital status, and level of income affect demand for life insurance in NCP. Results further reveal that the main motive which influences urban people to purchase life insurance products is directly associated with their concerns about protecting their families and loved ones. However, females are found to be more concerned about adding extra financial security than the protection of their families through life insurance.

Keywords: Life assurance, North-Central Province, purchasing motives

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Financial Sector Development

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

T Lalithasiri Gunaruwan[1]

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

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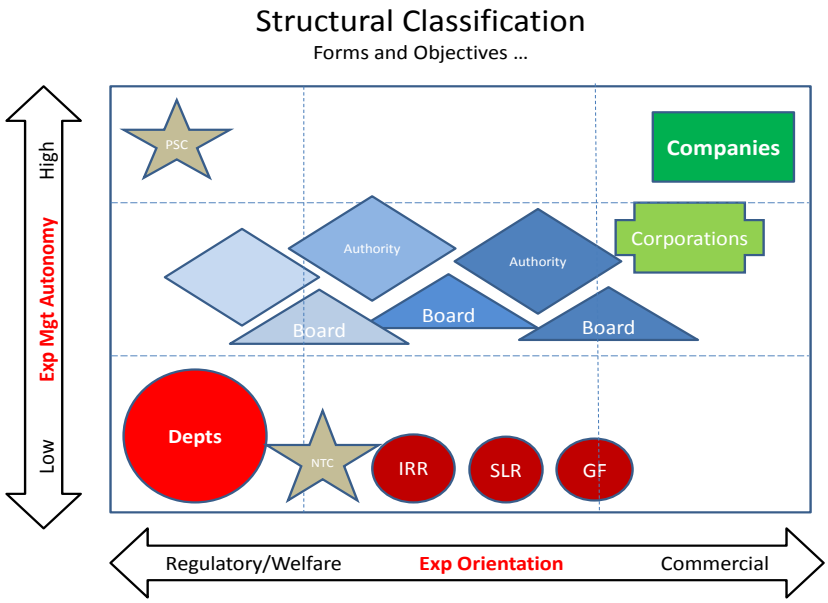
(the share-holders); and thus, it becomes a question as to why this principal-agent relationship does not appear functional with regard to SoEs (Holzer & Shwester, 2011)where agents (Governments) seem incapable of taking care of the interests of their principals (true owners, the general public) and 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



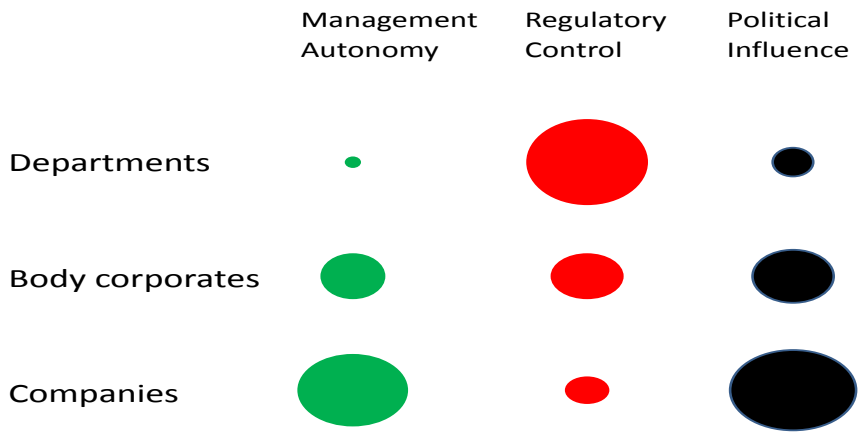
Source: Author compilation

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). Though less harmful with regard to policy, planning or regulatory-type functions (such as National Budget, Inland Revenue, Pensions, 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 as 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. External interference to management of SoEs were thus examined 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.

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



Source: Author depictions

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.

Lack of adequate accountability when enjoying management autonomy appears to have exposed the company structure to political interference. Inadequate management autonomy, on the other hand, appears to plague Departments. Evidence thus suggests that a root cause for the poor performance of SoEs could be the mismatch between management autonomy and accountability.

Agents in the private sector (Board of Directors) 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 holding company for the SoEs under it and was successful in ensuring both management autonomy and accountability of SoEs, while keeping political interference at bay. 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, 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 yard-stick of measuring performance if social obligations served could be compensated by the Treasury through the holding body (which would make performance 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.

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

JEL Codes: L32, L33, P42, P48

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Circular Model for Forecasting Returns of Bank, Finance, & Insurance Sector of the Sri Lankan Stock Market

W.G. S. Konarasinghe[1]

Introduction

Share trading is an important part of the economy of a country. Share market investments are high return, but also high risk. As such, scientific forecasting plays a vital role in share market. Previously, the Capital Asset Pricing Model (CAPM), Auto Regressive Integrated Moving Average (ARIMA) models and Vector Auto Regression (VAR) models were the main models tested across the world, but the Circular Model (CM) was developed more recently as a Univariate Statistical Model for forecasting share returns.

Problem Statement

The CAPM has been subjected to extensive empirical testing in the past few decades. Literature reveals that CAPM is unable to measure the return of Sri Lankan share market. Konarasinghe & Pathirawasam (2013) show that VAR models are not suitable in the Sri Lankan context. Konarasinghe, Abeynayake & Gunaratne (2015) show that ARIMA models are also not highly successful. It is Konarasinghe et al. (2016-a) who introduce the Circular Model (CM) for forecasting returns, demonstrating the success of CM in the context of the Sri Lankan share market. However, the authors recommend that the method is subject to further testing, as it is a newly developed technique. Bank Finance & Insurance (BFI) plays a vital role in an economy of a country. It is believed that the sector BFI of the Sri Lankan share market is highly volatile, and that as such returns are unpredictable.

Objective of the Study

This study focused on testing the suitability of CM in forecasting the returns of individual companies in the BFI sector .

Literature Review

The development of the Circular Model (CM) is based on the theory of Uniform Circular Motion and the Fourier transformation (Konarasinghe, 2016). The CM is given by the formula;

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$$R_t = \sum_{k=1}^{n} (a_k \sin k\omega t + b_k \cos k\omega t) + \varepsilon_t \quad (1)$$

Where; R_t is the return at time *t*, ω is the angular speed, a_k and b_k are amplitudes, k is the harmonic of oscillation.

As explained by Konarasinghe (2016), model assumptions are; trigonometric series $\sin k\omega t, \cos k\omega t$ are independent; residuals (ε_t) are normally distributed and independent. The model is applicable only if the R_t follows a wave like pattern.

Konarasinghe et al. (2016-a) have tested the CM on random sample of companies of the Colombo Stock Exchange (CSE). Results of the above study revealed that the CM was successful in forecasting monthly returns of Sri Lankan share market. Konarasinghe et al. (2016-b) have compared the forecasting ability of ARIMA and CM in Sri Lankan share market. They have concluded that CM is superior to ARIMA in Sri Lankan context. Konarasinghe et al. (2016-c) have shown that the CM is suitable in forecasting individual company returns of the Hotel & Travel sector of the CSE.

Methodology

The sector BFI of the CSE has 33 companies listed in year 2014. Among them, a simple random sample of ten companies was selected. Monthly average share prices for individual companies were calculated by using daily closing share prices from year 1991 to year 2014. Then, monthly returns were calculated by the formula;

$$R_t = \left(\frac{P_t - P_{t-1}}{P_{t-1}} \right) 100 \quad (2)$$

Where; P_t is the share price at month *t*.

The CM was tested on outlier adjusted series. Model validation was based on the Goodness of fit tests; Auto Correlation Functions (ACF) and Partial Autocorrelation Functions (PACF) of residuals, Ljung-Box Q statistics (LBQ) and Anderson Darling test. The absolute measures of errors; Mean Absolute Deviation (MAD) and Root Mean Squared Error (RMSE) were used to check the forecasting ability of fitted models.

Results & Discussion

The Circular model was tested on returns of the companies by using the program written by Konarasinghe, (2016); using the software MATLAB. The Angular speed (ω) for a company is calculated by;

$$\omega = 2\pi f / N \quad (3)$$

Where f is the number of peaks and N is the number of observations in the series. Then trigonometric series; $sink\omega t$ and $cos\ k\omega t$ for k is from 1 to 6 were obtained. The correlation analysis confirmed the independence of these series. Hence R_t was regressed on them. The summary of the analysis is given in Table1.

Table1: The Best Fitting Circular Models in Forecasting Returns of Sector BFI

Company	Best Fitting Model	Model Fitting		Model Verification		Remarks of Residuals
		RMSE	MAD	RMSE	MAD	
ALLI	$R_t = 1.48 + 0.60\cos\omega t$	7.07	5.45	6.85	5.34	Normal, Uncorrelated
ASIA	$R_t = -0.30 + 2.90\sin 4\omega t$	8.9	7.1	8.75	7.18	Normal, Uncorrelated
DFCC	$R_t = 0.31 - 2.03\cos 5\omega t$	8.3	6.5	6.06	4.96	Normal, Uncorrelated
HNB	$R_t = 0.77 - 1.60\sin 5\omega t - 1.28\cos 5\omega t$	5.7	4.4	4.3	3.5	Normal, Uncorrelated
LFIN	$R_t = -0.21 + 2.33\sin 6\omega t + 2.11\cos\omega t$	7.89	6.48	5.76	4.35	Normal, Uncorrelated
LOLC	$R_t = 1.00 + 1.90\cos 2\omega t$	9.7	7.6	8.8	6.8	Normal, Uncorrelated
HASU	$R_t = 1.08 - 2.10\sin 5\omega t$	6.7	5.3	5.7	4.4	Normal, Uncorrelated
SAMP	Model does not fit					
AMANA	Model does not fit					
AAIC	Model does not fit					

The CM was well fitted for seven out of the ten companies. Residuals of all the fitted models were normally distributed and independent. The MAD and RMSE of all the models were small in both model fitting and verification. Findings of the study revealed that the Circular Model is suitable in forecasting individual company returns of the sector BFI.

Conclusions & Recommendations

Forecasting is indispensable to a healthy stock market. The statistical models; CAPM, ARIMA, VAR, and ARCH/ GARCH were not successful in forecasting individual company returns in the Sri Lankan share market, but the CM has proven

successful in this context (Konarasinghe, 2016). This study focused on testing the CM on forecasting individual company returns of the sector BFI of the CSE.
The results of the study are consistent with the findings of Konarasinghe et al.

According to Konarasinghe (2016), the CM fills the knowledge gap in forecasting individual company returns of the Sri Lankan share market. Therefore the CM can be applied in the Sri Lankan context, instead of depending on CAPM which is not applicable to the Sri Lankan share market forecasting. However, the existing software; SPSS, MINITAB etc cannot be used for model testing and forecasting. The program written and published by Konarasinghe (2016) can be used for the purpose, but the MATLAB software is not freely available, and is also expensive. As such, it is necessary to develop software for the practical implementation of the CM.

Key Words: Circular Model, Fourier transformation

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The Global Financial Crisis and the Technical Efficiency of Commercial Banks in Sri Lanka: A Data Envelopment Analysis

S.S.Uthayakumar [1] and T.Selvamalai [2]

Introduction

Data envelopment analysis (DEA) introduced by Charnes et al. (1978) based on Farrell (1957), is a non-parametric technique for measuring the relative efficiency of a set of similar units, usually referred to as decision-making units (DMUs). It was initially used to assess the relative efficiency of not-for-profit organisations; but gradually its application was extended to cover for-profit organisations as well. Its first application in banking industry appeared with the work of Sherman and Gold (1985). DEA provides the technical efficiency score of a bank or any institution.
Technical efficiency of a firm is a comparative measure of how well it actually processes inputs to achieve outputs, as compared to its maximum potential for doing so, as represented by its production possibility frontier (Barros and Mascarenhas, 2005). Technical efficiency relates to the productivity of inputs (Sathye, 2001). A bank is said to be technically inefficient if it operates below the frontier. A measure of technical efficiency under the assumption of constant returns-to-scale (CRS) is known as overall technical efficiency (OTE). Technical efficiency of banks is determined by internal and external factors. A financial crisis is an important external factor. A financial crisis is a situation in which some financial institutions or assets suddenly lose a large part of their value. It is a testament to the shortcomings of international capital markets and their vulnerability to sudden reversals of market confidence. It can be classified into five categories, macroeconomic policy-induced crisis, financial panic, bubble collapse, moral hazard crisis, and disorderly workout. There was a financial crisis in 2007 and 2008 in the world. It affected the efficiency of financial institutions directly or indirectly. In this view, the study focuses on the impact that financial crisis 2008 had on the efficiency of commercial banks in Sri Lanka.

Objective and Methodology

The objective of the study is to find the impact of the financial crisis of 2007/2008 on the efficiency of commercial banks in Sri Lanka using DEA. The study selected only four commercial banks (People's Bank, Bank of Ceylon, Commercial Bank of Ceylon, and Hatton National Bank) and only studied six years between 2005 and

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2010. For the DEA, the study used one output variable (profits of the bank before taxation) and three inputs variables (Loans and advances, liabilities, and a number of labours). All data were gathered from the annual reports of the banks.

In basic DEA, there are two types of model, CCR and BCC. The CCR model is named after developers Charnes, Cooper, and Rhodes (1978), and is based on the assumption of constant returns-to-scale (CRS). The BCC model is named after developers Banker, Charnes and Cooper (1984), and is based on the assumption of variable returns-to-scale (VRS). The CCR and BCC models can be divided into two categories, input-oriented and output-oriented models. The study considered both CCR and BCC models, applying only input-oriented CCR and BCC.

$$\min_{\theta\beta} \theta_k$$

Subject to

$\sum_{j=1}^{n} \beta_j X_{ij} \leq \theta_k X_{ik}$ (i= 1, 2,…..,s) (1)

$\sum_{j=1}^{n} \beta_j Y_{rj} \geq Y_k$ (2)

$\beta_j \geq 0,$ (j=1, 2,….n) (3)

$\sum_{j=1}^{n} \beta_j = 1,$ if VRS (4)

Where X_{ik} = amount of inputs *i* used by DMU *k*
Y_k = amount of output *Y* produced by DMU *k*
θ_k = technical efficiency score for DMU *k*
n = the number of DMUs (j= 1,2,…….,n)
s =the number of inputs (i= 1,2,……...,s)

The CCR model's restrictions are 1, 2, and 3 and the BCC model's restrictions are 1, 2 and 4. The CCR model provides overall technical efficiency (OTE) score which decomposed by pure technical efficiency (PTE) and scale efficiency (SE).The BCC model provides the PTE score. The SE is measured by a ratio of OTE score (from CCR model) to PTE score (from BCC model). The PTE measure has been used as an index to capture managerial performance and measure of SE provides the ability of the management to choose the optimum size of resources.

All results have estimated by using DEAP version 2.1 (Coelli T.J, 1999) software. The study considered the year 2005 and 2006 as pre-crisis years, 2007 and 2008 as crisis years and 2009 and 2010 as a post-crisis years.

Results and Discussion

Table 1 shows the results of the average overall technical efficiency (OTE) score of selected commercials banks of Sri Lanka between 2005 and 2010. During the crisis, an average overall technical efficiency score of selected commercial banks of Sri Lanka was less than the during pre and post crisis. The mean of OTE score was 0.658 during the crisis period but it was greater than 0.734 during the pre- and post-crisis periods (see Table 1).

Table 1: Results of overall technical efficiency of selected commercials banks of Sri Lanka between 2005 and 2010

Year		Overall Technical Efficiency (OTE)	
Pre-crisis	2005	0.737	0.751
	2006	0.765	
Crisis	2007	0.658	0.658
	2008	0.658	
Post- crisis	2009	0.711	0.735
	2010	0.759	

Source: Author calculation

Table 2: Decompositions of Overall Technical Efficiency

Year		Pure Technical Efficiency (PTE)		Scale Efficiency (SE)	
Pre-crisis	2005	0.913	0.866	0.811	0.877
	2006	0.819		0.943	
Crisis	2007	0.809	0.816	0.738	0.761
	2008	0.824		0.785	
Post-crisis	2009	0.799	0.852	0.863	0.857
	2010	0.905		0.851	

Source: Author calculation

Table 2 shows the decomposition of overall technical efficiency. The pure technical efficiency (PTE) and scale efficiency (SE) was less during the crisis period compared to pre and post-crisis periods. The PTE score was 0.816 during the crisis but it was greater than 0.85 during pre- and post-crisis periods. The SE score was 0.761 during the crisis but was greater than 0.856 during pre- and post-crisis

periods. The global financial crisis affected SE more than PTE because the decrease in SE score is greater than the decrease in PTE during the crisis period.

Conclusion and Recommendation

During the crisis, the average overall technical efficiency score of selected commercial banks of Sri Lanka fell below pre and post crisis values. The global financial crisis affected scale efficiency more than pure technical. Therefore, policy makers should focus more on how to increase scale efficiency than on how to increase the pure technical efficiency of banks during periods of crisis or depression in an economy.

Keywords: Commercial Banks, Data Envelopment Analysis (DEA), Financial Crisis, Technical Efficiency

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

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 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

இலங்கையின் பங்கு விலைச் சுட்டெண்கள் மீது தெரிவுச் செய்யப்பட்ட பேரினப் பொருளியல் மாறிகள் எத்தகைய தாக்கத்தினை ஏற்படுத்துகின்றது: காலத்தொடர் பகுப்பாய்வு

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

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

ஆய்வுப்பின்னணி

மூலதனச் சந்தையில் ஒரு அங்கமாக விளங்குகின்ற பங்குச்சந்தையின் செயலாற்றும் போக்கு ஒரு நாட்டின் பொருளாதாரத்தைப் பிரதிபலிக்கும் முக்கியமானதோர் குறிக்காட்டியாகவுள்ளது. ஆதலால் பங்குச்சந்தையின் போக்கு பொருளாதாரம் பற்றிய மதிப்பீட்டுக்கு மிகவும் முக்கியமானது. ஏனெனில் 30 வருட கால யுத்தம் முடிவடைந்ததன் பின் உலகில் எந்தவொரு நாடும் வளர்ச்சியடையாத அளவிற்கு தளம்பலற்ற வளர்ச்சிப் போக்கினை இலங்கை அனுபவித்து வருகிறது. இதற்குக் காரணம் பங்குச்சந்தையின் செயலாற்றுகை அதிகரித்தமையும் அதேபோன்று பொருளாதாரத்தின் எதிர்காலம் தொடர்பில் முதலீட்டாளர்களின் எதிர்பார்ப்புகள் அதிகரித்தமையுமேயாகும் என்பதை அண்மைக்கால பொருளியல் குறிகாட்டிகள் சுட்டிக் காட்டுகின்றன. கொழும்புப் பங்குச்சந்தை உலகில் அதியுயர் செயலாற்றுகையை பிரதிபலிப்புடன் உள்ளூர் மற்றும் வெளிநாட்டு முதலீட்டாளர்களுக்குத் தங்களுடைய முதலீடுகளை முதலிடுவதற்குச் சந்தர்ப்பம் அமைத்துக் கொடுக்கும் மிகச் சிறந்த வழிமுறையாகவும் காணப்படுகின்றது. அத்தோடு முதலாளித்துவப் பொருளாதார நிதியியல் முறைமை தொடர்ந்து இயங்குவதற்கு அடிப்படைச் சக்தியாகவும் பங்குச்சந்தை காணப்படுவதுடன் முதலீட்டாளர்கள் பங்குகளை, தொகுதிக்கடன்களை அல்லது வேறு ஏதேனும் பிணையங்களைக் கொள்வனவு செய்கின்ற மற்றும் விற்பனை செய்கின்ற இடமாகவும் காணப்படுகின்றது.

நவீன பொருளாதாரத்தில் பங்குப் பரிவர்த்தனை என்பது மிக முக்கிய விடயமாகக் காணப்படுவதுடன் கடந்த சில தசாப்தங்களில் பொருளாதாரத்தோடு பங்கு வருமானத்தினை எதிர்வுகூறும் தன்மையானது பல ஆய்வாளர்களால் ஆய்வுக்குட்படுத்தப்பட்டு வருகின்றன. இன்றைய

காலப்பகுதியில் பொருளாதார ஆய்வாளர்கள், நிதிமுதலீட்டாளர்கள் மற்றும் கொள்கை வகுப்பாளர்களும் கூட பேரினப் பொருளாதார மாறிகளுக்கும் பங்கு விலைச்சுட்டெண்களுக்குமுள்ள தொடர்பு குறித்து ஆராய்வதற்கு அதிக அக்கறை செலுத்தி வருகின்றார்கள். அதாவது ஒரு நாட்டுப் பொருளாதாரத்தைப் பொறுத்தவரையில் சிறந்ததொரு நிலையில் உள்ளதா என்பதை அறிவதற்கான சிறந்தவொரு கருவியாக கூட பங்குச்சந்தை காணப்படுகின்றது. தற்காலத்தில் இலங்கைப் பங்குச்சந்தை நிலவரங்கள் தேசிய மற்றும் சர்வதேச முதலீட்டாளர்களால் மிகவும் கவனமாக அவதானிக்கப்பட்டு வருகின்றது. எவ்வாறாயினும் தற்போது ஒரு சிலர் பங்குச்சந்தை உயர்வடைந்தால் மாத்திரமே பொருளாதாரம் சிறந்த நிலையிலுள்ளதெனக் கூற முடியாது எனவும் வாதிடுகின்றார்கள். அதற்கான காரணமாக முதலீட்டாளர்கள் அனேகமாக எதிர்காலம் தொடர்பிலேயே நம்பிக்கை வைக்கின்றனர் என்ற விடயத்தைச் சுட்டிக்காட்டுகின்றார்கள். ஆகவே இலங்கைப் பங்குச்சந்தை பற்றி அறிவது முதலீட்டாளர் என்ற வகையில் பயனுள்ளதாக இருப்பதுடன் இந்த ஆய்வின் பெறுபேறு சிலவேளை பங்கு விலையின் வெளிப்பாடாகவோ அல்லது பேரினப் பொருளாதார மாறிகளின் விளைவின் அங்கமாகவோ கூட அமையலாம். இந்த ஆய்வு பொருளாதார மாறிகளுடாகப் பங்குச்சந்தையின் எதிர்காலத்தை எதிர்வுகூறும் ஒரு சிறந்த கருவியாகவும் பயன்படுத்தப்பட முடியும்.

கடந்த மூன்று தசாப்த காலமாகத் தோன்றிய யுத்தத்தின் காரணமாகப் பங்குச்சந்தையில் பாரிய வளர்ச்சி தோன்றவில்லை என்றாலும் 2009 ஆம் ஆண்டு இறுதி நிலையில் பங்குச்சந்தையின் அனைத்து விலைச் சுட்டெண்ணும் பாரிய அளவு வளர்ச்சியினை அடைந்துள்ளது எனலாம். இத்தளம்பல் நிலைக்குப் பிரதான காரணமாக அமைவது பல கம்பனிகளின் விலைகள் வீழ்ச்சி அடைந்து பங்கு விலைச்சுட்டிகளும் வீழ்ச்சி நிலையினை அடைந்தமையாகும். மேலும் மற்றைய நாடுகளுடன் ஒப்பிடும்போது கொழும்புப் பங்குச் சந்தையில் கைமாற்றப்படும் பங்குகளின் வகைகள் வரையறுக்கப்பட்டுள்ளன. இத்தோடு கடந்த தசாப்தத்தில் இலங்கையில் சராசரி அனைத்து பங்கு விலைச்சுட்டெண் 2400 ஆகவும், பொருளாதார வளர்ச்சியானது சராசரியாக 6.4% ஆகவும் பதிவு செய்யப்பட்டுள்ளதுடன், பணவீக்கமானது 11.2% ஆகவும் பதியப்பட்டிருக்கிறது. எனவே இவ்விரு பேரினப் பொருளியல் மாறிகளினால் பங்குச்சந்தைச் செயலாற்றத்தின் மீது பாதிப்பினை ஏற்படுத்துகின்ற நிலையினை அவதானிக்க முடிகின்றது. அத்தோடு தெரிவுச்செய்யப்பட்ட பேரினப்பொருளியல் மாறிகளான பணவீக்கம், பணநிரம்பல், வட்டிவீதம் மற்றும் நாணயமாற்றுவீதம் போன்ற மாறிகளில் ஏற்படுகின்ற மாற்றங்கள் பங்குச்சந்தையின் சாதகமான மற்றும் பாதகமான தளம்பல் நிலைக்கு இட்டுச் செல்கின்றதா என்பதே ஆய்வின் பிரதான பிரச்சினையாகும்.

இவ் ஆய்வினுடைய பிரதான நோக்கம் கடந்த இரண்டு தசாப்தத்திற்கு மேலாக இலங்கையின் அனைத்துப் பங்குகளுக்குமான விலைச்சுட்டெண்ணுக்கும் தெரிவுசெய்யப்பட்ட பேரினப் பொருளாதார மாறிகளுக்கும் இடையிலான தொடர்புத்தன்மையினை அடையாளம் காணுவதற்கான மாதிரி வடிவத்தினை உருவாக்குவதுடன், உப நோக்கங்களாக அனைத்துப் பங்குகளினதும் விலைச்சுட்டெண்ணுக்கும் தெரிவுசெய்யப்பட்ட பேரினப் பொருளாதார மாறிகளுக்கும் இடையில் குறுங்காலம் மற்றும் நீண்டகாலத் தொடர்பினைக் கண்டறிவதுடன் நேரடியான மற்றும் மறைமுகமான தொடர்புகளை மதிப்பீடு செய்வது ஆகும். அத்தோடு பங்குச்சந்தையின; செயலாற்றத்தின் மீது ஏற்பட்ட தளம்பல் நிலைக்கு அல்லது அதிர்ச்சிகளுக்கு காரணமான பேரினப் பொருளாதார மாறிகளை இனங்கண்டு அம்மாறிகளில் ஏற்படும; எவ்வகையான மாற்றம் அனைத்துப் பங்குகளுக்குமான விலைச்சுட்டெண்ணை நகர்வடையச் செய்கின்றது என்பதைக் கண்டறிவதுமாகும்.

ஆய்வு முறையியல்

1986 ஜனவரி தொடக்கம் 2014 டிசம்பர் வரையான தரவுகள் ஆய்வுக்கு எடுத்துக்கொள்ளப்பட்டுள்ளது. இக் காலப்பகுதியில் இவ் ஆய்வுக்காக அனைத்து பங்குகளுக்குமான விலைச்சுட்டெண் மற்றும் தெரிவுசெய்யப்பட்ட பேரினப் பொருளாதார மாறிகள் தொடர்பான மாதாந்தத் தரவுகள் பல்வேறுபட்ட மூலங்களிலிருந்து 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.
அத்தோடு இந்த ஆய்வில் தரவுப் பகுப்பாய்வுக்கு மூன்று பொருளியலளவை (Econometrics) முறைகள் பயன்படுத்தப்பட்டுள்ளன. முதலாவது அலகு மூலப் 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) மூலமாக இலங்கையின் அனைத்துப் பங்குகளுக்குமான விலைச்சுட்டெண் மற்றும் தெரிவுசெய்யப்பட்ட பேரினப் பொருளாதார மாறிகள் என்பவற்றிற்கு இடையிலான நீண்டகால மற்றும் குறுங்காலத் தொடர்புத்தன்மைகள் நி&பிக்கப்பட்டுள்ளன. இறுதியாக கிரஞ்சரின் காரண காரியப் பகுப்பாய்வு (Granger Casualty Test) மூலமாகவும் இம் மாறிகளுக்கிடையிலான தொடர்புத்தன்மை தனித்தனியாகவும் பகுப்பாய்வு செய்யப்பட்டுள்ளன.

தரவுப் பகுப்பாய்வும் புள்ளிவிபரப் பெறுபேறுகளும்

Augmented Dickey – Fuller (ADF) அலகு மூலப் பரிசோதனை

Augmented Dickey – Fuller (ADF) அலகு மூலப் பரிசோதனை (Unit Root) மூலமாகப் பொருளியலவைப் பரிசோதனையும் புள்ளிவிபரப் பெறுபேறுகளும் இங்கு எல்லாப் பங்குகளுக்குமான விலைச்சுட்டெண்ணுக்கும் தெரிவுசெய்யப்பட்ட பேரினப் பொருளாதார மாறிகளுக்குமான இயற்கை மடக்கை வடிவிலான éச்சிய மட்டம் மற்றும் 1ம்வேறுப்படுத்தல் மட்டத்தின்போது பெறப்பட்ட அலகு மூலப் பரிசோதனைக்கான புள்ளிவிபரப் பெறுபேறுகளும் அதனுடைய புள்ளிவிபரப் பொருண்மைத் தன்மையானது வெட்டுத்துண்டு (Intercept) மட்டும் காணப்படுகின்றபோதும் வெட்டுத்துண்டு மற்றும் காலப்போக்கு (Trend &Intercept) காணப்படுகின்றபோது பெறப்பட்ட முடிவுகள் பின்வரும் அட்டவணை 1 இல் காட்டப்பட்டுள்ளன.

அட்டவணை:-1

இயற்கை மடக்கை (Natural Log –L) வடிவிலான அனைத்து மாறிகளுக்குமான அலகு மூல (Unit Root) ADF பரிசோதனைக்கான பெறுபேறுகள; (காலம; 1986 -2014 மாதாந்தத் தரவுகள்)

மாறிகள் (Variables)	éச்சிய மட்டம; (Level)				1ம்வேறுபடுத்தல் (1st Differences)			
	வெட்டுத்துண்டு (INTERCEPT)		வெட்டுத்துண்டு மற்றும் காலப்போக்கு (TREND & INTERCEPT)		வெட்டுத்துண்டு (INTERCEPT)		வெட்டுத்துண்டு மற்றும் காலப்போக்கு (TREND & INTERCEPT)	
	τ-statistic	**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	-14.6265***	0.0000
LAWPLR	-1.6103	0.1428	-2.0764	0.1922	-16.5133***	0.0000	-16.4381***	0.0000
LMS	-1.0442	0.7508	-2.0032	0.7957	-16.0307***	0.0034	-16.0291***	0.0151
LEXR	-1.8550	0.3534	-0.9222	0.9511	-16.72932***	0.0000	-16.8552***	0.0000
LINF	-2.3416	0.4511	-2.4411	0.6722	-16.5155***	0.0000	-16.5057***	0.0000

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

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

இந்நுட்பமானது எல்லாப் பங்குகளுக்குமான விலைச் சுட்டெண்ணுக்கும் பேரினப் பொருளாதார மாறிகளுக்கிடையே நீண்டகாலத்தில் எவ்வகையானதொரு தொடர்புத்தன்மை காணப்படுகின்றது என்பதை மதிப்பிட்டுக் கொள்வதற்கு இணை ஒன்றுப்படுத்தல் (Co- Integration) பிற்செலவு மதிப்பிடப்பட்டுள்ளது. அவ்வாறு மதிப்பிடப்பட்ட பிற்செலவு மாதிரி தரப்பட்டுள்ளதுடன் அதனை மையமாகக் கொண்டே இந்நுட்ப முறை பிரயோகிக்கப்பட்டுள்ளது. இவ்வாறு E-views 7.1 மென்பொதியின் மூலம் மதிப்பிடப்பட்ட பிற்செலவின் பெறப்பட்ட புள்ளிவிபரப் பெறுபேறுகள் பின்வரும் பிண்ணினைப்பு அட்டவணை 2ல் காட்டப்பட்டுள்ன.

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

அட்டவணை : 3 நீண்டகாலப் பிற்செலவுப் பகுப்பாய்வுப் பெறுப்பேறுகள;

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**	Meandependent 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**

மூலம;:-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 சரிப்படுத்தல் மாதிரியுறு (Error Correction) மற்றும் கிரஞ்சரின் காரண காரியப் பகுப்பாய்வு (Granger Casualty Test) போன்ற மாதிரிப் பரிசோதனையும் செய்யப்பட்டுள்ளன. மாதிரி பரிசோதனை செய்யப்பட்டதன் முடிவுகள் அட்டவணைகளிலும் 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

மூலம;:-E-views7.1

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 பூர்த்தி 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 நீண்டகால மற்றும் குறுங்காலத் தொடர்பினைக் கொண்டுள்ளது என்பதனை அவதானிக்க முடிகின்றது.

இதற்காக இவ்வாய்விலே பங்குச்சந்தையில் மாற்றத்தை ஏற்படுத்துவதற்குக் காரணமாக நான்கு பேரினப்பொருளாதார மாறிகள் ஆய்வுக்குட்படுத்தியதுடன், இரண்டு மாறிகள் பங்குச்சந்தையின் செயலாற்றத்தின் மீது நேரடியான தாக்கத்தினையும், இரண்டு மாறிகள் எதிர்க்கணியத் தாக்கத்தினையும் கொண்டுள்ளன என்பது அவதானிக்கப்பட்டது. மேற்படி ஆய்வின் மூலம் பெற்றுக்கொள்ளப்பட்ட முடிவுகளின்படி இலங்கையில் பங்குச்சந்தைத் தளம்பலைக் கட்டுப்படுத்துவதற்குப் பல கொள்கைகளும், பரிந்துரைகளும் முன்வைக்கப்படவேண்டும். எமது நாட்டை ஆசியாவின் முன்னனி 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 - 1 ஜோன்ஸனின் 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*	696.2571	69.8188	0.0001	None*	42.89133	40.07757	0.0235
At most 1*	509.3966	47.8561	0.0001	At most 1*	33.90649	33.87687	0.0496
At most 2*	343.0608	29.7970	0.0001	At most 2*	33.00939	27.58434	0.0091
At most 3*	202.8345	15.4947	0.0001	At most 3*	22.94787	21.13162	0.0275
At most 4*	79.9273	3.8414	0.0000	At most 4*	4.557848	3.841466	0.0328

Appraising Economic Performance of Government Departments: A Case for Preparing Accrual Based Accounts

T Lalithasiri Gunaruwan[1] and Shalini Mohandiramge[2]

Introduction

The published accounts of an organisation are expected, *inter alia*, to mirror its performance over the period of accounting. It is therefore natural that stakeholders examine relevant accounts to ascertain how efficiently an organisation has performed. If the accounts do not reflect the correct picture, this could yield misleading diagnoses regarding organisational efficacy, and thus, constrain the management from taking appropriate and timely action.

Government Departments in Sri Lanka essentially adopt a cash-based accounting methodology, where an annual Appropriation Account is submitted containing records of finances received and spent. Therefore, Departmental accounts do not necessarily reflect incomes and expenditures attributable to economic activities undertaken by the Departments within the period.

A research was conducted to examine the effect of this accounting practice, and the distortions which it could yield in reflecting organisational economic efficiency. It primarily studied the published accounts of Sri Lanka Railways (SLR), a Government Department, while focusing on one of its expenditure headings, namely fuel, for detailed investigation. This paper summarises the methodology adopted, analysis performed and results obtained, and discusses the policy relevance of the findings.

Research Problem

The total revenue, expenditures, and net surplus (or deficit) of the SLR as reflected by the published accounts of the Department (CBSL Annual Reports) for the period from 2005 to 2014 are graphically depicted in the Figure 1. The year 2010 appears to be relatively better in terms of financial results, while 2007, 2008, 2009, 2011, 2013 and 2014 indicated poorer financial performance. In 2014, for instance, fuel expenditure alone appears to be higher than the income. Total expenditure seems

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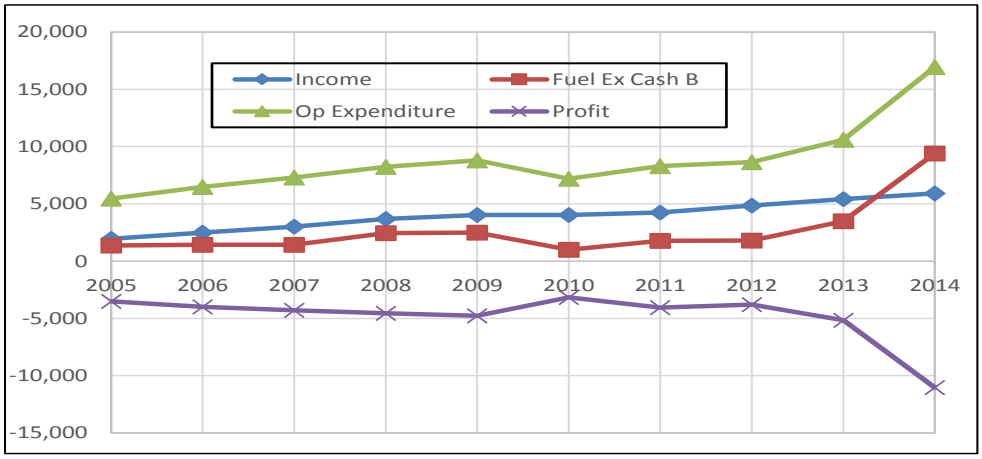
having close correspondence to the fuel expenditures, indicating that the 'other expenditures' would have followed a stable pattern.

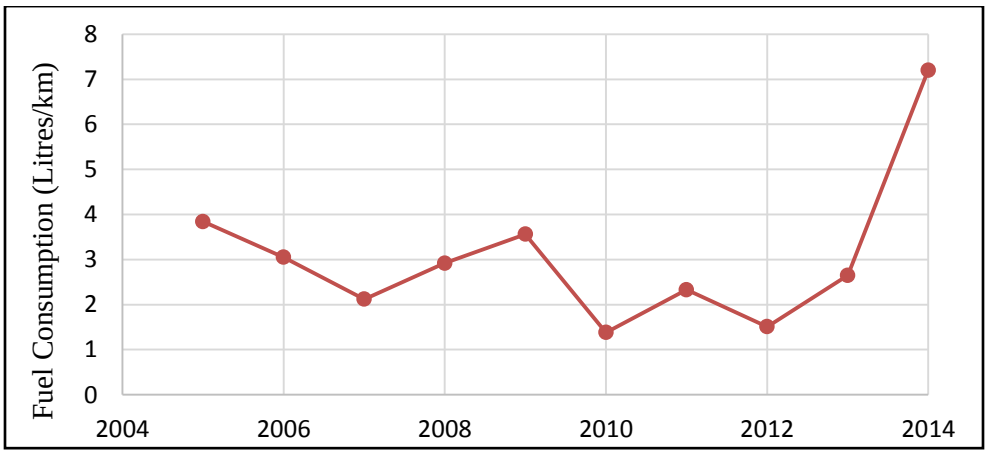
Figure 1: Operating Results of SLR as Reflected in Published Accounts



Source: Author compilations from data published in the CBSL Annual Reports

In-depth analysis of fuel expenditure by estimating the fuel consumption intensity per train kilometer operated, as reflected in the published accounts, mirrors the problem (Figure 2): the variability observed in the so estimated fuel consumption per train kilometer is far from reality; train operations appear highly fuel efficient in certain years (2007 and 2010, for instance) and highly fuel intensive in some others (2005 and 2009), which cannot be technically explained.

Figure 2: Fuel Consumption estimates as per Cash-based Published Accounts



Source: Author compilations from Cash-based Accounts of the SLR

The hypothesis examined in this research therefore is that the fuel expenditure figures appearing in the published Departmental accounts do not represent the

actual fuel consumption, and therefore do not reflect the true economic cost of train operations.

Materials and Methods

The adoption of cash-based accounting in the Government Departments stems from the colonial practice in which the Departments are considered as part of the main Government body, and not as separate organisations which manage finances on their own. Thus, Departments historically were not allowed to commit to expenditure without financial allocations received from the Treasury, and all revenues accrued to Departments were considered Treasury income. The accounting procedure adopted in the Department structure therefore corresponds more to a cashiering role than a financial management exercise.

The suitability of using the accrual basis of accounting for publicly owned enterprises has been subject to discussion for some time by accounting professionals as well as by scholars. Most Asian countries are in the process of converting publicly owned enterprises to accrual basis (Abdi, 2015). Even in Sri Lanka, all State enterprises, except those within the Department structure, use accrual basis. Pressure from international financial institutions such as the IMF and the World Bank is behind this trend; they persuade Governments in underdeveloped and transitional economies to undertake reforms which include better accountability and transparency in public sector management (Ouda, 2003). Besides, the increase in Government activities, Government debt and the increased need of transparency and accountability, require Government-owned entities to adopt accrual basis of accounting (Marand, et al., 2014).

The present research went into critically examining the Railway Department's fuel cost heading. It appraised the process involved in recording purchases of fuel, their inventories and dispatches from stocks to relevant consumption units of the Department. Information pertaining to actual amounts of fuel pumped in for locomotion and the actual train kilometers operated on such fuel were gathered from the records of the relevant sub-Departments through a primary data collection exercise. Fuel consumption for other auxiliary purposes also were estimated using the available information and balancing off from recorded purchases. The actual fuel expenditure of the Department attributable for each year was thus calculated, and compared against those reflected in the published accounts (which are on cash-basis) to perceive whether there were any significant differences, and if so, the possible causes. The study also attempted to reconcile the accounts based on actual fuel expenditure, and to better reflect financial performance over the period between 2005 and 2014.

Unit cost computation and accounting reconciliation approaches were adopted in conducting the research while graphical and tabular presentations were used to perceive analytical results.

Results and Analysis

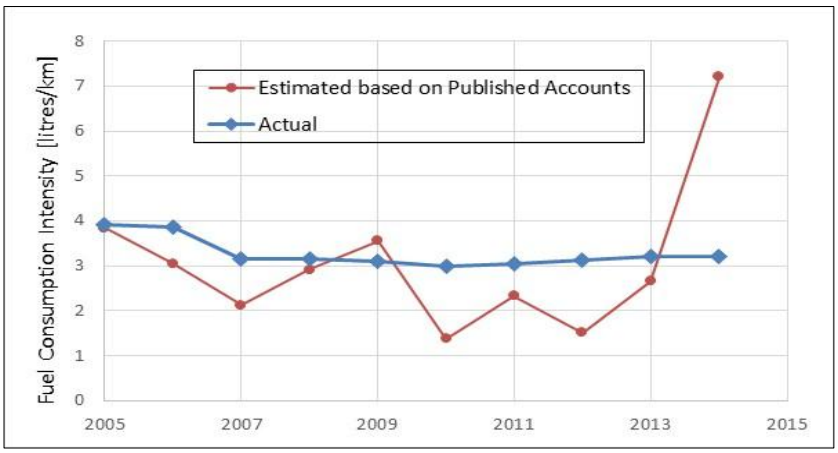
Table 1 contains the summary of data gathered on actual fuel consumption in the SLR for the period from 2005-2014, train kilometers operated during the same period, and the actual fuel consumption intensity (litres per train kilometer). The comparison between the actual fuel consumption intensity and the fuel consumption intensity estimated based on the Departmental accounts are presented in the Figure

Table 1: Estimated Actual Fuel Consumption Intensity and its Evolution

Year	Total liters used for trains	Train km Operated	Fuel Consumption Liters/km
2005	29,613,919	7,570,000	3.91
2006	30,220,300	7,800,000	3.87
2007	30,125,806	9,560,000	3.15
2008	29,008,561	9,220,000	3.15
2009	29,474,305	9,540,000	3.09
2010	29,374,946	9,790,000	3.00
2011	30,479,035	10,030,000	3.04
2012	32,446,052	10,370,000	3.13
2013	35,024,312	10,920,000	3.21
2014	35,594,846	11,080,000	3.21

Source: Author estimates based on data collected from the SLR

Figure 3: Fuel Consumption Intensity – Actual vs Estimated based on Accounts

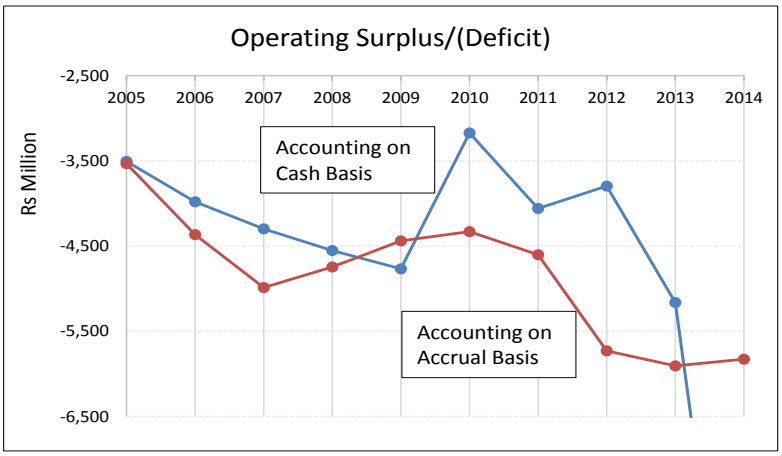


Source: Author compilations

The results show that the actual fuel consumption per train kilometer has a stable evolution, and does not experience sharp peaks or ebbs unlike the fuel consumption intensity estimated based on Departmental accounts. Thus, it becomes evident that relying on published accounts to appraise operational efficacy or economic performance would be futile.

The research went into working out the annual accounts of the Railway Department, partially converted (partial because the conversion was only regarding fuel expenditure heading) to accrual basis through substitution of cash-based fuel expenditure records by actual fuel expenditure attributable for each year calculated based on actual fuel usage as estimated in Table 1. These partially converted financial results could then be compared with published results as depicted in the Figure 4.

Figure 4: Financial Results of the SLR - Accrual Based vs Cash based



Source: Author compilations

These results indicate that the financial deficit of SLR gradually reduced (and thus, financial performance improved) between 2007 and 2009, even though a different picture would be depicted by published accounts prepared on cash basis. Similarly, the improvements seen in 2010 and in 2012 appear to be largely owing to non-payment for fuel consumed within those years. The sharp deterioration in 2014 indicated in cash-based accounts would not be real either, and appears to have been caused by the settlement of past dues to the Ceylon Petroleum Corporation. When accrual-based accounting reflects the actual fuel expenditure attributable to that year, financial performance in 2014 improves as against the previous year.

Conclusions

Results of the analysis reveal how misleading cash-based accounts could be in reflecting actual performance of operations by a Government Department in Sri Lanka. Just adjusting for fuel expenditure, the trend of performance of SLR between 2007 and 2009 reversed completely from what was reflected in cash-based published accounts.

Hence, it could be concluded that the practice of Government Departments preparing accounts on cash-basis is highly inappropriate. Not only do such cash-based accounts depict an inaccurate picture on performance, but they also thwart opportunities for making correct economic decisions for Departments.

Therefore, the outcomes of the study suggest that the Government should consider resorting to accrual-based accounting, or at least publish them in addition to the cash-based accounts currently released to public.

Key Words: Government Departmental Accounting, Revelation of Economic Performance, Financial Regulations, Sri Lanka Railways

JEL Codes: H83, L25, L32, L92, M41, M48,

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An Extension of theTheory of Planned Behavior: Explaining Entrepreneurial Intentions of Undergraduates

ChinthakaJayasundara[1] and AthulaRanasinghe

Introduction and Research Problem

When discussing entrepreneurship, intention based models are expected to bestow a suitable approach due to increased predictability of entrepreneurial performance. Intentions can be defined as states of mind which direct individuals' 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 in this respect. Shapero's model incorporates three components that influence entrepreneurial intentions: perceived desirability, perceived feasibility and propensity to act. Ajzen's TPB explicates the human behaviour by understanding the intentions leading to such behaviour. The theory assumes intention as the immediate antecedent of behavior, 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), and 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 attitudes and personality traits have played an important role in these attempts to predict and explain human behaviour. However in accordance with arguments developed by Ajzen andFishbein (1980), as cited in Ajzen (1991), broad attitudes and personality traits have an indirect impact on specific behaviours:influencing only some of the factors closely linked to the behaviour in question. This utilised an extended version of Ajzen's TPB, analysing the entrepreneurial intentions of Sri Lankan State university undergraduates.

Conceptualisation & 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. As per the described theoretical framework, this study employs an extended

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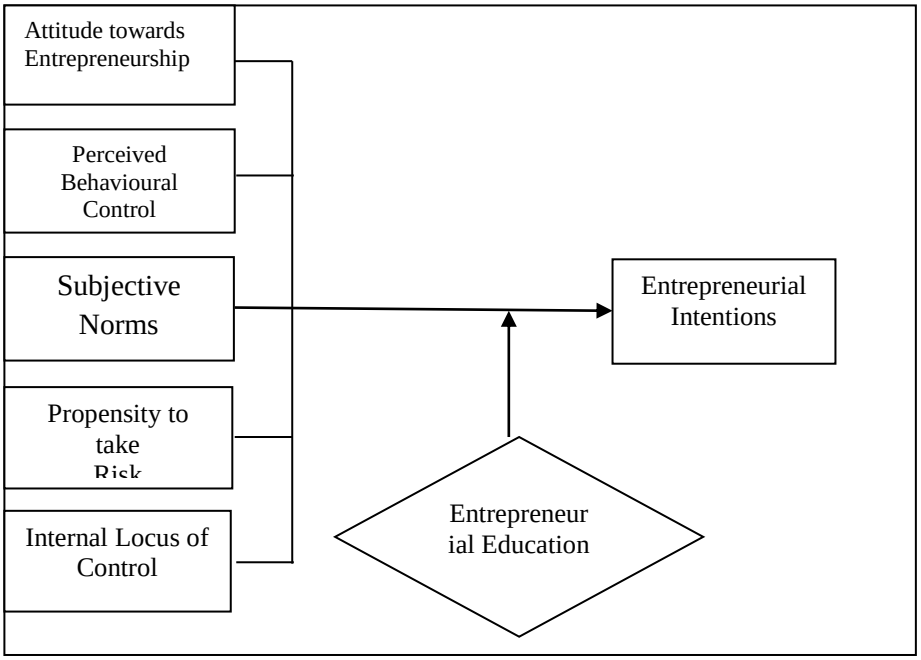
version of TPB developed by Ajzen (1991) and the schematic diagram of the conceptual model of this study is as follows:

Figure 1: Conceptual Framework



Source: Author Developed

Statements of Hypothesis

H1 - Attitude towards entrepreneurship positively influences entrepreneurial intentions

H2 - Subjective norms positively influences entrepreneurial intentions

H3 - Perceived behavioural control positively influences entrepreneurial intentions

H4 - Internal locus of control positively influences entrepreneurial Intentions

H5 - Propensity to take risks influences entrepreneurial Intentions

H6 - Entrepreneurial education moderates the relationship between entrepreneurial traits and entrepreneurial intentions

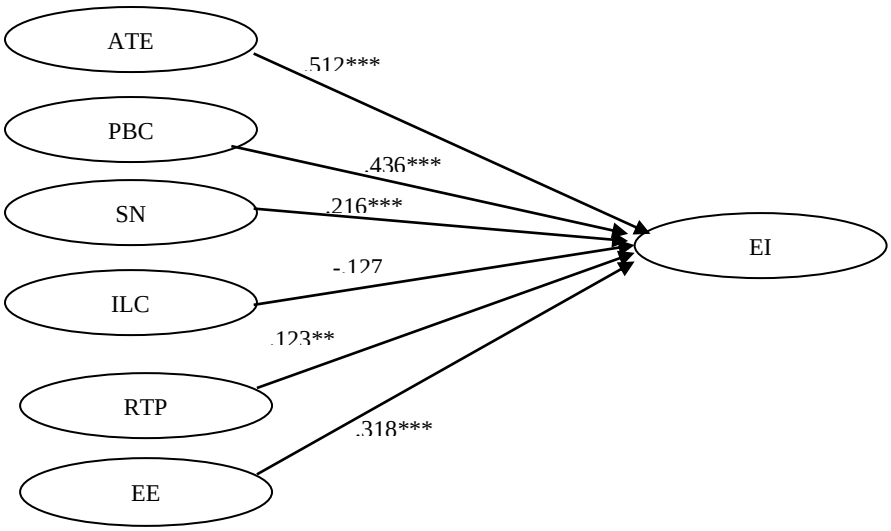
The study is predominantly quantitative in nature. The entrepreneurial intentions questionnaire (EIQ) has been carefully developed and administered among 486 final year undergraduates across the country to draw conclusions about the Sri Lankan State university undergraduates. A joint sampling technique comprising quota

sampling, judgmental sampling and convenient sampling was used to select 486 final year undergraduates for the study. Sampling frame has been carefully selected such 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 Uva-Wellassa 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 LinanandChen(2006) developed using seven-point Likert scale questions was employed to measure 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 internal consistency as the questionnaire includes multiple Likert scale questions to measure a single construct. Accordingly, the reliability of each construct was measured with Cronbach's Alpha for the data set.

Results and Findings

A majority of respondents were females who constituted 55.6 percent of the study sample while males represented 44.4 percent. The sample was drawn from 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 theparticipants were 23 years old and above. Moreover, the vast majority of the respondents were Sinhala Buddhists while there were some representatives from other ethnic groups as well.Participation of males inthe 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 Modelling (SEM) was employed to analysis of the hypotheses. The following diagram shows standardised estimates of the structural model.



Source: Author Developed

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 modelling results revealed that the proposed model had an acceptable fit to the data. Even though the Chi-Square ($\chi 2$) value was not significant, the $\chi 2$ to degrees of freedom ratio recorded a value of 3.554, which is in the acceptable range between of 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 and 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 that 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 propensityis 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 Conclusion

This study has proven that subjective norms, meaning social norms and environment affect a person's intention to be an entrepreneur. For example what do family and friends think, accept, and expect from you? How positive and permitting the norms are is also a vital factor. Most importantly, this study empirically verifies applicability of TPB in the Sri Lankan context toexplain the 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.

Key words: Theory of Planned Behavior, Entrepreneurial Intentions, Attitude towards Entrepreneurship, Subjective Norms

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Health Economics

Impact of Biomass Cooking on Women's Health in Rural Sri Lanka

N. V. Sandaroo[1] and B. W. R. Damayanthi[2]

Introduction

More than half of the developing world's population, particularly rural poor households, depend on solid fuels such as agricultural residue, green waste, wood and wood derivatives, charcoal, coal, crop waste, and dung for their primary cooking. This high level of dependence on traditional solid fuels and inefficient and polluting cook stoves imposes huge health, environmental, economic, and social costs on the people in these economies.

Biomass smoke contains an enormous number of substances, many of which damage or are injurious to human health. Most important are particulates, carbon monoxide, nitrous oxides, sulphur oxides, formaldehyde, and polycyclic organic matter causing respiratory infections, nasopharyngeal and airways irritation, wheezing, chronic bronchitis, chronic obstructive pulmonary disease, low birth weight, an increase in prenatal deaths, cancers of the lung, mouth, cataracts etc. (Banerjee et al., 2012).

Firewood collection, fuel processing (e.g., drying and cutting), cooking, and post-meal cleanup are traditionally female-gendered roles across the developing world. As a result, women are supposed to bear a disproportionate burden of the negative health, economic and time poverty effects of bio mass fuel. As per evidence gathered from several countries, exposure of women cooks to significantly higher particulate matter emissions is higher than men, up to four times men's levels in Kenya and up to double the level of men in South Asia studies. (Huq, et al., 2004). Recent research demonstrates evidence of greater incidence of respiratory illness and eye disease including a higher component of disadvantage towards women regarding depression, blindness headaches, coughing, eye itching. According to Fullerton, et al., (2008) women are also expected to have more incidences of headaches, anemia, and other symptoms of excessive carbon monoxide exposure because the negative impacts of carbon monoxide in women, especially pregnant women, occur at significantly lower proportions than men.

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Another part of evidence is injuries from firewood collection and transportation among female population (Warwick, & Doig, 2004). There are more strong informal evidence that the head loading of firewood and other physical strains caused by firewood transport by foot have resulted in headaches and musculoskeletal damage, along with several symptoms of back pains, neck stiffness and waist pains. These symptoms and related physical injuries have significantly higher incidence rates in women than for men (Wickramsinghe, 2003).

As in many countries, biomass fuel and wood burning stove use is most common in rural areas and the country's rural estates in Sri Lanka. Over 78% of households nationwide burn wood in biomass stoves; 84% of these households are in rural areas, and 96% are households on rural estates. This heavy use of wood-burning stoves is the leading contributor to indoor air pollution in the country. High concentrations of indoor air pollutants represent a significant health issue for Sri Lanka. Respiratory diseases, which may have been caused by cooking emissions, are one of the leading causes of hospitalisations and death. Despite Sri Lanka's well-established public health system and relatively good public health indicators compared to other developing countries, current issues are poorly studied to date. Although the adverse effects of indoor air pollution on respiratory health, birth weight, cataract, etc. are well documented in the world, limited literature suggests that the health impacts of indoor air pollution coupled with traditional cooking practices in Sri Lanka has not been adequately addressed and discussed. Hence this study aims at examining the effects of biomass fuel on women's health in the rural context enriching the sector specific evidences in the literature.

Methodology

Empirical model

Since the outcome variable is dichotomous, binary logistic model which specified below is estimated to examine the probability of being affected by indoor air pollution related issue. Hence, In this model, binary dependent variable takes value 1 if a household has related health issue or 0 for otherwise. Then the basic model takes the form of,

$$y_i = \sum_{j=0}^{k} X_{ij}\beta_j + \varepsilon_i \qquad (1)$$

Where y denotes binary dependent variable, β is vector of parameters and the error term Ɛ which has zero mean and logistic distribution. If Pi is the probability that a household report a health issue takes logistic distribution,

$$ln\left(\frac{P_i}{1-P_i}\right) = \propto + \sum \beta_j X_{ij} \qquad (2)$$

With the logit transformation and taking the logarithm of the ratio of probabilities to get the log odds ratio, the full model can be specified as follows.

$$ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 age + \beta_2 gender + \beta_3 wealth + \beta_4 education + \beta_5 cook\_fuel + \beta_6 stove + \beta_7 time_{cook} + \beta_8 kitc + \beta_9 years\_cook + \varepsilon$$

Data and the variables

Data were collected from a random sample of 300 households in Yagirala Udugama, Karapagala, and Walallawita GN Divisions in Walallawita divisional secretariat in Kalutara district. The main survey tool of the study was questionnaire which consisted close and open ended questions. Self administered method was used for a part of the field survey whilst interview method played a major role. The respondent for socio-economic and other variables was the chief cook in the household. For health-related issues the queries were put directly to all adult individuals present during the survey.

The data at household level were collected to get a comprehensive picture of socio-economic conditions, energy use pattern, housing characteristics, cooking behavior, willingness to pay to reduce indoor air pollution and environmental considerations. Energy use pattern included information on consumption of bio-fuels and commercial fuels for cooking, time and effort involved in collecting firewood, issues faced in collecting processing or utilising bio fuel. Housing characteristics included information on number of rooms, type of house and type of kitchen, location of kitchen, and number of doors and windows in the kitchen. Information on cooking behavior includes number of meals cooked using different fuels in a day, hours of cooking, cooking involvement in different age groups and type of involvement. People's willingness to reduce the impact of indoor air pollution included information on people's desire for type of intervention, reason for not using clean fuels, willingness to pay for clean fuel. Health profile data included information on smoking habits, involving dusty environment, cooking involvement, years of cooking and the Medical Research Council (MRC) questionnaire, 1986, UK, for respiratory symptoms was followed to construct health index.

Results and discussions

The majority of the sample consists of females (93 %) while male representation is only a small fraction (7 %). It was observed that approximately half of the respondents were of the 18 – 40 age groups, while a higher proportion, 26.4 percent, is in the age groups of 30- 40 years. Only 2% of the respondents were illiterate, while 11% of them were educated to primary level indicating higher level of educational attainment in the country.

Almost all (99 %) sampled households use bio-fuels for cooking of which the majority (83 %) use fuel-wood. The percentage of houses using electricity for lighting is 98.2% of the sampled households. However, the use of electricity or biogas for cooking was almost negligible (less than 0.5%). Only 15.9% of households with electricity used gas as the main cooking fuel while the rest relying on biomass. About 98% of the households using fuel-wood gather it and the remaining 4% pay for workers to gather it. About 34% of households using firewood gather it from their own lands while government forests are the main source for more than 50%.

On average, availability, affordability and adaptability have been the main reasons for using biomass fuel. A majority of households use biomass fuel based on availability and since they find it more affordable and adaptable. Relatively less households consider its renewability when using it as a cooking fuel.

Table 1: Determinants of a household having air pollution related health issue: Regression results

Variable	Coefficient	OR	Wald
Constant	-2.035		3.608
	(1.071)		
Age	0.190	1.094	0.152
	(0.502)		
Gender	2.125*	0.044	13.505
	(0.540)		
Edu	-0.400*	0.741	4.473
	(0.234)		
Wealth	-0.208**	0.812	2.538
	(0.511)		
Cook-fuel	1.162*	3.196	6.349
	(0.461)		

Cook-time	0.384	1.468	0.945
	(0.385)		
Cook-years	0.014*	1.014	2.947
	(0.008)		
Cook-stove	0.449**	2.584	2.565
	(0.593)		
Kitchen-type	0.251**	1.285	0.156
	(0.635)		

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

Except age, estimated regression coefficients for all other variables were significant having expected signs. Wealth and education showed a negative relation confirming those who are wealthy and educated have low probability of falling into risk. However, the impact is very small and least significant compared to the other variables. Cooking fuel, cooking time, stove type etc were positively significant at 1% level of significance.

Conclusions

The poor and less-educated who live in rural areas are found to be at greater risk for indoor air pollution related health issues while wealthier people are suggested to have comparatively low risk of falling ill due to this problem. More interestingly it was found that the other considerations such as the availability and affordability of wood, as well as attitudes, practices and life styles of the rural population can influence much on the type of principal cooking fuel used and thereby the health problems. Hence, considering the possibility of the continued use of wood as the main source of cooking fuel for many more years in Sri Lanka, measures should be taken to mitigate the health hazards due to indoor air pollution. Most importantly, improved stoves could be introduced as a national priority among wood users. Proposed stoves should be culturally acceptable, user friendly and of low cost for sustained use by the needy communities. Market access could be improved to facilitate with kerosene and LPG usage to help the households that are ready to consume cleaner fuel.

Possible structural changes would be another option to improve ventilation in the kitchens of households by having chimneys, exhaust fans and open windows or separating kitchen from living room by partition. Awareness programmes will be helpful in improving the knowledge about the health effects due to indoor air pollution and in changing the attitudes that lead to improper cooking practices. Specially increasing the female literacy can have a significant impact on reducing negative health issues through motivating them to demand for clean fuel.

Conducting further studies to monitor actual indoor air quality, ventilation levels in Sri Lankan households should be prioritized.

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Use of Agrochemicals on Cost of Family Health with reference to Giradurukotte Divisional Secretariat

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Introduction

Around the globe, chemical-synthetic pesticides have been used increasingly since the 1940s. In recent decades, there has been a steady increase in the amount of pesticides marketed for agricultural use. In developing countries, the effects of acute poisoning due to exposure to dangerous levels of pesticides in food are apparently more severe than in industrialised countries. Their use leads to considerable health hazards for people, due, for example, to direct contact during application, pesticide drift from fields, or contamination of food or drinking water. The use of pesticides in production of rice, banana, and vegetable is high in Sri Lanka. When effectively applied, pesticides can kill or control pests, including weeds, insects, fungi, bacteria and rodents. Chemical pest control has contributed to dramatic increases in yield for most major fruit and vegetable crops. On the negative side many pesticides are harmful to the environment and are known or suspected to be toxic to humans. They can produce a wide range of adverse effects on humans that include acute neurologic toxicity, chronic neurodevelopmental impairment, cancer, reproductive dysfunction and possibly dysfunctions of the immune and endocrine systems. The increase of cancer, chronic kidney disease, diabetes mellitus, heart diseases suppression of the immune system, sterility among males and females, neurological and behavioral disorders, especially among children, have been attributed to chronic arsenic poisoning.(Tchounwou et al., 2003. Tseng et al., 2003; Rahaman et al., 2003; Meliker et al., 2007; Kozul et al., 2009; Vahter, 2009). Arsenic in drinking water, usually in its inorganic form, is known as the silent, slow killer because its presence is not revealed by taste, odour, or colour of the water. Groundwater is the main source of drinking water in many countries around the world. In rural Bangladesh and India (West Bengal), the presence of arsenic in groundwater has endangered tens of millions of people (Chakraborti et al., 2010). The risk of health problems depends not only on how toxic the ingredients are (Pesticide Ingredients), but also on the amount of exposure to the product. In addition, certain people like children, pregnant women and sick or aging populations may be more sensitive to the effects of pesticides than others. Therefore, the Government should take several steps to reduce few chemical applications.

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Problem Statement

Pesticides contain active ingredients and inert substances that are potentially dangerous to human health and environment as well as being costly farm inputs. Exposure to some active ingredients can increase the risk of contracting Cancer, respiratory problems and other health problems. The aim of the study is to identify the impact on family health cost due to agrochemical use in rice/paddy farming.

Methodology

The research has used published scientific articles, conference papers on sustainable agriculture and food safety, reports and books on agriculture, and on the use of pesticides. The study also conducted an excessive review of Government documentation, newspaper/internet articles that were relevant to the objective. This study was descriptive in nature. The study was a combination of quantitative research (survey) and qualitative research (interview) method. In the survey, 100 farmers who are living and working in Giradurukotte Divisional Secretariat were selected randomly. They cultivated rice twice yearly. Each season is called a *kanna.* There are two such seasons each year: the *Yala* and the *Maha*. The data of this research is based on the *Yala* season. After the survey was completed, data was processed in SPSS for statistical results. Line graphs, percentages, tables and correlation have been used to present collection data. Correlation between the usage of pesticides and expenses of family health was measured. The significance of correlation was examined under the 95% confidence level, and two hypotheses were created.

H0: There is no correlation between use of agrochemicals and cost of family health.
H1: There is a correlation between use of agrochemicals and cost of family health.

Findings

According to the study, farmers used agrochemicals such as Paracott, urea, Nomini, and Round up. In the study we have tested the correlation between two variables: the use of agrochemicals and cost of family health. The value of the correlation was +0.66. According to research the people who were living in this area had to spend a high percentage of income on health. The reason for this was the high number of family members, a majority of whom suffered from kidney disease. The survey identified that 70% of farmers in this area suffered from kidney disease. The monthly health cost of the selected sample was therefore increased from Rs. 2 000 to Rs. 20 000. The doctors have said that long term pesticide usage was the main reason for kidney disease. Moreover they say that long term pesticide use could

contaminate soil and water, and result in arsenic over time. Thus, water resources have been polluted with arsenic. This is the reason for the increased incidence of kidney disease, and also the cause of increased health cost. Farmers have not taken precautions by sustainably handling their empty pesticide bottles, as they were not aware of environment-friendly pesticides. They were not cultivating crops in a sustainable manner and preferred to purchase fast-acting pesticides. They also do not comply with dosages recommended on the pesticide bottle, because they want to see immediate results on the crops. They cultivate according to their own experiences, irrespective of sustainability and even the safety of food production, because they don't get incentives from the Government. They feel that incentives and good policy are the key to successful agriculture, and that they need support from the Government.

Conclusion and Recommendations

In this study we examined the correlation between two variables. They are, the use of agrochemicals and cost of family health. It had a positive relationship. The value of the correlation was a +0.66. A majority of the people who were living in this area have suffered from kidney diseases, and also have low educational levels. Thus it is an urgent need to divert more resources to consolidate these findings and to plan and implement strategies to contain environmental pollution, particularly of ground water, soil, and plants with arsenic derived from agrochemicals. Rainwater harvesting for drinking purposes, promoting natural and traditional methods for pest control, public awareness over chronic toxicity of arsenic and potential risks in agrochemical–based agriculture to remove arsenic in groundwater and soil may be prudent immediate measures in addressing this issue. According to this, the following recommendations are proposed;

- the surveyed farmers in Giradurukotte are made aware of the fact that it is important to handle pesticides in a responsible manner,
- that information can be spread further about pesticides, pests and diseases, and that
- the government should introduce quality pesticide for the farmers.

Thus, it is the prime duty of relevant authorities to take immediate measures to implement those laws and regulations and protect Sri Lanka and Sri Lankans from this accumulative non-threshold carcinogen.

Key words: Agrochemical, Cost of Family Health

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The Impact of Diabetes on Worker Performance in the Public Sector: the Case of a Selected Area in Jaffna City

N. Baskaran[1]

Introduction

Today, many of the greatest threats to individual health and physical well-being stem from unhealthy lifestyles and high-risk behavior. This statement is true for cancer, diabetes, acquired immunodeficiency syndrome (AIDS) and a host of modern health ailments often connected to a person's or group's social class, educational status and living conditions and their impact on such people's ability to access various opportunities.

Diabetes is a social health problem that the global society faces today. The World Health Organization (WHO) defines health as a state of complete physical, mental, and social well-being, and not merely the absence of disease or injury. This definition calls attention to the fact that being healthy involves much more than simply not being ill or injured. Being healthy also means being physically fit, having good social relationships with friends and family, being able to function or do things, and having a sense of well- being (Cockerhan, 2015). Health is defined as a capacity of personal experiences or a feeling of well–being. Many factors influence or contribute to such feeling: among them, social, religious, economic, personal, and medical factors.

However, today, people with diabetes face an increased risk of developing a number of serious health problems. It also has become a major and growing contributor to mortality and disability. According to the World Health Organization (WHO), about 347 million people worldwide have diabetes. In 2012 diabetes was the direct cause of 1.5 million deaths. The disease is predicted to become the 7th leading cause of death in the world by the year 2030. Diabetes Association of Sri Lanka (DASL) statistics reveals that there are nearly 4 million diabetics in Sri Lanka. Most studies suggest that being overweight and lack of exercise were the main causes of diabetes among children, while family history, food habits and obesity were the main causes among youth.

Most studies suggest that good health is a prerequisite for the adequate functioning of any individuals or society. If our health is sound, we can engage in numerous types of activities. But if we are ill, distressed, or injured, we face curtailment in our daily lives, and we may also become so preoccupied with our state of health that other pursuits gain secondary importance or are even rendered meaningless. It is in

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this context that this study investigates empirically the relationship between workers living with diabetes and their performance and satisfaction, by applying a medical-sociological framework. The present study seeks to highlight diabetes and understand the complex relationship between social factors and health in the public sector. It is expected to cast new light on a growing reality in the everyday activities of the public sector, and to help deepen the discourse on awareness among workers.

Objective of Research

The aim of this study is to examine the impact of diabetes on worker performance and the influence of environmental factors on public sector workers with diabetes. Under these components, this study especially focuses on two main research questions.

1. What is the complex relationship between environmental factors and workers living with diabetes?
2. How does diabetes impact a person's performance at work?

Research Methodology

Research Site

This study focuses on the work conditions of workers with diabetes in Jaffna district. Jaffna is the most important and metropolitan city in the Northern Province. This study focuses on Jaffna General Hospital in Jaffna city.

Methods of Data Collection

As Yin (2004:1) suggested, as this study was examining a real situation, the best methodology wis the case study approach. Further, the study was an explanatory one looking at workers' activities and job satisfaction in Jaffna district. Being a case study, this study especially focuses on two major components such as workers with diabetes and their work performance. Under these components, this study examines the effects of environmental factors, and responses to health problems in a manner consistent with the culture, norms, and values of the workers. This study has reported on the experiences of 70 workers (62 diabetics and 8 non-diabetics) in the public sector. The participants were selected from a list of those who were registered with the General Hospital in Jaffna as having diabetes, using the purposeful sampling method. This study has been conducted using in-depth interviews and observations as ways of collecting primary data. For the analysis of this study, the grounded theory method was used with the ultimate goal of analysing

subjectivities as an outcome of diabetic workers' perceptions of their performance at work.

Data Analysis

In order to meet the objectives of the study, data was collected using qualitative methods and analysis. This study followed the grounded theory method for data analysis, which required the use of inductive methods and a constructive approach in constructing the meaning of data found during the field visit. After collecting the data, researcher conducted the initial coding of responses, then formulated focus coding, and finally constructed narrative of the response. This study summarises interviews by the researcher.

Finding of the Research

This study focused on the overall picture of workers with diabetes in the public sector, their health issues, satisfaction, and opinions and suggestions for future well-being. Care was taken to conduct the interviews in a manner sensitive to different aspects of worker perception, their feelings in the process of acquiring workers, and their subjective perspectives on various aspects of their life.

The information provided by participation was organised around themes that emerged from the data and discussed. This part presents a summary of the different themes based on workers' interviews during field visits, among them economic satisfaction, working environment, and gender inequality.

Economic satisfaction

Workers` economic positions are an important social scale to measure economic stratification. On the other hand, economic satisfaction acknowledges the fact that being healthy depends heavily on income. Also, it connects with the materialist explanation of how health inequality is related to wealth and income distribution in the light of housing, unemployment, and poor working conditions. Most workers face issues in relation to the monthly distribution of income among their families. As such, class-based health inequalities were identified. On the other hand, disparity in economic satisfaction is even more pronounced between the long term unemployed and private sector employees: people in work tend to live longer and better than those who are without work and without diseases like diabetes.

Working Environment

The strongest theme to emerge from the data was that of working environment. The data show that working condition is defined as the capacity of a population to

safeguard sustainable human well-being, and social and economic development. This theme focuses on how experiences of workers with diabetes affects them, and their day to day life. The stories of workers with diabetes illustrate how working environmental performs a function in constituting both lives and lifestyles.

Gender Inequality

This study has found disparities in health in men and women. Traditionally material circumstance appears to influence women's health. However, women with diabetes seek medical attention and have higher rates of self-reported disease than men. Women's lives are inherently different from men's in terms of family size, sexual reproduction, and status, with impacts on levels of domestic consumption, income and childbearing, and mothering activities.

Conclusion

The main purpose of this study is to discuss the impact of diabetes on workers in the Government sector. Social factors are important influences on the manner in which societies organise resources to cope with health hazards and to deliver medical care to the population at large. This paper attempts to examine the relationship between environmental factors and workers living with diabetes, and their job satisfaction. This study discussed three themes based on the grounded theory method and coding system. In turn, these stories thus focus on how environmental factors and material conditions are constitutive of how workers with diabetes understand themselves and their places in social hierarchy.

This study found that healthy lifestyles and the avoidance of high- risk behavior advanced the individual potential for their productivity and job satisfaction in the Government sector, and also for a longer and healthier life. Also, workers with diabetes have a lower social and economic status.

The main limitations of this study are the period of time and size of the sample covered by the study. Data representing only the public sectors were used for the study. To avoid this limitation sample size can be increased, and the private sector included. However, this study can also contribute to the further development of sociology of health and industrial sociology.

Key words: Diabetes, Productivity, Job Satisfaction, Public Sector.

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Industrial Development

A Study of Industrial Development in the Northern and Eastern Provinces during the Post-war Period

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Introduction

Industrialisation is a leading strategy for economic development in developing countries since World War II. Twenty six years of civil war ended in 2009 and post-war reconstruction work was initiated by the Government in the hope of achieving 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 a majority of the labour force in former war zones belonged to agriculture sector, the previous Government had taken a policy decision to develop the industrial sector in order to rapidly develop the area as well as to overcome unemployment.

The developed countries of Europe are pioneers of industrialisation (Szirmai, 2009). They were overtaken by the United States which became a modern developed economy in the nineteen century. In the developing world, industrialisation was experienced since the end of the 19th century in Latin America and East Asia. Since World War II, the industrial sector has become a leading sector in many developing areas in the world (Maddision, 2001). Industrialisation is a driving force for foreign direct investment, technology, and growth of labour productivity which correlate with rapid economic development in the processs of globalisation (Bairoch & Kozul Wright, 1996).

Objective of the study

The aim of this study was to explore Government work on industrial development and its effect on the economy of war-affected zones.

Methodology

This study was mainly conducted on primary and secondary data. Primary data was collected from in depth interviews of affected people from former war zones in Jaffna, Vauniya, Trincomalee and Batticaloa districts in Sri Lanka, and Government

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officers involved in post-war development activities in the North and East. Secondary data was collected from Government reports, related articles, and documents.

Implementing New Industrial 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. These projects aimed to create more job opportunities and to promote the industrialisation of the area. Further, the projects were expected to increase production and people's income in these regions, and so to help reduce poverty and income disparities.

As part of the industrial development policy, the Government planned to establish a new industrial estate in Atchuvely in Jaffna that will consist of 50 factories.[2] The government will provide all infrastructural facilities to investors, and financial assistance will be available from banks.[3]

The Board of Investment of Sri Lanka (BOI) was entrusted with the establishment of new industries in the area. The Chairman of the BOI points out that four apparel factories are to be established and that 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 garment factories. Further, the BOI has identified ten areas for development/investment, and they have started 572 small and medium projects in the Northern Province.[5]

To develop the vocational talent of youth in the North, a vocational training school will be established with the assistance of the Government of Germany.[6] This will help to produce skilled labour for the newly-planned industries. 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. This work on post-war economic development was highly commended by several international dignitaries who visited Sri Lanka in the post-war era.[7]

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[2] "Over 50 companies to invest in Atchuvely industrial estate", Daily News, 10 December 2013. http://www.dailynews.lk/business/over-50-companies-invest-achchuveli-industrial-estate#sthash.8oH3Afll.dpuf [Accessed 15 January 2014]

[3]*Ibid*.

[4]"BOI invites expats to invest in North – East", *Sunday Observer*, 13 July 2010

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

[6]Interview with the Secretary to the PTF.

[7]" 'Fair Dinkum' Say the Aussies", *Daily News*, 28 January 2014; "World Bank VP Cheers: Highly Impressed", *Daily News*, 28 January 2014.

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.

Table 1. Macro industries situated in the North and the East before the War

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	Atchuvely	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.Tricomalee	Mineral Factory	Ilmenite	Pulmoddai	Operating

*Source: 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.)

According to reports, some of them resumed operations soon after the war ended (see Table 1) but the rest have still not resumed production.

As shown in Table 1, eight macro level factories are not operational. These factories supported a number of families in the past. The Chairman of the Chamber of Commerce in Jaffna pointed out that there would be no need to build new factories

in Jaffna if the Government could restore the old factories which had benefitted a number of families.[8]

Conclusion

Although there are no reliable unemployment figures available for the Northern and Eastern Provinces for the recent period,[9] the GDPs of both provinces have increased since the war ended (see Table 2). Likewise, the provincial GDPs relating to the industry and services sectors have increased dramatically when compared with the agricultural sector (See Table 3).

Table 2: Contribution to GDP (%) from the Northern and Eastern Provinces, 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 4

Table 03: 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

[8]Zahrah Imtiaz (2014) *op cit*.

[9]The official National accounts are not available for the war affected periodof 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).

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

Government policy should aim to increase industrial development since it will facilitate rapid economic development in war-affected areas. The reported economic boom in the area has not benefitted all resettled families, since they do not have the required vocational skills to work in the new industries. 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, and because victims of war were unable to receive proper education, skill acquisition, or vocational training.[10]

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

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[10]The 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]

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

Apeksha Embuldeniya[1]

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

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,

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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 though 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;

$H0_1$: There is no significant relationship between communication on employee health and safety practices and employee productivity.

$H0_2$: There is no significant relationship between structure on employee health and safety practices and employee productivity.

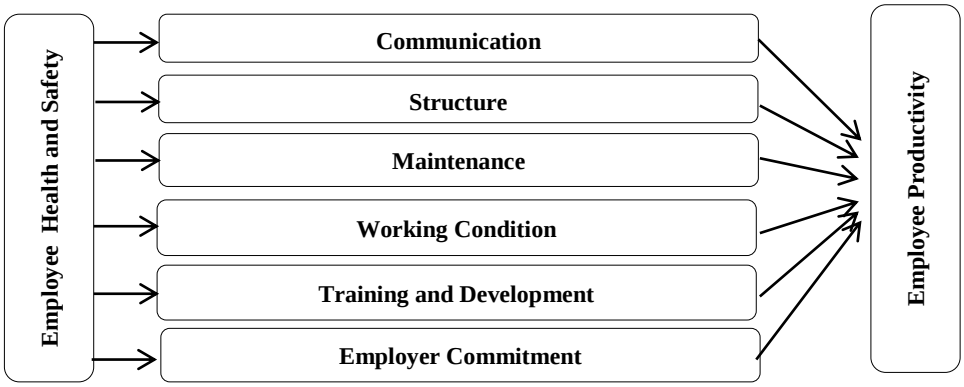
$H0_3$: There is no significant relationship between maintenance on employee health and safety practices and employee productivity.

$H0_4$: There is no significant relationship between working conditions on employee health and safety practices and employee productivity.

$H0_5$: There is no significant relationship between training on employee health and safety practices and employee productivity.

$H0_6$: There is no significant relationship between employer commitment on employee health and safety practices and employee productivity.

Figure 1: Conceptual framework

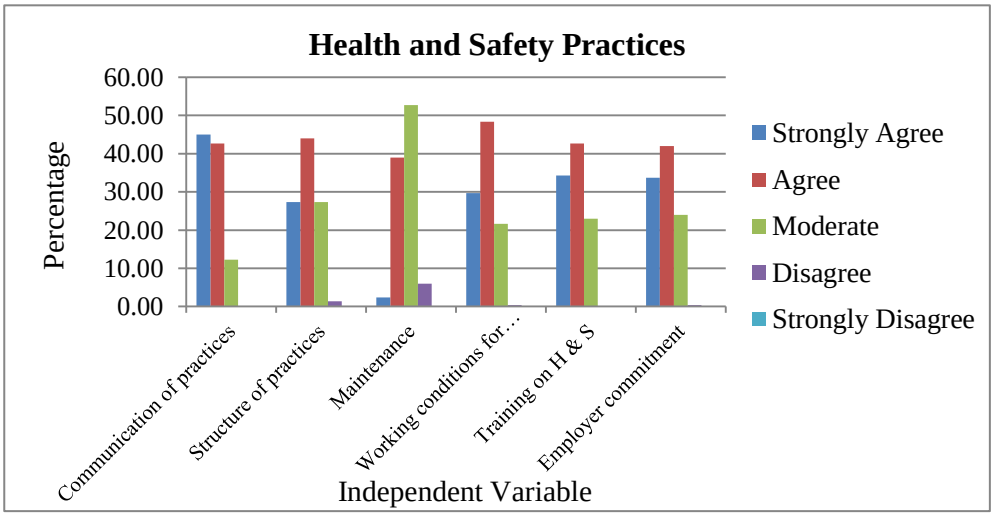


Source: Author developed, 2015

Data Analysis and Results

Descriptive analysis

Figure 2: Summary of responses towards health and safety practices



Source: Sample Survey data, 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.

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

Dependent Variable	Employee Productivity
Independent Variables	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, than 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

X_1 = Working Conditions on H & S practices

X_2 = 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

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.

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

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An Assessment of Factors Affecting Voluntary Labor Turnover Intention in Apparel Industry (with special reference to MAS Holdings (Pvt) Ltd;Mihintale)

S D I Dulanji[1] and H A B W. Hettiarachchi[2]

Introduction

Today it is widely accepted in the business world that human resources are a valuable asset to companies. The flow of this valuable asset, employee turnover, plays a crucial role in firm performance. The garment industry is more labour oriented than other firms because it cannot survive in the competitive global market without good and strong workforce. Turnover intention is a continuous issue that has affected organisations todate. When considering the Sri Lankan context the apparel sector is the highest industrial employment generator and the highest foreign exchange earner. Kelegama (2005) emphasised that the garment industry in Sri Lanka has been contributing to the livelihood of nearly 1.2 million people.

Labour turnover is common to all companies in all industries. However, in some companies or in some industries there can be a huge turnover. There may be different factors or a background causing this huge turnover rate. In the Sri Lankan garment industry the average labour turnover per factory is about 60 percent per annum and the net number of persons leaving the industry is nearly 25 percent per annum (Dheerasinghe, 2009). Voluntary employee turnovers result in significant costs for an organisation. Thus it is important to identify turnover intents and findings of the study would be important to human resource managers in the apparel industry particularly in designing effective management programs to retain employees while achieving organisational expectations (Fernando, 2010).

Objectives

The aim of this study is to assess the factors which lead to voluntary labour turnover intention in apparel industry. There will be an attempt to determine the most important factors which cause voluntary labour turnover intention and to find the impact of demographic factors on labour turnover in Sri Lanka's apparel industry.

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Hypotheses

H1: There is a positive relationship between stress on the job and labour turnover intention.

H2: There is a negative relationship between salary and labour turnover intention.

H3: There is a negative relationship between social image and labour turnover intention.

H4: There is a negative relationship between supervisory support and labour turnover intention.

H5: There is a negative relationship between job security and labour turnover intention.

Methodology

This research measures factors affecting voluntary labour turnover intention in theapparel industry. In this research, the researcher has selected a sample from MAS Holdings, Mihintale. The study was based on the primary data gathered through questionnaire and from a sample of 100 operational level employees (n=100). When the respondents were selected, this was done with respect to two categories: those who came from another garment factory to MAS Holdings (Pvt) Ltd and those who joined MAS Holdings as their first job. Random sampling technique has been used to select the sample. The data was collected by pilot survey.

The data gathered were analysed by using Non-Parametric test in Statistical Package for Social Sciences (SPSS) software version 21. All the values of Cronbach's alpha were greater than 0.7. Correlation analysis was used to identify the two measurement variables and to quantify the strength of the association or relationship between the 'five factors' (independent variables) and 'turnover intention' (dependent variable). Factor analysis using Principal Component Analysis (PCA). It enables the distribution of resulting factors to be determined.

Results and Findings

All the values of Cronbach's alpha are greater than 0.7 and all the factors are reliable. The Kaiser-Meye-Olkin (KMO) measure of sampling adequacy and the Barlett's test of sphericity results indicated that factor analysis was appropriate for this data. Kaiser recommends accepting values greater than 0.5 as acceptable, values between 0.5 and 0.7 as mediocre, values between 0.7 and 0.8 as good, values between 0.8 and 0.9 as great and values above 0.9 as superb. For these data the values are 0.775 for the first group and 0.799 for the second, which falls in the range of being good hence the researcher was confident that factor analysis was

appropriate for this data. Barlett's test was also highly significant ($p<0.001$), and therefore factor analysis was appropriate ($P=0.000$).

Key findings of the study indicate that among five hypotheses, salary, supervisory support, social image and job security have a negative relationship with turnover intentions of operation level employees in apparel industry. Considering employees who are working in the company as their first job, it has correlation levels of (-0.483), (-0.556), (-0.270) and (-0.623) respectively. Among employees who have come from another factor, the correlation levels are (-0.528), (-0.336), (-0.225) and (-0.444) respectively. Job stress has a positive relationship with turnover intentions of operation level employees in apparel industry. It has correlation level $(+0.5) \leq r < (+1)$. Its (0.566) and (0.577) among employees who are working in the factory as their first job and the employees who have come from another factory respectively. According to findings of the researcher, all the hypotheses could be accepted.

Demographic factors such as age, gender, tenure, educational level, position of organization, civil status, and family background are also important factors in arriving at an intent to quit. There is a higher probability of female employee turnover intention in apparel industry. In here femaleness is one of major reason to increase turnover intention. Considering age variance, there is a higher probability for labour turnover intention among the middle aged employees (18-25) for labour turnover intention. There is a higher probability of unmarried employees for intending to quit. Considering tenure, there is a higher probability of labour turnover intention among those who had been employed for less than one year or one to three years. Considering education level, 60 employees have studied up to GCE O/L. 19 employees have studied up to Grade Nine or 10. There is a higher probability of labour turnover intention among employees educated up to GCE O/L in the apparel industry.

Conclusions, Implications and Significance

Considering all these factors, it is apparent that they affect for the labour turnover intention. Considering those who are working in the garment as their first job, the greatest effect is exerted by job stress, followed by salary, supervisory support, security and social image respectively. Considering those who have come from another garment factory, the salary is most impactful followed by job stress, supervisory support, security and social image. On comparison of the two groups, the researcher noted that those who are working in a garment factory as their first job have a higher intention of turnover than those who come from another garment.

According to this study, factors such as job stress, salary, and supervisory support seem to have the strongest impact on turnover intent. Security and social image seem to somewhat impact turnover intent, with demographic determinants providing important evidence for the research.
These findings highlight the necessity of an appropriate retention policy formulation process for managers.

Keywords: Apparel industry, Voluntary labour turnover intention, , Factors

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Evaluation of Entrepreneurship Development Programmes in Sri Lanka

A. M. N. J. Abeykoon [1]

Introduction

Entrepreneurship is the key to the economic progress of a nation. Development of entrepreneurs leads to rapid industrialisation and hence to the improved well-being of a country. Entrepreneurs are therefore called wealth creators. Traditionally it was believed that entrepreneurial talent is an innate trait which one inherits through birth. An entrepreneurial development programme is the systematic and organised development of a person into an entrepreneur. The development of an entrepreneur refers to inculcating entrepreneurial skills into a common person, providing the necessary knowledge, developing the technical, financial, marketing and managerial skills, and building 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 to adopt entrepreneurship as a career and to enable him to identify and successfully exploit opportunities for a new venture. These days, entrepreneurship development programmes are treated as important tools for industrialisation and as a solution for the unemployment problem in Sri Lanka (Sri Lanka has experienced two-digit unemployment rates for almost three decades). Unemployment causes many social, economic, and political problems, exacerbated by the lack of Government jobs and the mismatch between job skills and status in private jobs. Therefore Sri Lanka entrepreneurship development has adopted a new approach adopted by the Ministries of Rural Development, and Youth Affairs and Sports, as well as by the handloom textile industry in 1989, under the UNDP/ILO project SRL/87/035. According to this project, Small Entrepreneur Development Unit and Sri Lanka Industrial Development Board could obtain 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 institutes, non-Government institutions and semi-Government institutes. Government institutes are the Small Entrepreneur Development Unit, Department of Manpower and Employment and Ministry of Women Affairs. Semi-Government institutes are the Sri Lanka Industrial

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Development Board, Mahaweli Authority, National Youth corps, 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 conduct entrepreneurship development programmes in a country. They generate new opportunities, generate equitable income distribution, contribute to economic development, utilise 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 these programmes. According to this research problem two hypotheses were created.

H_o: not start an enterprise after completing entrepreneurship development programmes

H_1: start an enterprise after completing entrepreneurship development programmes

Objective of the Study

The main objective of this study is to identify the contribution of entrepreneurship development programmes to entrepreneurship in Sri Lanka. Other objectives are to identify the contribution of Government to entrepreneurship development programmes in Sri Lanka, to identify the strengths and weaknesseses of programmes implemented in Sri Lanka, and to identify the problems of entrepreneurs during their operation of enterprises.

Methodology

Primary data were collected from 60 participants who completed entrepreneurship development programmes in Small Entrepreneur Development Unit conducted by Industrial Development Bureau in Kurunegala Divisional Secretariat area in 2014. The sample was collected from a population of 729. Simple random sampling method used for selecting sample for this study. Questionnaire and interviews were used to collect primary data. Secondary data were collected through Central Bank and International Labour Organisation reports, magazines, and web sites. Bar, pie,

and line charts were used to represent data. Descriptive statistics and chi square test were used for data analysis, with the aid of SPSS software. The chi square equation was,

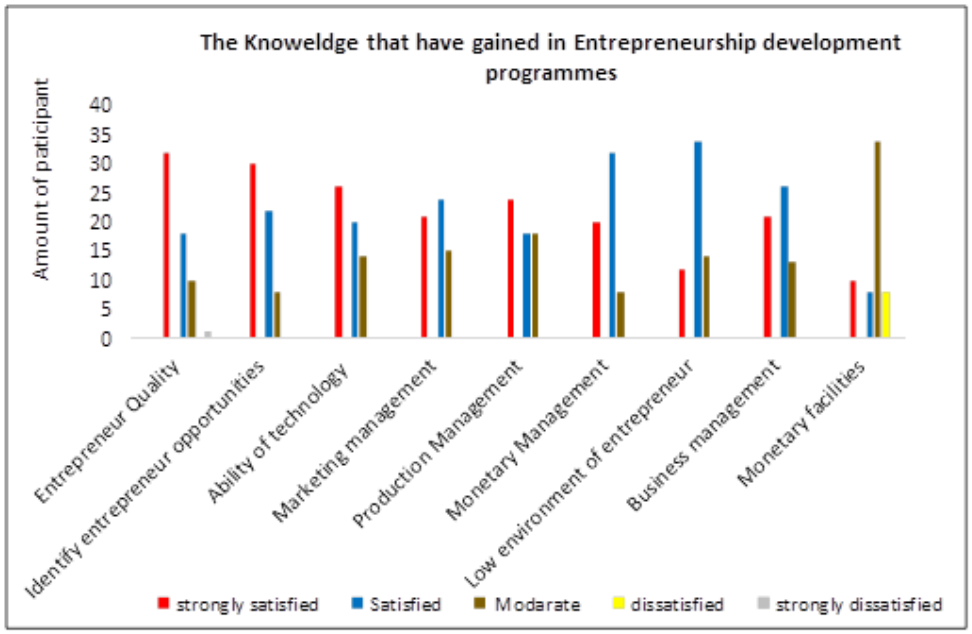
$$\chi^2 = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i}$$

O_i = frequency of i th section observation
E_i = compatible expect frequency
K = number of section

Result and Analysis

According to the data collected by this study, participants selected program es in business (75%), business management (16.7%), accounts (11.7), marketing management (13.3), and costing (13.3). The knowledge obtained by participants are represented in Figure 1.1 below.

Figure 1.1: Knowledge gained by the participants through entrepreneurship development programmes



Source : Survey Data, 2014

According to the above figure, a majority of participants have moderate satisfaction with the knowledge gained through entrepreneurship development programmes.

76.7% of the sample were employed and 23.3% were unemployed. A majority are neutral as to whether their skills have improved as a result of the programmes. When considering the problems of entrepreneurs in this study, they faced many problems such as lack of capital investment, insufficient knowledge of finance, management, accounts, and technical matters, and the lack of trained employees. The chi square test first experimented the relationship between participation in entrepreneurship development programmes and starting enterprises after the completion of such programmes. The significance was 0.008. Entrepreneurship development programmes contributed to the respondents becoming entrepreneurs, as established under the 95% significance level. In Sri Lanka such programmes are one to four day programmes, and are therefore of insufficient duration. Further, Government intervention is not satisfactory in the context of such programmes.

Conclusion

The study focuses on evaluating entrepreneurship development programmes in Sri Lanka and identifying the contribution of such programmes in generating entrepreneurs in Sri Lanka. Therefore these programmes are a major strategy to reduce unemployment in Sri Lanka. The Government must further intervene in their implementation and should increase the duration of existing programmes, thus improving them.

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Poverty and Rural Development

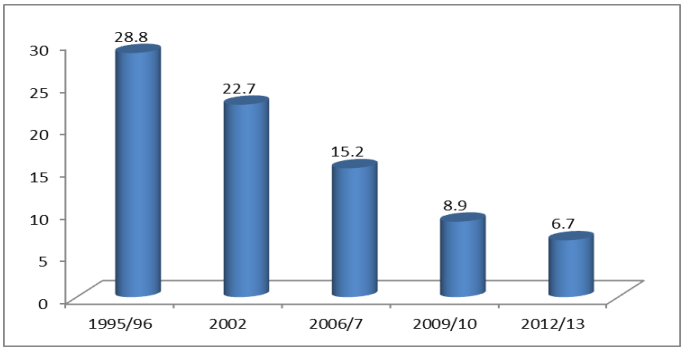
Changes in Determinants of Poverty in Sri Lanka within the Last Two Decades: A Household-level Analysis

Seetha P. B. Ranathunga[1]

Introduction

According to the Food and Agriculture Organization (FAO), most of the world's 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). These problems mean that the definition of poverty is broader and more complex than a mere lack of money, and the multidimensional nature of poverty is increasingly recognised. Eradicating poverty is a difficult and complex challenge for any developing country. However, as 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 single digit level, at 6.7 per cent (Graph 01). However, regional disparities are high. As such people just above the poverty line are likely to drop back due to policy shocks. Therefore poverty studies in Sri Lanka are still command considerable attention of policymakers. Analysis of 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

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Differences in the concepts and definitions used and in data sources and measurement assumptions caused changes in the poverty profile of 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 over time is a timely need in the context of Sri Lanka as most studies are descriptive, and focus on measurement issues.

Literature Review

Considerable analytical efforts have been made within the last two decades in poverty-related literature directed towards driving good practices in measuring poverty in all its dimensions and generating the required data. Those studies primarily focus on determinants of poverty, on how changes in economic policy influence poverty, and on various other measures of poverty (Datt & Jolliffe D., 1999; Datt & Ravallion, 1992; De Silva, 2008; Deaton, 1997; Mok, Gan, & Sanyal, 2007; World Bank, 2005). Most poverty studies are based on multivariate regression analysis to identify determinants of poverty at household level, using reduced-form models of various structural relationships (Glewwe, 1991). 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 are measures of the poverty gap. Although there is a rich literature on poverty, focusing on the measurement of poverty and related issues, there are limited studies on poverty determinants in Sri Lanka (De Silva, 2008; Gunawardena, 2004). Till now there has been no appropriate attempt to identify changes in poverty determinants over time and across economic sectors in Sri Lanka; 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

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. This study employs data from four comparable Household Income and Expenditure Surveys (HIES) conducted by the Department of Census and Statistics Sri Lanka.

Results and Discussion

Table 1 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. 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 the education of the head of the household is negatively correlated to poverty (Datt & Jolliffe, 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.

Also, changes in the direction of impact of the determinants (sign of the variables) can be examined over the years. Among all poverty determinants, foreign remittances have been the most influential factor for reducing poverty, 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 factors which are positively correlated with household poverty. Considering geographical variables, both rural and estate sector households are more likely to be poor in Sri Lanka relative to urban 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.

Table 1: Determinants of household poverty in Sri Lanka: 1990-2010 probit

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

regression estimates (marginal effects)

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%

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 factors which 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.

Key Words: Poverty determinants, poverty changes, probit regression, Sri Lanka

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Can Graduates Increase Earnings by Acquiring Multiple Qualifications?

Mahinda Pushpakumara[1], AthulaRanasinghe [2] and Padmasiri Siddhisena[3]

Introduction

Sri Lanka maintained an average economic growth of around 6 percent during the past decade. With such economic growth, the overall unemployment rate has significantly declined, but still the unemployment rate among educated youth remains high. According to the Quarterly Labour Force Survey (QLFS)4, conducted by the Department of Census and Statistics, Sri Lanka, in 2013, the overall unemployment rate was only 4.4 per cent, though unemployment among youth who have qualifications above General Certificate Examination of Advanced Level (G.C.E. A/L) was 8.6 percent. Data from the Graduates' Career Outcome Survey (GCOS) for 2011 reveals that unemployment three years after graduation is 49 percent among graduates.

Many researchers have introduced several hypotheses to explain the Sri Lankan unemployment problem. Among these, three hypotheses are prominent: Skill mismatch hypothesis [ILO (1971), World Bank (1999), Aggestam and Hallberg (2004)] Demand deficiency hypothesis [Kelly and Gunasekera (1990)] and, Queuing hypothesis [Rama (1999), Heltberg and Vodopivec (2008), Rama (2003), World Bank (2007)]. The skill mismatch hypothesis [World Bank (1999)] concludes that the skills of educated youth do not match labour market requirements. As graduates understand this, they use different strategies to increase employability and earnings. One such strategy is to diversify their skills by following professional and certificate courses.

According to the Graduates Career Outcome Survey 2011, graduates diversify their skills by following certificates and professional courses other than degrees. Twenty seven percent of graduates have followed professional courses. A significant percentage of graduates have certificates in Computing (62%), English language (42%), Tamil language (20 %) and Management (10%).

Objectives

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[3] *Professor Emeritus, University of Colombo*
[4] Figures related to graduates unemployment is not available in LFS report.

The objective of this paper is to identify whether acquiring multiple qualifications is an effective strategy to increase the earnings of graduates.

Methodology

Data

The empirical analysis is based on data collected from the Graduates Career Outcome Survey (GCOS) conducted by the Department of Manpower and Employment in 2011.

Econometric Model

As all individuals have an equal level of education it is not possible to estimate standard mincer earning function. However based on the mincer earnings functions a log earnings function is estimated.

$$\log W = \alpha_0 + \alpha_1 X + \alpha_2 X^2 + \sum_{i=3}^{5} \alpha_i DT_i + \sum_{i=6}^{8} \alpha_i DR_i + \alpha_9 DM + \alpha_{10} DS + \sum_{i=11}^{12} \alpha_i MA_i + \sum_{i=13}^{14} \alpha_i PQ_i + +\alpha_{15} ENG + \alpha_{16} COM + \alpha_{17} MAN + \alpha_{18} TEC + \alpha_{19} WS + +\alpha_{20} WST + \alpha_{21} GD + e$$

Where;

LogW = Log monthly wage in Rupees
X = Years of Experience
DT = Degree Type
DR = Result of degree
DM = Medium of instruction
DS = Degree status
MA = Postgraduate qualifications
PQ = Professional qualifications
ENG = Certificate for English language
COM = Certificate for management
TEC = Certificate for technical course
WS = Working Status (full time /part time)
WST = Working sector
GD = Gender

Results and discussion

Table 1 presents the results of the model. The value of the adjusted R is 0.30 which implies that 30 percent of the total variation of the log wage has been explained by independent variables in the model.

All variables related to university education except the status of the degree are statistically significant at the acceptable level. For the variable of degree type, the reference category is Bachelor of Arts graduates. All the coefficients related to degree types are significant and have positive signs. This implies that Arts Graduates have low earnings compared to other graduates.

The wage of the graduates who graduated from Commerce or Management Faculty is 22 percent higher than that of Arts graduates. The individuals who graduated from the Sciences Faculty earn 32 percent more than Arts graduates. Individuals with a Bachelor of Information Technology or of Laws (LLB) have monthly earnings 50 percent higher than Arts graduates. The earnings of engineers are 40 percent higher than those of Arts graduates.

The coefficient related to degree status is not significant which implies that there is no earnings differences between graduate with a special degree and a general degree. Among the employed only 38 percent of them have a general degree. The majority of general degree holders are unemployed. However employed general degree holders' monthly earnings are equal to those of special degree holders.

The coefficients related to the result of second class lower and second class upper divisions are not significant, implying that the wages of graduates with second class upper and lower divisions are equal to the wages of graduates with a simple pass. The graduates with a first class have a wage premium in the labour market. The earnings of graduates with first class results are 28 percent higher than the others.

The medium of instruction of the degree can be identified as a significant determinant of the wage of a graduate. The wage of graduates who studied in English is 20 percent higher than others.

Table 01 : Regression Results

	Coef.	T
Experience	-0.04	-0.43
Square of Exp.	0.01	0.20
BBA or B.Com or B.Sc.(Mgt)	0.22*	2.13
B.Sc. (Science)	0.32*	3.52
BIT or Law or Other	0.50*	4.39
Degree status , Special	0.05	0.84
Result ;2nd class lower	0.02	0.39
Result ;2nd class upper	0.02	0.35

Result ;1st Class	0.28*	2.88
Medium of instruction English	0.20*	2.36
MA Following	0.21*	3.12
MA Completed	0.31*	2.20
Professional qual. Following	-0.04	-0.62
Professional qual. Completed	0.16*	1.96
Certificate for English	0.00	-0.09
Certificate for Computer	-0.17*	-3.06
Certificate for Management	-0.06	-0.71
Certificate for Technical	-0.09	-1.10
Working in Public sector	-0.02	-0.38
Working full time	0.13*	2.20
Male =1	0.24*	4.64
Consent	9.48*	89.09
Adj R-squared	0.32	

*Source: GCOS 2011, author's calculation, * significant at a 5 percent significance.*

Graduates with postgraduate qualifications have a wage premium in the labour market. Some follow Masters degree while working. Their earnings are 21 percent higher than the earnings of graduates with only Bachelors degrees. The earnings of graduates who have completed a Masters degree are 31 percent higher than graduates without such qualifications.

Graduates with a professional qualification have a better position in the labour market. The earnings of graduates who have completed professional qualifications are significantly (16%) higher than the earnings of graduates without such qualifications. As explained above, degree, postgraduate, and professional qualifications have a significant impact on the earnings of graduates.

However, graduates do not receive returns for other qualifications such as a certificates in Computing, Management, English and other technical subject. The surprising finding is that coefficients related to above certificates except for English have a negative impact on earnings. The coefficient related to the certificate in Computing is significant, but other coefficients are not. This suggests that earnings of graduates with a certificate in Computing is significantly less than those who do not have such qualifications. Male graduates have a better position in the labour market compared to their counterparts, with earnings 24 percent higher than females'.

Conclusions

This paper analysed wages of graduates by qualification. Graduates have acquired three types of qualifications; post-graduate qualifications, professional qualifications, and certificate courses, in order to enhance their positions in the labour market.

The earnings of Arts graduates are significantly lower than others. Graduates who learn in English have a better position in the labour market than those who learned in Sinhala or Tamil. Average earnings of graduates with first class results are higher than the others. Post-graduate qualifications also increase earning capacity.

Other than university education, the graduates can improve their position at the labour market by acquiring professional qualifications. Graduates with professional qualifications earn more than others.

Though a significant percentage of graduates have followed certificate courses in English, Tamil, Computing and Management, they do not receive returns for such courses.

In the Sri Lankan education system, specialisation begins at the GCE Advanced level. Future earnings depend on decisions taken at school level. Therefore individuals should assess their capabilities before taking decisions regarding specialisation. If they have the capacity and opportunity to enter the Science or Mathematics streams they will earn relatively higher incomes after graduation.

After entering university, individuals should perform well in order to get a higher income after graduation. Individuals can increase their income by following their degree in English. Following professional courses is also an effective strategy to increase future earnings.

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Rural-Urban Differences in Savings Practices and Attitudes: With Special Reference to Matara District

Charitha Vidanapathirana[1], K. G. G. Weerasinghe[2] and N. M. A. Jayasinghe[3]

Introduction

Savings play a major role in the accumulation of capital in an economy. In macroeconomic analysis, savings are classified into two parts as private and national savings. According to savings sources, household savings are further categorised as formal and non-formal; commercial and specialised banks, as well as financial institutions being popular institutions in the former category. This paper illustrates the impacts of public opinion on savings deposited in commercial banks.

Commercial banks have recently emerged as the most favorable institutions in the financial market of an economy. Their major role is financial intermediation and facilitation of transactions, with an aim to achieve economic development. The evolution of commercial banks began in Great Britain and advanced over time to gain global popularity. In the Sri Lankan economy, commercial banks report a contribution of more than 51% to the financial market.

In financial transactions, commercial banks offer various types of products by which people may save. Among these, savings products are particularly important. Since 1977, the Sri Lankan financial market has experienced a savings products growth of more than 70%. Therefore, this study is important to identify attitudes of the community in relation to savings product maintenance.

Methodology

The data was collected from a sample from two divisional secretariat (DS) divisions in the Matara district in Sri Lanka, namely, Hakmana and Matara; representative of both the rural and the urban sector. 150 households were randomly selected from each DS division, and data was gathered using a structural questionnair. Likert-scale options were employed to identify public attitudes about savings products.

Data analysis was of two parts, descriptive and statistical. To measure public attitudes on saving products offered by commercial banks, a composite index was estimated. In addition, an ANOVA test was used to compare differences in monthly savings between urban and rural sectors.

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Results and Discussion

Individuals saved money aiming at future protection and getting investment benefits. But, some people do not engage in saving. According to this study, while 84% people are motivated to save in the rural sector, 97% are similarly motivated in the urban sector. However, it can be identified that some parts of the community: urban or rural, avoid saving altogether. There is more diversity in the savings sources of individuals in the rural sector than the urban sector (see Table: 01).

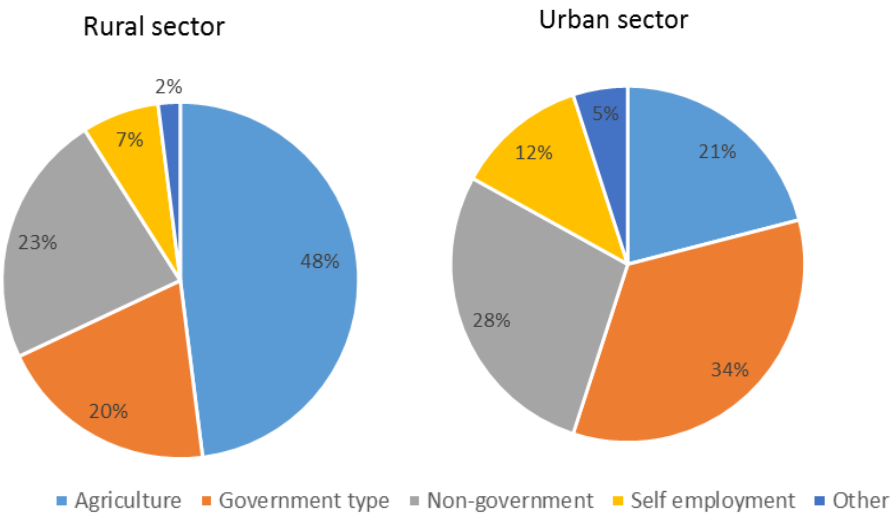
Table 01: Individuals' savings sources

Savings sources	Rural (%)	Urban (%)
Commercial banks	14.3	53.6
Specialised banks	16.7	13.2
Rural banks	35.3	6.2
Special Financial institutions	8.2	7.9
National Savings Bank (NSB)	15.4	10.5
Other institutions	10.1	8.6

Source: Author compilation based on survey data, Jan. 2016

Among basic socio-economic factors, occupation is also pointed out as varying in urban sector savings to a great extent. But such a variation is not visible in the rural sector, due to the predominance of agriculture-based occupations (see Figure 1).

Figure 01: Savings and occupation types



Source: Author compilation based on survey data, Jan. 2016

When comparing the mean difference in the monthly savings share of individuals between sectors, urban individuals score a higher mean than rural individuals. According to the ANOVA test, the mean savings difference among sectors was significant (see Table 2).

Table 2:

	Sector	Count	Mean	Std. deviation
Monthly saving share[1]	Urban	150	125.46	80.782
	Rural	150	100.58	78.234

[1] *significant under 95% confidence level*

Source: Author compilation based on survey data, Jan. 2016

According to the results of this study, it is evident that there is a high mean of monthly savings among the urban sector rather than the rural, because, individuals in the rural sector do not always generate monthly incomes.

When evaluating the individual attitudes towards savings products in both sectors, differences which should be considered in formulating financial market policy in Sri Lanka are reported.

This evaluation used a saving product attitude index (SPAI) as follows:

$$SPAI_i = (X_1 + X_2 + X_3) \,/\, 45$$

Where,

$SPAI_i$ = Saving product attitude index of i^{th} individual

X_1= Income generation

X_2 = Financial security

X_3 = Future investment

Three categories have been identified for the public attitude towards saving products based on SPAI: most satisfactory (SPAI>0.71), satisfactory (0.31<SPAI<0.70), and unsatisfactory (SPAI<0.30). Descriptive statistics showed that the majority of the sample (79% rural, 67% urban) indicated satisfaction due to transaction convenience, easy access, and updates of interest.

Conclusions

Savings convenience financial transactions in an economy and benefit capital accumulation as a macroeconomic phenomenon useful for the measurement of economic performance. Therefore, it is important to empirically identify attitudes of the community. Thus, to accumulate capital flows, savings should be integrated to the financial system of the economy. So, there is a requirement to develop a community for savings. Where public attitudes in favour of savings products offered by commercial banks are moderate, the financial system should be introduce

incentives to improve the savings habits such as double-bonus interest. Further, developing community-based investment activities, can be recognised as a new approach to participatory investment in the community, to develop self-employment or livelihood.

Likewise, as a result of community investment growth through savings, people can improve the employability of their society. However, all of these improvements depend on a healthy savings culture. In Sri Lanka, leadership in savings promotion should be taken by commercial banks because their share in the financial market is larger than the others. Individuals who are in the urban sector are more in favour of savings than those in the rural sector. It can be pointed out that the individuals who generate fixed income monthly tend to favour saving. Thus, financial institutions and leading commercial banks should introduce new participatory investment programmes based on community savings.

Further, various expenditure management programmes should be launched in the rural sector, aiming to improve saving habits in the rural community. Such programmes would formalise agri-based investment practices.

Keywords: commercial banks, investment, rural sector, savings attitudes, urban sector

Trade and Development

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

K.W.K. Gimhani[1], S. J Francis[2]

Introduction

Sri Lanka became the first South Asian country to liberalise its economy in 1977, and commenced trading with the rest of the world. Current economic theories emphasise that countries with trade liberalisation receive significant loans and aid from the rest of the world. In the case of a liberalised economy, investment may be financed through both domestic savings and foreign capital flows including FDI. Countries suffering from lower levels of domestic savings and capital face a choice between foreign debt and FDI inflows. Despite the positive influence of foreign debt in terms of capital inflow, repayment bears some risks. Therefore, debt is less preferable than FDI.

For twenty two years (i.e. till 1999), the Sri Lankan trade regime remained amongst the most liberal in South Asia region. Past empirical studies reveal that the Sri Lankan economy largely benefited from liberalisation at the time. Up to 1999, external trade was only affected by import duty. But in 2000, after the Sri Lankan Government introduced a number of additional tariffs, this condition was reversed because of Cess, Port and Airport Development Levy (PAL) and the Special Commodity Levy (SCL).

Research Problem and Research Objective

There are many studies researching the net outcomes of trade openness. Empirical findings indicate that trade openness has a positive and significant effect on economic growth of a given country, while some researchers argue that trade openness fails due to a combination of external and internal inconveniences. As such, there is a need to examine the relationship between trade openness and economic growth in Sri Lanka. The general objective of this study is to examine the relationship between trade openness and economic growth in Sri Lanka during 1977- 2015. Two hypotheses are used to test this relationship.

Null Hypothesis	$H_0 = \beta_1 \leq 0$
Alternative Hypothesis	$H_A = \beta_1 > 0$

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Null hypothesis reflects that trade openness has no positive relationship with the economic growth of Sri Lanka. The alternative hypothesis is trade openness has a positive relationship with economic growth.

Methodology

A well-defined methodology was used to explore the above objective. Secondary data is used for the study. The data are from various sources such as Central Bank 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 engage in trade with other countries or economies. These trading activities include import and export, borrowing and lending, and repatriation of funds abroad. It is measured as follows:

$$Openess = \frac{\text{Export} + \text{Import}}{\text{GDP}}$$

In this study, the dependent variable is Gross Domestic Product. Trade openness, gross capital formation and inflation are used as independent variables. Data is analysed using E-views 7 where the causality between dependent and independent variables are analysed 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. Granger Causality 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 Co integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace 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

Table 2: 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 results 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:

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

$$\mathbf{GDP = 6.633565 + 0.182056(LOPN) + 0.778408(LGFCF) - 0.005508(LINF)}$$

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 independent variables.

Trade openness positively relates to GDP but is not statistically significant. If trade openness increases with 100% GDP will increase by 18.20%. It may also conclude that trade openness is a significant variable for the interpretation of GDP growth. The β_2 value of the GFCF, 0.7784 suggests that there is a positive relationship between GDP and Sri Lankan capital formation. When gross capital formation increases by 100%, as a result GDP growth increases by 77.8%. Inflation and GDP have a negative relationship as mentioned in the equation. The coefficient of inflation is -0.0055. If inflation decreases by 100%, 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%), and shows that model is accurate. These variables explain the 98% of the variation in GDP with this model. The conclusion therefore is that this model is an appropriate model for the investigation of GDP growth in Sri Lanka

Table 3: 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: eviews7

Above results indicate that trade openness cause an increase in GDP while GDP is does not cause a country's trade openness. It emphasises that trade openness is imperative to the GDP of Sri Lanka.

Conclusion

Many researchers who engage in the area of international trade area have had an inadequate debate regarding the impact of trade openness on economic growth of a host economy. These findings reveal that trade openness has a positive impact on economic growth while some studies conclude the opposite.

This study implies that trade openness has a positive impact on economic growth in Sri Lanka. But it is not statistically significant. The study highlights the need to elimination of trade barriers such as import and export tariffs, technical barriers which upturn the benefits of trade openness in Sri Lanka. In order to achieve a positive balance of trade, Sri Lanka must focus on expanding domestic production and enlarging export supply capacity in the country.

Key words; Exports, Economic Growth, Imports

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

T Lalithasiri Gunaruwan[1]

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.

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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), 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). On the other hand, if it is the shortage of skills in certain segments which the opening of Sri Lankan doors to Indian human resources is intended to resolve, there is no reason why such a filling of the resource gap cannot be achieved through the existing work permit system which enables entry of an

[2] *"…*India*…is not interested in negotiating any further on goods till there is progress in the area of liberalising movement of professionals*.", Amiti Sen, The Hindu, Feb 6, 2016.

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. 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. 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".[3]

[3] Government Medical Officers' Association the United Professional Movement have called for a comprehensive policy framework and setting up of standards, rules and regulations.

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 playing field among all potential suppliers. 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. But, through the process of ETCA, Sri Lanka would have opened up its service market to India, and would have already faced all the related 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 biding 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.

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 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. 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 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.

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

JEL Codes: F13, F15, F53, F55

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Application of Econometrics in Sport: A Probability Estimation of Getting 'Out' in ODI Cricket

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Introduction

The responsibility of a batsman on the pitch is to get more runs out of a given number of balls (300) in an inning. A higher strike rate results in a better score for the batting team, so the anticipation of each player on the pitch is to get high runs during batting time. The anticipation of bowlers on the fielding side are to restrict batsmen against higher runs. There are two different ways to impose constraints on scoring: one, to set up a good arrangement on the fielding side which makes scoring difficult, and two, to get batsmen bowled out. The second approach offers better advantages than the first because getting a wicket (getting out) reduces the number of playing chances for the batting team while reducing the balls faced. If the bowling side succeeds to take ten wickets (all out) from the batting team, the inning would end. The inning will finish although the batting team is yet to face 300 balls, if ten wickets have fallen. Getting a wicket in an inning makes it worse for the batting team and makes it better for the bowling side. This 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 focuses on estimating the probability of getting out in terms of managerial aspect of the team captain. Therefore, this paper presents an investigation of the probability distribution of getting out in one-day international cricket (ODI). The research problem which drives this paper is how the probability of getting out is distributed under certain conditions of a match. Probability of getting out is determined by many independent variables. In this study, it is limited to two variables: number of wickets in hand and balls remaining, which is prominently used in Duckworth-Lewis method. The findings of this research can be used to determine batting strategy in different situations.

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Method: Estimating the Fall of Wickets (Probability of Getting Out ($p(b,w)$)

The purpose of estimating the fall of wickets is to estimate the probability of losing a wicket **(**getting out**)** in the next ball**.** If the batting team has *b* deliveries remaining 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 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 process is based on the Cater and Guthrie **(**CG**) (**2004**)** work which has been introduced for target resetting to overcome the shortcomings of DL method**.** The CG model is an extended version of the Preston and Thomas **(**2003**)** model**.** The unobserved variable for probability of getting out, $y^*_{b,w}$, is defined by

$$y^*_{b,w} = \alpha_0 + \alpha_1 b + \alpha_2 w + \alpha_3 b^2 + \theta_{b,w}$$

(1**.**0**)**

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 $y^*_{b,w} \rangle 0,$ 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**.**

$$y_i = \begin{Bmatrix} 1, y_i^* > 0 \\ 0, y_i^* \le 0 \end{Bmatrix}$$

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

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

(2**.**0**)**

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

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

(3.0)

It is assumed that outcomes are independent across different innings and chose $(\alpha_0, \alpha_1, \alpha_2, a_3)$ 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 were used in the estimation.

Results and discussion

Stepwise probit regressions were estimated for all 25 matches separately and the models were selected at 1% significant level[4]. The model fit information of a randomly selected match which is not statistically significant at 1% level. Only statistically significance matches were selected for estimation. After estimating the probit regression model of the *fall of wickets* (Equation: 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 the fall of wickets based on the above selection criteria. The parameter estimation of wicket process are done on eight matches using SPSS 19.0. The first column of

Table 1: Estimation of the parameters of wicket process 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.

[4] *Depending on accuracy of the predication capability, the estimation is based on 1% significant level*

Table 1: Estimation of the parameters of wicket process

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

Source: Parameter Estimation by Researcher

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:

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

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 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. 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 0.0126. The above procedure can be applied to any level of balls remaining. The example calculations are shown in ***Table 2: Marginal effect calculation of wicket process*** below:

Table 2: 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: Appendix 05

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 less probability changes (marginal effect), than a fewer number of balls in hand. ***Table 2: Marginal effect calculation of wicket process*** 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.

Conclusion and Remarks

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

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

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The Demand for Consumer Durables in Post Liberalisation Sri Lanka

I.W. Rathnayaka[5] and M.H.S.Dilrukshi[6]

Introduction

Sri Lanka liberalised its economy in 1977 paving the way for free exports and imports. The demand for consumer durables, especially for imported items, increased rapidly as a result of this policy shift. International aid and assistance, foreign direct investment, new and lucrative job opportunities, growing public expenditure, and rising migrant remittances boosted the buying capacity of households. Per capita income is also increased in an extraordinary manner during the post liberalisation years. The economic status of the country moved to the lower middle income category from the low income category as a result of rising per capita income. Society also moved away from the long standing prudent expenditure pattern to a consumer culture characterized by lavish expenditure. Even poor households managed to purchase a few consumer durables such as television receivers and mobile phones as a result of the ongoing durable consumer culture in the society.

Endogenous and exogenous shocks of the economy affect for the market for durable products. The consumer durables industry is highly price sensitive, making price the determining factor in increasing volumes, at least for lower range consumers. It is not easy to understand consumer behaviour in the context of maximising satisfaction. Consumer durables are normally high value, high priced products, and are not frequently purchased. The market for consumer durables is becoming more competitive in the current world. The durable product markets present features associated with oligopolies. There is interdependency when dealers select the customer. Therefore as a result of competition among several entities in the market, they always try to protect and increase their market share.

This study seeks to identify the properties of consumer buying behavior in relation to consumer durables in post liberalization Sri Lanka. This study is also an effort to explain the changes in the demand for consumer durables in the Sri Lankan market.

To understand buying behavior it is necessary to understand why consumers make the purchases that they make, and this was studied, together with businesses operating in the market for durable goods in Sri Lanka, the nature of the competition among those parties, the nature of demand for durable products, the

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means of entering the market for durable products and operation in the structure of imports are expected to study.

Literature Review

Consumer Behavior is influenced by a unique set of cultural, social, economic and psychological factors. These factors are not controllable by marketers. The producer of durable products should understand consumer interest in order to achieve higher sale. (Dasar et al, 2013). According to the Vaaikunthavasan (2013) there are 20 important variables which affect the consumer durables purchase decisions: they are durability, reliability, features, value for money, education, availability, discount, style, income, and job.

Rural consumers are price sensitive, and are influenced by the consumer fairs and advertisements. Family size in rural areas is quite large and agriculture is their main occupation, so marketers should produce products developed as per the requirements of rural folk and conduct for promotional campaigns with the help of print media (Purohit, 2001).

Prof. Chanduji Thakor (2013) describes the rising rate of growth of GDP, rising purchasing power of people, and higher propensity to consume with preference for sophisticated brands would provide a constant impetus to growth of the White goods industry segment.

Research Objectives

The objective of this study is to examine the determinants of the demand for consumer durables in Sri Lanka during the post liberalization time period, in addition to study the impact of identified factors on the buying decisions on consumer durables and evaluating the changing lifestyles and their impact on the purchase behavior among customers.

Methodology

Data Sources and Data Collection

Data for the study collected from secondary sources such as household income and expenditure surveys and other similar resources. In addition to these, key informants were interviewed where necessary as a supplementary source of information. Responses were collected from 60 customers from the Minuwangoda area. The study was based on primary data gathered using a questionnaire containing literature based measures of factors contributing to consumer purchase decisions. A mixed method was used to analyze the collected data. The data gathered during this study, being qualitative, were tabulated and analysed using SPSS. Collected information from the sample respondents were classified, tabulated and graphed,

and systematically analysed. While analysing data, simple percentages and ratios were used, with charts being employed for clarity.

Findings and discussion

The study found that since the serviceability of the durable products is long term their purchase can be identified as a saving rather than consumption. On the other hand, under the Hall consumption model that there is no a considerable change in consumption, even though such a purchase changes the level of income or wealth. However, if there is an increase of unexpected income, that increases the consumption level. This means that the additional income can be used for consumption of durable products.

The consumer durables market is facing a slump mainly due to heavy taxes and the current economic conditions, industry experts noted. "Last year and up to the first quarter of this year we have seen between 10 to 20 % drop in the electrical goods market. The high inflation rates for much of the year (2008) affected spending patterns for the average household. Research shows that in 2008, consumer durables spend reduced from 4% of the previous year to 3% of household income.The consumer durables industry faced a challenging environment in 2013 due to pressure on disposable income and introduction of the VAT, which companies found difficult to exceed on to consumers leading to a negative impact on margins. Further demand for consumer durables grows, fueled by the rise of the disposable income.The consumer durables industry is characterised by few key players in Sri Lanka. These companies have well-built brand names and widespread distribution networks, which are hard to replicate given the investment required and brand equity of established players like Singer, Abance, Softlogic, Damro etc. This protects the existing players from competition and market share to a certain extent.The modern trend of consumer durables markets are characterised by the growing interest in eco-friendly products.

As for the survey, around 63.33% of the respondents represent from a higher income group and only 1.67% of respondents belong to a lower income group. According to the study individual income, disposable income, Family income, future income expectations as well as liquidity assets and properties affect consumer buying behaviour. This study indicates a close relationship between durable products consumption and labour income certainty. Less than half of the consumers reported that the purchase was made following their decision. A majority (66%) of the respondents reported that the purchase decision of household items was made by a third party. 33% of the consumers reported that they obtained information from electronic media, while more than 20% of the consumers sought information from market, and less than 23% of the consumers reported that they sought information

from their social groups before going to purchase durable goods. The SLS, ISO, ASTM marks are considered a symbol of quality of the manufactured products:indicative of enlightened behaviour among consumers. Consumer's purchases durable goods under the full payment basis or installment payment basis, based on the ability of payment of the individuals. Around 60% of customers were involved in making payment on installment basis. Majority of customers pay a part of the price in initially and then paid installments with or without interest on a monthly basis.

Conclusion

Marketers of durable goods should understand consumer expectations and try to maximise their needs. After liberalisation Sri Lanka has been recognised as one of the most favourable and fastest growing economies in Asia. The study concludes that consumer buying behaviours are influenced by a unique set of economic, social, demographic and psychological factors. In particular the buying behaviors of consumers are very important to market mechanism in the economy. The Sri Lankan consumer durables industry has perceived a substantial change in the last two decades. The demand for consumer durables is becoming more competitive and complex now adays. Hence, the producer of durable products should understand consumer interest much to find higher turnover of their products. In developing economies like Sri Lanka, it is important to expand purchasing behaviors among consumers.

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

R. A. Rathnasiri[1]

Introduction

Financial institutions facilitate economic growth and development through financial intermediation. Among financial institutions, commercial banks are the biggest, performing a major share of financial intermediation and serving as the core of the financial system. Moreover, commercial banks are the foundation of payment systems in many economies particularly in developing countries by playing an intermediary role between depositors and borrowers ((Felix Ayadi et al., 2008). The intermediary role of commercial banks explain the core function of commercial banks which fall within the concept of traditional banking. However, lending by itself generates risk when the borrower fails to meet his obligations. The risks associated with lending is called credit risk that is recognised as the most important among risks relating to liquidity, operations, and markets (Perera et al., 2014,Yusuf,2003). Credit creation is an important determinant of bank performance since it is generated through 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 banks but this involves huge risks to both lender and the borrower. If the banks fail to manage credit risk, they may pay high costs in the shape of bankruptcy since the banks that are highly exposed to credit risk face a reduction in profitability (Arif, A., et al 2012). Uncertainty and the global financial crisis has created pressure on credit risk and ultimately caused profitability of commercial banks (Bayyoud & Sayyad, 2015). Most studies generally confirm that risk management is vital for any organisation to achieve its objectives in fair manner in the current business environment, (Smith et al., 1990., Fatemi and Fooladi, 2006).

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

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Literature on credit risk suggests that there are two main determinants of credit risks in banks. The first determinant are bank-specific variables (BSV). BSV has a significant relationship with credit risk in commercial banks (Chen & Pan 2012, Kargi 2011). The second determinant of credit risk is the various macroeconomic variables including GDP growth, 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 credit risk mitigation. Moreover, the downturn in economic activities negatively affects cashflows of borrowers which may cause default of bank loans.

There are extensive studies on credit risk and the profitability of commercial banks: most confirm the existence of an inverse relationship between credit risk and the profitability of commercial banks.(Poudel 2012, Honsa et.al 2009,Chen and Pan 2012,Kargi 2011,Naceur 2003, Thiagarajan et al 2011). Though, a relatively large number of studies confirm this negative association between credit risk and profitability, generalising it is difficult since a number of other studies offer different opinions. Some other studies also confirm the positive association between credit risk and profitability (Kithinji 2010).

Further, empirical literature on credit risk and profitability becomes more complicated with the findings of Hanseef et.al (2012) on the banking sector in Pakistan. This study regressed non-performing loans (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 reveal that the profitability of commercial banks has no significant relationship with NPL. Therefore, 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 credit risk and the profitability of commercial banks in the context of the Sri Lankan commercial banking sector. The findings of the study will enrich the existing literature gap on credit risk and profitability in Sri Lanka.

Material and Methods

The study reveals the apparent relationship between credit risk and profitability of commercial banking sector using secondary data in five selected domestic commercial banks in Sri Lanka. Literature provides a number of factors which determine the credit risk of commercial banks. Most previous studies identified non-performing loans, bank loans and deposits, and macroeconomic conditions as the major determinants of credit risk in commercial banks (Gul et. al . 2011,Kargi 2011,Kithinji 2010, Naceur 2003, Kosmidou, 2008). The present study extensively uses the model adopted by Gul, Irshad and Zaman (2011) on credit risk

management. Accordingly, the current study identifies the bank-specific factors such as non-performing loans to total loans ratio, provision for loan losses from total loans, loans 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 a regression model which utilised panel data. The profitability of commercial banks measured using return on average assets of commercial banks. Relevant data were obtained from the audited financial statements of commercial banks and the Central Bank annual reports for 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.

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

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 3.1 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. Total loans to total assets (LOAN) in the commercial bank is about 60 per cent. This indicates that credit given by commercial banks is relatively high in Sri Lanka and more than 50% of the assets in Sri Lankan commercial banks contributed to financing activities.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Return on average assets	60	0.10	2.01	1.1133	0.41578
Non-performing loan ratio	60	2.24	29.38	8.9450	5.62735
Provision for loan losses	60	0.07	3.00	1.1263	0.74223
Total loans/ Total assets	60	48.80	70.20	60.1833	5.55863
Total loans/ Total Deposits	60	62.50	95.10	79.8417	8.03037
Natural log of total assets60	60	8.10	13.60	10.7683	4.11448
GDP growth rate	60	3.54	830	6.1860	1.52912
Inflation rate	60	3.42	22.56	9.95560	5.38241
Total assets of the banking sector/GDP	60	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.

Table 2: Correlation

Variable	ROAA	GDP	INF	ASSETS	NPLR	PLL	LOAN	DEPO	LNTA
ROAA	1	0.332	-1.171	-0.078	-0.689	-0.587	-0.035	0.083	0.131
GDP	0.332	1	0.092	0.254	-0.365	-0.301	0.308	0.388	0.181
INF	-0.171	0.092	1	-0.102	-0.148	-0.039	0.262	0.412	0.084
ASSETS	-0.078	0.254	-0.102	1	-0.072	0.009	0.126	0.119-	-0.033
NPLR	-0.689	-0.365	-0.147	-0.072	1	0.698	-0.009	-0.216	-0.355
PLL	-0.587	-0.301	-0.039	0.009	0.698	1	-0.008	-0.046	-0.186
LOAN	-0.035	0.308	0.263	0.126	-0.099	-0.008	1	0.822	0.212
DEPO	0.083	0.388	0.412	0.119	-0.219	-0.046	0.822	1	0.373
LNTA	0.132	0.181	0.084	-0.033	-0.355	-0.186	0.212	0.373	1

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

According to the table 3.3, 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 for bank profitability.

Table 3.3 Regression Results

Variable	Unstandardised Coefficient		Standardised 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

This study investigates the impact of credit risk on the profitability of commercial banks in Sri Lanka during 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 how to reduce non-performing loans, and increase deposits and assets of the banking sector to increase profits. The finding has resulted in a number of implications for policymakers and practitioners in the banking system in promoting resource allocation through financial intermediation by ensuring the profitability of the banking sector and growth potential of the country.

Keywords; commercial banks, profitability, credit risk, panel regression, Sri Lanka

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The Impact of Media Convergence on Customer Satisfaction with special reference to Bank of Ceylon, Malabe

S. N. Karunathliake[1] & A. Aruna Shantha[2]

Introduction

Today organisations seem to have changed rapidly due to the changes in the business environment. To remain in the business world, they have to use each and every resource to full capacity to attract customers. Services and products of organisation could improve in many ways. Media convergence can be identified as a theory that can enhance customer satisfaction.

Essentially the impact of the media convergence can be applied to any industry in the country, as the functions of the theory can be related to any field (Winseck, 1999). In this study the banking sector is taken into particular account in studying the impact of media convergence because service sector improvements are very important for economic development.

Banks want to provide a high level of service to customers to deliver positive utility. So in this study the bank customer is the personal consumer, whose satisfaction is a major consideration of the bank.

In the banking sector customer satisfaction is interrelated to media convergence. But this interrelation is not yet properly measured or identified by the Sri Lankan banking sector. This is considered a limitation of this research. This limitation must be overcome using empirical evidence in the local context which would impact policy decisions. The research problem is identifying whether there is a significant impact from media convergence on customer satisfaction. To identify the overall impact of media convergence on these banks, a theoretical survey should be carried out, and the factors influencing the effectiveness of media convergence and improved customer satisfaction identified.

Objectives

Main objective - Examine media convergence impact on customer satisfaction.

Sub objective - Measure the relationship between dimensions of media convergence and customer satisfaction.

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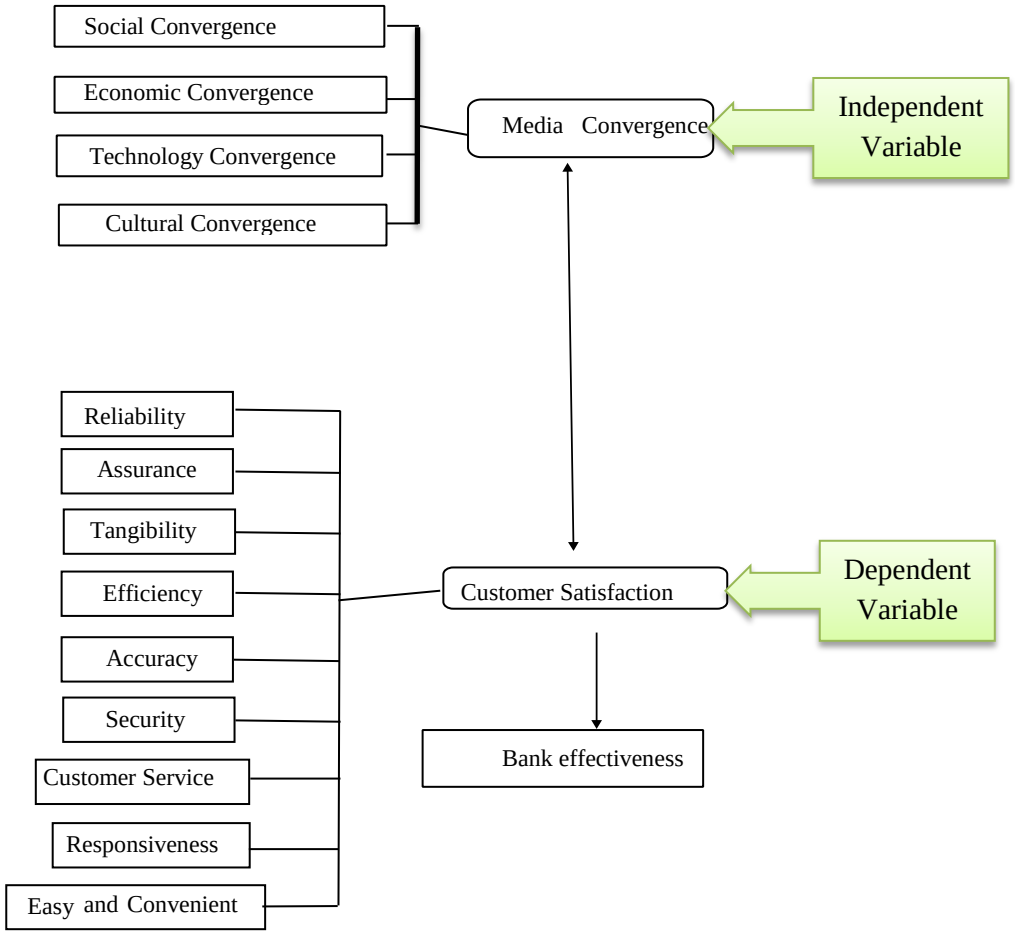
Methodology

There are many factors that influence customer satisfaction, and as identified in the literature survey nine factors were selected as independent variables. Four dimensions of media convergence, the independent variable, are identified for this research, as the basis of the conceptual framework.

The satisfaction levels improve as a result of different factors of service quality



(Awan, Shahzad, & Iq, 2011). Media convergence dimensions are social and organic convergence, economic convergence, technology convergence, cultural convergence (Latzer, 2013).

To address the research objectives the researcher has developed and tested hypotheses with the theoretical support to make pre-conclusion. This study is based on a Bank of Ceylon branch in the Malabe area and 80 customers were randomly

selected to represent all customers of the bank. The contact method was multiple Likert questionnaires.

All questions in the questionnaires cover the objectives of the research project and are based on background literature. Basically there are three main parts to the questionnaire. The first highlights personal data, the second the four dimensions of media convergence, and the third, the nine factors that influenced customer satisfaction. Pilot surveys were also done before entering the field.

Factor analysis was used to analyse the nine factors of customer satisfaction and reduce them to one variable. It is a useful tool for investigating variable relationships for complex concepts such as socioeconomic status, nutritional forms, or spiritual scales (Maike, 2015). For this method, the KMO and Bartlett's Test of Sphericity and Cronbach's alpha have been applied to measure validity and reliability.

Then the multiple regression model was used. Because the research sub objective involved a single dependent variable it is supposed to be related to more independent variables (Joseph, Black, Babin, & Aderson, 2010). Correlation, normality test methods were used to ascertain the relationship between customer satisfaction and dimensions of media convergence.

Data Analysis and Findings

As per the Cronbach's alpha test, all items had high reliability, because all dimensions were greater than 0.8. 'Measure of reliability that range from 0 to 1, with values of 0.60 to 0.70 supposed the lower limit of acceptability' (Joseph, et al., 2010).

The values of the KMO Measure of sampling acceptability for this set of variables are greater than 0.7. There are three factors that load above greater than 1 eigenvalue, for which weighted mean values were computed (Plotting Eigenvalues for Calibration Model, 2011).

According to the results of the normality test analysis, independent variables were associated with customer satisfaction. The P-value of Anderson darling Normality test was greater than 0.05.

In this research the highest tolerance value was 7.84, VIF would be 1.2., and there is high multicollinearity. The standard error of the regression coefficients will be inflated when tolerance values are close to 0.

The model was a good and strong significant model. R2 is 58% and R2 (adj) is 56.3%. That mean the 58% of the dependent variable is described by the explanatory variables in the sample.

Table 1:

Variable	Correlation	P-value
Social Convergence	0.727	0.000
Economic Convergence	-0.365	0.001
Cultural Convergence	-0.201	0.074
Technological Convergence	0.363	0.001

Source: Sampling Survey, 2015

The regression for the overall factors which was based on the multiple regression is as follows;

Y= - 3.09 + 0.0338 X1 + 0.0115 X2 - 0.00507 X3

Y = Customer Satisfaction

X1 = Social Convergence

X2 = Technological Convergence

X3 = Economic Convergence

According to the ANOVA (analysis of variance), the model P value was recorded as 0.000 determined those variables were most suitable to explain dependent variable. Furthermore this model was most suitable to explain dependent variable customer satisfaction and dimensions of customer satisfaction.

Hypothesis testing proves the objectives and identify the relationships between the customer satisfaction and the dimensions of media convergence.

Conclusion, Recommendations and Implications

The main objective of this research was prove with the impact of media convergence on customer satisfaction. The sub objective was to measure the relationship between dimensions of media convergence and customer satisfaction. Considering the final result social convergence and technological convergence have positive relationships with customer satisfaction. When social and technological convergence changed by 1 unit each, customer satisfaction was increased by 0.0338 and 0.0115 respectively, assuming other factors remaining constant. There was a negative relationship between customer satisfaction and economic convergence, and there is no relationship between cultural convergence and customer satisfaction.

According to the above findings, the following implications are identified as the final role of the study. Working conditions contributed customer satisfaction. Therefore, improving working conditions is important. Pleasantness of branch environment, appropriate language, and informational content are important in improving the culture of the bank and therefore customer satisfaction. Improving existing and new banking technology will enable customers to do their banking activities such as balance enquiries, transfer of funds between accounts, payment of bills, requisitions and pawning activities avoiding the inconvenience of queuing up

at a bill payment center or the bank branch. It will provide mobility, lower cost, convenient, and speedy service to customers.

The Government should pay attention on the encouragement of service quality of the bank to improve customer satisfaction, such as the knowledge of new technologies, the usage of new techniques and specially marketing facilities. On the other hand there were differences among banking and other sectors related to media convergence. Most banking customers have not enough knowledge about the importance of media convergence, especially with respect to social and technological convergence. Most of customers use banking only for their basic financial needs. Therefore Government should implement programs to improve their knowledge about importance of banking sector. Therefore Government has to implement a proper process to develop the banking sector. Thus, policy makers also need to draw their attention not only to the importance of industry profit enhancement, but also to the enhancement of social and cultural background, economic situation, and technological usage.

Key words: Media Convergence, Customer Satisfaction, Factor Analysis, Consumer Behavior, Utility theory

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

H. S. G. Fernando[1]

Introduction

Development assistance can be defined *inter alia* as foreign aid, foreign loans, and grants. The flow of development assistance is essential to most developing countries. Development assistance began shortly after World War II, with the primary goal of spurring the economic growth of 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, the concept of development assistance has changed. With rapid population growth, attention was directed to per capita income. Unequal income distribution paved the way for international financial institutions and Governments to respond 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, and insecurity of income. Development assistance has helped most developing countries to improve their investment climate by building the factors that contribute to investment growth and empowering people through education, health, and social protection. These allowed them to progress towards closing the economic gap with 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. Development assistance is has played and continues to play a major role in the Sri Lankan economy in responding to obstacles prevailing in sectors such as infrastructure, education, health, and elimination of poverty. The Asian Development Bank, World Bank, Japan, China, UN agencies, Western and Middle Eastern countries are major donors in the form 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

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income increased into US$ 3280. Sri Lankan Government and policymakers believe 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: having 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 into a sustainable high income country. But it is not a very clear straightforward process without hassle. The main midway hassle is the 'middle income trap' and which makes it difficult for middle income countries move forward. Middle income trap is the inability of move up the 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 concerned about the possibility that Sri Lanka may be trapped in a lower middle income trap before elevation to upper middle income status.

Problem statement

As a developing country, the relevance of development assistance to the economy of Sri Lanka is relatively critical. On the other hand, the impact of the transition of Sri Lanka from a lower income country to an upper middle income country on such assistance is the main obstacle faced by the Sri Lankan economy. Therefore, this paper will also take into consideration the challenges that Sri Lanka would face within the transition period as an upper middle income country with a lack 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

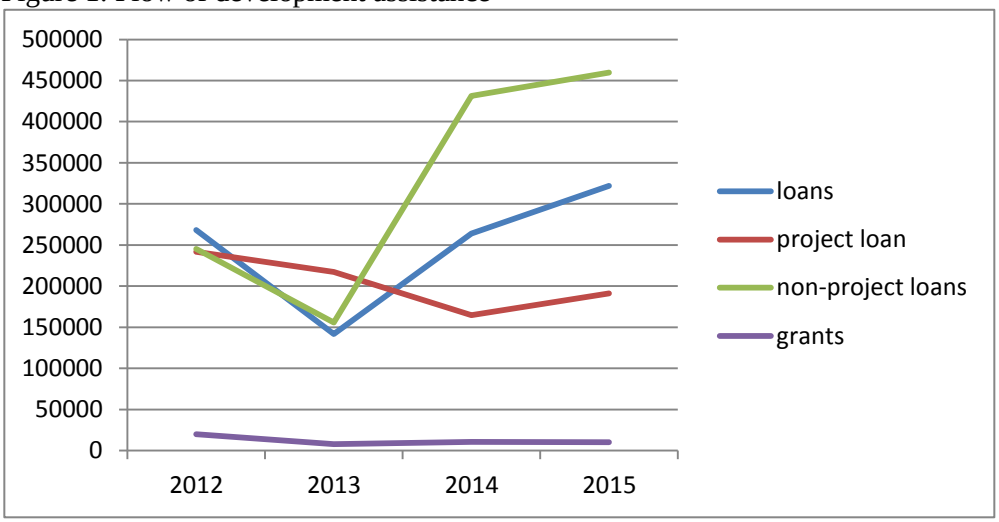
This paper is based mainly on secondary data in which the impact of development assistance on the Sri Lankan economy and future trends can be observed. Basically it uses data published in the annual reports of Central Bank of Sri Lanka, the reports of Foreign Ministry and Department of External Resources, Institute of Policy Studies (IPS) publications and the annual reports of the IBRD, IMF and ADB. As the paper is based on time series data, few variables like major donors, total amounts, trends, future possibilities, challenges are discussed. Simple and advanced statistical techniques are applied to identify the main objectives. Impact of and trends in the receipt of development assistance by the economy of Sri Lanka is

assessed by comparing the amounts of development assistance received in previous years, and comparing domestic economic standards with other lower middle income countries. The possibilities of receiving further development assistance after being elevated to an upper middle income country is assessed by the economic performance 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 analysed using descriptive statistics and graphical presentations.

Results and Analysis

According to the data collected by the study, the per capita income of Sri Lanka is increasing gradually. In 2013 the per capita income was only US$ 3,610 and in 2014 it was US$ 3,853. But in 2015 the per capita income further increased to US$ 3,924 and most economists believe that in 2016 the per capita income will be over US$ 4,000. When considering the growth of per capita income and the flow of development assistance, there has been a significant reduction in development assistance received. According to the Central Bank Report the growth of per capita income has clearly affected the flow of development assistance of Sri Lanka. 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 interest payments due.

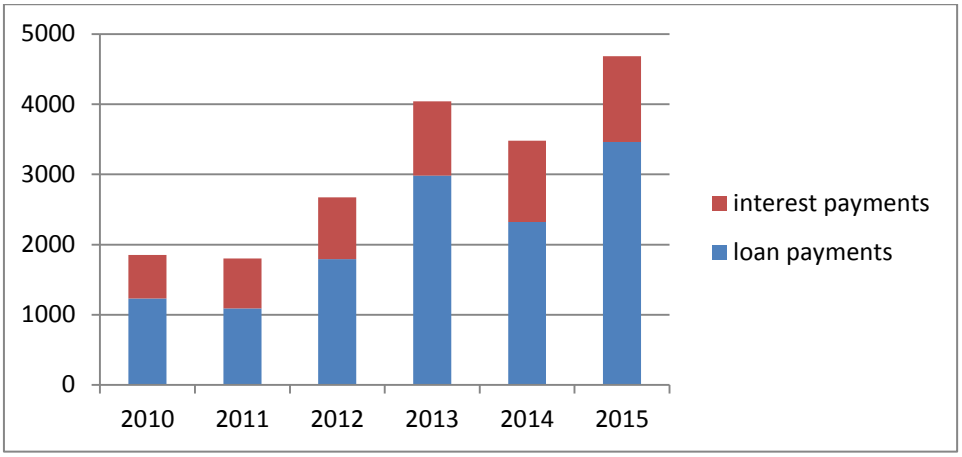
Figure 1: Flow of development assistance



Source: central Bank reports

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

Figure 2: Loan and interest payments



Source: Central Bank reports

The increase in loan and interest payments due has clearly become a burden for the Sri Lankan economy. Therefore, there is a possibility that Sri Lanka will be trapped-in when transiting from a lower middle income country to upper middle income status. Apart from this main obstacle, the study identified several other challenges which Sri Lanka may face.

1. Limited development assistance

Sri Lanka already faces limitations in receiving development assistance as a MIC. Some argue that foreign aid and grants should be provided to the poorest countries and question why development assistance should be given to MICs. But there are others who argue that aid to MICs is a legitimate need in order to meet the Millennium Development Goals and eradicate poverty.

2. Reduction of concessional financing

As Sri Lanka elevates from a lower middle income country with increased demand for public investment the concessional financing the country has enjoyed over the past years is on the decline. This concessional financing was 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 assistance in the form of outright grants, credits with longer maturities with a longer grace period and low interest, and mixed credit combining loans and grants. However, at present Sri Lanka has access to a limited range of concessional funding from IDA, ADB, UN agencies, selected bilateral

development partners and dedicated development funds. According to IPS discussions with several aid missions, 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'.

3. Lacklustre flow of loans

The loan flow to Sri Lanka reflects a decline since 2012. Most development projects of the country are mainly financed through these loans. If this trend continues for the next two years, Sri Lanka would have to seek alternatives in order to fulfill the requirements to become an upper middle income country. On the other hand, the interest payment for loans is increasing annually.

Table 1:

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

Source: Central Bank report 2013

4. Imperative taxation

Lately, Sri Lanka realised 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 maintain 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 the people developing countries including Sri Lanka can increase their tax ratio. According to the benchmark tax GDP ratio, a middle income country can increase their tax ratio up to 25% and Sri Lanka has just 12.4%. Sri Lanka performs poorly in its collection of taxes generation just ¼ of revenue from direct taxes and rest from indirect taxes like VAT.

5. Reduction of investments in education and health

For several decades, Sri Lanka has continued to be the key provider of social services such as education and health. But these two sectors received the least investment sectors during the last few years. Investment in education is low and has declined over time up to 2.3% of public expenditure during 2000-2010. In 2012, the total expenditure in education was 1.9% of GDP, relatively low compared to other low income countries. Upper middle income countries spend an average of 5% of

GDP and lower middle income country spend 4% of GDP for the improvement of education. On the other hand, only 10% of schools in urban areas were capable of offering students facilities to study Advanced Level science subjects. Total expenditure on health remained below 5% of GDP during 1995-2008 and was comparatively lower than the global average. The requirements of the health sector were fulfilled by the private sector. Education and health sector produce the country's educated, skillful and healthy workforce.

6. Political and foreign policy structure

After the thirty-year 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 concessions were a result of above mentioned factors. These directly affected the flow of development assistance to Sri Lanka. Dramatic changes in the politics and foreign policy of Sri Lanka directly influenced economic growth, investment, and financial receipts. If Sri Lanka can build a better image in the international arena, Sri Lanka will be able to secure the assistance required to fuel transition into an upper middle income country.

Case study

Furthermore, according to the South Korean shift into upper middle income status, the development of five-year plans intended as guidelines to coordinate public and private efforts to improve the performance of the country may prove useful to Sri Lanka.

South Korea is a successful model and an exceptional case of swift transition to an advanced economy. In 1960, the per capita income of South Korea was only US$ 2,000 and by 2008 it was around US$ 28,000, elevating it to a developed country. South Korea's quick transition to an advanced country can be divided into 3 stages:

The first stage began in 1962, with the establishment of five year plans. This stage was further strengthened by high levels of savings, and investments, and a determined industrial policy framework which inspired technological upgrades to align exports with South Korea's evolving comparative advantages. During that period, South Korean Government outlawed unions and created conditions for a labor market with cheap and abundant labor.

The second stage covered the financial crisis of 1997-1998, which slowed down 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 high and there was continued overinvestment in

manufacturing sectors that had excess capacity even before the crisis. On the other hand, unregulated of financial liberalisation had induced overindebtedness on the part of the private sector. The South Korean financial crisis put banks and businesses in a crunch, and paved the way to a broader economic crisis.

The third stage of the South Korean economy was characterised by the recovery of the financial crisis. In 1999, South Korean GDP grew by 10.7%: 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. Countercyclical 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 of the South Korean economy was led by rapid growth in exports due to the depreciation of currency, strong demand in China, and an effective and aggressive monetary and fiscal policy response.

Economic indicators							
Period	GDP per capita income US$	Macroeconomic indicators					
		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%	0.706%	5%	53.92%

Source: IMF-World Bank Economic Outlook data

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 other countries in the region due to the flow of development assistance. But this flow of development assistance to Sri Lanka will be limited in the eve of elevation to upper middle income status. The decreasing trend in the flow of development assistance can be seen in the distribution of development partners. Most lending agencies and countries argue against giving development assistance to MICs rather than LDCs. On the other hand, Sri Lanka has gained a remarkable position in indicators for education and health compared to other South Asian countries, and the Government has implemented new initiatives to overcome this obstacle to achieving its goal of becoming an upper middle income country and avoiding the middle income trap by overcoming the lack of funds by way of development assistance.

Recommendations

To overcome the challenges of elevating Sri Lanka to upper middle income status, and to seek alternative income flows due to reduction of development assistance, the following policy options can be implemented:

1. Maintenance of human and physical capital and reforming the education system
2. Expansion of public sector and government thrust for international trade
3. Economic reforms and attracting FDIs
4. Strengthening investments and concentrating on fiscal affairs under public finance management
5. Technological advancement, good governance and rule of law

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Telecommunication, Transportation and Public Policy

The Determinants of Personal Telecommunication Expenditure of Rural Youth with Special Reference to Balangoda Divisional Secretariat

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Introduction

Telecommunication has now become an essential component of human life and has also become a key component in every section of the modern world. Telecommunication-related activities among youth have rapidly increased over the past few years in both developed and less developed countries around the world. Although the term telecommunication refers to a broader level of technological usage, there are two main media widely accessed by the youth: the internet and telephone services (World Bank Group, 2006). For this study, the term telecommunications includes fixed and mobile telephone services and internet, as in Ureta (2005), which evaluates the importance of telecommunications expenditure in relation to total household expenditures in four developing countries.

It is commonly said that access to telecommunications is important for economic growth especially in developing countries. For example, Waverman et al. (2005) expressed that in a classic developing country, an increase of 10 mobile telephones per 100 people could increase GDP growth by 0.6 percentage points. Among all markets, youth are considered the prominent segment of society which has been active in transforming the application and use of digital technologies in unprecedented ways (Selian, 2004). The youth market segment comprises both teenagers and young adults between ages of 12–29 who are more comfortable with using the internet, building web sites, communicating via mobile phones and playing with digital equipment than any previous generation (Selian, 2004).

Worldwide, a study carried out by UCLA finds that Internet usage is highest among people aged 35 and under, with especially high use among people aged 18 and under. Usage among those aged 16 to 18 was 97 per cent in 2002 (Fillion, 2003). Nearly 81 per cent of teens aged 12 to 17 use the internet for email according to a survey by AOL; while 70 per cent use it for instant messaging, which was expected to overtake e-mail as the most popular form of internet communication by the end of 2005 (Carpenter, 2003). A recent study has revealed that almost two thirds of

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Americans aged 16 to 29 years of age would choose a mobile phone ahead of a landline phone (Derick, 2004).

Research Problem

Telecommunication refers to the communication at a distance by technological and electronic means. Nowadays, telecommunication expenditure has become one of the main expenditure categories among youth worldwide. Sri Lanka as with its rapidly developing infrastructure, social structure and business level improvements, is experiencing a boom in telecommunication infrastructure and services. The African Youth Charter defines 'youth', as those persons between the ages of 15 and 35 years of age. Considering the market share for the Sri Lankan telecommunication industry which is covered by 8 major telecommunication service providers, Sri Lanka is still far behind expectations in fulfilling the requirements of consumers. Especially, the youth is the prominent factor in modern day telecommunication services. Therefore the requirements and expectations of youth should be considered by the relevant authorities. In order to do so, it is essential to identify the determinants of youth telecommunication expenditure and their behavioral patterns. In Sri Lankan context, there may be various factors affecting the telecommunication expenditure of the youth which may vary according to sector. Therefore the research problem is, what are the determinants of personal telecommunication expenditure of youth in rural sector?

Objectives of the Study

Main Objective

- To identify the determinants of personal telecommunication expenditure of rural youth.

The Specific Objectives of the Study

- To investigate how much rural youth consumers spend on mobile telecommunication services.
- To examine the factors that rural youth consumers take into consideration in their choice of mobile network provider.

Literature Review

Generally, demand for telecom service can be categorised into two types, namely, demand for access and demand for usage. Demand for access is the demand for connection or subscription to telecom services while usage demand is the demand to make and receive calls once subscription has been made. Taylor (1994) interpreted that telecom demand is distinct from demand for most goods and services because

telecommunication services are not consumed in isolation: a network is involved. He also presented that for telecom services a distinction is made between access cost (i.e. cost of a handset) and usage cost. They said that access telecom service provides utility to consumers in terms of the ability to make and receive calls. Verkasalo (2008) argued that usually before the end-user considers using a service she probably evaluates how the service matches her individual needs. According to him, needs are born in the individual and they tend to direct all behaviour. One way of fulfilling these needs is to purchase a good or service, thereby becoming a consumer and in the case of mobile telecommunication services becoming a subscriber or user of the services.

Gerpolt, Ram and Schnidler (2001) argued that the following four individual features are critical factors that affect customers' value of mobile telecom services:

- The network quality, which is reflected in excellent indoor and outdoor coverage and the clarity of voice production without any connection breakdowns;
- The price paid for obtaining access to and using the network;
- Customer care which is seen in the quality of the exchange of information between customer and operators in response to customer's telephone enquiries in the course of interactive activities initiated by the network operator; and
- The personal benefits they obtain from the range of mobile telecommunication services.

According to Loebbecke (1995), cost of using mobile services and service quality are critical factors that influence the use of mobile service. Costs of using mobile service include cost of acquiring the line, the phone and the usage per minute. Cost of mobile usage can also be viewed in terms of the price for calls within the same network and calls to other networks. A significant phenomenon prevailing in the mobile market is that charges for calls within the same network are relatively cheaper than calls to other networks because of connectivity fees (Laffront, Rey & Tirole, 1997). Loebbecke (1995) indicated that the quality of mobile service is important in sustaining demand over time. Service quality is affected by network coverage and quality of mobile telecom network. Expanded coverage improves network quality which in turn enhances service quality for consumers. Network expansion drives demand for mobile telecom service because services are made available to previously uncovered people.

Mobile Telecommunication

Mobile telecommunication refers to the exchange of information, ideas and thoughts through the medium of mobile phone, telephone or wireless network. A mobile telephone network is comprised of the physical components required to connect users. The basic physical components are the handset, base station and mobile service switching station (Gruber & Hornicke, 1999).

Network Effects and Mobile Subscription

Telecommunication theorists widely believe that telecommunications are characterised by network effects. There are two types of network effects as direct and indirect. Direct network effects refer to the case where users benefit directly from the fact that there are large numbers of other users of mobile telecom networks. In mobile telecommunication, Birke and Swann (2006) argued that direct network effect occurs when the user can contact a large number of people. This motivates other people to subscribe to mobile telecom networks. Indirect network effects, on the other hand, are created as a result of the availability of other services that complement voice telephony such as short messaging service (SMS), internet, and multimedia messaging service (MMS).

Factors Influencing the Choice of Mobile Telecom Network Provider

Birke and Swann (2006), Corrocher and Zirulia (2008) and Svigelj and Hrovatin (2008) identified several factors relating to the choice of mobile network. The factors include: prices of mobile telecom services (prices for calls within network and calls outside network); service quality (that is network quality); range of products; customer care; discount, promotion and special offers on calls, text messages and multimedia messages; advertisement; and network size. Perceived quality of services affects the choice of mobile network in the sense that when customers perceive that a particular mobile operator offers quality services that network is more likely to be chosen compared to another network which provides poor quality of service. Improvement in the quality of service means that the network would become attractive to customers and hence be adopted. According to Kim and Kwon (2003), consumers take into account network size when choosing mobile operators. They argued that larger mobile networks have an advantage over smaller networks in acquiring subscribers because of intra-network-call discounts and quality-signaling effect. This view is shared by Birke and Swann (2006). According to them, mobile networks with larger subscriber base attracts more subscribers because with rising number of users subscribing to a network it becomes more attractive to other people to subscribe to the same network. On their part, Corrocher and Zirulia (2008) maintained that the larger the customer base of

mobile network the greater the benefits from adoption. Birke and Swann (2006) indicated that individual social network (friends, family and partner) and income influence the choice of mobile operator. According to them, mobile subscribers try to avoid high mobile expenditure by coordinating/matching operator choice with their peers and family. This implies that the individual choice of mobile operator is influenced by the choice of their social networks. Moreover, Corrocher and Zirulia (2008) argued that network effects affect the choice of mobile operator. According to them, network effects are common in communication network where consumers primarily consider the pattern of adoption by agents in their social neighborhood. These agents include family, friends and other social groups. They argued that network effects are explained by social networks of people.

Methodology of the Study (Study Design)

Study Area

To identify the determinants of personal telecommunication expenditure of youth, the selected population was youth who live in urban, rural and estate sector in Balangoda Divisional Secretariat area. There are 53 Grama Niladari Divisions in this area. There are total of 91,094 persons in the Balangoda Divisional Secretariat aream of which the urban population is 19,261, rural population is 62,451 and the estate sector population is 9382. Six Grama Niladari Divisions such as Balangoda town and Thumbagoda represent the urban sector, Rassagala and Kiridigala represent the rural sector, Pettigala and Kirimatitenna represent the estate sector.

Sampling

As it is practically difficult to collect data from entire population to fulfill the study objectives, several methods were used to choose sample from the population. In here the most important part of the sampling was determining the size of the sample. Therefore 40 youth consumers were selected as the sample which represents rural youth consumers.

Methods of Data Analysis

Multiple regression analysis

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 \ldots\ldots\ldots + \beta_n x_n$$

Chi – Square Test

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

Multiple Regression Method

Multiple Regression method was used to analysis the data. The independent variable in the regression equation was Personal Telecommunication Expenditure as a function of the following selected independent variables. Equation of Multiple Regression can be written as follows.

$Y= B_0+B_1X_1+B_2X_2+….B_nX_n+ \varepsilon$

Y = Personal Telecommunication Expenditure
X_1 = Monthly Income
X_2 = Prices/Tariff rates of services
X_3 = Age of the respondent
X_4 = Gender of the respondent
X_5 = Educational level of the respondent
X_6 = Network coverage of the service providers
X_7 = Marital Status
X_8 = Number of communication devices possess by the respondent
X_9 = Amount of online/usage time
X_{10} = Advertising
ε = Error Term of the Equation

Chi-Square Test

Following variables were tested using the chi-square method

- The type of mobile device possess by youth individuals
- The type of default mobile connectivity (prepaid/postpaid)
- Gender and Marital status
- Education and Employment status
-

Data Collection Methods

Primary Data

This study was mainly based on primary data. Primary data is essential to collect the facts, views and thoughts of youth related to the telecommunication expenditure. Therefore data were collected using

questionnaires according to the sample of urban, rural and estate sector youth population in the Balangoda Divisional Secretariat

Secondary data

To collect secondary data following documents and methods were used.

- Department of Census and Statistics
- Other government authorities and institutions
- Resource Profile - Divisional Secretariat - Balangoda.
- News Papers, Magazines, Journals, Books, Publications etc.
- The Internet and Online Data Centers

Results & Discussion

Table 1: Significance of the Variables in Rural Sector

Predictors	P values
Monthly income or transfers receive	0.000
The type of mostly used mobile device	0.884
Number of devices possess with	0.021
Amount of sms/mms messages send per day	0.000
The type of the default mobile connectivity	0.606
Amount of family members	0.032

Source: Sample survey, 2015

The significance level was recorded as 0.05 for the analysis. Hence, if p value of predictors < 0.05 those variables are more suitable to explain the dependent variable. Considering p value of the selected variables, monthly income or transfers receive, amount of sms/mms messages send per day, number of devices possess by the individuals and amount of family members were significant at 95% confidence level and 5% significance level. According to the p value of other factors, those were not significant at 5% significance level.

The Regression Equation of Rural Sector

$Y= \beta 0+ \beta 1X1+ \beta 2X2+ \beta 3X3+ \beta 4X4$
Y=Telecommunication Expenditure

X1= Monthly income or transfers received (β1)
X2= Amount of sms/mms messages sent per day (β2)
X3= Number of family members (β3)
X4= Number of devices possessed by the individual (β4)

Interpretation of the Regression Result of Rural Sector

The regression equation
Y = 323.171 + 0.046X1 + 10.609X2 + 101.484X3 + 121.774X4
The regression equation shows the relationship between telecommunication expenditure and selected variables in rural sector. Using this equation the effects of socio economic factors can be easily understood. Without affecting any other variables the constant value represents the effects of telecommunication expenditure when other variables were constant. It was recorded as 323.171 rupees.

- + 0.046X1 (Individuals' monthly income or transfers received)

There was a positive relationship between telecommunication expenditure and individuals' monthly income or transfers received. When income increase by one unit (rupees) then the telecommunication expenditure was increased by 0.046 units (rupees) assuming other factors remaining constant.

- +10.609X2 (Amount of sms/mms messages sent per day)

According to the results of the analysis, Amount of sms/mms messages sent per day by individuals was positively related to telecommunication expenditure. It means when amount of sms/mms messages send per day was increased by 1 unit (sms/mms) the monthly telecommunication expenditure was increased by 10.609 units (rupees) per month.

- +101.484X3 (Number of family members)

There was positive relationship between number of family members and telecommunication expenditure. When family members increase by 1 then the telecommunication expenditure increased by 101.484 units (rupees) per month assuming other factors remain constant.

- +121.774X4 (Number of devices possessed by the individual)

The number of devices possessed by individuals is also a very important factor to determine telecommunication expenditure. According to the regression coefficient value, there was a positive relationship between these two variables. When the number of devices possessed by the individuals increased by 1 unit, the

telecommunication expenditure was increased by 121.774 units (rupees) per month assuming other factors remaining constant.

Determinants of Personal Telecommunication Expenditure of Rural Youth

According to the rural sector regression, following factors affected rural sector telecommunication expenditure pattern to a greater extent than others.

- Monthly income or transfers receive
- Amount of sms/mms messages send per day
- Number of devices possess by youth individuals
- Amount of family members

Considering these factors the type of most-used mobile device and the type of the default mobile connectivity were not highly impactful on changing rural telecommunication expenditure pattern. Number of devices possessed by youth, amount of sms/mms messages sent per day and number of family members affected rural youth in changing their telecommunication expenditure.

Conclusion

The main objective of this study was to find out the determinants of personal telecommunication expenditure of rural youth.

- According to the results monthly income or transfers received is a significant factor in changing the telecommunication expenditure of youth in the sector.
- Mobile internet access and mobile communication were identified as leading methods of connectivity among rural youth.
- There was not much of a difference in expenditure patterns between pre- and postpaid subscribers.

Recommendations

Telecommunication expenditure of rural youth in Sri Lanka is somewhat satisfactory. Therefore the Government should pay attention to help rural youth to gain maximum benefit from spending. The main problem is the lack of Government policies related to rural youth behavior. Therefore implementation of Government policies related to rural youth telecommunication is essential for Sri Lanka. Most of the rural young lack knowledge about meaningful usage of the internet and affiliated services. They prefer mobile internet, mobile communication and mobile exchanges. Therefore, the government should implement programs to improve their knowledge and efficiency in mobile telecommunication.

There are some problems related to infrastructure and accessibility of telecommunication services as identified during this study. Considering the rural sector, most young individuals face some problems relating to the lack of high speed data access. Therefore, the Government has to implement proper telecommunication related infrastructure to facilitate high speed data access without any gap among urban, rural and estate sectors. Research and policy interventions are needed to address the problem of low levels of access and connectivity in rural sector and low income youth individuals. These could include education on quality internet services and improving young individuals' knowledge, and providing some kind of incentives for telecommunication related activities. It is very important for policymakers to understand the patterns of youth telecommunication expenditure before implementing such policies.

Keywords: Youth Telecommunication Expenditure; Determinants of Rural Youth Telecommunication; Telecommunication Expenses; Rural Youth Expenditure

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Comparative Economics of Planning Public Transport Provision to Address Transport Connectivity Issues in a Rural Setting: The Case of Kalyanipura – Weli Oya

T Lalithasiri Gunaruwan [1] and M. H. Saumya Dilrukshi[2]

Introduction

Transportation functions as an essential cornerstone of rural development. Improved rural transport infrastructure provides greater mobility and access to services such as education and health at affordable costs (BMZ, 2013). It also facilitates access to jobs and enhances the movement of agricultural products (Rubel, 1990; cited by Brown & Flake, 1999). For instance, the lack of low cost and efficient goods transport services from villages to market centers has become a critical issue faced by rural farmers (Silva. R, 2014). Transport connectivity gaps therefore often impose limits on the welfare of deep rural settlements, and constitute one of the root causes of rural poverty.

The village of Kalyanipura in Weli-Oya, an enclave formally known as *Dollar-Farm*, which was destroyed by the LTTE terrorists in 1984 and rehabilitated in 2009 after the defeat of terrorism, is no exception: here, too, the lack of reasonable transport connectivity has, *inter alia*, rendered the village unattractive to settlers, with less than 40 out of the approximately 100 families resettled in 2009 continuing to live there at present.

A survey was conducted in the village in early 2016 to identify the problems and possible solutions to infrastructure gaps faced by the village. This survey 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).

This paper summarises the outcomes of the extended research conducted to examine the viability of addressing the transport connectivity problem of Kalyanipura by planning a public bus service, and the comparative economics of associated service provision alternatives.

Materials and Methods

The objective of this analysis was to evaluate the options of providing an affordable transport solution to Kalyanipura village. The problem was positioned between two

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delicate parameters where (a) poor income levels of villagers made any private transport modal ownership and operating cost unaffordable, while (b) the distance from town and the sparsely populated nature of the village rendered any public transport operation costly, and less financially attractive to operators (Hine, 2014). The most pragmatic scenario for analysis therefore was a bus operation planned and operated by the Sri Lanka Transport Board (SLTB) through its Kebithigollewa Depot, where any shortfall of revenue could be expected to be bridged through national or provincial grants.

Data pertaining to travel demand and distances were obtained from the survey conducted and from the transport modal affordability analysis by Gunaruwan and Dilrukshi (2016). Bus operating cost data required for the assessment were sourced from the SLTB.

Analysis and Findings

According to Gunaruwan and Dilrukshi (2016), for motor bicycle travel cost to be economically justified, a villager should on average place a value of at least Rs. 48 per hour saved. However, little over half of this amount justifies the operating cost that has to be incurred to secure such time savings by way of bus travel. Therefore, it is clear that most economical mode of motorised mobility which could be provided for Kalyanipura villagers is a public bus transport facility.

This exercise examined supply economics, by comparing alternative modes of bus transport service provision. The operation of a bus by the private sector was not considered in this analysis because SLTB operation would imply significantly less capital costs and greater deployment flexibility for the purpose from among the fleet of SLTB buses in the Kebithigollewa Depot. The thrice daily operation of a new service from Sampath Nuwara to Kalyanipura was planned, comprising two school trips in the morning and afternoon, as well as one trip in the evening. The total operation would involve 126 bus kilometres daily.

Based on the operating cost statistics of Kebithigollewa SLTB Depot in 2014, it could be worked out that this bus operation would cost Rs. 5,890 per day (or nearly Rs. 2.12 Million 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 of passengers in all the buses operated, this would require a near 78% of minimum load factor to be realised, 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 26,700 passenger kilometers per month, as worked out for Kalyanipura.[3]

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 relevant Provincial Council.

Alternatives to such 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 passengers, could well run through Kalyanipura by travelling approximately 6 additional kilometers on each trip. The study examined the comparative economics of this option, and found it to be much more attractive for both the supplier and the national or provincial authorities. The comparative results are presented in 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 re-routing the current bus operation to Gajabapura to run via Kalyanipura would be very much more economical to the

[3] 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.

operator as well as to the national or provincial transport authorities than planning a dedicated bus service to Kalyanipura.[4]

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, because a smaller bus which could operate on the route as it exists at present may cause a welfare loss to the existing clientele of the bus to Gajabapura.

Conclusions and Recommendations

The research examined the economics of the alternatives to providing a bus service to an isolated rural village setting, namely Kalyanipura in Weli-Oya. Introducing a public bus service was found to be a potentially affordable mobility solution for villagers due to their income constraints. The importance of serving the purpose through the most economical means also was revealed through the study: A new dedicated bus service would require a 13 times greater compensative grant payable by the authorities to the Kebithigollewa Depot than a re-routing of the existing bus service to Gajabapura to run through Kalyanipura. 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 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, which may prevent 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 capture (i) the likelihood that the passengers using the bus to Gajabapura at present having to incur increased travel time costs owing to the proposed re-routing, and (ii) the possibility of this new bus service inducing more settlers who have left the village to return: resulting in increased patronage of the bus and reduction of compensative grants required to meet the operating economics of the bus service. Such furtherance is likely to 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.

[4] However, this re-routing causes existing passengers using Gajabapura bus to spend additional travel time. Not capturing this externality is a shortcoming of this research.

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

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

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Service Quality Factors affecting Passenger Satisfaction in Public Bus Transportation: a case study of Kegalle District Passenger Bus Transportation Service Sector reforms for Economic Development

I. D. C. Wijerathna[1]

Introduction

The goal of transport research should not be limited to theoretical analysis but needs to include the development of practical tools that improve the quality of people's mobility and daily life (Maria Morfoulaki, et all 2007). Public transport is a shared passenger transport service available for the use of general public for the purpose of travelling from an origin to a destination. Public transport modes may include buses, trains, rapid transits, trams, ferries and air carriers, depending on countries' requirements (Ranawana and Hewage, 2015). For the current research study, bus transportation was considered more relevant than other categories as a majority of passengers are transported by public and private passenger transport services.

An improvement of supplied service quality can attract additional users from other modes of transport such as private transport modes. This would also resolve many problems (for example by helping to reduce traffic congestion, air and noise pollution, and energy consumption) as individual transport would be used less (Laura Eboli , Gabriella Mazzulla, 2007). Generally, people tend to be satisfied when their perceptions of the service they receive match their expectations, and these expectations could be subjective or objective. When service quality falls short of expectations they tend to be dissatisfied (Mintesnot G. Woldeamanuel, Rita Cyganski, 2011). Therefore for the development of public transport, customer satisfaction analysis is necessary.

It is also notable that less emphasis has been placed on user perception in influencing and guiding policies of public transport (SEVANATHA organisation, 2002). Therefore in this research study, the researcher mainly focuses on user perception about public bus transport service quality, and its impact on passenger satisfaction, making recommendations for policy makers to solve the quality issues travellers face in public bus transport services.

This study is based mainly on two research problems;

1. What are the factors affecting passenger satisfaction in public transport?
2. What are the problems travelers face in the current transport system?

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Research objectives of the study,

1. To find and analyse factors affecting the satisfaction of passengers in public bus transport sector
2. To identify problems which passengers face in the current transport System.
3. To give recommendations to transport operators and regulators to enhance the service quality of public transport service.

Through this research, the researcher intends to make an important academic contribution to the public transport sector in Sri Lanka which is an area less focused upon in Sri Lankan academic research.

Literature Review

The study by Ranawana and Hewage, (2015) found factors affecting service quality in public bus transportation and their effect on development of public bus transport sector. In this research study factors used to measure service quality are vehicle safety, physical design of station, physical quality of vehicle, information regarding timetable, travel time/delay, frequency of departures, ticket system etc.

An empirical study based on urban buses in the city of Larissa, Greece by Arris-Panagiotis Kostakis and Ipsilandis Pandelis (2009) dealt with satisfaction in urban transportation. In particular, it tried to identify the important factors which affect customer satisfaction in the city of Larissa.

Laura Eboli and Gabriella Mazzulla (2007) proposed a tool for measuring customer satisfaction in public transport. More specifically, a structural equation model was formulated to explore the impact of the relationship between global customer satisfaction and service quality attributes. In this research study 16 service quality factors have been tested for their impact on passenger satisfaction.

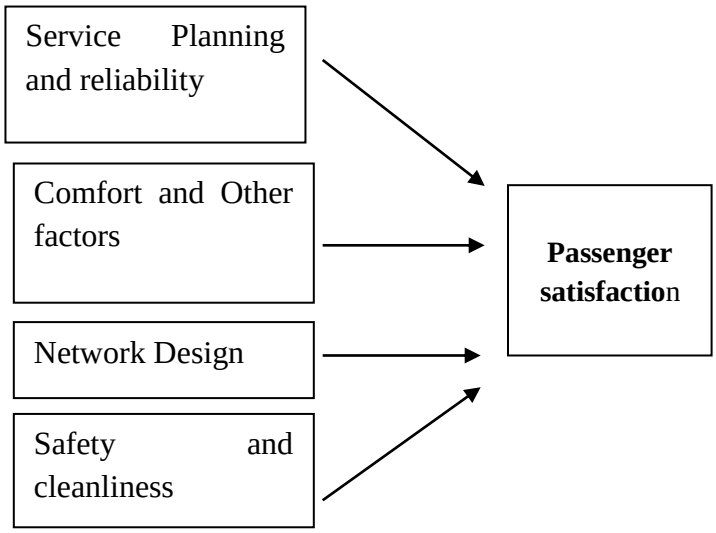
Research Methodology

In the current study, the researcher has chosen to use a mix of qualitative and quantitative method as his data analysis technique. The researcher has mainly used primary data to achieve the research objectives. Kegalle district has been selected as a case study and 100 passengers were used for the survey. Research was carried among 100 of people in the SANASA campus including students, lecturers, administrative staff and minor staff who travel to the campus from various areas in the Kegalle district. A structured questionnaire with a five-point Likert scale was used to gather data. SPSS software was used for statistical analysis.

Model

The conceptual framework of the study is based on literature, chief among them the framework proposed by Laura Eboli and Gabriella Mazzulla (2007). When constructing the model researcher has added the variable of safety and cleanliness which is not tested in the model of Laura Eboli and Gabriella Mazzulla (2007). The model of the study can be depicted as follows:

Figure 01



Researcher constructed hypotheses for the study as follows.

H1: There is a significant impact from service planning and reliability on passenger satisfaction.

H2: There is a significant impact from comfort and other factors on passenger satisfaction.

H3: There is a significant impact from safety and cleanliness on passenger satisfaction.

H4: There is a significant impact from network design on passenger satisfaction.

Data analysis

As per the research methodology, the researcher affirms data reliability through cronbach's alpha. The tested cronbach's alpha 0.752 shows high reliability of the responses given by the respondents of the study.

Table 01: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.711	4	3.678	11.009	.000[b]
	Residual	31.737	95	.334		
	Total	46.448	99			

a. Dependent Variable: Passengers satisfaction

b. Predictors: (Constant), Network design, Service planning and reliability, Safety and Cleanness, Comfort and other factors

Table 2:Coefficients for Regression analysis

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.043	.448		.097	.923
	Service planning and Reliability	.348	.125	.254	2.779	.007
	Comfort and Other Factors	.056	.125	.048	.444	.658
	Safety and Cleanness	.182	.116	.162	1.578	.018
	Network Design	.448	.106	.369	4.234	.000

a. Dependent Variable: Passengers satisfaction

Table 1 ANOVA results show the overall model fit of the study. The significant P value which is 0.0000 proves high level of model fit. Table 2 regression analysis results shows the significance of tested variables, according to which service planning and reliability, safety and cleanliness, and network design are statistically significant predictor variables of passengers satisfaction. Test results of the model shows comfort and other factors are less significant.

Hypothesis Testing

Hypothesis	**Result**
H1: There is a significant impact of service planning and reliability on passenger satisfaction.	Supportive
H2: There is a significant impact of comfort and other factors on passenger satisfaction.	Non Supportive
H3: There is a significant impact of safety and cleanliness on passenger satisfaction.	Supportive
H4: There is a significant impact of network design on passenger satisfaction.	Supportive

Conclusion

The researcher could identify the major issues faced by passengers of public transport system in relation to the number of bus turns, information sharing system, complaint management, facilities and the maintenance of the bus stops and terminals, overcrowding, cost and ticketing process, cleanliness of buses and poor road infrastructure. The researcher recommends that it should improve the service quality of public bus transport in relation to service planning and reliability, safety and cleanliness and network design. The researcher believes that this study will be a source for successful future research on the public transport system.

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

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Introduction

Computer labs, or computer clusters, give many people access to computer programs and the Internet. Schools, public libraries, Universities, hotels and 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 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. You 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 aims to provide basic, functional computer services for users who may not have access to such technology at home or elsewhere. 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

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information for the student to refer while they were working. But in hear students can't keep there 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 wants to create 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 researchers 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 research about disorder Computer Lab Policy. The main concern of this paper is to address the disorder problems in Computer labs and create a policy frame work for that problem. Some results of a survey conducted among Lab users of University of kelaniya faculty of Social Science. Data were obtained from the responses of 300 Lab Users by using simple random sampling. The researcher used questionnaire and interview method to collect data and also used 5 likert scales for data processing. Data were analysis from SPSS 21.0 using 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 the researcher made a conclusion that the most Lab Users' effective problem was disorder computer Lad. There for researcher did a SWOT Analysis for identify the possibility for create a policy frame work. In addition, the researcher is made recommendation to increase perfect arrange Lab policy it is CLEAR SCREEN POLICY. The University authority should take a step to increase the CLEAR SCREEN POLICY when in building a new Computer Lab and develop exist Lab like faculty of Social Sciences Computer labs.

Key Words: Computer Lab, Policy Framework, Lab Maintenance, Lab Policy.

Methodology

Both secondary (literature review and desk research) and primary data have been gathered. Primary data have been collected through a survey conducted among University of Kelaniya faculty of Social Sciences Computer labs. The survey was set up after a small pilot study. Respondents were simple randomly selected among the computer lab users. According to pilot study researcher build up a questionnaire to fulfill the objectives. Students and staff approached in 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 area, 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 the problems are which effective in the Computer lab. The study has mainly 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. Researcher used 5 likert scale for data processing. Data were analysis from SPSS 21.0 using 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 the researcher made a conclusion that the most Computer Lab users' effective problem was disorder computer lab and computer table. According one way Anova significant value was 0.012. There for researcher did a SWOT Analysis for identify the possibility for create a policy frame work. Then used a Policy cycle and create a recommended policy like CLERAR SCREAN POLICY.

Results

32% respondents were male, 62% were married, and 49.7% were staff users. The higher Lab using age of respondents was 22-25 years.

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 Tabe 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 helpfull	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			

We used one way Anova analysis to test, when Users attend to the Computer lab for Studies. What are the most effective problems they were facing? Some problems are significance. But strongly significant problem was "Working Table Appearance is not good it's full with wire and other things". 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. Researcher can see that the significance level is (P=0.002) in the full data set, the effective problem is "Working Table Appearance is not Good it's full with wire and other things".

In Computer Lab the Users need Calm environment But in this regarding disorder, they were facing big problem about disorder working Table. Therefor researcher did a SWOT Analysis for identify the possibility for create a policy framework. Finally, according to the Policy cycle analysis researcher recommended a CLEAR SCREEN POLICY.

Recommendation & Conclusion

According to Results mainly there are lot of problems affected in the Computer Lad. Researcher considers only bad Working Table Appearance problem and solves that problem research recommends a CLEAR SCREEN POLICY. According to the results of the researcher conducted, with a conclusion can be consistently made about the role of Computer Lab in general. However, some conclusive remarks can be made.

First of all, when using Computer Lab, among researcher finds out problems on observations. The bad working table appearance is the highly dominate problem. Computer Lab fulfills many educational functions and psychological needs of students. CLEAR SCREEN POLICY of make a computer table and other devices in appropriate places on the table and make a system for use wires and how they connect under the table without disturbance. However further researchers can develop a policy framework for other effective problems and they can do a research like that for another computer Labs. University authorized persons can develop this policy. Whatever the following suggestions are made for future researchers, who are interested to carryout studies in respect of this particular field of the Labs. Especially this research is important for the future innovators, students who study the field of Computer Science.

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The Impact of Interior and Exterior Designs on Demand for Hotels

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Introduction

Design can be identified as the human power of conceiving, arranging and creating products that permit human beings to attain their individual and collective purposes (Buchanan, 1999). Through the process of designing, objects will be more gorgeous, eye-catching, and attractive. Design may take place in households, hotels, companies, banks, and so on. Among them hotel design plays a significant role in today's society as it directly influences profits and success in the hospitality industry.

The concepts of hotel design and demand for hotels are highly correlated. Nobles (1999) emphasised that 'the design of hospitality establishment can lend an identity to the business and project the operation's appeal and vision to visitors or potential visitors'. Furthermore Stipanuk (2006) highlighted that 'design in hospitality and tourism facilities is regarded as the core aspect that contributes to adding value for both operations by tourists'. Thus the above facts prove that there is a close association between the design and the income of or demand for hotels.

Ccountries like Germany, United Kingdom, France, and South Korea place high priority on design when constructing hotels because they believe more customers will be attracted by hotels through their designs, as design aids mental satisfaction among guests. That is why design has become a major component when constructing hotels in those countries. But in the Sri Lankan context the designers, managers and the hotel owners do not consider design to the same extent when constructing a hotel, presumably due to a lack of knowledge regarding the value of design.

However to develop the tourism industry in Sri Lanka it is important to pay more attention to hotel design. By developing design, occupancy and attractiveness may be enhanced.

Objectives

This study focuses on investigating the impact of interior and exterior design on demand for hotels in Sri Lanka. Although the developed countries are highly concerned about this psychological concept, Sri Lankan hotels do not cover the full range of design, a wide-ranging concept. Therefore it is important to improve the

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tourism industry through well-designed interiors and exteriors which may support guests' mental satisfaction, customer loyalty, and perceptions (Alsaqre, 2011). The main objective of this study was to investigate the impact of interior and exterior designs on the demand for hotels. The secondary objectives are to identify the relationships between interior and exterior designs and customer perceptions, and to examine the importance of design in increasing the demand for hotels.

Methodology

The study site was Hikkaduwa. The sample size was 30 hotels and 60 tourists selected using stratified random sampling method. This covered all categories of hotels such as five-star, four-star, three-star, two-star, one-star and guest houses.
Data was collected through interviews, questionnaires and field observations (British Dental Journal, 2008). Data were gathered through hotel managers and tourists who visited Sri Lanka during the last six months of the previous year. Data were presented using figures such as frequency, percentage, means, median, stranded deviation, maximum and minimum values. The analysis was conducted by factor analysis creating interior and exterior indexes, simple linear regression, and one-way ANOVA (Steinmetz & Sussman, 2013).

Major Findings

- The percentage of female tourists (55%) arriving in the Southern Province of Sri Lanka was higher than male tourists (45%).
- The highest percentage of tourists were came from the Germany, Sweden and China.
- Most tourists were between 15 to 35 years of age.
- 69% of tourists were single and 31% were married.
- The highest numbers of travellers were students following part time jobs followed by others, like engineers and doctors, doing white collar jobs.
- The incomes of the tourists were mostly less than US$ 1,000, followed by others earning between US$ 1,000 and 3000.
- The highest percentage of travellers in the sample were engaged in private sector jobs (39%) and businesses (30%).
- With respect to exterior design in hotels, most travellers were highly concerned about the entrance of the hotel, as it is the first impression of

their lodgings. In addition to that they were highly concerned with the gardens of their hotels as they spend more time outside the hotel.

- Considering interior designs, they were highly concerned about wall colour as this affects relaxation.
- Travellers did not consider the size of the pool, because they prefer to swim in the sea when in southern Sri Lanka.
- 67% of travellers admitted that they consider hotel design whereas 32.8% stated that they do not care much about design.

Results and Discussion

It can be concluded that the interior and exterior designs were highly impactful on hotel demand. Elements of interior design like the main entrance, wall colour, furniture layout, reception, room type and decor, lobby layout, paintings, lighting, and dining area impacted tourist arrivals. On the other hand exterior design elements such as garden, pool area, main entrance, landscaping and star type were also impacted tourist arrivals.

There is positive relationship between interior and exterior design elements of hotels and consumer perception. This was proved through the comments of the interviewed tourists. Most travellers gave high priority to hotel design as it contributes to the simplicity, neatness, cleanliness and ambience of their lodgings.

In addition to this, it can be concluded that if a hotel is to increase tourist demand or arrivals they should pay attention to the design of their main entrance, wall colours, room decor, landscaping, and lobby, because the tourists interviewed paid particular attention to these factors when they chose a hotel to stay in.

Policy Implications

Considering this study there can be various recommendations to improve or develop the designing of hotels in Sri Lanka. It is a must to develop the concept of design in Sri Lanka as at present we attract tourists from across the world by natural beauty alone. Therefore if Sri Lanka can develop accommodation facilities up to a considerable level it will automatically attract more tourists to the country.

From this study it can be recommended that green hotel designing is increased in Sri Lanka. Nowadays eco-tourism is being developed and the world is moving towards green hotels. Through this concept hotels will strive to be environmentally friendly, and this in turn will create higher desire or preference on the part of guests or travellers, without creating new environmental hazards as a result.

The study found that interior and exterior designs highly impacted demand for hotels and that there is a positive relationship between design and customer perception. Furthermore this study concluded that the hotel lobby design, wall colours, room decor, star type and the room type were extremely important to increase the demand for hotels. This means that in future facilities such as high-speed Wi-Fi, larger rooms, clean facilities, food and entertainment activities will be important, as would eco-tourism and better management systems.

The policy implication of this study is that tourism management, eco-tourism, and green hotel design should be prioritised. There should be effective, long term, and continuous policies regarding the tourism industry. The policy of hotel management can be implemented. This policy involves the better management of workers, managers, designs, facilities, and services provided by hotels. By implementing such a policy, hotels in Sri Lanka can improve their capacities and attract more tourists.

Key words: Interior and Exterior Designs, Customer Perception, Green Hotel Designing, Eco- Tourism, Lobby Designing

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Urban sector Development

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

T Lalithasiri Gunaruwan [1]

Introduction

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 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 Word Bank assistance in 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 century. Needless to say therefore 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 recently conducted research to appraise flood prevention economics for the Colombo Metro Area (CMA),[3] with a view to ascertain viable levels of investment, and to propose strategies for the consideration by the Government.

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[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] 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.

Materials and Methods

Flood control benefits correspond to avoided costs of flood damage. Such benefits in Colombo, a highly urbanised and commercialised setting, would stem largely from the prevention of damage to residential and commercial properties, urban infrastructure and economic livelihoods.

The research used the probabilistic distribution of flood damage cost estimates, initially prepared by the JICA study sources (Nippon-Koei, 2002) and updated for 2011 by the Metro Colombo Urban Development Project study team (World-Bank, 2012), as basic data required 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). 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

Table 1: 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

The probabilistic distribution of flood damage cost estimates, summarised in Table 1, was used to estimate 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. Table 2 summarises the comparative results obtained.

Table 2: 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

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 results.

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.[4] 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.[5] Market cost estimates were converted to economic values using the Aggregate Conversion Factor (ACF).[6] An economic rate of discounting of 10% was employed.[7]

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 1.

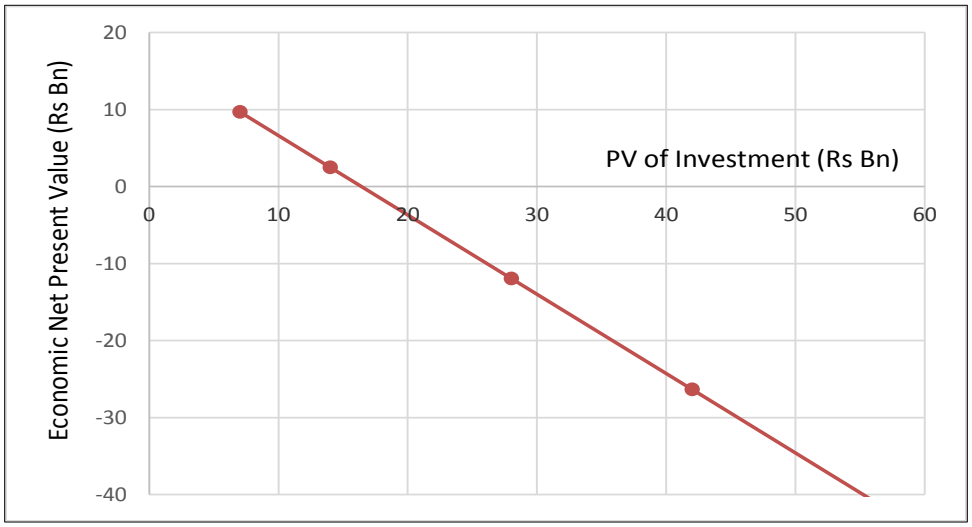
[4] The projection made by the World Bank study team corresponds to a 3.75% annual real growth of average flood damage costs.

[5] 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.

[6] ACF = (X+M) in Border Prices / (X+M) after adjusting for taxes and subsidies. ACF for Sri Lanka was thus estimated to be 0.95.

[7] 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%.

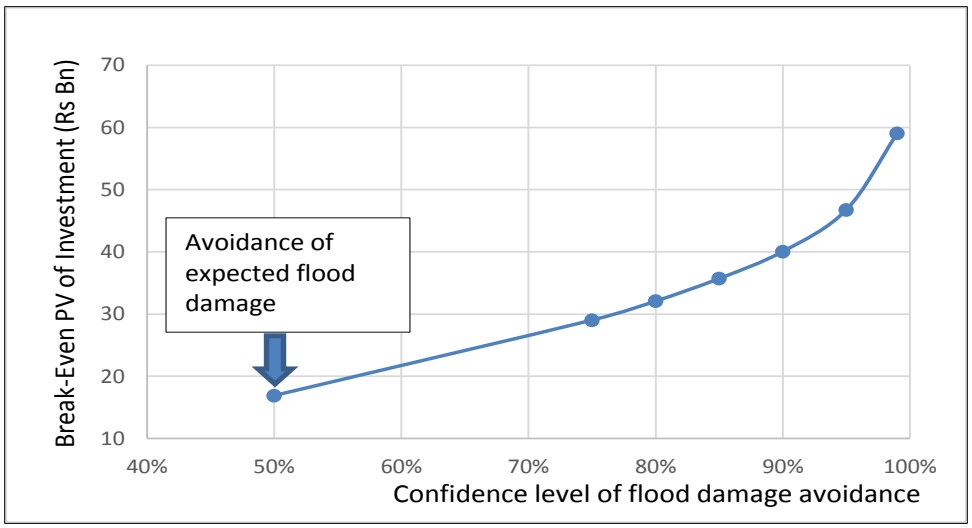
Figure 1: Variability of Economic NPV as a function of Discounted Investment for the Expected Flood Damage Scenario



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 2.

Figure 2: Investment requirements for varying levels of confidence in 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 2 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. 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. 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, and 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, and also disappointing. 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.

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

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

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Probing the Recent Decade of Violent Conflict Globally and in Muslim Countries

Haseeb Bhatti[1], Steven Lim[2] and Dan Marsh[3]

Introduction

Theories abound on the determinants of global civil violence. However, two lines of reasoning receive more attention than others: one concentrating on conflicts of ideas, culture, and religious beliefs, which tend to cause violence within national boundaries, and the other considering deprivation and grievances resulting from income differences and poverty, as well as the denial of political rights as root causes of rebellion and violence (Gurr 1970; Sen, 2008). The multiple consequences of violence include the destruction of infrastructure, losses to human and other capitals, and to social and political institutions, as well as injuries. (Blattman & Miguel, 2009; Collier 2006, 2007**).**

In our view contemporary reasons for public policy failures or interventions which may cause or prevent civil conflicts should be explored. This aim is fulfilled in our study. Western countries regard recent decades of rising global insecurity resulting from 'Islamic terrorism' rooted in the Middle East and South Asia, and these countries have waged joint efforts to curb its origins in recent decades. Cross-border terrorism, considered to originate from Muslim countries, is usually an offshoot of violent internal conflicts. Thus the research focus was made specific to Muslim majority countries to understand links between them and the occurrence of conflict, and whether those links are substantially different from or similar to the reasons for conflict in countries in the larger global sample.

Definitions and Technique

For the investigation of the occurrence of conflicts, 160 countries with populations of at least one million as at the middle of the study period in 2005, are included (excluded were North Korea, Taiwan and Hong Kong due to the unavailability of data for key variables).

This analysis adopts the definition of conflict from Conflict Barometer (2008). This publication classifies each conflict as crisis, severe crisis and, in its most extreme

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form, as civil war, represented by intensity levels of 3, 4 and 5 respectively. The classification of the Heidelberg Institute for International Conflict Research (HIIK) differs from quantitative classifications of conflicts, which considers war to arise when 1,000 or more battle-related deaths occur in a year.4 An absolute quantitative distinction of wars in practical terms is difficult to make (what if there are 999 deaths in a year or if there are different estimates which give different mortality figures?). Most importantly, it is difficult to count the exact number of victims during a conflict, particularly in developing countries with limited or sometimes concealed information. HIIK's qualitative classification identifies a crisis when at least one party uses violence: a severe crisis occurs when violence is used repeatedly in an organised way. Civil war is thus an aggravated form of severe armed conflict in which violent force is used continuously, and in an organised and systematic way.

Econometric Approach

A binary Probit model is used where Y represents the presence/absence of conflict and the vector of regressors X from the data is assumed to influence the occurrence of conflict. A general specification of the model is:

$$\Pr(Y = 1 \mid X) = \Phi(X'\beta),$$

where Pr denotes probability and Φ is the cumulative distribution function (CDF) of the standard normal distribution. A country is coded 1 if conflict is reported during the study period, and is otherwise coded 0. Four groups of countries are analysed. One consists of 87 countries where conflicts of levels 3, 4 and 5 are reported by HIIK and are coded as 1 in the model. The second group comprises 45 countries (out of 87 countries in total) where severe violent crises or civil wars (level 4 and 5) occurred during the ten-year study period, and are coded as 1. A similar classification occurs among the two Muslim subsets. Tables 1 to 4 report empirical results with marginal effects.

Results and Discussion

Countries with All Levels of Conflict

The findings in Table 1 (Appendix 1), for models 1 to 7, the effects of per capita income, the index for developmental process (HDI), and democratic rights on conflict risk are highly significant. Infant mortality significantly associates with conflicts when the two manifestations for quality of life (health and education) are

[4] This concept remains vague: as Sambanis (2004) notes, does it mean battle deaths or also civilian deaths?

grouped with democracy. The quality of public institutions in terms of the corruption index matters for the outbreak of conflicts in the last model along with political terror.

The results do not suggest strong linkages of conflicts with unemployment. However, this study observes that though the data set used is from credible international data sources, it is mostly collected and reported by individual countries, and may have measurement errors. For example, for Burundi, Benin, and Chad, adult unemployment rates are reported at just one percent by the International Labour Organisation (ILO), sourced from household surveys performed by the respective domestic institutions. This is close to full employment, which is doubtful for conflict-ridden developing countries.

Countries with Severe Conflicts and Wars

Models 1 to 3 in Table 2 (Appendix 2), have similar significant results to those presented in Table 1. The index for quality of life (HDI) has a very high probability value of 0.62 for decreasing the conflict risk. Models 4, 5 and 6 are in contrast to the earlier analysis; democratic rights are the only significant factor which links with the high intensity conflict risk. Model 6 has similar findings as political rights are significant, but column 7 gives an unexpected result. Along with political terror, which is highly significant, increases in adult literacy rate decrease the probability of severe conflict at statistically significant levels. However, the probability value (-0.002) is quite low compared to other significant values.

Results from the Muslim Subset: All Levels of Conflicts

Models 1, 2 and 3 in Table 3 (Appendix 3), have similar significant results as in the global analysis (consisting of non-Muslim and Muslim sets), but have different likelihoods for outbreak of conflicts, the highest being for HDI in model 3 alongside lack of democratic freedoms. The strong effects of human development achievements are validated by the data, which includes African Muslim countries such as Chad, Burkina Faso, Somalia, Niger, and countries in South Asia like Pakistan, Bangladesh, and Afghanistan,[5] which have low HDI performance. However, some exceptions in this subset are the United Arab Emirates, Qatar, Saudi Arabia, and Jordan with reasonable human development records. These mostly

[5] HDI is not available for Afghanistan for the study period but other relevant indicators for development are quite low.

Middle Eastern examples are under monarchical or authoritarian rule, thus supporting the connection of low freedom with the occurrence of conflicts.
In model 7, adult literacy has a statistically significant effect on the probability of occurrence of conflict. Prevailing and past Muslim attitudes of negating non-religious education (sometimes a cost-based decision), contribute to the low literacy, which results in underemployment or unemployment.

Muslim Sub-set with Severe Crisis and Wars

Models 1 to 4 in Table 4 (Appendix 4), provide similar findings as in the previous analysis. Lack of democracy remains statistically significant in all the models, when used as a predictor. Typically, as Stepan and Robertson (2003) conclude, while the lack of democracy is an observed phenomenon in Arab Muslim countries, not all Muslim countries lack democracy. Electoral freedom and political rights are present in non-Arab Muslim countries like Turkey, Malaysia, and Indonesia, in West-African Senegal, and in low-income Bangladesh and Pakistan.
Model 7 finds that a lower corruption index (indicating more corruption) in public institutions and the use of public office for private gain, significantly increases the likelihood of civil wars in Muslim countries. Of 17 countries having severe crises or wars, 14 Muslim countries have a CPI lower than 3.

Conclusions

We probed violent conflicts and their connections with a range of income and developmental parameters. This study explores these connections purely in terms of public policy mistakes. The results and discussion provide more opportunity to identify possible interventions, and to decrease the chances of conflict.
This study observed the handicaps associated with accurate data availability for some variables like unemployment data, for a cross-country analysis. Further, this paper establishes that it matters how we classify conflicts. It gives varying strength to the explanatory variables. Health infrastructure matters more than educational opportunities in countries with low to high intensity crisis, while minimum educational attainment negatively links with conflicts in countries with wars.
The developmental index has significant value in decreasing the chances of conflict in Muslim majority countries. Moreover, corruption in model 7 (Table 4), contrary to the global sets, solely explains the occurrence of conflicts. The Muslim world has many dictatorships and kingdoms, some of which have been sustained for decades. For the continuity of authoritarian rule they rely on some welfare initiatives which they provide with wealth obtained from natural resources. Nevertheless, there is another side: not every country under dictatorial rule is rich in resources. Further,

well-functioning democracies perform better in development indicators than countries under benevolent dictatorships. The fundamental roots of violent conflict may lie here. In the vicious circle of poverty and deprivation, when voices remain unheard for long periods, hardly any choice is left for the deprived other than violence.

Keywords: Civil war, Muslim countries and Terrorism, Economic development and conflict, Democracy and conflict

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Importance of Water Management in Overcoming Developmental Challenges Faced by Sri Lanka

Kasundi Mallawaarachchi[1]

Introduction

Water is a finite natural resource and the fundamental pillar upon which human civilisations were built. Sri Lanka has a history of engineering irrigation marvels that spans millennia, whereby the smooth functioning of local agricultural system over generations was ensured while preserving the harmonious co-existence of humans with the nature. The ancient reservoirs remained in existence not only through physical structures, but also through specific socio-economic structures that operated under a Buddhist cultural background. However, a century of British reign created a significant amount of chaos in the ancient society which ultimately led to the dilapidation of irrigation facilities and rural agricultural systems. Specifically, the abolition of the traditional *Rajakari* System, and the introduction of plantation agriculture lead to a general negligence of the maintenance of the infamous cascading tanks system, was first constructed by the ancient kings of Sri Lanka. The subsequent reduction of agricultural production attracted the attention of the colonial governors and consequently the Department of Irrigation, which continues its operations to date, was founded with the aim of increasing domestic food production.

Half a century after the independence, even with the assistance of several other Government agencies, the proper management of the natural abundance of water resources available in the country, remains a strenuous task. The current water management crisis is complicated by the lack of appreciation of water resources. Additionally, there is an absence of a comprehensive aggregate water policy which collectively governs the bulk allocation of water for a wide variety of uses such as irrigation, domestic water supply, industrial water supply, hydro-electricity generation, fisheries management, wetland systems, and wildlife conservation.

Furthermore, there is a difficulty in equitably distributing water resources among different user groups in the community, caused by the deficiency of well-defined guidelines on water priorities. The inadequacy of water laws has benefitted powerful user groups while depriving weaker sectors of society of their basic water rights. Heterogeneous land use in most parts of the island has posed a significant disturbance to water management. The administrative boundaries inherited from the colonial days, which do not conform to the river basins and the associated natural

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resource boundaries, has spawned critical administrative errors by Government authorities. Additionally, ethnic issues have also come into play in matters of water sharing, due to the miscellany of ethnicities in different areas of the country, elaborating the need for neutral water-sharing principles. The corruption of politicians and Government officials, prevalent in a majority of developing countries of the world, concerns the Sri Lankan public as well. The self-interested behaviour and incompetency of political and bureaucratic administrators has led to a wastage of Government funds and impoverishment of the general public through lags in the economic growth in the country.

The environmental pollution due to human activities and the resultant climate change has adversely affected the rural agricultural systems. The inhabitants of the dry zone of Sri Lanka have been victims of annual droughts over a decade. The negligence of local authorities in the maintenance of ancient tanks has deteriorated irrigation facilities along with the quality of life of residents of the dry zone whose preferred livelihood over generations has been the cultivation of agricultural crops. The encroachment of humans into wildlife areas and mismanagement of brackish water in farming systems have generated significant imbalances in the surrounding eco-systems. The salinisation of water sources has created a crisis in drinking water supply in the Northern areas of the country. Increasing deforestation has had a negative impact on the natural water cycle posing a threat to the existence of natural water resources and causing infertility of land. Uninhibited ground water extractions in search of freshwater have expanded the risk of sea water intrusions into freshwater sources.

Addressing all the aforementioned issues can begin with the establishment of well-defined guidelines and well analysed public policy prescriptions in water management. The development of an aggregate water policy is of utmost importance. Thereafter the loophole in law enforcement has to be mended through imposition of all-encompassing water laws to ensure fair and equitable distribution of water resources among all sectors of the community. If the alteration of administrative boundaries remains a challenge owing to ingrained social norms of the public, the feasibility of superimposing natural resource boundaries and allotting natural resource management areas has to be explored. Adopting more scientific and neutral principles in sharing of natural water resources will reinforce reconciliation efforts among different ethnicities as well. The young minds of the country have to be fostered with education on the importance of proper management of water resources. The responsibilities of Government authorities have to be well defined and the efficiency and transparency of their actions has to be observed by independent bodies to prevent fraudulent activity. The externalities have to be addressed with creation of information through conduct of research on various areas of natural resource management. The policy implications of the

aforementioned studies can be sent to administrators to improve the productivity and effectiveness of their decisions.

The issues arising from the dramatic climate change have to be addressed by creating scientific information of water availability. Rainfall variability, intensity, evaporation and spatial distribution data have to be recorded while river activities are closely observed. The tank system has to be properly renovated and maintained to ensure the full functionality of irrigation facilities. Methods have to be developed to measure the quantities of water received and retained, and the water available can be managed under the constraints of superimposed natural resource boundaries. Adoption of novel farming techniques to replace conventional techniques may sustain dry zone agriculture even under harsh climates. Farmers may benefit from diversification of crops as opposed to specialising. The ancient irrigation expertise of Sri Lanka has to be combined with the modern technological advancements to invent authentic solutions to the current complications that threaten to upset the balance between humans and nature. Self-interest must be replaced by the common interest and compatible policies must be developed. The politicians should be guided by policymakers on appropriate actions for the economic development and wellbeing of the public.

As a developing country, Sri Lanka can benefit from learning from the advanced water management techniques used by developed countries. Although the solutions may have to be translated to fit the local context, the underlying planning principles can be applied. Studies must be conducted to ascertain the feasibility of such principles to be utilised in local scenarios. No water policy is eternally sustainable, since environmental and demographic change is universal. Thus, every policy needs to be reviewed for continuous improvement. A well-developed policy incorporates diverse perspectives of persons from different walks of life. The aim is to ensure the progress of civilisation while maintaining a balance between humans and nature.

Keywords : Water , Management , Natural, Resources, Development

Reference

3rd International Conference on Social Sciences Global challenges in development: Social Sciences Perspectives: Session No.07: Water Management

Author Index

A. Aruna Shantha 195, 243
A. M. I. Gunarathna 213
A. M. N. J. Abeykoon 17, 141
Aminda Methsila Perera 59
Apeksha Embuldeniya 131
ARND Ramanayaka 177
AthulaRanasinghe 99, 153
B. W. R. Damayanthi 107
Charitha Vidanapathirana 159
ChinthakaJayasundara 99
D.I.J. Samaranayake 27
Dan Marsh 255
Fahmida Abbassi 7
G. A. T. Nimeshika 113
G. M. Henegedara 17
H A B W. Hettiarachchi 137
H. A. T. Hettiarachchi 113
H. S. G. Fernando 201
Haseeb Bhatti 255
Hemali Kanthilanka 11
I. D. C. Wijerathna 231
I.W. Rathnayaka 183
JeevikaWeerahewa 11
K. G. G. Weerasinghe 159
K.M.U.B Konarasinghe 39
K.W.K. Gimhani 165
Kasundi Mallawaarachchi 261
M. H. Saumya Dilrukshi 225
M.H.S.Dilrukshi 183
Mahinda Pushpakumara 153

Mansoor Ahmed. Koondhar	7
Muhammad Ismail Kumbhar	3
Mumtaz Joyo	3
N. Balamurali	35
N. Baskaran	117
N. M. A. Jayasinghe	159
N. V. Sandaroo	107
Naeem Ahmed Qureshi	3
Nanik Ram	3
Osantha Nayanapriya Thalpawila	125
P.A.L Ohani	177
P.K.G.C Pitigala	237
Padmasiri Siddhisena	153
Priyanga Dunusinghe	35
R. A. Rathnasiri	189
S D I Dulanji	137
S. J Francis	165
S. N. Karunathliake	195
S.S.Uthayakumar	45, 79
Sasini T.K. Kulatunga	55
Seetha P. B. Ranathunga	147
Shalini Mohandiramge	93
Steven Lim	255
Sujith P. Jayasooriya	21
T Lalithasiri Gunaruwan	67, 93, 171, 225, 249
T.Selvamalai	45, 79
W. S. P. Fernando	213
W.G. S. Konarasinghe	73
W.G.D.S Wehigaldeniya	177
Wenkatha Achala	243
WM Semansinghe	177