# FACTORS ASSOCIATED WITH OVER EXPENDITURE AMONG LOW INCOME HOUSEHOLDS IN SRI LANKA

Ayodya Jayamali Kodithuwakku (179073K)

Degree of Master of Science

Department of Mathematics

University of Moratuwa Sri Lanka

March 2023

## FACTORS ASSOCIATED WITH OVER EXPENDITURE AMONG LOW INCOME HOUSEHOLDS IN SRI LANKA

Ayodya Jayamali kodithuwakku

### (179073K)

Thesis/Dissertation submitted in partial fulfillment of the requirements for the degree Master of Science

Department of Mathematics

University of Moratuwa

Sri Lanka

March 2023

#### **Declaration of the Candidate and Supervisor**

"I declare that this is my own work and this thesis/dissertation2 does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text."

Also, I hereby grant to University of Moratuwa the non-exclusive right to reproduce and distribute my thesis/dissertation, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works (such as articles or books).

Signature:

Date:

The above candidate has carried out research for the Masters/MPhil/PhD thesis/ Dissertation under my supervision.

Name of the supervisor: :

Date:

Signature of the supervisor:

#### ABSTRACT

Over expenditure can cause various problems in household. If monthly income is lower than monthly expenditure it can be referred to as a situation of "over expenditure". This means that the amount of money spent in a given month exceeds the amount of money earned during that same period. It can worst the living condition in a low income household. It can be identified huge problems in the society due to low income in the households. Among the problems caused by insufficient income are health problems caused by insufficient nutrition and depression due to the inability to provide adequate facilities for the dependents, economic security lost due to the increase in expenditure over income, negative impact of family well-being with mental stress and emerging family problems, negative impact on children's education, mental and physical health and the future etc. are critical social problems.so it is important to find out the reason for over expenditure among low income families. Therefore the current study was done in order to find the factors associated with over expenditure among low income families. This study was done by using secondary data obtained from the Income and Expenditure Survey\_ 2019, conducted by Department of Census and Statistics. There are seven factors identified as significantly associated with over expenditure among low income households. Those are Sector of residence, Number of members in household ,Employment status of the household head, Educational level of the household head, Age group of the household head, Suffer from chronic illness by household head, monthly food expenditure greater than the half of income. Among low income households in Sri Lanka those who are in urban sector, working as a contributing family worker, headed by person who are in 31-40 year of young age level and suffer from chronic illnesses, have the maximum possibility of being low income over expenditure per month. Also the family who spent money for their monthly expenditure than their half of monthly income has high possibility being low income over expenditure. When increasing the number of family members possibility of being over expenditure also increasing.

Keywords: Economic security, Family well-being, Family stability, Food security

#### ACKNOWLEDGEMENTS

I would like to express my profound gratitude to my supervisor, Dr. Dilshani Thissera, Senior Lecturer in Statistics, University of Colombo, for her invaluable guidance, unwavering encouragement, and exceptional assistance throughout the course of this study. Her expert direction and insightful feedback have been instrumental in making this research a success.

I wish to extend my heartfelt thanks to Mrs. Ravindi Jayasundara, Coordinator of the MSc in Business Statistics program and Senior Lecturer in the Department of Mathematics, Faculty of Engineering, University of Moratuwa. I am deeply grateful to her for providing me with the opportunity to conduct this study and for her constant support and encouragement, which were instrumental in enabling me to successfully complete this research.

I am sincerely indebted to Mr. P.M.P. Anurakumara, Director General of the Department of Census and Statistics (DCS), for granting me permission to access the raw data from the Household Income and Expenditure Survey conducted by the DCS in 2019.

I am sincerely grateful to Dr.J.S.N.P. Dharmawardhana, Senior statistician, Department of Census and Statistics, for his unwavering support throughout my research. His guidance and willingness to share his knowledge have greatly contributed to the success of my research project.

I would also like to express my heartfelt appreciation to my parents, family members, friends, and the staff of my department for their unwavering support and encouragement throughout my MSc degree program. Their belief in my abilities and their constant motivation have been essential in enabling me to overcome challenges and complete this academic journey.

### **Table of Contents**

Declaration of the Candidate and Supervisor	i
Abstract	ii
Acknowledgement	iii
Table of Content	iv
List of Figures	vi
List of Tables	vii

Chapte	er 1		1		
Introd	uction.		1		
1.1	Backg	ground	1		
1.2	Significance of the Study				
1.3	Objec	Objective of the Study			
1.4	Data3				
1.5	Exped	Expected Methodology4			
Chapte	er 2		5		
Literat	ture Re	view	5		
Chapt	er 3		12		
Metho	dology		12		
3.1	Data	Collection	12		
3.2	Low i	income families	14		
	3.2.1:	Income deciles	14		
	3.2.2:	Expenditure deciles	15		
		Monthly mean household expenditure and income by whold income decile-2019			
	3.2.4:	The way of selecting low income family group in this study	16		
3.3	Analy	tical Procedure	17		
3.3	3.1 I	Descriptive Analysis	17		
3.3	3.2 A	Advanced Statistical Analysis - Model Fitting	18		
	3.3.2.1	Generalized Linear Model (GLM)	18		
	3.3.2.2	Fitting Logistic Model To Binary Data	19		
	3.3.2.3	Parameter Estimation	19		

3	3.3.2.4	Solving Likelihood Equations	20
3	3.3.2.5	Odds Ratios For Logistic Model	21
3	3.3.2.6	Goodness Of Fit Of The Logistic Regression Model	23
Chapter	: 4		25
Analysis	s And Int	terpritation	25
4.1	Descript	ive Analysis	25
4.2	Descript	ive Analysis of Income And Expenditure	34
4.3	Statistica	al Model Fitting	48
4.3.	1 Asu	mption Checking	49
4.3.	2 Log	istic Regression Model	50
Chapter	r 5		58
Discussi	ion, Conc	clusion And Recomendation	58
5.1	Discussi	on	58
5.2	Conclusi	ion	60
5.3	Recomm	nendations	61
Referen	ces		65

## List of Figures

Figure 3.2.1: National household income decile-201914
Figure 3.2.2:National household expenditure decile-201915
Figure 3.2.3:Monthly mean household expenditure and income by national household income decile 201916
Figure 3.2.4: Low income family group17
Figure 4.1.1: Descriptive analysis of sector
Figure 4.1.4: Descriptive analysis of food expenditure
Figure 4.1.5: Descriptive analysis of employment status of household head
Figure 4.1.6: Descriptive analysis of marital status of household head
Figure 4.1.7: Descriptive analysis of gender of household head
Figure 4.1.8: Descriptive analysis of religion of household head
Figure 4.1.9: Descriptive analysis of ethnicity of household head
Figure 4.1.12: Descriptive analysis of suffering chronic illness
Figure 4.2.1: Distribution of income expenditure group
Figure 4.2.3: Boxplot of average monthly income, expenditure and over expenditure
Figure 4.2.4: Descriptive statistics of average monthly income and expenditure by sector
Figure 4.2.5: Descriptive statistics of average monthly income and expenditure by gender
Figure 4.2.6: Descriptive statistics of average monthly income and expenditure by number of family members
Figure 4.2.7: Descriptive statistics of average monthly income and expenditure by age of the household head
Figure 4.2.8: Descriptive statistics of average monthly income and expenditure by education level of household head
Figure 4.2.9: Descriptive statistics of average monthly income and expenditure by employment status of household head
Figure 4.2.10: Descriptive statistics of average monthly income and expenditure by ethnic group

## List of Tables

Table 3.1:Sample allocations among districts 13
Table 4.1.1: Descriptive analysis of sector
Table 4.1.2: Descriptive analysis of age group of household head
Table.4.1.3: Descriptive analysis of education level of household head
Table 4.1.4: Descriptive analysis of food expenditure 27
Table 4.1.5: Descriptive analysis of employment status of household head
Table 4.1.6: Descriptive analysis of marital status of household head      29
Table 4.1.8: Descriptive analysis of religion of household head
Table 4.1.9: Descriptive analysis of ethnicity of household head
Table 4.1.10: Descriptive analysis of household sizes
Table 4.1.11: Descriptive analysis of number of sick persons
Table 4.2.1: Distribution of income expenditure group 34
Table 42.2: Descriptive statistics of average monthly income and expenditure35
Table 42.3: Descriptive statistics of average monthly income, expenditure and over      expenditure
Table 4.2.4: Descriptive statistics of average monthly income and expenditure by      sector
Table 4.2.5: Descriptive statistics of average monthly income and expenditure by gender
Table 4.2.6: Descriptive statistics of average monthly income and expenditure by      number of family members
Table 4.2.7: Descriptive statistics of average monthly income and expenditure by ageof the household head
Table 4.2.8: Descriptive statistics of average monthly income and expenditure byeducation level of household head
Table 4.2.9: Descriptive statistics of average monthly income and expenditure byemployment status of household head
Table 4.2.10: Descriptive statistics of average monthly income and expenditure by      ethnic group
Table 4.2.11: Descriptive statistics of average monthly income and expenditure by chronic illness

Table 4.3.1.1: Correlation among independent variables	49
Table 4.3.1.2: Pearson chi-square correlation among nominal variables	50
Table 4.3.2.1: Codes applied for levels of each independent variables	51
Table 4.3.2.2: Omnibus tests of model coefficients	52
Table 4.3.2.3: Model Summary	52
Table 4.3.2.4: Hosmer and lemeshow test	52
Table 4.3.2.5: Contingency table for hosmer and lemeshow test	53
Table 4.3.2.6: Classification table	53
Table 4.3.2.7: Variables in the equation	54
Table 4.3.2.8: Coefficient of the level of each variable, and odds ratio	56
Table 5.1: Statistics of household heads whose are not involving in economic a	ctivity
	63