

**FACTOR INFLUENCING FEMALE LABOUR FORCE  
PARTICIPATION IN SRI LANKA.**

**A STUDY ON 2019 LABOUR FORCE DATA.**

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## **DECLARATION OF THE CANDIDATE**

Hereby I state and declare that this MSc project report is a product of my own and without the participation of any other person or authority. The references made in here have been acknowledged appropriately and with appreciation. The sources of data and external information to the dissertation and the research have been acknowledged appropriately. Any form of substance in this research has never been submitted for any other degree, anywhere else. I hereby give my consent for making this available by photocopy for inter-library uses and for the title and summary of the dissertation to be made available for use of other institutes of learning.

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## **Abstract**

This study attempts to identify factor influence on Female Labour Force participation in Sri Lanka using Chi- Square test to identify important variables for the model and then binary logistic regression analysis to identify and to quantify the determinants of labour force participation. The study draws data from Sri Lanka Labour Force Survey 2019 conducted by the Department of Census and Statistics. The analysis investigates the data in order to find out the overall behavior of the labour force statistics and seeks the relationship between FLFP and explanatory variables. Eleven independent categorical variables are considered. Chi – square analysis for each variables divulge that all the variables considered have a significant impact on female labour force participation. The significant factors are age group, marital status, ethnicity, religion, relationship to head of the household, sector, level of education, province, literacy in English, currently attending to an educational institute, and number of dependents in the household. The results obtained in this study can be effective used for policy planning and economic planners can also identify growth sectors and analyze the job descriptions to pinpoint those areas which require appropriate female skills.

**Key words:** Female labour force participation, Unemployment, Economically active Population

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## LIST OF ABBREVIATION

| Abbreviation | Description                                            |
|--------------|--------------------------------------------------------|
| DCS          | Department of Census and Statistics                    |
| FLFP         | Female Labour Force Participation                      |
| LFP          | Labour Force Participation                             |
| OECD         | Organisation for Economic Co-operation and Development |
| SNA          | System of National Accounts                            |
| ILO          | International Labour Organization                      |
| LFS          | Labour Force Survey                                    |
| PSU          | Primary Sampling Unit                                  |
| SSU          | Secondary Sampling Unit                                |
| PPS          | Probability Proportionate to Size                      |
| SPSS         | Statistical Package for Social Scientists              |
| MLE          | Maximum Likelihood Method                              |
| LL           | Log Likelihood                                         |
| UN           | United Nation                                          |
| LR           | Logistic Regression                                    |
| CI           | Confidence Interval                                    |
| S.E          | Standard Error                                         |

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Background of the study**

The participation of women in the labour force is a major measure of society's contribution to economic development. In Sri Lanka, the male advantage in the labor market is generally greater than that of women. (ILO,2013). During the twentieth century, various discussions and seminars were held to deliberate women's matters and women's progress to enhance female labor participation, the most prominent feature of the global labor market. (Bombuwela and Chamaru,2013). Among the most important aims of SDG is fully integrating women in the economic system. (Charles, 2009) In this regard, this goal is achieved through the 5th goal, which is gender equality and empowerment for females. But gender equality flows primarily across the other sixteen goals,(ILOSTAT). Yet, women are still under represented in the wage sector in both developed and developing countries.(WBDI,2012).

The factors that determine the presence of a woman in the workforce vary depending on the country's economic development goals and other factors, such as education, marital status, age, number of children and husband's income. The ratio of FLFP to other economic development variables can vary widely from country to country. As a country develops economically, it is possible to create a prosperity and sophisticated standard of living for children and women in the country. (OECD,2014). It is expected to identify the factors influencing the labour force participation rate of women in Sri Lanka and whether it will be relatively different to compared to other countries. As a result of industrialization many of the home based activities were transformed into factory based activities. Men were more likely to work in factories and offices, so women had to stay at home and to engage in household activities such as cooking and cleaning and taking care of children ...etc. These

household activities cannot be considered as economic activities since most of them fall outside the economic boundary defined in the System of National Accounts (SNA). Predominantly Sri Lanka has been an agricultural country in the South Asian region mainly with a patriarchal society where father is considered as the main income earner and the decision maker while mother plays a main role as a housewife (DCS,2007).

Various social factors such as religion, race, and culture have a significant impact on the employment rate of women. This is also evidenced by the fact that educated women are more likely to be unemployed than their male counterparts (Nanayakkara,2004). Nature of the job also affects the female participation, many of the studies have shown that more females engage in low skill activities such as agricultural supporting activities, garments manufacturing, and clerical work. It is important to understand the reasons behind the prevailing low FLFP rates (Nisha, 2012; Myat Mon, 2000).

## **1.2 Labour Force in Sri Lanka**

According to the Census and Statistics Department in Sri Lanka, which publishes official statistics, the overall labor force participation rate is about 52.3%, the same level as it was two decades ago. LFP rate is the percentage of the economically active population that is in the labor force of the total 15 and above population (DCS,2019). The working age prior to before was 10 years but after 2012 it has been increased to age of 15. However, the LFP rate prior to 1950 was 37% (Karunatilaka,2006). There are two main groups of people in Sri Lanka that can be divided into: the economically active and the economically inactive. The former are referred to as the labour force and the latter are known as the unemployed. Basic statistics of labour force in Sri Lanka is shown in Table 1.1

Table 1.1: Population and Labour Force-2019.

|           | Population<br>(15years &<br>over) | Labour<br>Force | participation<br>Rate of LF | Employed<br>population | Rate of the<br>Employment |
|-----------|-----------------------------------|-----------------|-----------------------------|------------------------|---------------------------|
| Sri Lanka | 16,424,016                        | 8,592,010       | 52.3                        | 8,180,693              | 95.2                      |
| Male      | 7,610,113                         | 5,554,192       | 73.0                        | 5,368,896              | 96.7                      |
| Female    | 8,813,903                         | 3,037,818       | 34.5                        | 2,811,796              | 92.6                      |

Source: Census and Statistics Department (2019)

Figures in Table 1.1 shows that the total household population (age 15 and above) is about 16 million and the total labour force of the country is estimated to be around 8 million. From that labour force, 3.03 million are female which equates to 34 percent of the total labour force. The female labour force participation (34%) is much lower than male labour force participation (73%). This indicates that more females in working age engage in non-economic activities than males. Economically active population can be divided into two categories employed and unemployed. The employment to population ratio provides a good indicator of the country's economic capacity. It shows the percentage of people working in the country. (2011), if the above ratio is more than 70% then it is considered as a high percentage and if that is less than 35 % is considered as a low percentage. Many of the develop countries show higher percentages while it is in opposite trend for least develop countries. The developing countries also show higher percentages but many of the articles (Ali Fakihi 2013, GENPROM 2001, and Karunatilaka 2006) indicate that other related indicators also should take into consideration to get the real condition of those countries since the lower productivity of the employment may also affect or higher levels of employment to population ratio. This ratio for Sri Lanka is 72.8 % for males and 30.8 % for females in year 2019.

The figure 1.1 shows that the LFP rate has increased at a certain age group and then declined at the other age group. For instance, the highest age group is 30 - 39 years old and this is factual for both males and females.

The figure shows the distribution of the labor force participation rate among male and female age groups in Sri Lanka. Despite the gender gap in participation, the rate of women has remained stable at a certain age group.

In Sri Lanka, the majority of young people enter the labor force between 15 and 24 years old while the graduates are between the age of 25 and 30 years old. (Nanayakkara, 2004).

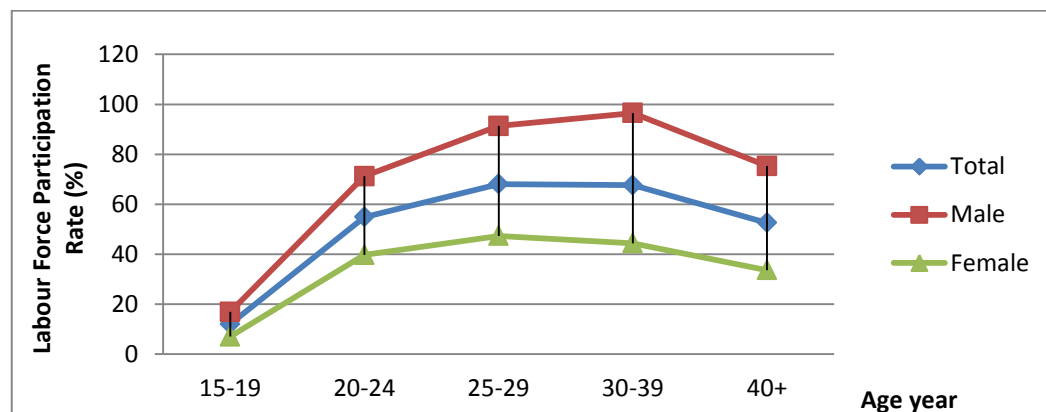


Figure 1.1: Labour Force Participation Rates by Gender and Age group - 2019

Source: Census and Statistics Department (2019)

### 1.3 Female Labour Force in Sri Lanka

Sri Lanka has been a developing country for many years in South Asian region and by now it is becoming a middle income level country. Also Sri Lanka is a country with a high Human Development Index in the Asia Pacific region. The high levels of literacy that is 93% in 2019, high school enrolments, and high life expectancies at birth...etc. Reveal that the country is leading to a better condition compared to other neighboring countries in the region. Yet the FLFP is very low compared to male and unemployment among young women is high. The employed females in managerial and equal positions still remain at very low percentages. In Sri Lanka, gender related statistics in education, health, economic opportunity and political participation are high compared to many other developing

countries. According to the World Economic Forum's Global Gender Report for 2020, Sri Lanka is ranked 102nd, ahead of industrialized, according to the World Economic Forum's Global Gender Report 2020, Sri Lanka ranks 102nd, followed by India (112) and Ahead of industrialized countries such as Japan (121). However, there are gender gaps and it is more visible to discriminate on the basis of gender participation rate and the type of job they are engaged in and this is a situation that must change. (ILO, 2001-2002)

The gender gap in the LFP has remained in current level and the percentage increase of FLFP is only 1% for last two decades. It is very clear from the recent official statistics of the DCS (2019). Despite the large number of women in Sri Lanka, the FLFP rate is still lower than that of men. The rapid increase in women's participation in the LF during the mid-1980s was mainly due to the structural reforms in the country's labor market. Further job opportunities should be placed in the living areas of females for them to be able to stay close to their families. (Nanayakkara, 2004). Sri Lanka has virtually eliminated gender disparities at all levels of education as women students were 49% of students in primary grades, 51% of students in secondary grades and 53% of university students in 2004, reveals by the report on Gender Dimensions, of the Millennium Development Goals in Sri Lanka- policy perspectives. Therefore number of study papers argues that lower participation may be due the mismatching between education and the required qualifications for jobs especially in private sector (RamaniGunathilaka, 2008).The current education system of the country provides free education for both male and female children. Both school and higher education are freely available for children and there are enforced rules by the government so as every child to get access to education without any discrimination. As a result of the current education system of the country Sri Lanka is considered as an early achiever of the Millennium Development Goal 2, “Achieve universal primary education”. So it is vital to see the reasons for remaining lower labour force participation while the level education is increasing (Suwama,2007).

#### 1.4 Unemployment Rate in Sri Lanka

The unemployment rate is a useful indicator of the state of the economy. Booms are associated with low levels of unemployment and recessions are associated with high levels of unemployment (Mupunga G, 2013). Unemployment is major component of the LF. Unemployed people are defined as those who are currently unemployed but are actively seeking jobs or willing to accept a job, if given job opportunity within 14 days. The unemployment rate is the percentage of people who are unemployed. It is often used to evaluate the level of joblessness relative to the total labor force. In general, a low unemployment rate is a good economic indicator for a country. The high unemployment rate is root causes for many socioeconomic problems and political instability. Therefore every country strives to achieve relatively low and stable unemployment rate (Karunatilaka, 2006). Unemployment rate by gender and age group is shown Table in 1.2.

Table 1.2: Unemployment Rate (%) - 2019

| Age group | Unemployment Rate (%) |            |            |
|-----------|-----------------------|------------|------------|
|           | Total                 | Male       | Female     |
| Total     | <b>4.8</b>            | <b>3.3</b> | <b>7.4</b> |
| 15 to 24  | 21.5                  | 17.6       | 28.7       |
| 25 to 29  | 11                    | 6.6        | 18.5       |
| 30 to 39  | 3.1                   | 1.3        | 6.3        |
| 40 +      | 1.2                   | 0.9        | 1.7        |

Source: Department of Census and Statistics (2019)

Table 1.2 shows that female unemployment rate (7.4 %) is greater than that of male (3.3 %) regardless of age group. Additional, it is clear from this available statistics youth female (15-24) unemployment (28.7%) is much severe compared to those of other age groups and also compared to male youths in same age group (17.6 %). The following figure 1.2, show the trend of unemployment rate over 10 years (2010-2019). Although the unemployment rate decrease by nearly 1% in compared to 2010 it has shown a gradually increasing since 2013. Furthermore the gap between the males and the females are highest in 2015.

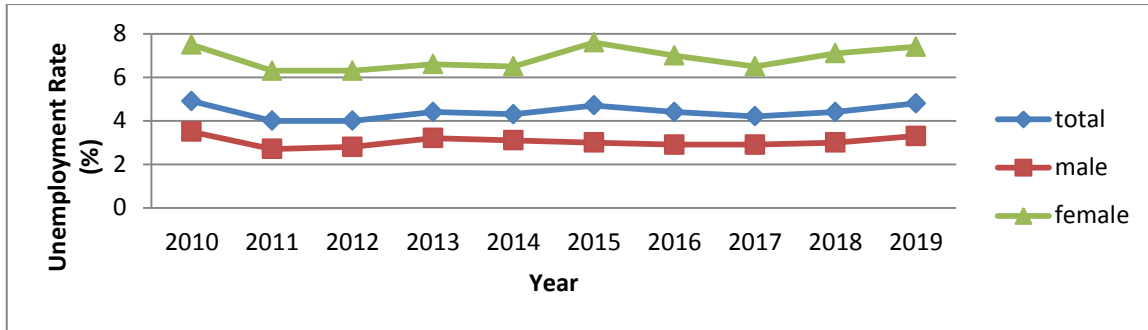


Figure 1.2: Unemployment Rates by Gender 2010-2019

Source: Department of Census and Statistics (2019)

### 1.5 Distribution of Employment Status by Gender

Final report on Sri Lanka Time use survey 2017 reveals the participation rate in employment and related activities for woman is 27.7% and 60.8% for men. Although the participation rate for unpaid domestic services for household and family members for woman is 86.4% and 54% for men. (These rate calculate for 10years and above ages)

Report on Gender Dimensions, of the Millennium Development Goals in Sri Lanka, 2007 explains that the majorities of female workers are in informal sector, outside the protection of labour legislation moving from one low income low skill occupation to another or are confined to unpaid family labour in agriculture. Further the report point outs that the quality of wage employment deteriorated as an outcome of demand for low cost female labour in international and domestic markets. The following figure1.2: shows the Distribution of employment status among gender in 2019.

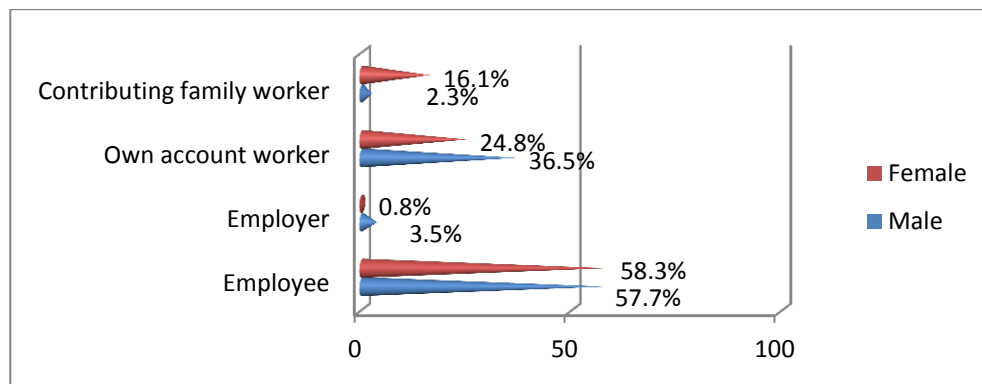


Figure 1.3: Distribution of Employment Status by and Gender -2019

Source: Department of Census and Statistics (2019)

Figure 1.3 indicates that about 16.1% of total unpaid family workers are females while only 0.8% of total employers are females.

## 1.6 Female Employee in Government and Privet Sector

According to the World Bank, employees are those who work for a private or public employer and are paid in wages, commission, tips, and piece rates. The public sector in Sri Lanka is at the forefront in terms of better wages, social benefits coverage and job security compared to the private sector. (ILO, 2013). The increase of both male and female labour force participation was due to improved education facilities and increased job opportunities of the country. With the introduction of open economic policies in the mid-1980s, labor force participation increased rapidly, mainly due to the structural reforms implemented by those open economic policies that created opportunities for women to enter the labor market in the private sector. (Nanayakkara, 2004). Distribution of employee population by Gender in public and private sector in Sri Lanka is shown in table 1.3.

Table 1.3: Distribution of Employee Population by Male, Female in Public and Private Sector-2019.

| Sector         | Total     | Gender    |      |           |      |
|----------------|-----------|-----------|------|-----------|------|
|                |           | Male      |      | Female    |      |
|                | Number    | Number    | %    | Number    | %    |
| Total Employee | 4,738,244 | 3,097,684 | 65.3 | 1,640,380 | 34.6 |
| Public         | 1,216,549 | 657,149   | 54.1 | 559,400   | 45.9 |
| Private        | 3,521,695 | 2,440,715 | 69.3 | 1,080,980 | 30.7 |

Source: Department of Census and Statistics (2019)

Table 1.3 shows that there are around 1.2 million public sector employees in the country. The gender gap in the public sector is also small.

## 1.7 Female Employment Occupation in Sri Lanka

Women play a crucial role in the Sri Lanka economy and many of most important sectors are dependent on women, such as tea, garments, and migrant workers (Nisha,2014).Majority of those employed in managerial and technical jobs in the garment industry are men, 80% of factory workers are female, concentrated at the bottom of employment structure without

much opportunity for promotions. Occupational segregation tends to confine women to ‘feminine’ areas of employment in the services sector and limited access to technical employment (Suwarna, 2007). According to the LFS - Annual Report 2019 Occupation of Sri Lankan employed persons as follows,

Table: 1.4 Employed Population by type of employment (Occupation)

| Occupation                           | Total | Gender |        | Women’s contribution to overall employment (%) |
|--------------------------------------|-------|--------|--------|------------------------------------------------|
|                                      |       | Male   | Female |                                                |
| Senior Officials & Managers          | 7.6   | 8.4    | 6      | 27.2                                           |
| Professionals                        | 7.4   | 4.3    | 13.5   | 62.4                                           |
| Technical & Associate Professionals  | 9.1   | 8.9    | 9.4    | 35.6                                           |
| Clerks                               | 3.8   | 2.8    | 5.7    | 51.9                                           |
| Sales & Service workers              | 8.7   | 9.2    | 7.6    | 30.2                                           |
| Skilled Agri. & Fishery Workers      | 16.8  | 17.6   | 15.4   | 31.4                                           |
| Craft & Related workers              | 16    | 16.6   | 14.8   | 31.7                                           |
| Plant/Machine operators & Assemblers | 8.7   | 11.5   | 3.4    | 13.3                                           |
| Elementary occupations               | 21.5  | 20.1   | 24.1   | 38.5                                           |
| Armed forces occupations             | 0.4   | 0.6    | 0.2    | 14.6                                           |

Source: Census and Statistics Department (2019)

The ratio of men to women in different occupational categories is shown in table 1.4. It shows that women are more concentrated in various professions. For women, 24.1% of the total workforce is employed in “Elementary occupation”. Also, the percentage of women in the professional occupation is 13.5% compared with 4.3 percent of male employees. This table shows the percentage of women in the overall employment status of a given professional group. It shows that among the professionals, the majority of them are women. According to the report this group mainly consists of doctors, nurses, teachers, and machine operators. It is believed that the physical ability of men makes them more likely to exhibit high rates than women. This level is applicable to the junior ranks as well, since they do not have the same physical ability as the senior ones. Women's rate on various occupational groups is higher than that of men. They also contribute more to the employment.

## **1.8 Significance of the Study**

Compared to the other countries in the South Asian region Sri Lanka has gained remarkable improvements in the areas of education and health infrastructure, but female labour force participation still remains lower compared to that of males. Therefore, it is very important to investigate the levels and trends of female labor force participation. Also, it is very important to find out the reasons for the remaining gender gaps in different sectors in the labour market.

In literature there exist some studies focusing on labour force participation in Sri Lankan perspectives but it was hard to find any recent micro level study on female labour force participation. The findings of this study will help in forming a stronger base for future studies and also help in improving the planning procedures in the country.

## **1.9 Objectives of the Study**

- ✚ On view of the above, the objective of to identify and examine the factors that influence FLFP in Sri Lanka.
- ✚ To model fit FLFP, using some explanatory variables.
- ✚ To compare the factors influence on FLFP and MLFP
- ✚ To compare female labour force participation between Western province and Northeast provinces.

## **1.10 Outline of the Report**

The report structures as follows, the first chapter includes the introduction of the study, the second chapter consists with the literature review on both national and international studies which were done on related issue. The third chapter provides the information on data and discusses research methodologies use in the study such as the definitions of labour force statistics, methods of variable selection for the chi-square test, binary logistic regression and the methods of checking model adequacy. The forth fifth and sixth chapters of the report will cover the analysis and interpretation, the final chapter consist of the conclusions recommendations

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter will discuss the various factors that affect the FLFP in Sri Lanka and other countries. Furthermore, this research discovered that demography and socio-economic factors have the greatest effect on female labour force participation.

#### **2.2 Literature Review in Sri Lanka**

There have been a few studies on this subject conducted in Sri Lanka by previous researchers. Anju Malhota (1997) conducted a study called "Entry versus Performance in the Labor Force: Young Women's Jobs in Sri Lanka" to analyze actions in developing societies through a household level examination of young single women in Sri Lanka. She found that higher education levels contribute to a higher labor force participation rate, but are more likely to be unemployed among highly educated females. The high level of education and the favorable role that women can play in households have prevented young female workers from participating in the labor force, the report stated.

As per Ramani Gunatilaka (2008), *The Existence, Probability, and Determinants of Wages of Informal Employment in Sri Lanka*: This research aims to analyze the role of informal employment in the economy and the factors that influence wages. It will also examine the factors that influence a person's likelihood of being employed in the informal economy. According to the results of the report, the majority of Sri Lankans are working in informal work arrangements. The job situation is uncertain, with just about 6% of employees getting a long-term contract. Males make up a greater proportion of those working in the informal economy than females. It is also clear that the rise of informal jobs has had a direct effect on the reduction of unemployment.

Bombuwela P. M., De Alwis A., and Chamaru, (2013) conducted a study that was entirely based on the impact of the Glass Ceiling on women's career growth. According to the study, a conceptual framework was created based on the results of a literature review. The research was carried out in order to achieve the following goal. The aim was to “determine the effect of +6+ Female Career Growth on women executives in private sector organizations.” Simultaneously, theories are being formulated to assess if human, family, organizational, and cultural factors have a major impact on women's career growth. Simply put, this research was completed with an observational study that was performed using a self-administered questionnaire and a sample of 150 female executives. Both descriptive and inferential statistics were used to present and interpret the results. The findings show a moderate negative relationship between the Glass Ceiling and Women's Career Growth, as well as that Human, Organizational, and Cultural Factors have a significant impact on Women's Career Development, while Family Factors have an impact on the Glass Ceiling. Following the findings of the report, it was decided that the Glass Ceiling has a major influence on the career growth of executive level female workers in the private sector in Sri Lanka.

### **2.3 Literature Review in Other Countries**

Even though there are few micro level studies on the variables of female labor force participation in Sri Lanka, there are numerous studies on this issue in other countries at various levels, so the literature on this subject is very comprehensive.

The goal of Betilde Rincon de Munoz's study, which took place between 1995 and 1998, was to fill a gap in research on women in Venezuela by looking into the determinants of their labor force participation. Individual, demographic, socioeconomic, and geographic characteristics of individuals living in Venezuela during that period were collected semiannually by the Venezuelan Central Office of Statistics and Information. To evaluate a variety of hypotheses, he used binomial and multinomial logit models. Person, social, socioeconomic, and regional characteristics are examined in the labor force participation decision using a complete sample of women aged 15 to 60, while also adjusting for a time

trend. The same judgment is tested for three subgroups of women: married women, single women, and female heads of households. These studies indicate substantial variations in motivating factors between the three groups. His findings indicate that education has a substantial effect on women's decisions to enter the labor market, and that age is one of the most relevant determinants of women's labor force participation. Moreover, married and divorced women are more likely than single women to compete in the labor market. Rana Ejaz Ali Khan & Tasnim Khan, *Economic and Social Study* 11(2) 2009, This paper presents the various factors that affect the participation of married women in the labor force in Pakistan. On the basis of 3911 observations, it was revealed that various factors such as household size, education level, and income level have a positive impact on married women's labor force participation. Aside from being a nuclear family, other factors such as household wealth, age, and education have also negatively affected the family's structure. It is believed that being poor is the most significant factor that affects married women's participation in the labor force. Other studies also suggest that education and household income are also important. They noticed that participating women's home-time allocation is substantially and negatively affected by their age, education, and the household's expected wages. Another consideration is the distance from the main market to the home. This can raise the cost of living and make it difficult to make home-based goods. The time it takes to work in the market decreases as the distance increases.

Mupunga G. (2013) conducted a study titled "Determinants of female labor force participation in Zimbabwe" to classify the determinants of FLFP in Zimbabwe from 1980 to 2012. The study also aims to see whether education and economic growth improve FLFP in Zimbabwe, and to build a log linear model for female labor force participation. The study revealed that real wages in non- agricultural sectors are determined by the gross domestic product per capita, male unemployment rate, and female education level are the primary factors that decide FLFP in Zimbabwe.

Myat Mon conducted a study called Determinants of Female Labour Force Participation in Burma. The logistic regression model is used to evaluate data collected in a socio-economic

survey conducted in Burma in 1998. The findings of the chi-square tests and theoretical models related to the labor force participation of women are analyzed to establish the possible factors for inclusion in the proposed logistic regression. His study revealed that the husband's earnings and marital status are key factors in determining if a woman joins the labor force and educational attainment did not affect the labor force participation rate of urban women in Burma.

Human capital investment is another significant aspect that has been discussed in the literature. Fatma G.L. and Feyza B. explained in their report, "Determinants of female labor force participation," that education is the key factor that increases women's chances of participating in the labor market. Other factors such as age and place of residence also play a critical role in women's labor supply in North Cyprus.

In their research in Chile, Dante Contreras (2008) discovered that level of education is a positive factor for female participation, whereas the number of children is a negative factor. Furthermore, the study discovered that certain cultural influences, such as conservatism, have a negative influence on educational attainment.

Patriarchal structures can also explain the characteristics of the labor supply and the incentives and disincentives that arise from the national jobs system, according to Olukemi I. Lawanson (2008). Patriarchy in the home, state, and culture is one of the factors influencing women labor supply negatively.

In a study conducted for Denmark, the author, Maire D. and Scheuer C. (2005) of the paper noted that the participation rate of women in the labor force was only an exogenous factor that could affect the labor market attachment of some groups. They also discovered that women with more conservative views toward gender roles are less likely to participate. Furthermore, the study discovered that education and traditional gender attitudes are negatively linked, suggesting that raising women's educational levels can have a positive effect in two ways: education is a positive factor for entering the labor market, and education can also help women overcome traditional attitudes.

Yakubu A Yakubu used the Human Capital Theory (HCT) to analyze trends in the South African labor force in his paper. The HCT notes that women's education is positively linked to their probability of engaging in the labor force. The study's data came from Statistics South Africa's Quarterly Labor Force Survey from 2008. When adjusting for other demographic and economic variables, logistic regression modeling was used to estimate the effect of schooling on labor force participation.

Ali Fakhri's article FLFP in the Manufacturing Sector in MENA: The Consequences of Firm-Related and National Factors (2013). In terms of women's labor market participation, the Middle East and North Africa (MENA) region lags behind most other geo-economic areas. The consequences of firm-related and national factors for Female Labour Force Participation Rates (FLFP) in manufacturing firms in the MENA region are discussed in this paper. The empirical research employs fractional logit models to carry out the estimations, which are based on data from the World Bank's Enterprise Surveys database.

## **2.4 Summary**

Although there are some studies focusing on labor force participation from a Sri Lankan perspective, no recent micro level studies on female labor force participation have been identified. The findings were useful in identifying solutions to some of the country's labor-related concerns and in performing the study's research. However, empirical data on female labor force participation will be given to the study.

## **CHAPTER 3**

### **MATERIAL AND METHODS**

#### **3.1 Data Source**

##### **3.1.1 Background of the data**

This study draws data from Sri Lanka LF Survey 2019 conducted by the Census and Statistics Department in Sri Lanka. The survey is an annual household survey and normally the annual sample size is 25,750 housing units and it conducts annually in twelve monthly rounds. This sample provides a general overview of the labour force characteristics at the national, provincial, and district levels. It also includes errors in the workforce attributes for the relevant reference period. LFS is a main source of information on the country's labour force and employment trends. It provides estimates on the level of labour force and unemployment in the country quarterly and annually. The survey has a rich data series since 1990. The survey collects information on demographic characteristics of the usual residents of the household, economically active and inactive conditions, employment and unemployment characteristics, underemployment and informal sector employment information.

##### **3.1.2 Sampling methodology of the LFS**

The LFS uses a two stage stratified sampling scheme and the sample frame is the list of all housing units of the country that had prepared during the Census of population and Housing in 2011. The Primary sampling unit (PSU) is a Census block prepared at the population Census which consists with a list of housing units and this has geographical boundaries, each Grama Niladari Division is divided into number of census blocks with 150 housing units around. The secondary sampling unit (SSU) is a housing unit. At the first stage of sample selection the census blocks are selected considering probability proportionate to size (PPS) method and 10 secondary sampling units are selected from each selected PSU using

systematic sampling method. In 2019, 2,575 primary sampling units were assigned among districts and sectors. The allocations were made according to the Neymann Allocation and the variance of unemployment rate. Since a probability known sampling method is used populations estimates and their variances can be calculated.

### **3.2 Concepts and Definitions**

The concepts and definitions used by the DCS to disseminate LF information will be used for this study. The recommended statistical definitions for labour statistics are as follows. The Figure 3.1 shows the flow of working age population by labor market status.

- I. Labour force: People who are 15 and above are considered to be working age; working age refers to the age when a person is considered to be working and before 2013, this age group was considered to be over 10 years old.
- II. Economically Active Population: The economically active population includes persons who are unemployed or employed during the survey period
- III. Employed: Employees who have worked as an employee, employer, own account workers, or unpaid contributor to the family economy during the reference period of the survey may be considered employed.
- IV. Unemployed: Can be defined as those who were unemployed during the reference period and those who were seeking for a job or looking for a job, as well as those who were willing to accept a job if it was received during that period.
- V. Currently Economically Active: People who are employed or unemployed are currently considered economically active during the reference period.
- VI. Not in the Labour Force (not economically active): People who are not involved in any economic activity and do not expect a job are those who are not economically active. For example, housewives, full-time students, retirees, the elderly, and people with disabilities..

Labour force population is divided into two groups as employed and unemployed. Unemployed are those who seek and available for a job during the reference period and employed are those who engage in an economic activity. There exist internationally defined

standard statistical definitions for employment status to accommodate comparability among countries. Sri Lanka is using the same definitions. The following employment categories with definitions are available from the Survey. The employment status definition is approved by the United Nation Statistical Commission in 1958.

(a) *Employer*: is a person who owns or operates a business or a profession that he or she engages in. Some countries may require that employers be identified by the number of employees they employ.

(b) *Own-account worker*: is someone who operates his or her own business or engages in a profession or trade without hiring people.

(c) *Employee*: a person who works for a public or private employer and receives payment in wages, salary, commission, tips, piece-rates or pay in kind.

(d) *Unpaid family worker*: a person who works in an economic enterprise operated by a related person living in the same household without pay.

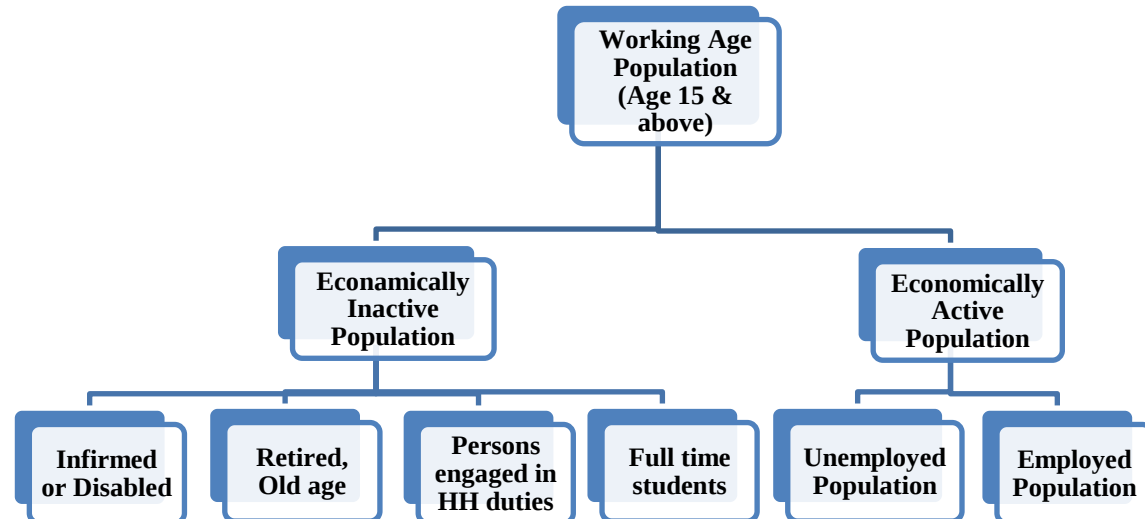


Figure: 3.1 Distribution of Working age populations by labour market status

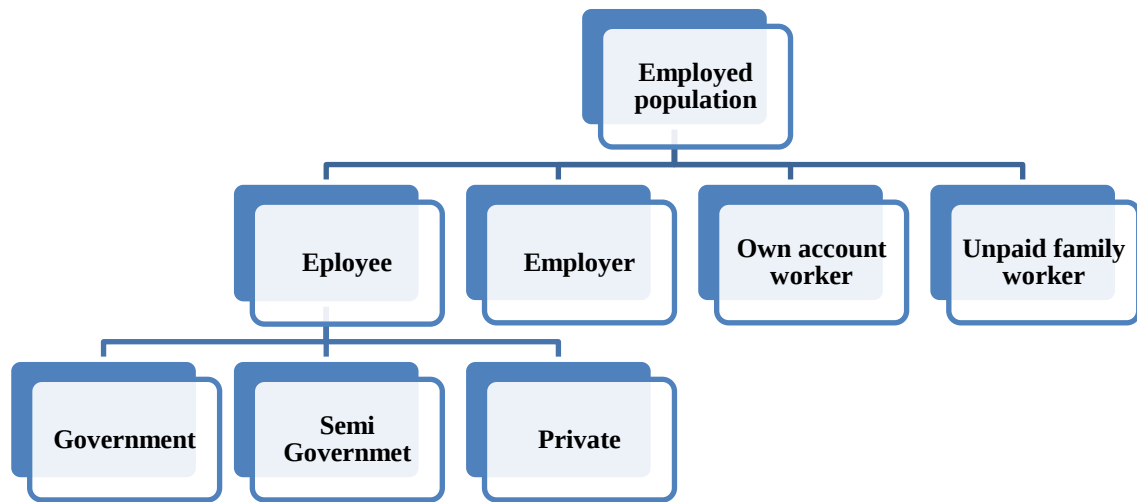


Figure: 3.2 Employed population by status of occupation

### 3.3 Data Used for the Study

Full of The original data set is used for this study consists with person records and it covers following information. There are about 80,090 total number of person records in the data file.

1. Geographical Information of households such as province, administrative district, sector, .etc.
2. Demographic characteristics of persons such as relationship to head of household, age, sex, ethnicity, religion, marital status, level of education, literacy, .etc,
3. Information which are needed to identify employed, underemployed, unemployed and economically inactive persons.

### 3.4 Variables Used for the Analysis

Most of the variables collected through the survey are categorical in nature. Using the original data set some new variables like labour force, economically active, economically inactive, employed and unemployed were created by considering the statistical concepts and

definitions. All the control variables included in the analysis were categorically coded. The categorization of the control variables was based on theoretical grounds. Some variables in the original data set are re-categorized by considering the homogeneity of the groups and to help statistical procedures such as to minimize small cell sizes. For an example age groups are created by regrouping the original variable ‘completed age at last birthday’ into five year age groups and last category kept open as 40 and above. The information on literacy for three languages are available two of them are local languages such as Sinhala and Tamil, and the other is an international language English. The basic variable categorization used for the study is in Table: 3.1.

**Table: 3.1 List of Variables used for Labour Force Participation Analysis**

|                                       | <b>Type</b> | <b>Code</b> |
|---------------------------------------|-------------|-------------|
| <b>Age Group</b>                      | Categorical |             |
| 15-19                                 |             | 1           |
| 20-24                                 |             | 2           |
| 25-29                                 |             | 3           |
| 30-34                                 |             | 4           |
| 35-39                                 |             | 5           |
| 40 and above                          |             | 6           |
| <b>Marital Status</b>                 | Categorical |             |
| Never Married                         |             | 1           |
| Married                               |             | 2           |
| Separated/Widowed                     |             | 3           |
| <b>Relationship to household head</b> | Categorical |             |
| Head of household                     |             | 1           |
| Spouse                                |             | 2           |
| Son/Daughter                          |             | 3           |
| Other                                 |             | 4           |
| <b>Religion</b>                       | Categorical |             |
| Buddhist                              |             | 1           |
| Hindu                                 |             | 2           |
| Muslim                                |             | 3           |
| Catholics                             |             | 4           |
| Other                                 |             | 5           |
| <b>Ethnicity</b>                      | Categorical |             |
| Sinhala                               |             | 1           |
| Tamil                                 |             | 2           |
| Moor                                  |             | 3           |
| Other                                 |             | 4           |
| <b>Level of Education</b>             | Categorical |             |
| No Schooling                          |             | 1           |
| Primary                               |             | 2           |
| Lower Secondary                       |             | 3           |
| Ordinary Level                        |             | 4           |
| Advanced Level                        |             | 5           |
| Degree & above                        |             | 6           |
| <b>Sector</b>                         | Categorical |             |
| Urban                                 |             | 1           |
| Rural                                 |             | 2           |
| Estate                                |             | 3           |

|                                                        |             |   |
|--------------------------------------------------------|-------------|---|
| <b>Province</b>                                        | Categorical |   |
| Western                                                |             | 1 |
| Central                                                |             | 2 |
| Southern                                               |             | 3 |
| Northern                                               |             | 4 |
| Eastern                                                |             | 5 |
| North Western                                          |             | 6 |
| North Central                                          |             | 7 |
| Uva                                                    |             | 8 |
| Sabaragamuwa                                           |             | 9 |
| <b>Literacy in English</b>                             | Categorical |   |
| Literate                                               |             | 1 |
| Illiterate                                             |             | 2 |
| <b>Currently attending to an educational institute</b> | Categorical |   |
| Attending                                              |             | 1 |
| Not Attending                                          |             | 2 |
| <b>No. of dependants age &lt;15</b>                    | Categorical |   |
| No children                                            |             | 1 |
| 2 or less                                              |             | 2 |
| 3 or more                                              |             | 3 |

### 3.5 Statistical Methods Used

The analytical part of the study performs in several stages. Mainly computer packages SPSS, (Statistical Package for Social Scientists) and MS Excel is used to conduct statistical tests and to calculate statistics of the study. At the first stage descriptive statistics is utilized to explore the objectives. The standard error and the coefficient of variation are calculated for each estimated value using SPSS computer package. The weighting factor which is calculated considering the selection probability of the sample is used to get the population estimates. At the next stage bi- variant analysis such as Chi-square test uses to recognize important variables for the models and then binary logistic analysis will be conducted to identify and to quantify the determinants of labour force participation.

There are three common statistics can used to analysis of 2-D table (when A and B are two factors, each factors has two levels)

- Pearson's Chi-Square Test(exact) =  $\chi^2 = \sum \frac{(Observed-Expected)^2}{Expected}$  Equation 3.1

- Yetes correction Chi-Square Test=  $\sum \frac{(Observed-Expected-0.5)^2}{Expected}$  Equation 3.2

- Likelihood Ratio =  $\sum Observed * \log \left( \frac{Observed}{Expected} \right)$  Equation 3.3

(Peiris, 2017)

### 3.5.1 Pearson's Chi-Square Test

Pearson Chi-Square test is used to identify relationship between categorical variables.

(i) **Hypotheses**

Null: There is no association between the two variables.

Alternate: There is an association between the two variables.

(ii) **Chi-Square test statistic**

Consider two variables A and B and have “i” and “j” categories respectively. If “O” represents observed frequency and “E” represents expected frequency, for i and j possible computations,

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{(O_{i,j} - E_{i,j})^2}{E_{i,j}}. \quad \text{Equation 3.4}$$

The number of degrees of freedom is equal to the number of cells  $rc$ , minus the reduction in degrees of freedom,  $p$ , which reduces to  $(r - 1)(c - 1)$ . The Pearson statistic with  $i$  row and  $j$  column is approximated by a chi-square distribution with  $(i - 1)(j - 1)$  degrees of freedom. The test of independence refers to the probability of a chi-square statistic that is less than or equal to 0.05. This is the reason why the null hypothesis is rejected if the row variable is independent of its column variable.

(iii) **Limitations:**

Chi-Square test can be used only to find the association between two factors. The simultaneous effect many factors or interaction between two or more factors cannot be tested. Pearson Chi-Square test is valid only if no more than 20% of the categories should have expected frequencies of less than five. In such problematic situations combining two or more neighboring classes with small frequencies to form a class sufficiently large or use non parametric test to test the association between variables will be a good solution.

#### (iv) Assumptions used in Chi-square test

The following assumptions are used to calculate a chi-square distribution,

- A random sampling of the data from a fixed distribution or population.
- An adequate expected cell count is necessary for proper operation. Generally, in all cells of a 2-by-2 table, and in 80% of cells in larger tables, more than 5 or more cells are required.
- Independence – The observations are always assumed to be independent of each other.

Note: If degrees of freedom=1 (for 2 x 2 table), it is advisable to use Yates' continuity correction. In this case Pearson chi-square statistics is

$$X^2_{\text{cal}} = \sum [O_{ij} - E_{ij} - 0.5]^2 / E_{ij} < X^2_{(1), \alpha\%} \quad \text{Equation 3.5}$$

(Agresti, 1996)

### 3.5.2 Logistic regression analysis

This process aims to predict the degree of dependency on a dependent variable on the basis of categorical or continuous independents. It also aims to rank the relative importance of independents to the dependent variable. The impact of predictor variables is usually explained in terms of odds ratios.

#### ➤ Odds ratio

Logistic regression works by dividing the probabilities of two possible outcomes into the proportion of the proportions for the first (p) and second outcome (1-P).

$$\text{Odds} = \frac{p}{1-p} \quad \text{Equation 3.6}$$

The log transformation is a mathematical procedure that simplifies the distribution. It shows the log distribution's dependence on the p values. The log distribution is a type

of calculation that shows the distribution of a given quantity (or unit). It is also called the logit  $p$ .

$$\text{Logit}(p) = \log\left[\frac{p}{1-p}\right]$$

*Equation 3.7*

Logit ( $p$ ) scale refers to the range from minus infinity to plus infinity. It is symmetrical around the logit (0.5) which is 0

The odds ratio is a concept that shows how the odds of a given group change when the target group is increased by one unit. It can be used to evaluate the validity of statistical models.

A maximum likelihood estimate is provided by the logistic regression procedure when the dependent is a logit variable. It is computed by taking into account the likelihood function. In logistic regression, continuous variable is not used as dependent variable, and also there can be only one dependent variable.

### 3.5.2.1 Binary logistic regression

A binary logistic regression is a type of regression that uses the dependent as its denominator. In this type of regression, the independents are not defined. Suppose  $X_{1i}, X_{2i}, \dots, X_{ki}$  are the explanatory variables for the  $i^{\text{th}}$  individual. The response is a binary variable that has two outcomes. The binary logistic model shows the relationship between the response and the explanatory variables.

$$\text{Log}(P_i / 1 - P_i) = \beta_0 + \beta_1 X_{1i} + \dots + \beta_k X_{ki} \quad i = 1, 2, \dots, N; \quad X_{i0} = 1 \text{ for all } i = 1, 2, \dots, n$$

*Equation 3.8*

$P_i$  is the probabilities of occurrence of the response of interest of the  $i^{\text{th}}$  individual.

The Model can alternatively be expressed in the form of,

$$P_i = \exp(\beta_0 + \beta_1 X_{1i} + \dots + \beta_k X_{ki}) / 1 + \exp(\beta_0 + \beta_1 X_{1i} + \dots + \beta_k X_{ki})$$

*Equation 3.9*

Where  $i=1, 2, \dots, n$  (Scott W. Menard, 2002)

➤ **Fitting the binomial logistic model**

The coefficients  $\beta_i$  of the model are to be estimated. The maximum likelihood method is used as the estimation method.

- **Maximum likelihood method (MLE)**

MLE stands for the likelihood that the values of a dependent variable will be influenced by the observations of independents.

The likelihood for a given observation is:

$$L_i = \left( \frac{\exp(X_i \beta)}{1 + \exp(X_i \beta)} \right)^{Y_i} \left[ 1 - \left( \frac{\exp(X_i \beta)}{1 + \exp(X_i \beta)} \right) \right]^{1-Y_i}$$

*Equation 3.10*

- Coefficient estimation

Assuming independent observations we can take the product overall No bservations to get the overall likelihood:

$$L_i = \prod \left( \frac{\exp(X_i \beta)}{1 + \exp(X_i \beta)} \right)^{Y_i} \left[ 1 - \left( \frac{\exp(X_i \beta)}{1 + \exp(X_i \beta)} \right) \right]^{1-Y_i}$$

*Equation 3.11*

- Taking the natural logarithm of above equation:

$$\ln L_i \sum_{i=1}^N \left[ Y_i \ln \left( \frac{\exp(X_i \beta)}{1 + \exp(X_i \beta)} \right) + (1 - Y_i) \ln \left[ 1 - \left( \frac{\exp(X_i \beta)}{1 + \exp(X_i \beta)} \right) \right] \right]$$

*Equation 3.12*

- For each independent variable, the log-likelihood can be maximizes by differentiating the  $\beta$  s to find out the  $\beta^\wedge$ . The “Newton Raphson Method” is used to solve the equations (Agresti, 1996).

➤ **Procedure of Model selection**

The forward selection method is used to select the most suitable model. This method starts with the null model. Then most significant variable (main effect) is added to the model. The variable with lowest p-value (at a given significant level) or highest deviance difference is considered to choose most significant variable. In this way by adding one variable at a time to the each new model finalized model is defined when there is no further improvement (using the test of difference in deviance). At the next step two-way interactions are added using the same method as did for main effects and further higher order interaction terms are added to the model (Agresti, 1996).

➤ **Test the significance of the binomial logistic regression model**

- **Log likelihood ratio test**

SPSS provides the likelihood ratio test to test the significance the difference between final model and a reduced model. The difference between the null and the reduced model is known as the likelihood ratio test. It shows how much the model would have improved over the baseline model. A well-fitting model at a level of significance is  $P \leq 0.05$ , This finding of significance leads to the rejection of the null hypothesis.

- **Deviance test**

Corrected deviance of a model:

$L_c$ - ML of the current model

$L_f$ - ML of the full or saturated model,

Both contain same number of unknown parameters as they are binary observations.

Corrected deviance =  $D = -2 (\text{Log } L_c - \text{Log } L_f)$ . *Equation 3.13*

The D is also known as the likelihood ratio statistics for comparing a current model with the full model and  $D \sim \chi^2_{(n-p), \alpha\%}$

Two logistic models can be compared to examine the difference in deviance when two sets of forms contain the additional conditions.

$H_0$ : Additional term/terms does not improve the fit of the model significantly

$H_1$ : Additional term/terms improve the fit of the model significantly

| Model   | Deviance | Degree of freedom |
|---------|----------|-------------------|
| Model 1 | $D_1$    | $p$               |
| Model 2 | $D_2$    | $k$               |

Where  $p < k$

Difference in deviance =  $D_1 - D_2$

Difference of degree of freedom =  $k - p$

If reduction in deviance is significant at  $\alpha$  %, ie  $D > X^2_{(k-p), \alpha\%}$ , Then model 2 is preferred over the model 1. That implies that additional term should be in the model.

- **Omnibus test of model coefficients**

This study uses a large sample for the logistic test and large amount of independent variables are categorical therefore Omnibus test of model coefficients is used to test the significance of the last model. The test differs from the intercept test because it tests the model with multiple predictors instead of just one. It can also be used to evaluate the capabilities of the model's other predictors. The significance (usually at 5%) of a given variable depends on the research conclusion that the data fit to the model. (Agresti, 1996).

- **Test the significance of the individual logistic regression coefficients**

The goal of the Wald statistic test is to determine the significance of the logit coefficient of a given independent variable to check the null hypothesis that in logistic regression that a given logit coefficient is zero. The Wald statistics is a statistical representation of the UN's standard deviation due to the Wald statistic's squared ratio. (Agresti, 1996).

- **Measures of the proportion of variation**

In logistic regression,  $R^2$  is the proportion of variation in the model's outcome variable. In linear regression, it is equal to the sum of the variation in the model's outcome variable and the adjusted  $R^2$ . Both the  $R^2$  of Cox & Snell and the  $R^2$  of Nagelkerke are statistics that show that the model may not achieve the maximum value even when it predicts all the outcomes perfectly. When model data accurately predicts, there is a good chance that Nagelkerke's  $R^2$  will get a single value. (Wuensch, 2011).

## CHAPTER 4

### ASSOCIATION BETWEEN DIFFERENT VARIABLES AND FEMALE LABOUR FORCE PARTICIPATION

#### 4.1 Descriptive Results

This part of the analysis investigates the data in order to find out the overall behavior of the labour force statistics. Table: 4.1 gives the basic findings of the survey data such as estimated figures, standard errors, coefficient of variation and the sample size. The statistics are prepared separately for male and female to distinguish any difference in behavior of statistics for two sexes. These basic statistics give some evidence for lower female contribution to the labour market compared to male contribution of the country.

Table: 4. 1 Descriptive Statistics derived from the Sri Lanka Labour Force Survey -2019  
(Age 15 and above population)

| Labour Force Characteristic |        | Estimate  | %   | Standard Error | Coefficient of Variation | Sample Count |
|-----------------------------|--------|-----------|-----|----------------|--------------------------|--------------|
| population                  | male   | 7,610,113 | 46  | 43,570         | 0.006                    | 28,556       |
|                             | female | 8,813,903 | 54  | 44,325         | 0.005                    | 33,076       |
|                             | Total  | 16,424,01 | 100 | 75,000         | 0.005                    | 61,632       |
| Labour force                | male   | 5,554,192 | 65  | 36,513         | 0.007                    | 20,867       |
|                             | female | 3,037,818 | 35  | 32,806         | 0.011                    | 11,141       |
|                             | Total  | 8,592,010 | 100 | 54,293         | 0.006                    | 32,008       |
| Inactive                    | male   | 2,055,920 | 26  | 25,735         | 0.013                    | 7,689        |
|                             | female | 5,776,085 | 74  | 43,233         | 0.007                    | 21,935       |
|                             | Total  | 7,832,005 | 100 | 55,527         | 0.007                    | 29,624       |
| Employed                    | male   | 5,368,896 | 66  | 35,708         | 0.007                    | 20,168       |
|                             | female | 2,811,796 | 34  | 31,161         | 0.011                    | 10,278       |
|                             | Total  | 8,180,692 | 100 | 52,108         | 0.006                    | 30,446       |
| Unemployed                  | male   | 185,295   | 45  | 7,920          | 0.043                    | 699          |
|                             | female | 226,022   | 55  | 9,088          | 0.04                     | 863          |
|                             | Total  | 411,317   | 100 | 12814          | 0.031                    | 1,562        |

\*\* Author's calculations using the Labour Force Survey data including all districts

According to the result in above table, the estimated population, (age 15 and above) is 16 million and estimated labour force of the country is 8.5 million. Further the result indicates that estimated economically inactive population is around 7.8 million and of that 74% are females.

## 4.2. Results of the Chi- Square Test

This part of the analysis seeks the relationship between FLFP and explanatory variables. The results of all the independent variables with labour force cross tabulation depict in Table: 4.2 - 4.12. The Pearson Chi-square test result also included for each independent variable separately, considering the labour force participation as the dependant. Eleven independent categorical variables are considered. In order to association between two factors, relevant hypothesis was tested using Chi- Square test.

### 4.2.1 Influence of age group for labour force participation

The table 4.2 shows the cross tabulation of the FLFP within their age group.

Table: 4. 2 The Cross Tabulation of Age group \* Labour Force

| Age Group                                              |              | Labour Force |       | Total  |
|--------------------------------------------------------|--------------|--------------|-------|--------|
|                                                        |              | Yes          | No    |        |
| 15-19                                                  | Count        | 221          | 3034  | 3255   |
|                                                        | % within Age | 6.8%         | 93.2% | 100.0% |
| 20-24                                                  | Count        | 1012         | 1597  | 2609   |
|                                                        | % within Age | 38.8%        | 61.2% | 100.0% |
| 25-29                                                  | Count        | 1173         | 1351  | 2524   |
|                                                        | % within Age | 46.5%        | 53.5% | 100.0% |
| 30-34                                                  | Count        | 1140         | 1581  | 2721   |
|                                                        | % within Age | 41.9%        | 58.1% | 100.0% |
| 35-39                                                  | Count        | 1420         | 1736  | 3156   |
|                                                        | % within Age | 45.0%        | 55.0% | 100.0% |
| 40& above                                              | Count        | 6175         | 12636 | 18811  |
|                                                        | % within Age | 32.8%        | 67.2% | 100.0% |
| Total                                                  | Count        | 11141        | 21935 | 33076  |
|                                                        | % within Age | 33.7%        | 66.3% | 100.0% |
| Chi- Square statistics- $\chi^2_5 = 1538.33$ (p=0.000) |              |              |       |        |

In the table 4.2 The Chi- Square statistics (1538.33) is highly significant (p=0.000) that there is an association between the FLFP rate and age groups.

According to the result in Table 4.2 the total FLFP rate is 33.7%, as the LFP rate is defined as the percentage of the economically active population or the total working age population in the workforce. Of the young adults who are in the age groups (35-39) shows the highest participation rate (45.0%) in labour force. Also it is found that the age groups 15-19 lowest (6.8%) labour force participation rate, and 40 and above indicate lower than other groups, where all the students and elderly persons can be allocated.

#### 4.2.2 Influence of marital status for labour force participation

Table: 4. 3 The Cross Tabulation of marital status \* Labour Force

| Marital Status                                         |                  | Labour Force |        | Total   |
|--------------------------------------------------------|------------------|--------------|--------|---------|
|                                                        |                  | Yes          | No     |         |
| Never Married                                          | Count            | 2156         | 4660   | 6816    |
|                                                        | % within marital | 31.60%       | 68.40% | 100.00% |
| Married                                                | Count            | 7631         | 13304  | 20935   |
|                                                        | % within marital | 36.50%       | 63.50% | 100.00% |
| Widowed                                                | Count            | 972          | 3687   | 4659    |
|                                                        | % within marital | 20.90%       | 79.10% | 100.00% |
| Divorced                                               | Count            | 119          | 73     | 192     |
|                                                        | % within marital | 62.00%       | 38.00% | 100.00% |
| separated                                              | Count            | 263          | 211    | 474     |
|                                                        | % within marital | 55.50%       | 44.50% | 100.00% |
| Total                                                  | Count            | 11141        | 21935  | 33076   |
|                                                        | % within marital | 33.70%       | 66.30% | 100.00% |
| Chi- Square statistics- $\chi^2_5 = 597.135$ (p=0.000) |                  |              |        |         |

In order to association between two factors hypothesis was tested using Chi- Square test and above table 4.3 shows, the Chi- Square statistics (597.135) is highly significant (p=0.000 and

so the null hypothesis is rejected. Therefore, it can be concluded that the presence of female labour force participation is associated with marital status.

As a result in table 4.3 the FLFP rate is higher among married than never married woman. This explains the higher expectations of those who are entering to labour market. This is due to the increasing tendency of married women to enter the job market with the rising cost of living. Also the labour force participation rate for Divorced and Separated woman is more than 50%.

#### 4.2.3 Influence of relationship to household head for labour force participation

Table: 4. 4 Relationship to Household Head \* Labour Force Cross tabulation

| Relationship to Household Head                        |                   | Labour Force |       | Total  |
|-------------------------------------------------------|-------------------|--------------|-------|--------|
|                                                       |                   | Yes          | No    |        |
| Head of household                                     | Count             | 1819         | 3696  | 5515   |
|                                                       | % within Relation | 33.0%        | 67.0% | 100.0% |
| Spouse                                                | Count             | 5196         | 9400  | 14596  |
|                                                       | % within Relation | 35.6%        | 64.4% | 100.0% |
| Daughter                                              | Count             | 2767         | 4983  | 7750   |
|                                                       | % within Relation | 35.7%        | 64.3% | 100.0% |
| Other                                                 | Count             | 1359         | 3856  | 5215   |
|                                                       | % within Relation | 26.1%        | 73.9% | 100.0% |
| Total                                                 | Count             | 11141        | 21935 | 33076  |
|                                                       | % within Relation | 33.7%        | 66.3% | 100.0% |
| Chi- Square statistics- $\chi^2_3 = 175.03$ (p=0.000) |                   |              |       |        |

The Chi- Square statistics (175.03) show that there is a significant association between the FLFP and the household head..

Approximately equal participation rates within family member categories. 35% of daughters whose relationship to household head is slightly higher rate than females who are heads of the household or spouses. Here other relationship includes parents, other relations, borders, domestic servants, etc., and out of this population 73.9% shows economically inactive.

#### 4.2.4 Influence of Ethnicity for Labour Force Participation

Table : 4.5 Ethnicity \* Labour Force Cross tabulation

| Ethnic Group                                          |                 | Labour Force |       | Total  |
|-------------------------------------------------------|-----------------|--------------|-------|--------|
|                                                       |                 | Yes          | No    |        |
| Sinhala                                               | Count           | 8602         | 14731 | 23333  |
|                                                       | % within Ethnic | 36.9%        | 63.1% | 100.0% |
|                                                       | Count           | 1999         | 4540  | 6539   |
|                                                       | % within Ethnic | 30.6%        | 69.4% | 100.0% |
|                                                       | Count           | 509          | 2603  | 3112   |
|                                                       | % within Ethnic | 16.4%        | 83.6% | 100.0% |
|                                                       | Count           | 31           | 61    | 92     |
|                                                       | % within Ethnic | 33.7%        | 66.3% | 100.0% |
| Total                                                 | Count           | 11141        | 21935 | 33076  |
|                                                       | % within Ethnic | 33.7%        | 66.3% | 100.0% |
| Chi- Square statistics- $\chi^2_2 = 552.46$ (p=0.000) |                 |              |       |        |

According to the results of the Chi- Square test statistics, the ethnic group with the highest confidence level is significantly associated with the FLFP.

The females of Sinhalese are 37% and Tamils are 31% in FLFP rates. The moor group shows the lowest (16.4 %) rate and this explains the cultural factors effect on FLFP rate. It is also found that ethnicity is a significant factor in determining the FLFP rate.

#### 4.2.5 Influence of religion for labour force participation

Table : 4. 6 Religion \* Labour Force Cross tabulation

| Religion                                                    | Yes    | Labour Force |         |
|-------------------------------------------------------------|--------|--------------|---------|
|                                                             |        | No           | Total   |
| Buddhist                                                    | 8215   | 13835        | 22050   |
|                                                             | 37.30% | 62.70%       | 100.00% |
| Hindu                                                       | 1648   | 3597         | 5245    |
|                                                             | 31.40% | 68.60%       | 100.00% |
| Muslim                                                      | 527    | 2635         | 3162    |
|                                                             | 16.70% | 83.30%       | 100.00% |
| Catholic                                                    | 745    | 1860         | 2605    |
|                                                             | 28.60% | 71.40%       | 100.00% |
| Other                                                       | 6      | 8            | 14      |
|                                                             | 42.90% | 57.10%       | 100.00% |
| Total                                                       | 11141  | 21935        | 33076   |
|                                                             | 33.70% | 66.30%       | 100.00% |
| Chi- Square statistics- $\chi^2_{22} = 578.610$ (p = 0.000) |        |              |         |

There is another cultural factor, which is significant for FLFP rate according to the above shown table 4.6. The Muslim female population group shows the lowest (16.7%) participation rate.

#### 4.2.6 Influence of education level for labour force participation

| Table : 4.7 Education * Labour Force cross tabulation                                                                                                                                                           |                    |              |       |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------|-------|--------|
| Level of Education                                                                                                                                                                                              |                    | Labour Force |       | Total  |
|                                                                                                                                                                                                                 |                    | Yes          | No    |        |
| <div> <div>No Schooling</div> <div>primary</div> <div>Lover</div> <div>Secondary</div> <div>Ordinary</div> <div>Level</div> <div>Advanced</div> <div>Level</div> <div>Degree&amp;</div> <div>Above</div> </div> | Count              | 288          | 940   | 1228   |
|                                                                                                                                                                                                                 | % within Education | 23.5%        | 76.5% | 100.0% |
|                                                                                                                                                                                                                 | Count              | 1188         | 3265  | 4453   |
|                                                                                                                                                                                                                 | % within Education | 26.7%        | 73.3% | 100.0% |
|                                                                                                                                                                                                                 | Count              | 4172         | 9775  | 13947  |
|                                                                                                                                                                                                                 | % within Education | 29.9%        | 70.1% | 100.0% |
|                                                                                                                                                                                                                 | Count              | 1832         | 4854  | 6686   |
|                                                                                                                                                                                                                 | % within Education | 27.4%        | 72.6% | 100.0% |
|                                                                                                                                                                                                                 | Count              | 2561         | 2885  | 5446   |
|                                                                                                                                                                                                                 | % within Education | 47.0%        | 53.0% | 100.0% |
|                                                                                                                                                                                                                 | Count              | 1100         | 216   | 1316   |
|                                                                                                                                                                                                                 | % within Education | 83.6%        | 16.4% | 100.0% |
|                                                                                                                                                                                                                 | Count              | 11141        | 21935 | 33076  |
|                                                                                                                                                                                                                 | % within Education | 33.7%        | 66.3% | 100.0% |
| Chi- Square statistics- $\chi^2_2 = 2263.40$ ( p = 0.000)                                                                                                                                                       |                    |              |       |        |

According to table 4.7, that the level of education increases the female labour force participation is increasing. Females who are obtain degree and above educational qualification group shows the highest labour force participation rate. In order to association between two factors hypothesis was tested using Chi- Square test. The Chi- Square statistics (2263.40) is highly significant (p=0.000). then the null hypothesis is rejected. It can be concluded that there has been a significant association between the level of education and participation of women in the labour force.

#### 4.2.7 Impact of sector on labor force participation

Table: 4. 8 Sector \* Labour Force Crosstabulation

| Sector                                                |                 | Labour Force |       | Total  |
|-------------------------------------------------------|-----------------|--------------|-------|--------|
|                                                       |                 | Yes          | No    |        |
| Urban                                                 | Count           | 1790         | 3823  | 5613   |
|                                                       | % within Sector | 31.9%        | 68.1% | 100.0% |
| Rural                                                 | Count           | 8706         | 17366 | 26072  |
|                                                       | % within Sector | 33.4%        | 66.6% | 100.0% |
| Estate                                                | Count           | 645          | 746   | 1391   |
|                                                       | % within Sector | 46.4%        | 53.6% | 100.0% |
| Total                                                 | Count           | 11141        | 21935 | 33076  |
|                                                       | % within Sector | 33.7%        | 66.3% | 100.0% |
| Chi- Square statistics- $\chi^2_2 = 109.28$ (p=0.000) |                 |              |       |        |

The distribution of female labor force among sectors is significant. This association is evidenced by the Chi-Square statistics (109.28) which show that the FLFP rate is highly significant in various sectors.

Further, the result in table 4.8, show, and the highest female participation (46.4%) in the Estate sector compared to other two sectors. The sector is an independent variable which is explains the place of residential of female. When urban females considered approximately 68.1% of them are economically inactive.

#### 4.2.8 Influence of province for labour force participation

| Province      | Labour Force |       | Total  |
|---------------|--------------|-------|--------|
|               | Yes          | No    |        |
| Western       | 2573         | 4986  | 7559   |
|               | 34.0%        | 66.0% | 100.0% |
| Central       | 1613         | 2670  | 4283   |
|               | 37.7%        | 62.3% | 100.0% |
| Southern      | 1478         | 2876  | 4354   |
|               | 33.9%        | 66.1% | 100.0% |
| Northern      | 880          | 2796  | 3676   |
|               | 23.9%        | 76.1% | 100.0% |
| Eastern       | 610          | 2255  | 2865   |
|               | 21.3%        | 78.7% | 100.0% |
| North Western | 1315         | 2070  | 3385   |
|               | 38.8%        | 61.2% | 100.0% |
| North Central | 723          | 1194  | 1917   |
|               | 37.7%        | 62.3% | 100.0% |
| Uva           | 692          | 1137  | 1829   |
|               | 37.8%        | 62.2% | 100.0% |
| Sabaragamuwa  | 1257         | 1951  | 3208   |
|               | 39.2%        | 60.8% | 100.0% |
| <b>Total</b>  | 11141        | 21935 | 33076  |
|               | 33.7%        | 66.3% | 100.0% |

Chi- Square statistics-  $\chi^2_{22} = 496.02$  (p=0.000)

The result in table 4.9 shows, that the Chi- Square statistics (496.02) is highly significant (p=0.000) and the null hypothesis is rejected. Therefore, it can be concluded that there is a significant association between female labour force participation and province of their residential.

This independent variable explain the Place of residential affect same as sector to the decision or the probability of labour force participation. When considered the result in table 4.9 both Northern and Eastern provinces show higher participation rate gap in female labour force than other provinces. The females who live in both of those provinces are highly economically inactive in rates. The highest female labour force participation rate (39.2%) obtains in Sabaragamuwa province.

#### 4.2.9 Influence of literacy in English for labour force participation

The information on literacy for three languages are available two of them are local languages such as Sinhala and Tamil, and the other is an international language English. Literacy is directly related to level of education but literacy in English language is crucial factor to enter into current labour market in the country. This study selects only the literacy in English to minimize multicollinearity problem at the modeling stage.

Table : 4. 10 Literacy in English \* Labour Force Cross tabulation

| Literacy in English                                   |                           | Labour Force |       | Total  |
|-------------------------------------------------------|---------------------------|--------------|-------|--------|
|                                                       |                           | Yes          | No    |        |
| Literate                                              | Count                     | 3127         | 4327  | 7454   |
|                                                       | % within English Literacy | 42.0%        | 58.0% | 100.0% |
| Illiterate                                            | Count                     | 8014         | 17608 | 25622  |
|                                                       | % within English Literacy | 31.3%        | 68.7% | 100.0% |
| Total                                                 | Count                     | 11141        | 21935 | 33076  |
|                                                       | % within English Literacy | 33.7%        | 66.3% | 100.0% |
| Chi- Square statistics- $\chi^2_1 = 294.45$ (p=0.000) |                           |              |       |        |

According to the result in table 4.10 Females who have English literacy show higher participation rate in labour force. The Chi- Square statistics (177.31) is highly significant (p=0.000).then the null hypothesis is rejected. Therefore, it can be concluded that there is a significant association between FLFP and Literacy in English.

#### 4.2.10 Influence of currently attending to an educational institute for labour force participation

Table : 4.11 Currently attending to an Educational Institute \* Labour Force Crosstabulation

| Currently attending to<br>an educational institute     |                  | Labour Force |       | Total  |
|--------------------------------------------------------|------------------|--------------|-------|--------|
|                                                        |                  | Yes          | No    |        |
| Attending                                              | Count            | 281          | 3307  | 3588   |
|                                                        | % within currEdu | 7.8%         | 92.2% | 100.0% |
| Not<br>Attending                                       | Count            | 10860        | 18628 | 29488  |
|                                                        | % within currEdu | 36.8%        | 63.2% | 100.0% |
| Total                                                  | Count            | 11141        | 21935 | 33076  |
|                                                        | % within currEdu | 33.7%        | 66.3% | 100.0% |
| Chi- Square statistics- $\chi^2_1 = 1204.07$ (p=0.000) |                  |              |       |        |

Result in table4.11 shows female labour force participation rate is about 7.8% among those who are currently attending educational institute. In other words economically inactive female population is higher among those who are currently attending to an educational institute. Further the Chi- Square statistics (1204.07) is highly significant (p=0.000). It can be concluded that there is a significant association between female labour force participation and currently attending to an educational institute.

#### 4.2.11 Influence of number of dependents (ageless than15) for labour force participation

Table : 4.12 Number of Dependents\* Labour force Crosstabulation

|                                                       |                 | Labour force |       | Total  |
|-------------------------------------------------------|-----------------|--------------|-------|--------|
|                                                       |                 | Yes          | No    |        |
| No dependents                                         | Count           | 10787        | 20171 | 30958  |
|                                                       | % within depsum | 34.8%        | 65.2% | 100.0% |
| 2 or less                                             | Count           | 154          | 734   | 888    |
|                                                       | % within depsum | 17.3%        | 82.7% | 100.0% |
| 3 or more                                             | Count           | 195          | 1026  | 1221   |
|                                                       | % within depsum | 16.0%        | 84.0% | 100.0% |
| Total                                                 | Count           | 11136        | 21931 | 33067  |
|                                                       | % within depsum | 33.7%        | 66.3% | 100.0% |
| Chi- Square statistics- $\chi^2_1 = 296.34$ (p=0.000) |                 |              |       |        |

According to the result in table 4.12, the FLFP is decreasing when the number of persons in a household whose age is less than 15 (Number of dependants age < 15)' is increased. The Chi- Square statistics (296.34) is significant (p=0.000). It has been observed that there is a significant link between the number of dependent (children) and the FLFP in the household.

### 4.3 Summary

Chi-Square analysis for each variables divulge that all the variables considered, have a significant (p=0.000) impact on FLFP. That identified significant factors are age group, marital status, ethnicity, religion, relationship to head of the household, sector, level of education, province, literacy in English, currently attending to an educational institute, and number of dependants in the household.

## CHAPTER 5

### MODELLING FOR FEMALE LABOUR FORCE PARTICIPATION USING BINARY LOGISTIC MODEL

#### 5.1 Introduction

The effects of various factors on the binary logistic model were studied simultaneously. To identify the best fitted model were developed forward stepwise and backward elimination under both criteria of LR and Wald.

#### 5.2 Binomial Logistic Regression Model

The gender-specific variable participation is also known as the dichotomous variable. It indicates whether a woman is participating in the labour force or not. The following codes are used to fit the binary logistic regression model with a list of variables and a label.

$$\text{Participation} = \begin{cases} 1, & \text{if female is participating in labour force} \\ 0, & \text{if female is not participating in labour force} \end{cases}$$

Table 5.1: The List of Variables Used for the Model Label and Name

| Variable Label                                  | Variable Name |
|-------------------------------------------------|---------------|
| Age group                                       | newage        |
| Marital Status                                  | NEWMARID      |
| Relationship to Head of HH                      | RSHIP         |
| Religion                                        | REL           |
| Level of education                              | NEWEDU        |
| Sector                                          | SECTOR        |
| Province                                        | PRO1          |
| Literacy in English                             | ENG           |
| Currently attending to an educational institute | CUEDU         |
| Number of dependants in the household           | NEWDEPENDENT  |

### 5.3 Use Forward –LR Method

The stepwise and forward selection methods are used to select the variables for the model.. This model starts with the constant-only model and then one best main effect is added to the model in each step. This process continues until there is no further improvement in the fitted model by adding new variables. When LR is specified, the addition of a variable to a model is dependent on the significance of a change in the log likelihood (LR). The likelihood ratio test is performed to evaluate the significance of the difference in the likelihood ratio between the current model and the reduced model. This difference is called “model chi-square” and significance of this shows the model significance at each step. Totally eleven effects (eleven independent variables) are added to the model, the order of entering variables into the model shows the last column of Table 5.2.

Table 5.2: Step Summary of Variable Addition to the Model- Female LFP

| Step | Improvement |    |       | Model      |    |       | Correct class % | Variable         |
|------|-------------|----|-------|------------|----|-------|-----------------|------------------|
|      | Chi-square  | df | Sig.  | Chi-square | df | Sig.  |                 |                  |
| 1    | 2185.990    | 5  | 0.000 | 2185.990   | 5  | 0.000 | 69.0%           | IN: NEWEDU       |
| 2    | 1637.524    | 1  | 0.000 | 3823.513   | 6  | 0.000 | 69.2%           | IN: NEWCUEDU     |
| 3    | 538.418     | 8  | 0.000 | 4361.931   | 14 | 0.000 | 69.5%           | IN: Province     |
| 4    | 515.096     | 3  | 0.000 | 4877.027   | 17 | 0.000 | 70.2%           | IN: NEWRELSHIP   |
| 5    | 430.655     | 4  | 0.000 | 5307.682   | 21 | 0.000 | 70.5%           | IN: Rel          |
| 6    | 250.850     | 5  | 0.000 | 5558.531   | 26 | 0.000 | 70.8%           | IN: newage       |
| 7    | 257.563     | 2  | 0.000 | 5816.095   | 28 | 0.000 | 70.9%           | IN: NEWMARID     |
| 8    | 72.715      | 2  | 0.000 | 5888.810   | 30 | 0.000 | 71.3%           | IN: SECTOR       |
| 9    | 20.169      | 1  | 0.000 | 5908.979   | 31 | 0.000 | 71.3%           | IN: English      |
| 10   | 10.736      | 2  | 0.005 | 5919.716   | 33 | 0.000 | 71.3%           | IN: NEWDEPENDENT |

In this analysis the first categorical group is considered as reference category and the corresponding group shown in below table.

Table 5.3: Considered Reference Category Variables to the Model- Female LFP

| Variables                                       | Reference category |
|-------------------------------------------------|--------------------|
| Age Group                                       | 15-19              |
| Religion                                        | Buddhist           |
| Marital Status                                  | Un Married         |
| Level of Education                              | No Schooling       |
| Province                                        | Western            |
| Sector                                          | Urban              |
| Relationship to Household head                  | Household Head     |
| Literacy in English                             | Literate           |
| Currently attending to an educational institute | Attending          |
| Number of dependents                            | No dependents      |

The next step is to add interaction terms into the model and first two way interactions are checked. Since many of the independent variables are categorical in nature the interaction terms add more complexity to the model and also it is found that those do not improve the model further, and since there are enough number of main effects in the model and to overcome the complexity of the model to have parsimony it is decided not to include interaction terms to the model. According to the above result in Table 5.2, the final model for female labour force participation can be written as,

$$\text{Log (P/1-p)} = \alpha + \beta_1^{(\text{NEWEDU})} + \beta_2^{(\text{CUEDU})} + \beta_3^{(\text{NEWMARID})} + \beta_4^{(\text{REL})} + \beta_5^{(\text{PRO1})} + \beta_6^{(\text{RSHIP})} + \beta_7^{(\text{newage})} + \beta_8^{(\text{SECTOR})} + \beta_9^{(\text{NEWDEPENDANT})} + \beta_{10}^{(\text{ENG})} \quad (\text{The estimated parameters are depicted in Table 5.5})$$

### 5.3.1 Goodness of Fit of the Fitted Model –Female LFP

The goodness of fit for the overall model can be discussed by using model Chi-Square test. When the reduce model is the baseline model with the constant only the likelihood ratio test the model as a whole. The Table 5.4 and Table 5.5 show the results for overall significance of the model.

Table 5.4: Model Summary – Female LFP

| Step | -2 Log likelihood      | Cox & Snell R Square | Nagelkerke R Square |
|------|------------------------|----------------------|---------------------|
| 1    | 40065.059 <sup>a</sup> | 0.064                | 0.089               |
| 2    | 38427.535 <sup>b</sup> | 0.109                | 0.151               |
| 3    | 37889.117 <sup>b</sup> | 0.124                | 0.171               |
| 4    | 37374.021 <sup>b</sup> | 0.137                | 0.190               |
| 5    | 36943.367 <sup>b</sup> | 0.148                | 0.206               |
| 6    | 36692.517 <sup>c</sup> | 0.155                | 0.215               |
| 7    | 36434.953 <sup>c</sup> | 0.161                | 0.224               |
| 8    | 36362.238 <sup>c</sup> | 0.163                | 0.226               |
| 9    | 36342.069 <sup>c</sup> | 0.164                | 0.227               |
| 10   | 36331.332 <sup>c</sup> | 0.164                | 0.227               |

The result in table 5.4, Cox & Snell's  $R^2$  (0.164) and Nagelkerke's  $R^2$  (0.227) are not achieve the maximum value of one, even when the model predicts all the outcomes. 22.7% of the variance in female LFP by above variables that can be concluded the model predicts the data perfectly.

Table5.5: Omnibus Tests of Model Coefficients –Female LFP

|               | Chi-square | df | Sig.  |
|---------------|------------|----|-------|
| Step          | 10.736     | 2  | 0.005 |
| Step 10 Block | 5919.716   | 33 | 0.000 |
| Model         | 5919.716   | 33 | 0.000 |

According to the above table 5.5, at the step 10 when all variables are added to the model change in -2LL is 5919.716 and degrees of freedom is 33 and change is statistically significant at 5% level of significance. The significance of the finding leads to the rejection of the null hypothesis, which states that all of the predictors are zero. Therefore it can be concluded that there is an adequate fit of the data to the model.

Table 5.6: Marginal Effects of Binomial Logistic Estimates with Categorized Variables-  
Probability of being economically active Female (Age 15 & above)

| Variables in the Equation                              | B      | S.E.  | Wald     | df | Sig.  | Exp(B) | 95.0% C.I. for EXP(B) |        |
|--------------------------------------------------------|--------|-------|----------|----|-------|--------|-----------------------|--------|
|                                                        |        |       |          |    |       |        | Lower                 | Upper  |
| <b>Age Group</b>                                       |        |       | 299.83   | 5  | 0     |        |                       |        |
| 20-24                                                  | 1.23   | 0.092 | 179.181  | 1  | 0     | 3.423  | 2.858                 | 4.098  |
| 25-29                                                  | 1.481  | 0.098 | 228.881  | 1  | 0     | 4.397  | 3.629                 | 5.327  |
| 30-34                                                  | 1.435  | 0.101 | 200.375  | 1  | 0     | 4.198  | 3.442                 | 5.12   |
| 35-39                                                  | 1.679  | 0.101 | 277.874  | 1  | 0     | 5.359  | 4.399                 | 6.529  |
| 40 and above                                           | 1.373  | 0.096 | 203.577  | 1  | 0     | 3.946  | 3.268                 | 4.766  |
| <b>Religion</b>                                        |        |       | 117.511  | 4  | 0     |        |                       |        |
| Hindu                                                  | 0.005  | 0.057 | 0.008    | 1  | 0.927 | 1.005  | 0.899                 | 1.124  |
| Muslim                                                 | -0.855 | 0.089 | 91.585   | 1  | 0     | 0.425  | 0.357                 | 0.507  |
| Catholic                                               | -0.274 | 0.055 | 25.255   | 1  | 0     | 0.76   | 0.683                 | 0.846  |
| Other                                                  | 0.031  | 0.622 | 0.002    | 1  | 0.961 | 1.031  | 0.305                 | 3.49   |
| <b>Marital Status</b>                                  |        |       | 254.714  | 2  | 0     |        |                       |        |
| Married                                                | -0.699 | 0.003 | 43283.38 | 1  | 0     | 0.497  | 0.494                 | 0.501  |
| Married(alone)                                         | -1.032 | 0.004 | 68496.02 | 1  | 0     | 0.356  | 0.354                 | 0.359  |
| <b>Level of Education</b>                              |        |       | 873.847  | 5  | 0.000 |        |                       |        |
| Primary                                                | 0.289  | 0.079 | 13.533   | 1  | 0.000 | 1.335  | 1.145                 | 1.558  |
| Lower Secondary                                        | 0.429  | 0.075 | 33.021   | 1  | 0.000 | 1.536  | 1.327                 | 1.778  |
| O/L                                                    | 0.412  | 0.079 | 26.922   | 1  | 0.000 | 1.511  | 1.293                 | 1.765  |
| A/L                                                    | 0.997  | 0.082 | 147.503  | 1  | 0.000 | 2.710  | 2.307                 | 3.182  |
| Degree & above                                         | 2.705  | 0.112 | 581.073  | 1  | 0.000 | 14.960 | 12.006                | 18.641 |
| <b>No. Of Dependants age &lt;15</b>                    |        |       | 10.034   | 2  | 0.007 |        |                       |        |
| 2 or less dependents                                   | -0.008 | 0.109 | 0.006    | 1  | 0.940 | 0.992  | 0.801                 | 1.229  |
| 3or more dependents                                    | -0.473 | 0.162 | 8.542    | 1  | 0.003 | 0.623  | 0.454                 | 0.856  |
| <b>Province</b>                                        |        |       | 253.516  | 8  | 0.000 |        |                       |        |
| Central                                                | 0.254  | 0.046 | 29.961   | 1  | 0.000 | 1.290  | 1.177                 | 1.413  |
| Southern                                               | 0.040  | 0.046 | 0.768    | 1  | 0.381 | 1.041  | 0.952                 | 1.139  |
| Northern                                               | -0.460 | 0.066 | 47.897   | 1  | 0.000 | 0.631  | 0.554                 | 0.719  |
| Eastern                                                | -0.292 | 0.063 | 21.675   | 1  | 0.000 | 0.746  | 0.660                 | 0.844  |
| North Western                                          | 0.401  | 0.049 | 67.524   | 1  | 0.000 | 1.494  | 1.358                 | 1.644  |
| North Central                                          | 0.404  | 0.059 | 46.202   | 1  | 0.000 | 1.498  | 1.333                 | 1.682  |
| Uva                                                    | 0.260  | 0.061 | 18.062   | 1  | 0.000 | 1.297  | 1.150                 | 1.462  |
| Sabaragamuwa                                           | 0.322  | 0.050 | 41.996   | 1  | 0.000 | 1.380  | 1.252                 | 1.521  |
| <b>Sector</b>                                          |        |       | 74.876   | 2  | 0.000 |        |                       |        |
| Rural                                                  | 0.040  | 0.039 | 1.079    | 1  | 0.299 | 1.041  | 0.965                 | 1.124  |
| Estate                                                 | 0.681  | 0.082 | 68.892   | 1  | 0.000 | 1.977  | 1.683                 | 2.322  |
| <b>Relationship to Household Head</b>                  |        |       | 298.341  | 3  | 0.000 |        |                       |        |
| Spouse                                                 | -0.107 | 0.045 | 5.710    | 1  | 0.017 | 0.898  | 0.823                 | 0.981  |
| Son/Daughter                                           | 0.328  | 0.057 | 33.438   | 1  | 0.000 | 1.388  | 1.242                 | 1.551  |
| Other                                                  | -0.532 | 0.049 | 119.660  | 1  | 0.000 | 0.587  | 0.534                 | 0.646  |
| <b>Literacy in English</b>                             |        |       |          |    |       |        |                       |        |
| Illiterate                                             | -0.177 | 0.039 | 20.551   | 1  | 0.000 | 0.838  | 0.776                 | 0.904  |
| <b>Currently Attending to an Educational Institute</b> |        |       |          |    |       |        |                       |        |
| Not attending                                          | 2.308  | 0.083 | 777.746  | 1  | 0.000 | 10.053 | 8.548                 | 11.824 |
| <b>Constant</b>                                        | -3.958 | 0.134 | 870.019  | 1  | 0.000 | 0.019  |                       |        |

According to the above result in Table 5.6, all the other age groups compared to the reference age group (15-19) show significantly increasing odds of female labour force

participation. The most significant increasing factor (5.359) shows for age group 35-39 compared to a woman in age group 15-19 when the other variables are remain constant. Religion is significantly decreasing affect for female labour force participation excepting Hindu and other religion women. The odds of female in labour force decrease (by a factor 0.425) to a woman in Muslim compared to a Buddhist woman, but the Hindu woman takes higher value 1.005 increase in the log odds of female labour force participation. Odds of participating labour force of a married (not alone) women decreases by a factor 0.497 compared to a never married woman as well as a decreasing factor which shows number of dependents. The model results depict that the odds of participation in the labour force increase for a person in any other education group compared to a person in 'no schooling' group. The odds of participating in labour force of a woman with Degree and above level of education increase by a factor 14.960 compared to a woman with no education when the other variables in the model are fixed. It can be seen from the results odds of a woman participate in labour force who is illiterate in English decreases by a factor 0.838 compared to a literate woman. The odds of participating increased for a woman who is not attending to an education by a factor 10.053 compared to a currently attending education woman when the other variables are controlled.

Both of selected residential factors which are province and sector are significant for female labour force. The odds of participating labour force of a woman in Northern and Eastern province decrease by a factor 0.631 and 0.746. The odds of participating labour force of a woman increase by 1.498 province compared to a women in Western province and odds of a woman participate in labour force increase to a woman in estate sector by a factor of 1.977 compared to a woman in urban sector.

#### **5.4 Use Forward –Wald Method**

The forward and stepwise selection method is used to select variables for the model. This model starts with the constant-only model and then one best main effect is added to the model in each step. This process continues until there is no further improvement in the fitted model by adding new variables. When Wald is specified, the added of a variable to the model is based on the significance of the Wald statistics. The chi-square distribution of the

Wald statistic shows that the number of parameters is equal to the number of degrees of freedom. The Table 5.7 is the summery table of added variables to the model.

Table 5.7: Step Summary of Variable Addition to the Model- Female LFP

| Step | Improvement |    |       | Model       |    |       | Correct class % | Variable         |
|------|-------------|----|-------|-------------|----|-------|-----------------|------------------|
|      | Chi- square | df | Sig.  | Chi- square | df | Sig.  |                 |                  |
| 1    | 2185.990    | 5  | 0.000 | 2185.990    | 5  | 0.000 | 69.0%           | IN: NEWEDU       |
| 2    | 1637.524    | 1  | 0.000 | 3823.513    | 6  | 0.000 | 69.2%           | IN: NEWCUEDU     |
| 3    | 538.418     | 8  | 0.000 | 4361.931    | 14 | 0.000 | 69.5%           | IN: Province     |
| 4    | 515.096     | 3  | 0.000 | 4877.027    | 17 | 0.000 | 70.2%           | IN: NEWRELSHIP   |
| 5    | 430.655     | 4  | 0.000 | 5307.682    | 21 | 0.000 | 70.5%           | IN: Rel          |
| 6    | 250.850     | 5  | 0.000 | 5558.531    | 26 | 0.000 | 70.8%           | IN: newage       |
| 7    | 257.563     | 2  | 0.000 | 5816.095    | 28 | 0.000 | 70.9%           | IN: NEWMARID     |
| 8    | 72.715      | 2  | 0.000 | 5888.810    | 30 | 0.000 | 71.3%           | IN: SECTOR       |
| 9    | 20.169      | 1  | 0.000 | 5908.979    | 31 | 0.000 | 71.3%           | IN: English      |
| 10   | 10.736      | 2  | 0.005 | 5919.716    | 33 | 0.000 | 71.3%           | IN: NEWDEPENDENT |

According to the above result in table 5.7, the final model for female labour force participation can be written as,

$$\text{Log } (P/1-p) = \alpha + \beta_1^{(\text{newedu})} + \beta_2^{(\text{eduattend})} + \beta_3^{(\text{newmari})} + \beta_4^{(\text{newreli})} + \beta_5^{(\text{province})} + \beta_6^{(\text{newrela})} + \beta_7^{(\text{newage})} + \beta_8^{(\text{sector})} + \beta_9^{(\text{dep-sum})} + \beta_{10}^{(\text{eng})}$$

The estimated parameters are depicted in Table 5.10

#### 5.4.1 Goodness of Fit of the Fitted Model –Female LFP

Table 5:8 Model Summary – Female LFP

| Step | -2 Log likelihood      | Cox & Snell R Square | Nagelkerke R Square |
|------|------------------------|----------------------|---------------------|
| 1    | 40065.059 <sup>a</sup> | 0.064                | 0.089               |
| 2    | 38427.535 <sup>b</sup> | 0.109                | 0.151               |
| 3    | 37889.117 <sup>b</sup> | 0.124                | 0.171               |
| 4    | 37374.021 <sup>b</sup> | 0.137                | 0.190               |
| 5    | 36943.367 <sup>b</sup> | 0.148                | 0.206               |
| 6    | 36692.517 <sup>c</sup> | 0.155                | 0.215               |
| 7    | 36434.953 <sup>c</sup> | 0.161                | 0.224               |
| 8    | 36362.238 <sup>c</sup> | 0.163                | 0.226               |
| 9    | 36342.069 <sup>c</sup> | 0.164                | 0.227               |
| 10   | 36331.332 <sup>c</sup> | 0.164                | 0.227               |

The result in table 5.8, Cox & Snell's  $R^2$  (0.164) and Nagelkerke's  $R^2$  (0.227) are not the maximum values of one even if the model predicts all the outcomes. That can be concluded the model predicts the data perfectly.

Table5.9: Omnibus Tests of Model Coefficients –Female LFP

|         | Chi-square | Df | Sig.  |
|---------|------------|----|-------|
| Step 10 |            |    |       |
| Step    | 10.736     | 2  | 0.005 |
| Block   | 5919.716   | 33 | 0.000 |
| Model   | 5919.716   | 33 | 0.000 |

According to the above table 5.8, at the step 10 when all variables are added to the model change in -2LL is 5919.716 and degrees of freedom is 33 and change is statistically significant at 5% level of significance. The significance of the findings leads to the rejection of the null hypothesis. It is then confirmed that the data have adequate fit to the model. Therefore it can be concluded that there is an adequate fit of the data to the model.

Table 5.10: Marginal Effects of Binomial Logistic Estimates with Categorized Variables-  
Probability of being economically active Female (Age 15 & above)

| Variables in the Equation                              | B      | S.E.  | Wald     | df | Sig.  | Exp(B) | 95.0% C.I. for EXP(B) |        |
|--------------------------------------------------------|--------|-------|----------|----|-------|--------|-----------------------|--------|
|                                                        |        |       |          |    |       |        | Lower                 | Upper  |
| <b>Age Group</b>                                       |        |       | 299.83   | 5  | 0     |        |                       |        |
| 20-24                                                  | 1.23   | 0.092 | 179.181  | 1  | 0     | 3.423  | 2.858                 | 4.098  |
| 25-29                                                  | 1.481  | 0.098 | 228.881  | 1  | 0     | 4.397  | 3.629                 | 5.327  |
| 30-34                                                  | 1.435  | 0.101 | 200.375  | 1  | 0     | 4.198  | 3.442                 | 5.12   |
| 35-39                                                  | 1.679  | 0.101 | 277.874  | 1  | 0     | 5.359  | 4.399                 | 6.529  |
| 40 and above                                           | 1.373  | 0.096 | 203.577  | 1  | 0     | 3.946  | 3.268                 | 4.766  |
| <b>Religion</b>                                        |        |       | 117.511  | 4  | 0     |        |                       |        |
| Hindu                                                  | 0.005  | 0.057 | 0.008    | 1  | 0.927 | 1.005  | 0.899                 | 1.124  |
| Muslim                                                 | -0.855 | 0.089 | 91.585   | 1  | 0     | 0.425  | 0.357                 | 0.507  |
| Catholic                                               | -0.274 | 0.055 | 25.255   | 1  | 0     | 0.76   | 0.683                 | 0.846  |
| Other                                                  | 0.031  | 0.622 | 0.002    | 1  | 0.961 | 1.031  | 0.305                 | 3.49   |
| <b>Marital Status</b>                                  |        |       | 254.714  | 2  | 0     |        |                       |        |
| Married                                                | -0.699 | 0.003 | 43283.38 | 1  | 0     | 0.497  | 0.494                 | 0.501  |
| Married(alone)                                         | -1.032 | 0.004 | 68496.02 | 1  | 0     | 0.356  | 0.354                 | 0.359  |
| <b>Level of Education</b>                              |        |       | 873.847  | 5  | 0.000 |        |                       |        |
| Primary                                                | 0.289  | 0.079 | 13.533   | 1  | 0.000 | 1.335  | 1.145                 | 1.558  |
| Lower Secondary                                        | 0.429  | 0.075 | 33.021   | 1  | 0.000 | 1.536  | 1.327                 | 1.778  |
| O/L                                                    | 0.412  | 0.079 | 26.922   | 1  | 0.000 | 1.511  | 1.293                 | 1.765  |
| A/L                                                    | 0.997  | 0.082 | 147.503  | 1  | 0.000 | 2.710  | 2.307                 | 3.182  |
| Degree & above                                         | 2.705  | 0.112 | 581.073  | 1  | 0.000 | 14.960 | 12.006                | 18.641 |
| <b>No. Of Dependants age &lt;15</b>                    |        |       | 10.034   | 2  | 0.007 |        |                       |        |
| 2 or less dependents                                   | -0.008 | 0.109 | 0.006    | 1  | 0.940 | 0.992  | 0.801                 | 1.229  |
| 3or more dependents                                    | -0.473 | 0.162 | 8.542    | 1  | 0.003 | 0.623  | 0.454                 | 0.856  |
| <b>Province</b>                                        |        |       | 253.516  | 8  | 0.000 |        |                       |        |
| Central                                                | 0.254  | 0.046 | 29.961   | 1  | 0.000 | 1.290  | 1.177                 | 1.413  |
| Southern                                               | 0.040  | 0.046 | 0.768    | 1  | 0.381 | 1.041  | 0.952                 | 1.139  |
| Northern                                               | -0.460 | 0.066 | 47.897   | 1  | 0.000 | 0.631  | 0.554                 | 0.719  |
| Eastern                                                | -0.292 | 0.063 | 21.675   | 1  | 0.000 | 0.746  | 0.660                 | 0.844  |
| North Western                                          | 0.401  | 0.049 | 67.524   | 1  | 0.000 | 1.494  | 1.358                 | 1.644  |
| North Central                                          | 0.404  | 0.059 | 46.202   | 1  | 0.000 | 1.498  | 1.333                 | 1.682  |
| Uva                                                    | 0.260  | 0.061 | 18.062   | 1  | 0.000 | 1.297  | 1.150                 | 1.462  |
| Sabaragamuwa                                           | 0.322  | 0.050 | 41.996   | 1  | 0.000 | 1.380  | 1.252                 | 1.521  |
| <b>Sector</b>                                          |        |       | 74.876   | 2  | 0.000 |        |                       |        |
| Rural                                                  | 0.040  | 0.039 | 1.079    | 1  | 0.299 | 1.041  | 0.965                 | 1.124  |
| Estate                                                 | 0.681  | 0.082 | 68.892   | 1  | 0.000 | 1.977  | 1.683                 | 2.322  |
| <b>Relationship to Household Head</b>                  |        |       | 298.341  | 3  | 0.000 |        |                       |        |
| Spouse                                                 | -0.107 | 0.045 | 5.710    | 1  | 0.017 | 0.898  | 0.823                 | 0.981  |
| Son/Daughter                                           | 0.328  | 0.057 | 33.438   | 1  | 0.000 | 1.388  | 1.242                 | 1.551  |
| Other                                                  | -0.532 | 0.049 | 119.660  | 1  | 0.000 | 0.587  | 0.534                 | 0.646  |
| <b>Literacy in English</b>                             |        |       |          |    |       |        |                       |        |
| Illiterate                                             | -0.177 | 0.039 | 20.551   | 1  | 0.000 | 0.838  | 0.776                 | 0.904  |
| <b>Currently Attending to an Educational Institute</b> |        |       |          |    |       |        |                       |        |
| Not attending                                          | 2.308  | 0.083 | 777.746  | 1  | 0.000 | 10.053 | 8.548                 | 11.824 |
| <b>Constant</b>                                        | -3.958 | 0.134 | 870.019  | 1  | 0.000 | 0.019  |                       |        |

According to the above result in Table 5.7 and Table 5.10, it is clear that age group, religion, marital status, level of education, number of dependents, province, sector, relationship to head of the household, literacy in English, and currently attending to an educational institute are significant variables at the 5% level of significance.

## 5.5 Use Backward –LR Method

A backward start model includes all of the methods for which the model is built. After all the predictors are removed, the model must be re-estimated. The estimated parameters are shown in Table 5.13.

### 5.5.1 Goodness of Fit of the Fitted Model –Female LFP

The Table 5.11 and Table 5.12 show the results for overall significance of the model

Table 5.11: Model Summary –Female LFP

| Step | -2 Log likelihood      | Cox & Snell R Square | Nagelkerke R Square |
|------|------------------------|----------------------|---------------------|
| 1    | 36331.332 <sup>a</sup> | 0.164                | 0.227               |

Table 5.12: Omnibus Tests of Model Coefficients –Female LFP

|         |       | Chi-square | df | Sig.  |
|---------|-------|------------|----|-------|
| Step 10 | Step  | 10.736     | 2  | 0.005 |
|         | Block | 5919.716   | 33 | 0.000 |
|         | Model | 5919.716   | 33 | 0.000 |

The result in Table 5.11 Cox & Snell's  $R^2$  (0.164) and Nagelkerke's  $R^2$  (0.277) are not achieve the maximum value of one, and Table 5.12 shows likelihood is significant. Therefore it can be concluded that there is an adequate fit of the data to the model.

Table 5.13: Marginal Effects of Binomial Logistic Estimates with Categorized Variables-  
Probability of being economically active Female (Age 15 & above)

| Variables in the Equation                              |                      | B      | S.E.  | Wald     | df | Sig.  | Exp(B) | 95.0% C.I. for EXP(B) |        |
|--------------------------------------------------------|----------------------|--------|-------|----------|----|-------|--------|-----------------------|--------|
|                                                        |                      |        |       |          |    |       |        | Lower                 | Upper  |
| <b>Age Group</b>                                       |                      |        |       | 299.83   | 5  | 0     |        |                       |        |
|                                                        | 20-24                | 1.23   | 0.092 | 179.181  | 1  | 0     | 3.423  | 2.858                 | 4.098  |
|                                                        | 25-29                | 1.481  | 0.098 | 228.881  | 1  | 0     | 4.397  | 3.629                 | 5.327  |
|                                                        | 30-34                | 1.435  | 0.101 | 200.375  | 1  | 0     | 4.198  | 3.442                 | 5.12   |
|                                                        | 35-39                | 1.679  | 0.101 | 277.874  | 1  | 0     | 5.359  | 4.399                 | 6.529  |
|                                                        | 40 and above         | 1.373  | 0.096 | 203.577  | 1  | 0     | 3.946  | 3.268                 | 4.766  |
| <b>Religion</b>                                        |                      |        |       | 117.511  | 4  | 0     |        |                       |        |
|                                                        | Hindu                | 0.005  | 0.057 | 0.008    | 1  | 0.927 | 1.005  | 0.899                 | 1.124  |
|                                                        | Muslim               | -0.855 | 0.089 | 91.585   | 1  | 0     | 0.425  | 0.357                 | 0.507  |
|                                                        | Catholic             | -0.274 | 0.055 | 25.255   | 1  | 0     | 0.76   | 0.683                 | 0.846  |
|                                                        | Other                | 0.031  | 0.622 | 0.002    | 1  | 0.961 | 1.031  | 0.305                 | 3.49   |
| <b>Marital Status</b>                                  |                      |        |       | 254.714  | 2  | 0     |        |                       |        |
|                                                        | Married              | -0.699 | 0.003 | 43283.38 | 1  | 0     | 0.497  | 0.494                 | 0.501  |
|                                                        | Married(alone)       | -1.032 | 0.004 | 68496.02 | 1  | 0     | 0.356  | 0.354                 | 0.359  |
| <b>Level of Education</b>                              |                      |        |       | 873.847  | 5  | 0.000 |        |                       |        |
|                                                        | Primary              | 0.289  | 0.079 | 13.533   | 1  | 0.000 | 1.335  | 1.145                 | 1.558  |
|                                                        | Lower Secondary      | 0.429  | 0.075 | 33.021   | 1  | 0.000 | 1.536  | 1.327                 | 1.778  |
|                                                        | O/L                  | 0.412  | 0.079 | 26.922   | 1  | 0.000 | 1.511  | 1.293                 | 1.765  |
|                                                        | A/L                  | 0.997  | 0.082 | 147.503  | 1  | 0.000 | 2.710  | 2.307                 | 3.182  |
|                                                        | Degree & above       | 2.705  | 0.112 | 581.073  | 1  | 0.000 | 14.960 | 12.006                | 18.641 |
| <b>No. Of Dependants age &lt;15</b>                    |                      |        |       | 10.034   | 2  | 0.007 |        |                       |        |
|                                                        | 2 or less dependents | -0.008 | 0.109 | 0.006    | 1  | 0.940 | 0.992  | 0.801                 | 1.229  |
|                                                        | 3or more dependents  | -0.473 | 0.162 | 8.542    | 1  | 0.003 | 0.623  | 0.454                 | 0.856  |
| <b>Province</b>                                        |                      |        |       | 253.516  | 8  | 0.000 |        |                       |        |
|                                                        | Central              | 0.254  | 0.046 | 29.961   | 1  | 0.000 | 1.290  | 1.177                 | 1.413  |
|                                                        | Southern             | 0.040  | 0.046 | 0.768    | 1  | 0.381 | 1.041  | 0.952                 | 1.139  |
|                                                        | Northern             | -0.460 | 0.066 | 47.897   | 1  | 0.000 | 0.631  | 0.554                 | 0.719  |
|                                                        | Eastern              | -0.292 | 0.063 | 21.675   | 1  | 0.000 | 0.746  | 0.660                 | 0.844  |
|                                                        | North Western        | 0.401  | 0.049 | 67.524   | 1  | 0.000 | 1.494  | 1.358                 | 1.644  |
|                                                        | North Central        | 0.404  | 0.059 | 46.202   | 1  | 0.000 | 1.498  | 1.333                 | 1.682  |
|                                                        | Uva                  | 0.260  | 0.061 | 18.062   | 1  | 0.000 | 1.297  | 1.150                 | 1.462  |
|                                                        | Sabaragamuwa         | 0.322  | 0.050 | 41.996   | 1  | 0.000 | 1.380  | 1.252                 | 1.521  |
| <b>Sector</b>                                          |                      |        |       | 74.876   | 2  | 0.000 |        |                       |        |
|                                                        | Rural                | 0.040  | 0.039 | 1.079    | 1  | 0.299 | 1.041  | 0.965                 | 1.124  |
|                                                        | Estate               | 0.681  | 0.082 | 68.892   | 1  | 0.000 | 1.977  | 1.683                 | 2.322  |
| <b>Relationship to Household Head</b>                  |                      |        |       | 298.341  | 3  | 0.000 |        |                       |        |
|                                                        | Spouse               | -0.107 | 0.045 | 5.710    | 1  | 0.017 | 0.898  | 0.823                 | 0.981  |
|                                                        | Son/Daughter         | 0.328  | 0.057 | 33.438   | 1  | 0.000 | 1.388  | 1.242                 | 1.551  |
|                                                        | Other                | -0.532 | 0.049 | 119.660  | 1  | 0.000 | 0.587  | 0.534                 | 0.646  |
| <b>Literacy in English</b>                             |                      |        |       |          |    |       |        |                       |        |
|                                                        | Illiterate           | -0.177 | 0.039 | 20.551   | 1  | 0.000 | 0.838  | 0.776                 | 0.904  |
| <b>Currently Attending to an Educational Institute</b> |                      |        |       |          |    |       |        |                       |        |
|                                                        | Not attending        | 2.308  | 0.083 | 777.746  | 1  | 0.000 | 10.053 | 8.548                 | 11.824 |
|                                                        | <b>Constant</b>      | -3.958 | 0.134 | 870.019  | 1  | 0.000 | 0.019  |                       |        |

According to the above result in Table 5.13, it is clear that age group, religion, marital status, level of education, number of dependents in the household, province, sector, relationship to head of the household, literacy in English, and currently attending to an educational institute are significant variables at the 5% level of significance.

## 5.6 Use Backward –Ward Method

A backward model includes all of the predictors. Therefore all independent variables are included at once. The variables are then removed at once until all the predictions of the model are significant. The significance of Wald statistics is used to determine the added variable. The estimated parameters are shown in Table 5.11.

### 5.6.1 Goodness of Fit of the Fitted Model –Female LFP

The Table 5.14 and Table 5.15 show the results for overall significance of the model

Table5.14: Model Summary –Female LFP

| Step | -2 Log likelihood      | Cox & Snell R Square | Nagelkerke R Square |
|------|------------------------|----------------------|---------------------|
| 1    | 36331.332 <sup>a</sup> | .164                 | .227                |

Table5.15: Omnibus Tests of Model Coefficients –Female LFP

|         |       | Chi-square | df | Sig.  |
|---------|-------|------------|----|-------|
| Step 10 | Step  | 10.736     | 2  | 0.005 |
|         | Block | 5919.716   | 33 | 0.000 |
|         | Model | 5919.716   | 33 | 0.000 |

The result in Table 5.14 Cox & Snell's  $R^2$  (0.164) and Nagelkerke's  $R^2$  (0.277) are not achieve the maximum value of one, and Table 5.15 shows likelihood is significant. Therefore it can be concluded that there is an adequate fit of the data to the model.

Table 5.16: Marginal Effects of Binomial Logistic Estimates with Categorized Variables-  
Probability of being economically active Female (Age 15 & above)

| Variables in the Equation                              | B      | S.E.  | Wald     | df | Sig.  | Exp(B) | 95.0% C.I. for EXP(B) |        |
|--------------------------------------------------------|--------|-------|----------|----|-------|--------|-----------------------|--------|
|                                                        |        |       |          |    |       |        | Lower                 | Upper  |
| <b>Age Group</b>                                       |        |       | 299.83   | 5  | 0     |        |                       |        |
| 20-24                                                  | 1.23   | 0.092 | 179.181  | 1  | 0     | 3.423  | 2.858                 | 4.098  |
| 25-29                                                  | 1.481  | 0.098 | 228.881  | 1  | 0     | 4.397  | 3.629                 | 5.327  |
| 30-34                                                  | 1.435  | 0.101 | 200.375  | 1  | 0     | 4.198  | 3.442                 | 5.12   |
| 35-39                                                  | 1.679  | 0.101 | 277.874  | 1  | 0     | 5.359  | 4.399                 | 6.529  |
| 40 and above                                           | 1.373  | 0.096 | 203.577  | 1  | 0     | 3.946  | 3.268                 | 4.766  |
| <b>Religion</b>                                        |        |       | 117.511  | 4  | 0     |        |                       |        |
| Hindu                                                  | 0.005  | 0.057 | 0.008    | 1  | 0.927 | 1.005  | 0.899                 | 1.124  |
| Muslim                                                 | -0.855 | 0.089 | 91.585   | 1  | 0     | 0.425  | 0.357                 | 0.507  |
| Catholic                                               | -0.274 | 0.055 | 25.255   | 1  | 0     | 0.76   | 0.683                 | 0.846  |
| Other                                                  | 0.031  | 0.622 | 0.002    | 1  | 0.961 | 1.031  | 0.305                 | 3.49   |
| <b>Marital Status</b>                                  |        |       | 254.714  | 2  | 0     |        |                       |        |
| Married                                                | -0.699 | 0.003 | 43283.38 | 1  | 0     | 0.497  | 0.494                 | 0.501  |
| Married(alone)                                         | -1.032 | 0.004 | 68496.02 | 1  | 0     | 0.356  | 0.354                 | 0.359  |
| <b>Level of Education</b>                              |        |       | 873.847  | 5  | 0.000 |        |                       |        |
| Primary                                                | 0.289  | 0.079 | 13.533   | 1  | 0.000 | 1.335  | 1.145                 | 1.558  |
| Lower Secondary                                        | 0.429  | 0.075 | 33.021   | 1  | 0.000 | 1.536  | 1.327                 | 1.778  |
| O/L                                                    | 0.412  | 0.079 | 26.922   | 1  | 0.000 | 1.511  | 1.293                 | 1.765  |
| A/L                                                    | 0.997  | 0.082 | 147.503  | 1  | 0.000 | 2.710  | 2.307                 | 3.182  |
| Degree & above                                         | 2.705  | 0.112 | 581.073  | 1  | 0.000 | 14.960 | 12.006                | 18.641 |
| <b>No. Of Dependants age &lt;15</b>                    |        |       | 10.034   | 2  | 0.007 |        |                       |        |
| 2 or less dependents                                   | -0.008 | 0.109 | 0.006    | 1  | 0.940 | 0.992  | 0.801                 | 1.229  |
| 3or more dependents                                    | -0.473 | 0.162 | 8.542    | 1  | 0.003 | 0.623  | 0.454                 | 0.856  |
| <b>Province</b>                                        |        |       | 253.516  | 8  | 0.000 |        |                       |        |
| Central                                                | 0.254  | 0.046 | 29.961   | 1  | 0.000 | 1.290  | 1.177                 | 1.413  |
| Southern                                               | 0.040  | 0.046 | 0.768    | 1  | 0.381 | 1.041  | 0.952                 | 1.139  |
| Northern                                               | -0.460 | 0.066 | 47.897   | 1  | 0.000 | 0.631  | 0.554                 | 0.719  |
| Eastern                                                | -0.292 | 0.063 | 21.675   | 1  | 0.000 | 0.746  | 0.660                 | 0.844  |
| North Western                                          | 0.401  | 0.049 | 67.524   | 1  | 0.000 | 1.494  | 1.358                 | 1.644  |
| North Central                                          | 0.404  | 0.059 | 46.202   | 1  | 0.000 | 1.498  | 1.333                 | 1.682  |
| Uva                                                    | 0.260  | 0.061 | 18.062   | 1  | 0.000 | 1.297  | 1.150                 | 1.462  |
| Sabaragamuwa                                           | 0.322  | 0.050 | 41.996   | 1  | 0.000 | 1.380  | 1.252                 | 1.521  |
| <b>Sector</b>                                          |        |       | 74.876   | 2  | 0.000 |        |                       |        |
| Rural                                                  | 0.040  | 0.039 | 1.079    | 1  | 0.299 | 1.041  | 0.965                 | 1.124  |
| Estate                                                 | 0.681  | 0.082 | 68.892   | 1  | 0.000 | 1.977  | 1.683                 | 2.322  |
| <b>Relationship to Household Head</b>                  |        |       | 298.341  | 3  | 0.000 |        |                       |        |
| Spouse                                                 | -0.107 | 0.045 | 5.710    | 1  | 0.017 | 0.898  | 0.823                 | 0.981  |
| Son/Daughter                                           | 0.328  | 0.057 | 33.438   | 1  | 0.000 | 1.388  | 1.242                 | 1.551  |
| Other                                                  | -0.532 | 0.049 | 119.660  | 1  | 0.000 | 0.587  | 0.534                 | 0.646  |
| <b>Literacy in English</b>                             |        |       |          |    |       |        |                       |        |
| Illiterate                                             | -0.177 | 0.039 | 20.551   | 1  | 0.000 | 0.838  | 0.776                 | 0.904  |
| <b>Currently Attending to an Educational Institute</b> |        |       |          |    |       |        |                       |        |
| Not attending                                          | 2.308  | 0.083 | 777.746  | 1  | 0.000 | 10.053 | 8.548                 | 11.824 |
| <b>Constant</b>                                        | -3.958 | 0.134 | 870.019  | 1  | 0.000 | 0.019  |                       |        |

A number of factors such as age group, religion, marital status, level of education, number of dependents in the household, province, sector, relationship to head of the household, literacy in English, and currently attending to an educational institute have significant effects at the 5% level of significance.

## **5.7 Summary**

The best fitted Logistic method of selection was invariant of the identified significant variables are the same for both forward and backward methods under LR and Wald criteria. Age group, marital status, religion, relationship to head of the household, sector, level of education, province, literacy in English, Currently attending to an educational institute, and number of dependents in the household are found as significant variables.

## CHAPTER 6

### EMPIRICAL RESULTS DERIVED FROM LOGISTIC REGRESSION MODELS FOR LABOUR FORCE PARTICIPATION

#### 6.1 Introduction

For the purpose of comparison the factors influence of LFP on male and female, the male LF participation also considered. The methodology discussed in the chapter 5, forward method under LR is used for this part of the study and same independent variables are considered.

#### 6.2 Variables Influence on Male Labour Force

The following table shows the results of the Chi- Square test conducted to find an association between male labour force participation as the dependent. The same hypothesis which was used in chapter5 was tested.

Table 6.1: Results of the Chi-Square test

| Independent Variable                            | Pearson chi-square value | Df | Significance(2-sided) |
|-------------------------------------------------|--------------------------|----|-----------------------|
| Age Group                                       | 6999.65                  | 5  | 0.000                 |
| Marital Status                                  | 3088.58                  | 2  | 0.000                 |
| Relationship to Head of HH                      | 1131.6                   | 3  | 0.000                 |
| Ethnicity                                       | 5.021                    | 6  | 0.541                 |
| Religion                                        | 6.554                    | 4  | 0.161                 |
| Level of education                              | 468.66                   | 5  | 0.000                 |
| Number of dependents                            | 22.268                   | 2  | 0.000                 |
| Sector                                          | 14.572                   | 2  | 0.000                 |
| Province                                        | 43.815                   | 8  | 0.000                 |
| Literacy in English                             | 167.74                   | 1  | 0.000                 |
| Currently attending to an educational institute | 8350.53                  | 1  | 0.000                 |

All the Chi- Square statistics shows in the table 6.1 are highly significant ( $p=0.000$ ) except ethnicity, and religion at 5% level of significance. It is clear the null hypothesis is rejected

for that significant variable. There is a strong association between the age group, marital status, and relationship to head of the household, level of education, province, literacy in English, Currently attending to an educational institute and male labour force participation.

Also it is clear that at 5% level of significance some variables like ethnicity and religion are not significant for males though those are significant for females. This further explains that some cultural factors affect female labour force participation in the country while those are not affecting for males at higher testing accuracy levels. Statistically significant variables at this stage are used for the advance analysis.

### 6.3 Fitting Binary Logistic Regression Model for Male Labour Force

Using the same method discussed in chapter 5, explanatory variables are added to the model. Forward stepwise method is used and the model starts with the constant-only model and then one best main effect is added to the model in each step. This process continues until there is no further improvement in the fitted model by adding new variables. In this part only the summery table of adding variables to the model is included

#### (i) Adding variables to the model

Table 6.2 Step Summary' of variable addition to the model

| Step | Improvement |    |       | Model      |    |       | Correct Class % | Variable         |
|------|-------------|----|-------|------------|----|-------|-----------------|------------------|
|      | Chi-square  | df | Sig.  | Chi-square | df | Sig.  |                 |                  |
| 1    | 7620.313    | 1  | 0.000 | 7620.313   | 1  | 0.000 | 83.1%           | IN: NEWCUEDEU    |
| 2    | 2066.199    | 5  | 0.000 | 9686.512   | 6  | 0.000 | 83.1%           | IN: newage       |
| 3    | 650.809     | 2  | 0.000 | 10337.321  | 8  | 0.000 | 83.4%           | IN: NEWMARID     |
| 4    | 250.227     | 5  | 0.000 | 10587.548  | 13 | 0.000 | 83.5%           | IN: NEWEDU       |
| 5    | 114.740     | 3  | 0.000 | 10702.289  | 16 | 0.000 | 83.6%           | IN: NEWRELSHIP   |
| 6    | 45.158      | 8  | 0.000 | 10747.447  | 24 | 0.000 | 83.7%           | IN: Province     |
| 7    | 17.141      | 2  | 0.000 | 10764.588  | 26 | 0.000 | 83.7%           | IN: NEWDEPENDENT |
| 8    | 6.125       | 2  | 0.047 | 10770.713  | 28 | 0.000 | 83.7%           | IN: SECTOR       |

**(ii) The final model for male LFP**

$$\text{Log } (P/1-p) = \alpha + \beta_1^{(\text{NEWCUEDU})} + \beta_2^{(\text{Newage})} + \beta_3^{(\text{newmari})} + \beta_4^{(\text{Newedu})} + \beta_7^{(\text{Newrela})} + \beta_6^{(\text{PRO1})} \\ \beta_5^{(\text{NEWDEPENDENT})} + \beta_8^{(\text{eng})} + \beta_8^{(\text{sector})}$$

The estimated parameters are depicted in Table 6.5

Here also the first category considered as the reference category same in female model.

**(iii) Fitting interaction terms to the model**

Similar to the female model the next step is to add interaction terms into the model and first two way interactions are checked. Since many of the independent variables are categorical in nature the interaction terms add more complexity to the model and also it is found that those do not improve the model further, and since there are enough number of main effects in the model and to overcome the complexity of the model to have parsimony it is decided not to include interaction terms to the model.

**6.4 Goodness of fit of the fitted model –male LFP**

The goodness fit for the overall model is discussed by using model Chi-Square test. When the reduce model is the baseline model with the constant only the likelihood ratio test the model as a whole. The Table 6.3 and Table 6.4 show the results for overall significance of the model.

Table: 6.3 Model Summary – Male LFP

| Step | -2 Log likelihood      | Cox & Snell R Square | Nagelkerke R Square |
|------|------------------------|----------------------|---------------------|
| 8    | 22480.134 <sup>a</sup> | 0.314                | 0.457               |

The result in table Cox & Snell's  $R^2$  (0.314) and Nagelkerke's  $R^2$  (0.457) are not achieve the maximum value of one, even if it predicts all the outcomes. That can be concluded the model predicts the data perfectly.

Table: 6.4 Omnibus Tests of Model Coefficients- Male LFP

|        |       | <b>Chi-square</b> | <b>df</b> | <b>Sig.</b> |
|--------|-------|-------------------|-----------|-------------|
| Step 8 | Step  | 6.125             | 2         | .000        |
|        | Block | 10770.713         | 28        | .000        |
|        | Model | 10770.713         | 28        | .000        |

According to the above table 6.5, at the step 8 when all variables are added to the model change in -2LL is 10770.713 and degrees of freedom is 28 and change is statistically significant at 5% level of significance. The significance of the predictor effects is rejected by the null hypothesis. When the likelihood of a given predictor is significant, at least one of them is significantly related to a dependent variable. Therefore it can be concluded that there is an adequate fit of the data to the model.

**Table :6.5 Marginal Effects of Binomial Logistic Estimates with categorized variables -Male**

| Variables in the Equation                              | B      | S.E.  | Wald     | df | Sig.  | Exp(B) | 95.0% C.I.for EXP(B) |        |
|--------------------------------------------------------|--------|-------|----------|----|-------|--------|----------------------|--------|
|                                                        |        |       |          |    |       |        | Lower                | Upper  |
| <b>Age Group</b>                                       |        |       | 1173.137 | 5  | 0.000 |        |                      |        |
| 20-24                                                  | 1.418  | 0.089 | 253.876  | 1  | 0.000 | 4.131  | 3.469                | 4.918  |
| 25-29                                                  | 2.099  | 0.111 | 355.754  | 1  | 0.000 | 8.161  | 6.561                | 10.150 |
| 30-34                                                  | 2.381  | 0.143 | 276.212  | 1  | 0.000 | 10.819 | 8.170                | 14.326 |
| 35-39                                                  | 2.280  | 0.144 | 251.809  | 1  | 0.000 | 9.774  | 7.375                | 12.953 |
| 40 and above                                           | 0.003  | 0.103 | 0.001    | 1  | 0.976 | 1.003  | 0.820                | 1.228  |
| <b>Marital Status</b>                                  |        |       | 466.368  | 2  | 0.000 |        |                      |        |
| Married                                                | 0.995  | 0.078 | 163.636  | 1  | 0.000 | 2.705  | 2.322                | 3.150  |
| Married(alone)                                         | -0.262 | 0.097 | 7.317    | 1  | 0.007 | 0.769  | 0.636                | 0.930  |
| <b>Level of Education</b>                              |        |       | 255.094  | 5  | 0.000 |        |                      |        |
| Primary                                                | 0.521  | 0.101 | 26.737   | 1  | 0.000 | 1.684  | 1.382                | 2.052  |
| Lower Secondary                                        | 1.095  | 0.098 | 125.632  | 1  | 0.000 | 2.990  | 2.469                | 3.622  |
| O/L                                                    | 0.811  | 0.103 | 62.085   | 1  | 0.000 | 2.250  | 1.839                | 2.753  |
| A/L                                                    | 1.085  | 0.109 | 99.763   | 1  | 0.000 | 2.959  | 2.391                | 3.660  |
| Degree & above                                         | 1.052  | 0.136 | 59.923   | 1  | 0.000 | 2.863  | 2.193                | 3.736  |
| <b>No. Of Dependants age &lt;15</b>                    |        |       | 17.475   | 2  | 0.000 |        |                      |        |
| 2 or less dependents                                   | 0.274  | 0.092 | 8.931    | 1  | 0.003 | 1.315  | 1.099                | 1.574  |
| 3or more dependents                                    | 0.542  | 0.177 | 9.354    | 1  | 0.002 | 1.720  | 1.215                | 2.434  |
| <b>Province</b>                                        |        |       | 33.414   | 8  | 0.000 |        |                      |        |
| Central                                                | 0.081  | 0.061 | 1.726    | 1  | 0.189 | 1.084  | 0.961                | 1.222  |
| Southern                                               | 0.133  | 0.060 | 4.913    | 1  | 0.027 | 1.143  | 1.016                | 1.285  |
| Northern                                               | -0.029 | 0.062 | 0.212    | 1  | 0.645 | 0.972  | 0.860                | 1.098  |
| Eastern                                                | 0.165  | 0.071 | 5.347    | 1  | 0.021 | 1.179  | 1.025                | 1.356  |
| North Western                                          | 0.276  | 0.068 | 16.245   | 1  | 0.000 | 1.317  | 1.152                | 1.506  |
| North Central                                          | 0.282  | 0.084 | 11.104   | 1  | 0.001 | 1.325  | 1.123                | 1.564  |
| Uva                                                    | 0.211  | 0.082 | 6.628    | 1  | 0.010 | 1.235  | 1.052                | 1.450  |
| Sabaragamuwa                                           | 0.153  | 0.066 | 5.342    | 1  | 0.021 | 1.165  | 1.024                | 1.327  |
| <b>Sector</b>                                          |        |       | 6.167    | 2  | 0.046 |        |                      |        |
| Rural                                                  | 0.120  | 0.049 | 6.025    | 1  | 0.014 | 1.127  | 1.024                | 1.240  |
| Estate                                                 | 0.077  | 0.097 | 0.621    | 1  | 0.431 | 1.080  | 0.892                | 1.306  |
| <b>Relationship to Household Head</b>                  |        |       | 112.782  | 3  | 0.000 |        |                      |        |
| Spouse                                                 | -0.233 | 0.114 | 4.180    | 1  | 0.041 | 0.792  | 0.634                | 0.990  |
| Son/Daughter                                           | 0.150  | 0.074 | 4.080    | 1  | 0.043 | 1.162  | 1.004                | 1.343  |
| Other                                                  | -0.548 | 0.063 | 76.192   | 1  | 0.000 | 0.578  | 0.511                | 0.654  |
| <b>Currently Attending to an Educational Institute</b> |        |       |          |    |       |        |                      |        |
| Not attending                                          | 3.730  | 0.085 | 1920.913 | 1  | 0.000 | 41.659 | 35.260               | 49.220 |
| <b>Constant</b>                                        | -4.494 | 0.154 | 846.979  | 1  | 0.000 | 0.011  |                      |        |

## **6.5 Comparison of Results in Chapter 5 and 6**

It was found all the variables are significant on both female and male labour force except religion. Religion was found not significant for male. However among the common significant factors the impact on male and female are not the same. It is briefly explained bellow. (According to the result in Table 5.6 in chapter 5 and Table 6.5 in Chapter 6)

- **Effect of the Age**

This study divides the variable 'Age' into six five-year age groups so considered as a categorical variable for the model, age 15-19 group is considered as the reference category and the last category is age 40 and above. The age group (30-34) found that for male model age is the second most important factor and all age groups compared to the reference age group (15-19) show significantly increasing odds for both male and female. Further compared to female factors the values of male factors are higher.

- **Effect of the cultural factors**

The study uses only two variables as cultural factors namely ethnicity and religion. It is unarguable that in a country like Sri Lanka ethnicity religion are highly related and correlated. Further it can be noticed in literature that many of the social habits strictly related to religion than to the ethnicity. Therefore this study mainly considers religion as a cultural. It is found that though the religion is a significant factor for FLFP, it is not a significant factor for male labour force participation where the literature gives lot of evidence in this regard. Hence the study finds religion as one of the cultural factors which significantly affect FLFP over male labour force participation. Further this is not strong as level of education and therefore by chi-square test analysis (Table 4.6) it can be seen that for higher levels of education the female labour force participation is higher irrespective of religion (Table 4.5).

- **Effect of the Marital status affects**

This study uses marital status in three categories never married, married (not alone), married but alone due to separation, divorce or being widowed. Many studies in literature found that marriage as a negative factor for labour force participation of female. Similar results were found in the study. For an example odds of participating labour force of a married (not alone) women decreases by a factor 0.497 compared to a never married woman but for male being married (not alone) significantly increase the odds of labour force participation by a factor 2.705 compared to never married male. Otherwise married but living alone men shows significantly decreases by a factor 0.769 compared to never married male.

- **Effect of the level of education**

It is found that the level of education is the most significant factor of female model. The reference category is “No Schooling” i.e. those who had never being to school among the age 15 and above population. The model results depict that the odds of participation in the labour force increase for a person in any other education group compared to a person in ‘no schooling’ group. For an example the odds of participating in labour force of a woman with Degree and above level of education increase by a factor 14.960 compared to a woman with no education when the other variables in the model are controlled this factor for male is 2.863. Further the results indicate that the level of education is a highly encouraging factor for females.

- **Effect of the Household factors**

Two household factors are used for the current study. These two variables are the person’s relationship to head of household and the number of person age less than 15 living in a household (dependents). It is found that as the labour force participation of woman having dependents decreases compared to woman without any dependents. However for males having young dependents at home is a positive factor when the number of dependents is increasing the male labour force participation.

- **Effect of the Place of residence**

The survey data provides information on place of residence, some such variables are province, district and sector. Province and sector are used in the models. A province is a collection of adjacent districts. Generally adjacent districts are common in some characteristics such as in geographically, environmentally and economically therefore province is selected as an independent variable to represent in the model. Western province is considered as the reference, where more opportunities, facilities and resources available compared to other provinces of the country. The result of cross tabulation statistics reveals that the labour force female participation rates are different in provinces.

The sector is the other variable related to place of residence and it is significant for both urban sectors are the reference group. The test results say that odds of a woman participate in labour force increase to a woman in estate sector by a factor of 1.967 compared to a woman in urban sector and it higher than for male factor. Rural sector also show positive odds compared to urban sector.

- **Effect of the currently attending to an educational institute**

The explanatory variable “NEWCUEDU” is an important factor among the selected variables for both female and male models. It is the most significant factor for male model and it is the second most important factor for female model. Logistic analysis considers a person ‘currently attending’ as reference. The odds of participating increased for a woman who is not attending by a factor 10.053 compared to a currently attending woman when the other variables are controlled. This factor for male is 41.659. The difference between female and male odds explains that more possibility of males to enter labour force over female when they are not currently attending to an educational institute.

- **Effect of the English literacy**

The reference category is literate in English. It can be seen from the results odds of a woman participate in labour force who is illiterate in English decreases by a factor 0.838 compared to a literate woman.

## CHAPTER 7

### COMPARATIVE ANALYSIS OF FEMALE LABOUR FORCE PARTICIPATION BETWEEN WESTERN PROVINCE AND NORTHEAST PROVINCES

#### 7.1 Introduction

This chapter aims to examine a comparative analysis of FLFP in high developed and less developed provinces of Sri Lanka. According to the HIES report published by DCS the Northern and Eastern provinces are reported highest poverty headcount index and lowest reported from Western province. (The poverty headcount index is a commonly used metric to measure the level of poverty in Sri Lanka. It shows the percentage of the population below the poverty line). Therefore, this chapter further studies the nature of female labor force participation among these provinces. The Northern and Eastern provinces are referred to as the “Northeast” provinces in this chapter.

#### 7.2 Current status of Female labour force in Western and Northeast provinces

Table: 7.1 Current status of female labour force participation in Western and Northeast provinces

| Status              | Western province |      | Northeast provinces |      |
|---------------------|------------------|------|---------------------|------|
|                     | Number           | %    | Number              | %    |
| Labour force        | 854114           | 33.8 | 253588              | 22.6 |
| Employed            | 806409           | 32   | 219663              | 19.6 |
| Unemployed          | 47705            | 1.9  | 33925               | 3.0  |
| Not in Labour force | 1669642          | 66.2 | 868944              | 77.4 |

In the Western Province's out of 15 and above female population, 33.8% women are economically active, while 66.2% are not economically active. 32% of them are workforce is employed and 2% is unemployed. In the Northeast provinces the FLFP is 22.6%, out of them 3% are unemployed and 19.6% are employed. A notable feature is that 77% of women over the age of 15 in the North Eastern Province are economically inactive women.

- **Age**

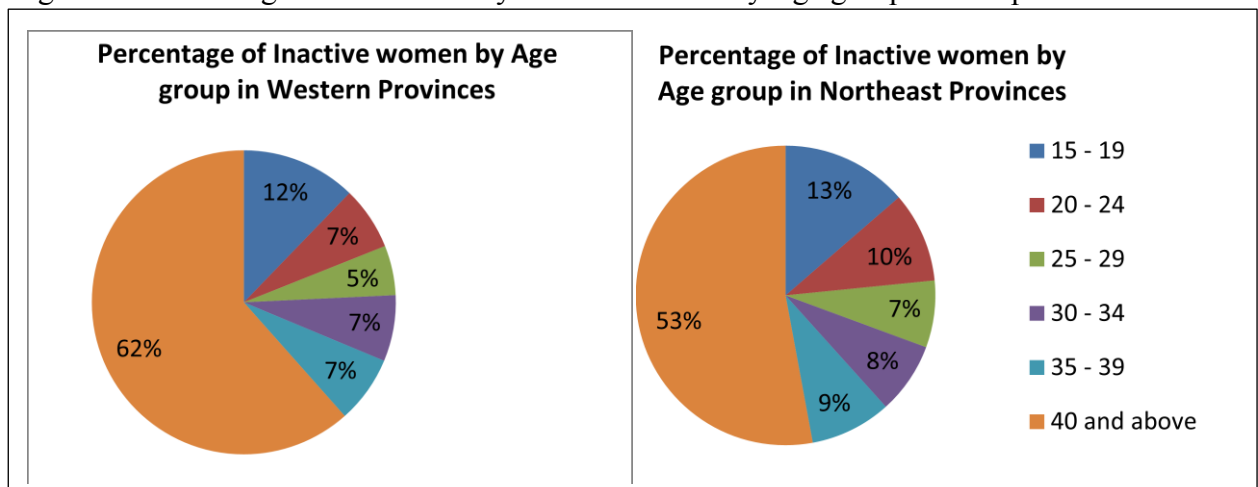
Table: 7.2 Economically active females by Age group in Western and Northeast provinces

| Age Category | Western province | Northeast Provinces |
|--------------|------------------|---------------------|
| 15 - 19      | 1.8%             | 2.3%                |
| 20 - 24      | 11%              | 10.4%               |
| 25 - 29      | 11.7%            | 13.6%               |
| 30 - 34      | 10.1%            | 14.4%               |
| 35 - 39      | 12.5%            | 15.3%               |
| 40 and above | 52.8%            | 44.0%               |

The participation of young women in the labor force is lower in both provinces. These findings indicate that the labor force participation rate of older women is higher in these provinces. The majority of older women in the Western Province are economically active compared to older women in the Northeast Provinces.

Since the majority of economically inactive women are in both provinces, further study was made on the age group at which those women were.

Figure 7.1 Percentage of Economically inactive women by Age group in both provinces



According to the figure 7.1 concedering 20-24 age group, 7% of young women in the Western Province and 10% in the North Eastern Province are economically inactive.

- **Marital Status**

Table: 7.3 Economically active females by Marital Status in Western and Northeast provinces

| Marital Status | Western Province | Northeast province |
|----------------|------------------|--------------------|
| Never Married  | 24.5%            | 24.2%              |
| Married        | 65.3%            | 59.1%              |
| Widowed        | 6.9%             | 10.3%              |
| Divorced       | 1.2%             | 2.1%               |
| Separated      | 2.1%             | 4.3%               |

Table 7.2 shows the female labour force participation rate in both provinces by marital status. It also noted that the incidence of female labour participation is highest among married women for both provinces. The presence of children and being married are known to affect labour force participation decisions.

- **Ethnicity**

Table: 7.4 Economically active females by Ethnic Group in Western and Northeast provinces

| Ethnic Group | Western Province | Northeast province |
|--------------|------------------|--------------------|
| Sinhala      | 85.6%            | 12.8%              |
| Tamil        | 5.6%             | 61.8%              |
| Moor         | 8.3%             | 25.3%              |
| Other        | 0.5%             | 0.1%               |

The distribution of female labor force can be clearly seen in relatively to the ethnic groups living in each province. The majority of economically active women in the Western Province are Sinhalese while the majority of economically active women in the Northeast Province are Tamils. The inclusion of Muslim women in the labor force is relatively low in both provinces.

- **Female Employment by major Industry Groups**

Table: 7.5 Economically active females by major industry groups in Western and Northeast provinces.

| Provinces | Agriculture |      | Industry |      | Services |      |
|-----------|-------------|------|----------|------|----------|------|
|           | No          | %    | No       | %    | No       | %    |
| Western   | 39546       | 4.9  | 270766   | 33.6 | 496097   | 61.5 |
| Northeast | 43359       | 19.7 | 44638    | 20.3 | 131666   | 59.9 |

The employment structure by sector can be shown by the number of jobs that were created in a given year. The highest share of the employed population is reported from the service sector in both provinces. Services sector's contribution to total employment in Sri Lanka varied widely across the provinces. For instance, its contribution in the Western Province was highest at 38 percent of total employment in Sri Lanka while the Northern and Eastern provinces had the lowest at 10 percent.

- **Employment status**

Table: 7.6 Economically active females by Employment status in Western and Northeast provinces

| Provinces | Employee | Self employed |                    |                            |
|-----------|----------|---------------|--------------------|----------------------------|
|           |          | Employer      | Own Account worker | Contributing Family worker |
| Western   | 70.2%    | 0.9%          | 20.6%              | 8.3%                       |
| Northeast | 62.8%    | 0.7%          | 29.5%              | 7.0%                       |

There are two main categories of employed population, depending on the status of employment and the number of salaried workers (self-employed) and self-employee. The self-employed can be further divided into three groups: employers, self-employed family workers, and own account workers.

## Level of Education

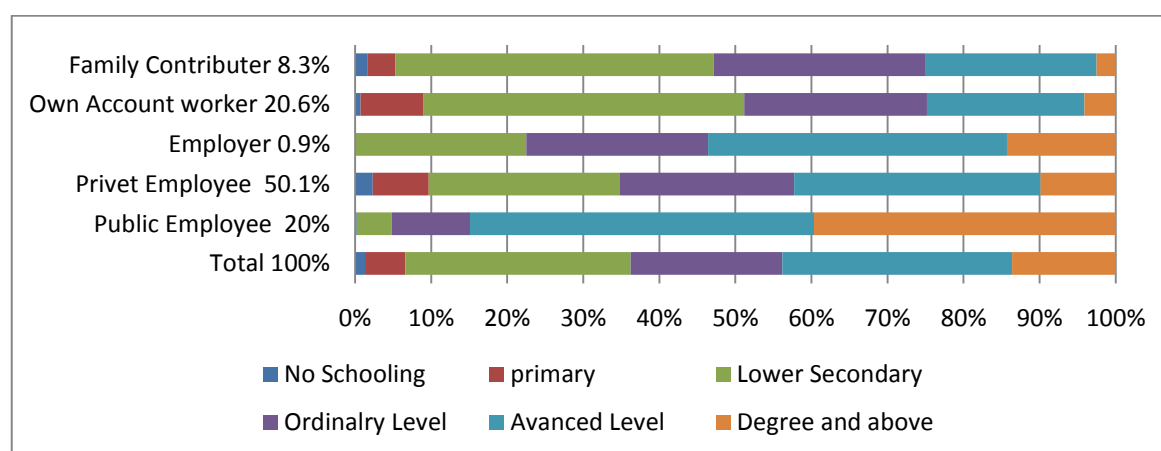
Table: 7.7 Economically active females by Level of Education in Western and Northeast provinces.

| Level of Education | Western province | Northeast Provinces |
|--------------------|------------------|---------------------|
| No Schooling       | 1.3%             | 3%                  |
| primary            | 5.1%             | 13.8%               |
| Lower Secondary    | 29.0%            | 34.3%               |
| Ordinary Level     | 20.0%            | 13.5%               |
| Advanced Level     | 30.9%            | 21.5%               |
| Degree and above   | 13.7%            | 13.9%               |

Among female labour force in Northeast provinces only 3 percent had less than primary education and majority 34.3% had only lower Secondary education. In western province majority 31% were educated up to Advanced Level

- **Female employee status by highest education level in western province**

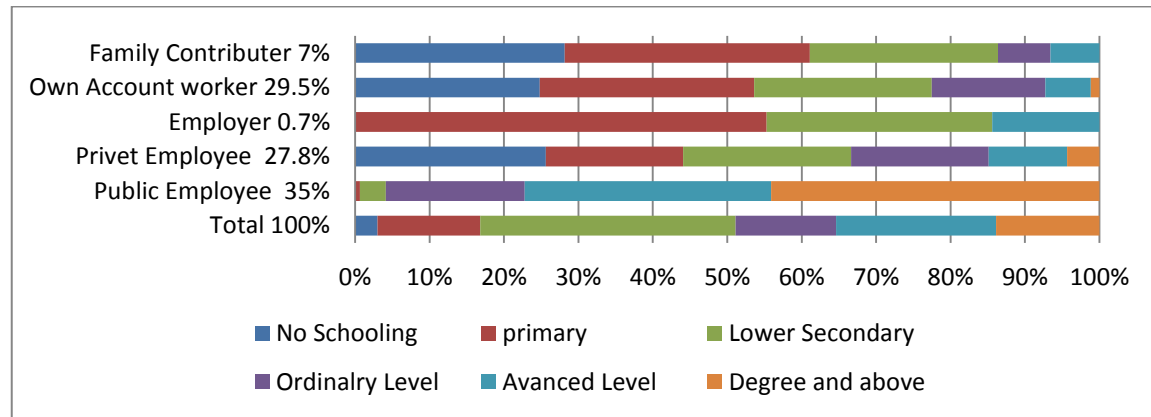
Figure 7.2 Female employee status by highest education level in Western province.



It is noteworthy that nearly 40% of female public servants in the western province have a degree or above qualification. That is, the majority of women with a degree or higher education qualification in the western province are engaged in the public service. Lower secondary is the highest educational level to most women who are engaging own account workers and family contributing work.

- **Female employee status by highest education level in Northeast provinces**

Figure 7.3 Female employee status by highest education level in Northeast province.



In the Northeast province 13.9% of women in the labour force have a degree or above education. Also, 91% of them are in the public service and 7% are in the privet sector and 2% are engage in own account work.

### 7.3 Variables influence on FLF in Western and Northeast province

The objective of the study was to compare the various factors that affect the participation of women in the labor market in both provinces. The methodology discussed in the chapter 5 and 6, forward method under LR is used for this part of the study and same independent variables are considered.

The following table shows the results of a separate Chi- Square test conducted to investigate an association between the participation of women in the labour force and the dependant status.

#### 7.4 Result of the Chi-Square Test

Table: 7.8 Result of the Chi- Square Test

| Category          | Western Province      |         | Northeast Provinces   |         | df |
|-------------------|-----------------------|---------|-----------------------|---------|----|
|                   | Chi-Square statistics | p-Value | Chi-Square statistics | p-Value |    |
| Age               | 440.122               | 0.000   | 323.064               | 0.000   | 5  |
| Ethnicity         | 80.261                | 0.000   | 64.791                | 0.000   | 3  |
| Marital status    | 171.960               | 0.000   | 214.471               | 0.000   | 4  |
| No of Dependents  | 58.478                | 0.000   | 61.725                | 0.000   | 2  |
| Sector            | 5.728                 | 0.057   | 0.876                 | 0.349   | 2  |
| Education Level   | 584.992               | 0.000   | 1153.028              | 0.000   | 5  |
| Current education | 220.548               | 0.000   | 576.591               | 0.000   | 1  |
| English Literacy  | 117.781               | 0.000   | 136.285               | 0.000   | 1  |

The purpose of this test was to find the association between the participation of female in the labour force in Western and Northeast provinces. All the chi-square statistics shows in the table 7.1 are highly significance ( $p = 0.000$ ) except sector variable at 5% level of significance. It is clear the null hypothesis is rejected for that significant variable.

#### 7.5 Fitting Binary Logistic Regression Model for Female labour force for both provinces

The model is constructed with the same method as in chapter 5 and 6. The forward stepwise method is used to start the model and then one main effect is added in each step. Separate Binary Logistic Regression analysis run for two provinces. The significance of this finding leads to the rejection of the null hypothesis, which states that all of the predictors are zero. A significant number of predictors is associated with a dependent variable. This characteristic can be used to evaluate the model's fit.

**Marginal effect of Binomial Logistic Regression Estimates with categorized Variable – probability of being economically active women in Western & Northeast provinces**

Table: 7.9 Marginal effect of Binomial Logistic Regression Estimates with categorized Variable – probability of being economically active women in Western & Northeast provinces

| Variables in the Equation                              | Northeast Province |         |       |        | Western Province |         |       |        |
|--------------------------------------------------------|--------------------|---------|-------|--------|------------------|---------|-------|--------|
|                                                        | B                  | Wald    | Sig.  | Exp(B) | B                | Wald    | Sig.  | Exp(B) |
| <b>Level of Education</b>                              |                    | 299.827 | 0.000 |        |                  | 195.951 | 0.000 |        |
| Primary                                                | 0.115              | 0.320   | 0.571 | 1.122  | -0.018           | 0.007   | 0.934 | 0.982  |
| Lower Secondary                                        | 0.227              | 1.355   | 0.244 | 1.255  | 0.053            | 0.067   | 0.796 | 1.055  |
| O/L                                                    | 0.566              | 7.294   | 0.007 | 1.761  | -0.021           | 0.010   | 0.922 | 0.979  |
| A/L                                                    | 1.430              | 45.232  | 0.000 | 4.177  | 0.431            | 3.994   | 0.046 | 1.538  |
| Degree & above                                         | 3.529              | 143.777 | 0.000 | 34.083 | 1.894            | 59.437  | 0.000 | 6.647  |
| <b>Currently Attending to an Educational Institute</b> |                    |         |       |        |                  |         |       |        |
| Not Attending                                          | 2.645              | 161.379 | 0.000 | 14.083 | 2.197            | 196.680 | 0.000 | 9.001  |
| <b>Ethnic Group</b>                                    |                    | 28.247  | 0.000 |        |                  | 67.501  | 0.000 |        |
| Tamil                                                  | 0.030              | 0.077   | 0.781 | 1.031  | 0.194            | 3.257   | 0.071 | 1.214  |
| Moor                                                   | -0.449             | 11.711  | 0.001 | 0.638  | -0.896           | 60.421  | 0.000 | 0.408  |
| Other                                                  | 1.196              | 1.815   | 0.178 | 3.308  | -0.406           | 1.186   | 0.276 | 0.666  |
| <b>Age Group</b>                                       |                    | 77.215  | 0.000 |        |                  | 101.299 | 0.000 |        |
| 20 - 24                                                | 0.753              | 13.059  | 0.000 | 2.124  | 1.464            | 56.207  | 0.000 | 4.325  |
| 25 - 29                                                | 1.146              | 27.285  | 0.000 | 3.145  | 1.588            | 57.622  | 0.000 | 4.896  |
| 30 - 34                                                | 1.456              | 39.972  | 0.000 | 4.287  | 1.265            | 34.376  | 0.000 | 3.544  |
| 35 - 39                                                | 1.641              | 51.227  | 0.000 | 5.159  | 1.534            | 51.791  | 0.000 | 4.638  |
| 40 and above                                           | 1.035              | 22.256  | 0.000 | 2.814  | 1.080            | 28.885  | 0.000 | 2.944  |
| <b>Marital Status</b>                                  |                    | 186.447 | 0.000 |        |                  | 218.141 | 0.000 |        |
| Married                                                | -1.151             | 95.383  | 0.000 | 0.316  | -1.004           | 116.058 | 0.000 | 0.366  |
| Widowed                                                | -1.002             | 42.827  | 0.000 | 0.367  | -1.629           | 169.361 | 0.000 | 0.196  |
| Divorced                                               | 0.896              | 7.452   | 0.006 | 2.449  | 0.310            | 0.937   | 0.333 | 1.363  |
| Separated                                              | 0.352              | 2.857   | 0.091 | 1.421  | 0.077            | 0.105   | 0.746 | 1.080  |
| <b>Literacy in English</b>                             |                    |         |       |        |                  |         |       |        |
| illiterate                                             | -0.338             | 10.370  | 0.001 | 0.713  | -0.211           | 9.228   | 0.002 | 0.810  |
| <b>Constant</b>                                        | -4.177             | 170.198 | 0.000 | 0.015  | -3.050           | 124.597 | 0.000 | 0.047  |

Model results show that the odds of participation in the female labour force increase for a person in any other educational group compared to a person in the ‘non-school education’ group for Northeast province. In Western province odds of woman participate in labour force that is in primary and O/L educational level are decrease by a factor 0.982 and 0.979 compared to a No schooling group.

In Northeast province the odds of participating in labour force of a woman with Degree and above level of education increase by a factor 34.083 compared to a woman with no education when the other variables in the model are controlled this factor for female in Western province is 6.647. Further the results indicate that the level of education is a highly encouraging factor for females. The effect of currently attending to an educational institute is also significant and positive for both provinces. The only factor used as a cultural factor in this section is the ethnicity. The odds of female in labour force decrease to women in Muslim compared to a Buddhist women in both provinces by a factor 0.638 in Northeast province and 0.408 for Western province. The odds for Hindu woman take higher value (1.214) in Western province.

The age group of 15 -19 is considered as a reference group and the other variables are constant all the other age groups shows significantly increasing odds for both provinces. Comparing both provinces the most significant increasing factor (5.159) shows for age group (35 - 39) in Northeast province and in the Western Province, the most significant age group is (25-29) for female labour force participation.

In this chapter uses marital status in five categories never married, married, widowed, divorced, and separated. Preceding studies have shown that there is an inverse relationship between being a married woman and being employed, which has been confirmed in this as well. While other factors are controlled, the participation of married and widowed women in the labour force has decreased compared to ‘never married women’ in both provinces. It can be seen for divorced and separated woman significantly increase the odds of labour force participation by a factor 2.449 in Northeast province and by a factor 1.363 in Western province.

## **CHAPTER 8**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **8.1 Conclusions**

The study finds that if a person whose age 15 and above is currently attending to an educational institute then it is a very important factor affecting to the decision of labour force participation of that person. It is strongly affects negatively for that person's labour force participation. This is a common feature for both men and women. Therefore it is found that one of the main reasons for low labour force participation is engage in studies either full time or part-time. Also the results of the study reveal that as the level of education increases the labour force participation is increasing. This shows less skills or less human capital attainment affect significantly for lower female labour force participation. Furthermore this shows that acquiring knowledge is important to face the competitiveness in the job market and therefore the persons in prime ages of labour force get ready to enter the labour market with good qualifications.

It was found that some cultural factors also affect females' decision of participating in labour force. It is very important to note that though the religion is a significant factor for female labour force participation it is not significant for male. Furthermore the results show that the Muslim women show comparatively lower participation rates. But it is also important to see that for higher levels of education there is no significant difference in labour force participation rates among religions.

The marital status of a female also effects on their labour force participation. Being married reduces the females in labour force and this is opposite for males. Getting married causes a woman to have lot of household responsibilities prevent females entering to labour force specially those who are with low levels of education. But for males who have the main

responsibility of household economy increases likelihood of participating in labour force as they get married.

The above factors are further explained by other significant household factors in the model, such as relationship to head of household and number of young dependants at home. The results of the study show that when the number of young dependants are increasing female labour force participation is decreasing but male labour force participation is increasing. The place of residence is also found as an important factor affecting for female labour force participation. Two variables related to place of residence were considered i.e. sector and province. Residential sector is a significant factor for female as well as male labour force participation. Further results reveal the females in both Rural and Estate sector are more likely to be in labour force compared to urban. The study results further explain residential province as a significant factor for labour force participation. All the provinces other than Northern show higher female labour participation compared to Western province.

It was found that having literacy in English is a positive factor for labour force participation and irrespective of gender. However, that female who is illiterate in English less likely to enter labour force compared to those with English literacy.

During the post-independence period, the female unemployment rate was higher than that of the male. It has remained so since 2004. The high rate of female participation in education and labor force as well as the declining agricultural sector share have led to the high female unemployment in Sri Lanka. Through open economic policies, more women have been employed in various industries in Sri Lanka.

The study revealed that youth unemployment among females is higher than among males. This could be a result of various factors such as gender-specific harassment at work, travel distance, patriarchal culture and religious barriers, as well as the lack of proper transportation facilities for women.

Most of the educated young woman will eventually want to work as clerks. To create awareness about the various job opportunities available to them, the Ministry of Industry and Commerce should organize various programmes.

The results obtained in this study can be effectively used for policy planning and some recommendations are given in section 8.2.

- **8.2. Policy recommendations**

- The age group 15-24 can be considered as the prime age of entry to the labour force of the country, irrespective of gender.
- Establish welfare centers for working women. These centers would allow women to keep their kids and adults safe while they're at work.
- Economic policymakers must classify industrial sub-sectors of the economy with large female concentrations and ensure that additional resources are invested in these sectors in order to increase women's participation in the labor force. Such a plan will aim to keep women stuck in low-wage, low-skill positions with little opportunities for advancement. Women's persistence in a few occupational groups within a limited number of industries makes them resistant to technological advancement.
- Economic planners should also classify potential growth sectors and examine job descriptions to determine which ones require female expertise. After that, they should establish a curriculum for women's training and selection.
- In Sri Lanka more population is concentrated in rural sector and high labour underutilization also reported from rural sector. This may be due to lack of opportunities or under development in those areas. Therefore employers should be persuaded to start new factories or offices in rural sector. Infrastructure should be provided.

- Self-employment is not a bad option for women who have some constraints like having dependants, household activities and not having enough education ect. It is important to promote females for own account works since that will eventually help their family's economy and country's economy. Therefore it is very important to provide them more facilities like training, credit facilities, an subsidies ect.
- A national-level intervention is needed to address these issues, which are mainly related to women's empowerment and employment. This would involve the Ministry of Labour and the Women and Child Affairs.
- In order to create awareness of the various job opportunities associated with this profession, the Ministry of Industry should organize programs and conduct training for the clerks.
- New legislations should be introduced to help private companies create more job opportunities for the unemployed youth. The Ministry of Skills Development and Vocational Training should promote job fairs to enable young women to acquire digital literacy skills.

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