DETERMINANTS OF FEMALE LABOUR FORCE PARTICIPATION
IN ZIMBABWE: 1980 TO 2012

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS OF THE MASTER OF SCIENCE DEGREE IN
ECONOMICS

BY GIFT MUPUNGA

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DEPARTMENT OF ECONOMICS
FACULTY OF SOCIAL STUDIES
UNIVERSITY OF ZIMBABWE
HARARE
Dedication

This thesis is dedicated to my lovely wife Oppah, my treasured son Valiant D.E and precious daughter Ethel, not forgetting my late son, Elgive, who tragically passed away on the 1st of May 2012.
Acknowledgements

Firstly I would like to express my sincere gratitude to my supervisor, Dr H. Zhou whose guidance and support steered my study into the right direction. Secondly I would like to acknowledge the invaluable contribution of the University of Zimbabwe, Department Of Economics teaching staff predominantly Dr Mumbengegwi whose constructive questioning stimulated careful thought. I further acknowledge Mr C Pindiriri whose recondite knowledge and instructing skills in econometrics helped me to understand and develop the methodology.

Also, worth mentioning are Department of Economics administrative staff, Lucy Mutuma and Loveness Mubvumbi, who provided hospitable attention to queries and enquiries. I also acknowledge invaluable comments from associates Mr Lazarus Muchabaiwa, Mr Stanford Hundi and classmate Edwin Chihava.

My gratefulness is further extended to the Secretary for Home Affairs, Mr M Matshiya whose visionary leadership granted me the necessary financial assistance. Similarly I would also like to thank brothers, Norman and Wellington Mupunga for related financial support. Many thanks go to my wife Oppah Mutambanashe for her encouragement together with comments on grammar. Likewise, I thank my mother Rebbie Gumbo-Mkambi for her moral support and appreciation she gave to my educational developments since childhood. Our Father in heaven deserves all the praise for creating friendly people around me and for granting me the exquisite life as well as the intellect to push me throughout the study. Hallowed be his name.

Special acknowledgments go to Zimstat, chiefly their staff Mr T Matangira and Mr M Madimutsa for availing the necessary data as well as providing the necessary clarifications. Other institutions whose data were useful are the World Bank, Reserve Bank of Zimbabwe and the Labour and Economic Development Institute of Zimbabwe (LEDRIZ).

Except for me, the personalities and/or institutions mentioned above are not liable for any wrong interpretation, error or omission in this study.
Abstract

The aim of the study is to identify the determinants of female labour force participation (FLFP) in Zimbabwe based on time series analysis of data from 1980 to 2012. The study also seeks to examine if education and economic development increase FLFP. Identifying the determinants of FLFP would assist with information necessary for accelerating the achievement of Millennium Development Goal number 3 (MDG3) on gender equality and empowerment of women. As propounded by Sackey (2005), achievement of MDG3 would help in alleviating poverty and in improving growth potential in the country.

Econometrics views 7 (e-views 7) was used to estimate a log linear model for female labour force participation in Zimbabwe. The study established that the major factors that determine FLFP in Zimbabwe are real wages offered in the non-agricultural sectors that are dominated by men, gross domestic product per capita, female education and the male unemployment rate. We established that high economic performance, higher levels of education for females and high male unemployment rate all raise female labour force participation in Zimbabwe. On the contrary the study established that high wages in male dominated sectors reduce female participation. The main reason for the negative effect of male wages is that the majority of working age females in Zimbabwe are married. Married women often consider their husbands’ income as part of their non-labour income (Mincer, 1962).

The results point out that fertility, health, male labour force participation and nominal market wages do not significantly affect female labour force participation in Zimbabwe.

The study recommends that Government should prioritise female education and economic development in its developmental efforts in order to achieve higher levels of participation of females in paid work.
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<thead>
<tr>
<th>Acronyms</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLFP</td>
<td>Female Labour Force Participation</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GDPPC</td>
<td>Gross Domestic Product Per Capita</td>
</tr>
<tr>
<td>ICSE</td>
<td>International Classification by Status in Employment</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labour Organisation</td>
</tr>
<tr>
<td>LEDRIZ</td>
<td>Labour and Economic Development Institute of Zimbabwe</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MOLASS</td>
<td>Ministry of Labour and Social Services</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>RBZ</td>
<td>Reserve Bank of Zimbabwe</td>
</tr>
<tr>
<td>SADC</td>
<td>Southern African Development Community</td>
</tr>
<tr>
<td>STERP</td>
<td>Short Term Economic Recovery programme</td>
</tr>
<tr>
<td>TCPL</td>
<td>Total Consumption Poverty Line</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>UNDG</td>
<td>United Nations Development Group</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>UNPF</td>
<td>United Nations Population Fund</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>Zimstat</td>
<td>Zimbabwe Statistical Agency</td>
</tr>
</tbody>
</table>
Glossary

**Contributing family worker** - A person who holds a self-employment job in a market-oriented establishment operated by a related person living in the same household, and who cannot be regarded as a partner.

**Economically active persons** (same as labour force) - comprises all persons of either sex who provide, or are available to provide, the supply of labour for the production of economic goods and services during a specified time reference period, as employed, unemployed or own account workers,

**Economically inactive population** - comprises all persons, irrespective of age, including those below the age specified for measuring the economically active population, who are not economically active during a given reference period. This includes the categories of students, homemakers and retired/ sick.

**Employer** is a person who operates his or her own economic enterprise or engages independently in a profession or trade, and hires one or more employees.

**Non-Labour Income** - total earnings, salaries and wages of other family members, retirement income, government transfers, profits, property income and other earnings accruing to an individual excluding his/her own wages and salaries.

**Homemaker**: A Homemaker is a person of either sex involved in housework in their own households, for example, fetching water and baby-sitting and who do not work for pay.

**Non-labour income** - a measure of the sum of earnings accruing to all people who live together as a family or household.

---

**Own account worker** are those who operate their own economic enterprise (a self-employed person working independently and who has no employees).

**Paid work**- work performed for some wage or salary, in cash or in kind.

**Reservation wage** - the lowest wage rate at which a worker would be willing to accept a particular type of job.

**Vulnerable employment** - the sum of own-account workers and contributing family workers.
Chapter 1: Introduction and Background

1.0 Introduction

Labour force participation refers to being engaged in paid activities or available to be engaged in paid activities (Beneria, 2003 and Makwavara et al. 2005). People can be part of the labour force as employers, employed workers or active job seekers. Self-employment is included if it produces a marketed product or service (Gaddis and Klasen, 2012).

The participation of a population in the labour force is measured by the labour force participation rate (LFPR) also known as the economic activity rate (Zimstat, 2011). LFPR is calculated by dividing the number of the economically active persons in a given age group by the total number of persons in that age group and multiplying the result by a hundred (Zimstat, 2004). Female labour force participation rate (FLFPR) is the percentage of the female\textsuperscript{2} working population that is working, available for work and actively looking for employment (Tansel, 2002).

A FLFPR rate of 50\% means that half of the female population is engaged in paid activities, either by working or looking for work, and the other half is not. However, according to Mincer (1966), this does not mean that half the individuals are always in the labour force and the remainder not. It could mean that the same individuals are sometimes in and sometimes out of the labour force. This gives rise to another interpretation of the labour force participation in terms of probability. In terms of probability, a 50\% female labour force participation rate would mean that each female person has a 50\% chance of being in the labour force at one point in time (Porath, 2001).

Labour force participation rates are extensively used in analysing labour markets, because they are the most quantitatively measurable component of labour supply (Psacharopoulos and Tzannatos, 2008). The distinction between labour force participation and labour supply is that the former mainly concerns the decision on whether to participate or not in the labour market.

\textsuperscript{2} The study looks at females aged 15 and above in general without classifying them according to age groups and thus classifies all females of working age as women. As a result the study uses the words "females" and "women" interchangeably.
while the later concerns how many hours of work one should put in the labour market (Ehrenberg and Smith, 1997).

Women who work on the family farms or enterprises are considered economically active and thus should be counted in the labour force (UN, 1975). However, according to Beneria (2003), in most cases low values of female labour force participation are reported because of absence of formal markets that would be measured in the certified national statistics. Given this low FLFP would not signal the absence of individuals who are willing to work in paid activities but lack of official statistics.

Due to issues relating to official statistics, approximations of labour force participation rates are contentious. The bone of contention arises because the term "labour force" refers to those engaged directly in paid employment which means in practice some important groups of the population indirectly contributing to the country's production are excluded. The groups excluded include those engaged in unpaid family work, agricultural family production or domestic activities (Psacharopoulos and Tzannatos 2008). In Zimbabwe, women activities largely fall within these categories and therefore are usually not recorded in the national statistics (Zimstat-LFCLS, 2012).

Factors that have been identified as determinants of female labour force participation include market wage rates, age, culture, marital status, education, health, family income and the number of children (Sackey, 2005). Chief among these factors are wages, non-labour income (whose major component in the case of married women is the husband's income) and education. Nevertheless the general belief is that female labour force participation is largely hindered by discrimination against women.

In several countries employers have been reported to hire men in spite of women in sectors where manual labour and acumen skills are required because of the stereotype that men are mentally better and physically stronger than women (Mon, 2000). This school of thought points to the existence of some degree of labour market discrimination related to gender. Due to issues concerning discrimination, the Fourth World Conference on Women held in Beijing 1995, requested governments and employers to formulate policies against gender discrimination at work. The conference encouraged the recruitment of women at both lower
levels and leadership or managerial positions on an equal basis with men. These declarations were then popularised as the ‘Beijing Declaration’ (United Nations, 1995).

1.1 Background

Since the evolution of labour economics, female labour force participation (FLFP) has been low in all countries. According to ILO (2009), women experience innumerable disadvantages in access to labour markets and usually do not have the same autonomy to choose to work as men do. ILO further reported that around two-thirds of employed women in developing countries work either as contributing family workers or as own-account workers. Such kind of work is characterised by poor pay, low-status, lack of safety and security, lack of representation and long working hours hence it is classified as vulnerable employment (UNDG, 2010 and Zimstat, 2012). Concentration of females in vulnerable employment results in economic efficiency losses and poverty. Psacharopoulos and Tzannatos (1989) reported that these losses are within the range of 3% and 10% of gross national product of any given country.

Findings by ILO (2010) pinpointed that female employment-to-population ratios have on average increased but remain at levels below those of men. As propounded by Psacharopoulos and Tzannatos (2008), women add up to more than half of any country’s human stock. Nevertheless, they still constitute the lesser fraction of the total labour force.

One of the resolutions of the Beijing Women’s Conference held in China in 1995 was to increase equality between men and women. In order to achieve the parity between men and women among other developmental goals, United Nations (UN) member states in the year further 2000 adopted the Millennium Declaration. The declaration set eight (8) millennium development goals (MDGs) to be achieved by 2015 to guide development efforts worldwide. MDG Number 3 (MDG3) seeks to promote gender equality and empower women (UNDG, 2010). One of the indicators of MDG 3 is the participation of women in paid activities particularly in wage employment in the non-agricultural sector (UNDG, 2010). Women’s participation in this respect is understood to give them greater autonomy, control over household decision-making and improve their welfare (Sackey, 2005).
The Government of Zimbabwe (GoZ) has since implemented drastic measures to promote gender equality; promote participation of females in the labour force and to reduce poverty among females. The measures include the ratification of the UN Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), the Beijing Declaration and the Millennium Declaration among other international and regional conventions. At the national level, Government has also created a full-fledged Ministry of Gender and Community Development, to advance the participation of females in economic activities.

1.2 Problem Statement

In Zimbabwe, there are more women (52%) than males (48%) yet observations show that, despite a steady increase in female labour force participation (FLFP) since 1980, FLFP has always been less than that of males (Zimstat, 2011). This in turn causes inequalities in income distribution between men and women (Razavi, 1997). Therefore, a study on what encourages females to participate in the labour force would provide essential information to reduce income inequalities.

Efforts by the Government of Zimbabwe on establishing a full-fledged Ministry of Gender and Community Development and on ratifying regional and international agreements to advance female participation have not yet proved fruitful. Most of the families with the exception of female headed households in Zimbabwe are still quite sceptical about participation of women in the labour force. This is indicated by the fact that female participation has never at any point surpassed male labour force participation (Figure 2.3). Ascertaining the determinants of female labour force participation would accordingly assist with information to improve the likelihood of females to partake in the labour market.

The deadline for achieving MDG targets by 2015 is fast approaching yet participation of females in the non-agricultural sector in Zimbabwe is still low relative to that of other countries (with the exception of North Africa and Middle East countries). Therefore, identifying the determinants of FLFP would assist with information necessary for formulating strategies to accelerate the achievement of MDG3.

Tansel (2002) publicised that low level of female labour force participation shows unemployment and under-employment of women as well as misallocation of human
resources. This reduces the economic performance through foregone output due to underemployment of females. It also reduces the capacity of the country to develop as well as the wellbeing of the citizenry (Sackey, 2005). Labour market participation of women will improve their relative economic position, increase overall economic efficiency and improve development potential of the country.

In Zimbabwe, poverty is rife amongst females especially amongst female heads of households. Female participation in economic activities is one of the existing means of alleviating poverty because it raises people’s incomes through wages and related earnings. Hence, FLFP has to be promoted and the promotion requires the requisite knowledge and facts concerning the determinants of FLFP.

Further, several conclusions on FLFP have been made based on studies that have been done for both developing and developed countries that include Ghana, Pakistan, Turkey and United Kingdom. However, discourse on female labour force participation in Zimbabwe is mainly centred on qualitative characteristics such as equality and justice. Little or no reference has been made to specific empirical studies on the determinants of FLFP in the case of Zimbabwe. Hence, empirical literature on determinants of FLFP in Zimbabwe is needed.

1.3 Objectives

The main objective of this study is to identify and examine the factors that influence female labour force participation (FLFP) in Zimbabwe.

The specific objectives are to determine if economic development as proxied by gross domestic product per capita (GDPPC) and female education increase female labour force participation in Zimbabwe.

1.4 Research Questions

The research seeks to find answers to the following questions:

- What are the factors that determine female labour force participation in Zimbabwe?
- Do improvements in gross domestic product per capita significantly lead to improvements in female labour force participation in Zimbabwe?
Are improvements in female education significant in explaining the increase in female labour force participation in Zimbabwe?

1.5 Hypotheses

The study hypothesizes that higher levels of economic development as measured by GDP per capita and higher levels of female education as indicated by the female literacy rate among other factors increase the participation of females in the labour force in Zimbabwe.

1.6 Significance of the study

According to ILO (2010), several countries are increasingly becoming aware that women are productive just like men are. Increased female labour force participation uplifts the human capital base and aggregate labour supply so it improves the capacity of an economy to grow (European Commission, 2010). The study will come up with empirical evidence on the variables that government has to manipulate in order to achieve higher levels of female participation as a way to increase the country’s growth potential.

Since the Growth With Equity policy of 1981, considerable amounts of public funds have been committed to promoting socio-economic transformation programmes that enhance equity for all citizens, especially gender equity. For example, the Government has been increasingly investing in education for all from primary to tertiary level. Female labour force participation is one of the indicators of socio-economic transformation. Therefore, identifying the determinants of FLFP would assist with information on whether the Government is spending on the right or wrong factors.

The study will also enable Government to identify policy variables that will make it achieve the millennium development goal number 3. It will also enable Government to generate socio-economic policies that have a positive impact on the employability of women workers in both the formal and informal sectors (UN, 1995 and Sackey, 2005).

The study will also supplement previous enquiries and existing knowledge on the determinants of female labour force participation. It also helps to establish whether the results obtained for other countries can be generalised to include Zimbabwe.
1.7 **Organisation of the study**

This chapter presented the introduction, the research objectives, research questions, problem statement and the significance of the study. The chapters that follow are organised as follows; chapter 2 presents the status of the labour market in Zimbabwe, Chapter 3 presents the literature review and Chapter 4 presents the methodology. Chapter 5 presents the results of the study and chapter 6 presents the findings, policy recommendations and suggestions for further research.
Chapter 2: Status of the Labour Market in Zimbabwe

2.1 Introduction

The chapter gives an overview of Zimbabwe’s labour market and provides historical and descriptive statistics relating to the status and evolution of selected labour market indicators between 1980 and 2012. Focus is particularly on female labour force participation (FLFP). The discussion largely utilises data from the labour force surveys conducted for Zimbabwe in 2004 and in 2011.

2.2 Population Characteristics

Based on the latest population census conducted in 2012, Zimbabwe, which attained independence in 1980, had an estimated population of 12 973 808. Of the population, 48% were male and 52% are female giving a sex ratio (male to female) of 92 males per 100 females (Zimstat, 2012). The Zimbabwe 2011 Labour Force Survey (LFS) estimated the 2011 population at 11.9 million and the sex ratio was similar to that for 2012. Table 2.1 summarises the major population characteristics of the labour force in Zimbabwe as at 2004 and 2011.

Table 2.1: Population Characteristics of Zimbabwe’s Labour Force as at 2004 and 2011

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population (million)</td>
<td>10.8</td>
<td>11.9</td>
</tr>
<tr>
<td>Sex ratio</td>
<td>95 : 100</td>
<td>92 : 100</td>
</tr>
<tr>
<td>Males above 5yrs who never went to school</td>
<td>6(%)</td>
<td>4(%)</td>
</tr>
<tr>
<td>Females above 5yrs who never went to school</td>
<td>9(%)</td>
<td>6(%)</td>
</tr>
<tr>
<td>Literacy rate- Males</td>
<td>94(%)</td>
<td>98(%)</td>
</tr>
<tr>
<td>Literacy rate -females</td>
<td>87(%)</td>
<td>97(%)</td>
</tr>
<tr>
<td>Male Labour Force Participation Rate</td>
<td>91(%)</td>
<td>90(%)</td>
</tr>
<tr>
<td>Female Labour Force Participation rate</td>
<td>84(%)</td>
<td>85(%)</td>
</tr>
<tr>
<td>Overall Labour force participation rate</td>
<td>87.5(%)</td>
<td>87.5(%)</td>
</tr>
</tbody>
</table>
Table 2.1 shows that though the sex ratio is skewed towards females, indicators such as labour force participation rate and literacy rate favour males.

2.3.0 Key Labour Market Indicators

Three important labour market variables will be discussed for Zimbabwe namely: employment, labour force participation and unemployment. A brief discussion will also be done on the economically inactive population. The employment rate is useful in estimating the capacity of the economy to absorb job seekers hence it is valuable for forecasting labour demand in the economy. The labour force participation rate (LFPR) is useful in providing an indication of the relative size of labour supply available for production of goods and services in the economy (Zimstat, 2011). 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.

2.3.1 Employment

Employment refers to that part of the labour force that is currently working. According to Zimstat (2011), knowledge of the number of people working on their own or for others is important for determining the structure and functioning of the labour market. Employment is usually measured as a ratio of the population. The employment to population ratio refers to the proportion of the working age population (15 years and above) who are employed. The ratio indicates the degree to which the economy uses the productive potential of males and females (Zimstat, 2011). The employed persons comprise paid employees, employers, own account workers and contributing family workers.

According to Zimstat (2005) and (2011), in 2004, 79% of Zimbabwe’s working age population was employed; employment rate for males was at 85% while for female employment rate was at 74%. The 11% variance between male and female employment could be a consequence of maternal roles, distinct educational attainment and choice of male labour by employers especially in heavy industries (Mammen and Paxson, 2000).

By 2011, Zimbabwe’s total employment to population ratio had declined by 1% to 78%. Male and female employment to population ratio declined by 1% to 84% and 73%
respectively. The decline in the ratio was mainly an outcome of the structural decline that occurred in the economy during the economic crisis period spanning from the year 2000 to early 2009.

Employment in Zimbabwe also varies according to formal and informal sectors. At independence, Zimbabwe carried over a relatively advanced formal modern sector economy on one hand and relatively backward communal, agricultural and informal sectors on the other hand (LEDIZ, 2011). According to the Ministry of labour and Social Services (MOLASS), the formal sector employed 20% of the labour force while the informal sector employed 80% of the labour force in the 1980s.

**Employment in the Formal Sector**

The International Labour Organisation (2011) noted that while 20% of the labour force was employed in the formal sector in 1980 only 13% of the labour force was employed in the formal sector by 2004. The Ministry of Labour and Social Services (MOLASS) and ILO (2011) further pointed out that formal employment growth slowed down from an annual average rate of 2.5% from 1980 to 1990 to 1.2% during ESAP period and to -1.6% during part of the crisis period from 1997 to 2004.

In the formal sector women are largely hired in agriculture and in low paying social services such as health and education (Table 2.2). According to Zimstat (2011), 61.8% of paid female employees received less than US$ 200 per month in 2011 while the poverty datum line was estimated at around US$500.

There are two major striking features in table 2.2 below. Firstly, the finance and insurance sector is relatively a high growth and high paying sector yet employment of females in this sector has been declining for the greater part of the period under study. Secondly the only sector in which females are dominant is the health sector which is a low paying sector. On the other hand, men have been associated with high paying and challenging occupations that require strategic decision making such as mining engineering and financial management.

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1. According to Zimstat (2011), an economic activity or a production unit is deemed to be informal if it is neither registered with the registrar of companies nor licenced or if it is licenced only.
### Table 2.2  Percentage share of female employment in selected sectors in the formal economy, 1980-2011

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>56.5</td>
<td>56.0</td>
<td>56.6</td>
<td>57.7</td>
<td>63.6</td>
<td>34.7</td>
</tr>
<tr>
<td>Finance &amp; Insurance</td>
<td>36.9</td>
<td>31.8</td>
<td>30.2</td>
<td>27.1</td>
<td>34.1</td>
<td>35.2</td>
</tr>
<tr>
<td>Education</td>
<td>35.5</td>
<td>34.3</td>
<td>32.4</td>
<td>43.0</td>
<td>52.0</td>
<td>55.0</td>
</tr>
<tr>
<td>Agriculture</td>
<td>23.3</td>
<td>25.5</td>
<td>29.0</td>
<td>31.9</td>
<td>53.8</td>
<td>54.6</td>
</tr>
<tr>
<td>Private Domestic</td>
<td>19.0</td>
<td>25.4</td>
<td>26.4</td>
<td>74.1</td>
<td>86.8</td>
<td></td>
</tr>
<tr>
<td>Public Administration</td>
<td>8.5</td>
<td>10.1</td>
<td>11.6</td>
<td>17.2</td>
<td>18.0</td>
<td>20.1</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>7.8</td>
<td>7.0</td>
<td>7.6</td>
<td>8.7</td>
<td>28.7</td>
<td>22.9</td>
</tr>
<tr>
<td>Mining</td>
<td>2.0</td>
<td>2.6</td>
<td>3.7</td>
<td>4.2</td>
<td>14.1</td>
<td>8.7</td>
</tr>
<tr>
<td>Construction</td>
<td>1.4</td>
<td>2.2</td>
<td>4.5</td>
<td>5.2</td>
<td>10.4</td>
<td>9.4</td>
</tr>
<tr>
<td>All sectors</td>
<td>16.6</td>
<td>17.9</td>
<td>19.7</td>
<td>22.8</td>
<td>48.6</td>
<td>50.2</td>
</tr>
</tbody>
</table>

*Source: Extracted from LEDRIZ, 2011 and Zimstat 2004 and 2011*

The statistics shown in table 2.2 indicate the existence of occupational segregation where women have traditionally been considered suitable for employment as land tillers, teachers, private secretaries and nurses.

**Employment in the Informal Sector**

Since 1980, the fraction of females in the informal sector has been relatively higher than that of males however, by 2011, there was almost equal participation of males (49.7%) and
females (50.3%) in the informal sector labour force (Zimstat, 2011). The number of females in the informal sector has been higher during the Economic Structural Adjustment Programme (ESAP) period because of a subdued labour market which forced women into informal activities (Sachikonye, 1997). Most of the microenterprises that were owned by females liquidated due to increasing competition and females were the first victims in the retrenchments that were associated with ESAP (MOLASS, 2010).

Involvement of females in the informal sector has also been high during the crisis period 1997 to 2008 as falling real wages made work in the formal sector less attractive. As noted by the Ministry of Labour and Social Services (2010), the economic crisis in the decade spanning from 1998 to 2008 disproportionally affected women through closure, downscaling and informalisation of female dominated sectors.

2.3.2 The Economically Active Population (Labour Force)

This refers to the persons aged between 15 and above, employed or unemployed, who are available to supply their labour services for the production of goods and services in the economy (Makwavarara et al. 2005). The overall labour force participation rate in Zimbabwe slowly rose from 65% in 1980 to 70% in 2004 and averaged around 87.5% during the period between 2004 and 2012 (Zimstat 2011). Male and female labour force participation rates showed a comparable pattern from 1980 to 2012 and that for male has always been higher than female. FLFP has been more volatile than male labour force participation (Figure 2.2).

Before independence, wage discrimination by race and sex foiled the engagement of women in paid activities. Black women were the least paid and the legal framework did not provide for representation or protection of females against ill-treatment or harassment at work places (LEDRIZ, 2011). Further, accommodation structures in urban areas residential suburbs for Africans could not accommodate both parents and children hence most females would stay in rural areas with children. All these forms of discrimination against females heavily thwarted the labour force participation of females before and soon after independence (GoZ and MOLASS, 2010).

After independence Government introduced the growth with equity policy that culminated in several legislative reforms. The reforms include introduction of equal pay regulations and paid maternity leave which made participation of women in paid work more attractive.
(Ncube, 2000). Discrimination of employees on the basis of sex was outlawed through the enactment of the Labour Relations Act of 1984. Participation of females in parliament or other political posts was made possible through the Electoral Act of 1990 (LEDRIZ, 2011). Participation of women in senior public decision making bodies was promoted through the Public Service Regulations 2000.

Female labour force participation rate (FLFPR) has been on a steady upward trend from 1980 to 1997 (Figure 2.1). Within that period the rate of increase of FLFP was rather slow between 1980 and 1990 and accelerated slightly during the ESAP period, 1991 to 1996. The favourable trends in female participation from 1980-90 were attributed to deliberate government macroeconomic policies that were aimed at addressing social and economic disparities in the economy, supported by the legal reforms cited in the preceding paragraph. The macroeconomic policies include the Growth with Equity Policy introduced in 1981, the Zimbabwe Transitional Development Plan, 1982 to 1985 and the Five Year National Development Plan 1986 to 1990, (Malaba, 2006).

**Figure 2.1  Trends in Labour Force Participation 1980-2012**

![Graph showing trends in Labour Force Participation 1980-2012](image)

*Source: World Bank, 2012*

Figure 2.1 shows that female participation has always been below male participation.
The increased female participation from 1991 to 1996 was perhaps not due to a deliberate policy but rather a consequence of the situation prevailing in the economy. As put forward by Standing (1999) and Klasen (2012), FLFP increases in response to push factors such as economic downturns or rising uncertainty in the labour market. As such, female participation would work as an insurance instrument against factors which reduce households’ income for example underemployment of males. Chipika et al. (1996) argued that the liberalisation of the labour market under ESAP led the real wage to decline in 1993 and 1994 to 34.4% of its 1980 levels. The associated retrenchments of most males and decline in real wages could have pushed non-participating women to participate in order to supplement their family incomes (Lundberg, 1985 and Standing 1999).

FLFPR slightly declined from 1997 up to 1999, this decline could have been a result of the abandonment of ESAP policy which eased the difficulties that had been brought into the labour market. Another possible reason could be decline in economic performance as shown by an average economic growth rate of -7% between 1997 and 2000 which government failed to control despite introducing the Zimbabwe Programme for Economic Recovery and Social Transformation (ZIMPREST: 1996-2000), (Malaba, 2006). Weak economic performance has negative implications on FLFP because it results in limited opportunities for females.

FLFPR then rose from 65% in the year 2000 to 84% in 2004. The sharp increase was probably due to the onset of the economic crisis that began around 1998. Though Government had put in place the Millennium Economic Revival Programme in 2001 followed by the National Economic Revival Programme (NERP) in 2003, the crisis continued. The continuous economic crisis led many females to plunge into poverty hence higher propensity to participate in paid activities as a way to reduce poverty (Lundberg, 1985). According to Malaba (2006), the proportion of the population living below the Total Consumption Poverty Line (TCPL) increased to 72% in 2003 up from 55% in 1995. Malaba reported that 68% and 60% of female headed households and male headed households respectively were in poverty (below TCPL) in 2003.

Further, the increase in FLFP from 1998 to 2008 and even beyond could also be attributed to the sprouting of feminist Non-Governmental Organisations (NGOs) specialising in gender equity and women’s rights. One such NGO is the Women of Zimbabwe Arise (WOZA). According to Zimstat (2012), the female labour force participation rate then oscillated within
the range of 84% to 85% between 2004 and 2011. The positive economic growth brought about by the Short Term Emergency Recovery Programme (STERP) introduced in 2009 under the Government of National Unity (GNU) helped to maintain the FLFPR at the higher levels. Higher economic growth (5.7% in 2009 and 8.1% in 2010) conceivably improved the opportunities for both jobs and access to capital for females to partake in the labour market as workers, employers and own account workers, (MOLASS, 2012).

Figure 2.2 shows the trends in factors that are believed to be responsible for changes in female labour force participation from 1980 to 2012 juxtaposed on FLFPR.

**Figure 2.2   Trends in literacy rate, male unemployment and economic growth**

*Source:*  *World Bank 2012 and www.tradingeconomics.com*

Over the entire period, 1980-2012, Government was continuously investing in education for all. The results of the pursuit of education for all policy have been noted in the rising literacy rate for demographic groups as well as rising gross enrolment ratio for both primary and secondary schools. These achievements in education may well be part of the reasons for the steady increase in female labour force participation since 1980.
The majority of females are in “vulnerable employment” that is characterised by low wages, low profits and little access to standardised working hours due to the nature of their work as demonstrated in figure 2.1 (ILO, 2010 and Zimstat, 2011).

Figure 2.3  Distribution of economically active female population by current activity as at 2012.

Source: Based on data from Zimbabwe 2011 labour force survey table 4.3

Figure 2.3 shows that around 59% of the economically active females worked on their own in communal and resettlement farms without hiring paid labour. Approximately 12% worked on their own in other activities outside communal and resettlement farming and 6.2% were working as paid casual workers. In contrast, only 0.2% of the economically active female population were employers and merely 7.9% were paid permanent employees. Thus only 8.1% (paid permanent workers plus employers) of the economically active females have
access to social protection through pension contributions and access to representation by employers or employee representative organisations.

As for males, 21% of the economically active males are in the better group. The 2011 labour force survey indicated that 66% of employed males and 83% of employed females were in vulnerable employment. Thus, in Zimbabwe, the proportion of the labour force that is in vulnerable employment is largely female (Makwavarara, 2005)

**Labour Force Participation by Sex and Age**

Zimstat (2012) reported that while the highest recorded participation rate for males was 98% for both 2004 and 2011 the highest recorded participation rate for females was lower at 92% and 95 % for 2004 and 2011 respectively.

**Figure 2.4 Labour force participation by sex and age as at 2011**

![Labour force participation by sex and age as at 2011](image)

*Source: Zimstat, 2012*

Figure 2.4 shows that in 2011, male labour force participation exceeded female labour force participation rate for all age groups.

**Female Labour Force Participation (FLFPR) by Rural or Urban**

According to Zimstat (2011), FLFPR has always been lower for urban areas compared to the rural areas over the period 1980 to 2011. As at 2004, total FLFPR (for all age groups) was at
76% for urban areas and 90% for rural areas. The distribution as at 2011 is shown in figure 2.5. The observed differences are partly due to differences in education attainment between rural and urban areas. As reported by the 2011 LFS, female literacy rate which is one of the indicators of the level of education was 95.1% for rural areas and 99.2% for urban areas. The agricultural sector which is dominant in rural areas would possibly absorb the majority of women without skills or education.

**Figure 2.5  Female Labour Force Participation by Rural and Urban as at 2011**

![Graph showing female labour force participation rate by age group in rural and urban areas]

*Source: Zimstat, 2011.*

Figure 2.5 shows that as at 2011 female labour force for all age groups was higher for rural areas than that for urban areas.

**The Economically Inactive Population**

The 2011 Labour Force Survey established that, of the population aged 15 and above, 1 149 424 were economically inactive and 60% of them were females while 40% were males. As much as one third of the females were inactive due to household duties while less than a tenth of males were inactive as a result of household duties. The situation is possibly a consequence of specialisation of labour within households where females are traditionally allotted household duties such as cooking and washing.
In addition, the survey indicated that as much as two thirds, 64.8%, of the economically inactive males are inactive due to engagement in studies. These studies enhance their employability and future earning potential (Sackey, 2005). For females, less than half of the economically inactive female population are inactive due to studies. The disparities in opportunity enhancing activities are a result of the traditional importance attached to the male child in Zimbabwe and other developing countries where the female child is expected to earn her future living from marriage.

Similar disparities exist for urban and rural areas where in rural areas 48% of all economically inactive people are students while in urban areas students constitute 55%. Female inactivity due to household duties is higher for urban areas (34%) than for rural areas (25%). This could be explained by higher costs of child care in urban areas which results in mothers deciding to stay at home to reduce the marginal cost of child care. Unlike in rural areas, the jobs that women can do for example agricultural work allow them to mix child rearing and work (Goldin, 1990). There are also noticeable differences between inactivity due to studies for urban females (45.6%) and for rural females (40.1%). This could be explained by concentration of higher and tertiary education institutions in urban areas which lead people to migrate to urban areas for the purpose of pursuing further education.

2.3.3 Unemployment

Based on the broad definition of unemployment, 14.5% of the economically active female population were unemployed while 6.6% of economically active male population were unemployed in 2011. This translates to an overall average of 11% of the economically active population above 15 years being unemployed in 2011. This represents a 2% increase from 9% in 2004 (Zimstat, 2012).

The unemployment rates for Zimbabwe have been contested by several individuals and research organisations in and outside Zimbabwe. For example, the CIA World Fact Book, 2012 estimated the unemployment rate to be as high as 80% in 2005 and 95% in 2009. However, official sources such as Zimstat and ILO argue that the unemployment rate for Zimbabwe has always averaged less than 10% for the greater part of the period from 1980 to 2012.
According to Luebker (2009), higher reported rates of unemployment are based on idiosyncratic judgements by some ordinary Zimbabweans who consider themselves as unemployed because they lack what they think is a “proper job”. Though the low rates are disputed, Luebker (2008) found that the official rates that are reported are a result of consistent application of ILO standard definition of unemployment which makes use of the “broad” and “strict” definition of unemployment.

The broad definition of unemployed refers to the population age 15 years and above which during a seven day reference period, did not work and had no job or business but were available for work. The strict definition of unemployment adds a requirement that those without a job and available for work be actively looking for work (Zimstat, 2012).

2.4 Conclusion

The chapter showed that, in Zimbabwe, disparities in labour force participation mainly exist according to sex, education, geographical location and age. To consolidate the achievements in eliminating legal deterrents to female labour force participation it is crucial to identify its major determinants. The chapter that follows looks at what theory and empirical studies have identified as the determinants of female labour force participation.
Chapter 3: Literature Review

3.0 Introduction

This chapter explores the various theoretical foundations underpinning the study of female labour force participation. The chapter also highlights the relevant empirical findings that previous researchers have come up with in the study of female labour force participation in both developing and developed countries.

3.1 Theoretical Literature Review

The determinants of labour force participation are examined in the same way as the determinants of labour supply. According to the neo classical theory, the major determinants of labour supply are own wages and non-labour income where, non-labour income represents alternative earnings apart from own wages (Spencer, 1973). The earnings include salaries and wages of other family members, retirement income, government transfers and returns on investments (Morrison et al, 2007).

Analysis by Becker (1965), Mincer (1962) and Spencer (1973) utilised the Hicksian neo classical labour supply model to study female FLFP particularly that for married females. Chaykowski and Powell (1999) also showed that labour force participation can largely be explained by the theoretical determinants of labour supply which are principally wages and non-labour income.

The neoclassical model scrutinises market labour supply in terms of the consumption theory where a consumer (worker) derives utility $U_C$ and $U_L$ from consumption goods and leisure respectively given her income so that:

\[ U = U_{cl}(C, L) \]  

where, C stands for consumption of market goods and L stands for leisure.

The theory is underpinned by the following assumptions among others:

- Leisure is a normal good
• The total time, T, available to an individual per given day can only be spent on either paid work, H, in the market or on leisure, L. Leisure is also assumed to include time spent in production of goods and services at home as well as caring for children and the sick.

• The individual consumes all her income so that value of goods consumed equals total income, that is $P_i C_i = WH + V$, where W is the wage rate, V is non-labour income and $P_i$ is the price of the good $i$ consumed.

Utility $U$ would be maximized subject to the income constraint and time constraint:

$$Y = WH + V$$  \hspace{1cm} (2) \hspace{1cm} \text{income constraint}$$

$$H + L = T \text{ which implies } L = T - H$$  \hspace{1cm} (3) \hspace{1cm} \text{time constraint}$$

Substituting C and L (1) becomes:

$$U = (WH + V, T - H)$$  \hspace{1cm} (4)$$

The consumer's problem becomes:

$$\text{Max } U(WH + V, T - H) \text{ subject to } Y = WH + V$$  \hspace{1cm} (5)$$

The first order conditions solution give rise to the following equations:

$$U_C(WH + V, T - H) = \lambda, \hspace{1cm} U_L(WH + V, T - H) \geq \lambda W$$  \hspace{1cm} (6)$$

where $\lambda$ is the marginal utility of income. Equation (6) involves the demand function for consumption goods and the maximum possible allocation of time between leisure and market work. According to Ackah et al (2009), if the inequality in equation (6) holds strictly the individual would be out of work meaning $L = T$. The wage, $W_r$, such that $U_L(WH + V, T - H) = \lambda W_r$ represents the reservation wage. The reservation wage being the wage below which the individual will not work. According to Chaykowski and Powell (1999), the reservation wage is the non-market value of an individual's time. An expected market wage ($W_e$) that exceeds the reservation wage ($W_r$) gives the individual an incentive to participate in market work.
Various variables can affect the labour force participation decision of an individual by either raising or lowering their potential wage rate or their reservation wage (Chaykowski and Powell, 1999).

An increase in the real wage rate for those employed increases the opportunity costs of leisure including home production. Therefore, a worker will substitute home production and leisure for market work; this is known as the substitution effect of a wage increase on paid work (Mincer, 1962 and Becker, 1965).

In the same manner, increased non-labour income means more money is now available for leisure, this will decrease total amount of time at work and the number of family members especially females joining the labour force. The responsiveness of labour force participation to changes in income is called the "income effect," the effect is negative on paid work and positive on leisure (Becker, 1965).

According to Hans (1976), the amount of labour that a woman is willing to supply or her decision to work or not depends on what other members of the household are earning, doing or have predetermined. For instance, if one of the key family members earns as much as US$10 000 monthly in wages, female members of the family may chose to work at home in place of market work.

According to the Male Chauvinist theory (assuming a family comprised of husband and wife only) the wife considers the husband as an income producing asset and considers the husband’s income as part of her non-labour income (Morrison, 2007; Lundberg, 1985). As a result, under the assumption that leisure is a normal good; an increase in the husband’s wages will reduce the wife’s hours of paid work or her willingness to participate in paid work through the income effect (Werding, 2005).

Mincer (1962) noted the wage rate also has an income effect because a higher wage rate for an individual translates to higher income. To this effect the net outcome on the paid labour market resulting from changes in wages and changes in non-labour income can only be ascertained empirically. However, for those that are currently not part of the work force, higher wages unequivocally induce higher participation.
According to Morrison et al (2007), non-labour income also affects female participation through savings, property owned and availability of credit. Families with higher incomes tend to have higher accumulated savings, property and have better access to lines of credit than low income families. Females from such high income families tend to have low preference for participation in the labour market because they buy their goods and services using past savings and can borrow to finance current consumption.

Implicitly utilising the income and substitution effect analysis, Boserup (1970) and others demonstrated that economic development explains the evolution of female labour force participation. Defining economic development as changes in average national income per head overtime, they argued that at the beginning of economic development the economy is largely subsistence. Subsistence activities allow females to mix economic activity with child nurturing and so female participation in paid work will be high. Gaddis and Klasen (2012) noted that as the economy develops into an industrial based economy, FLFP falls as a result of a negative income effect. The fall in FLFP is due to overall increase in family earnings earned mainly by the male household heads.

Continued improvements in per capita income lead to development of the services sector. The development of the services sector pulls back females into the labour force because of access to child care facilities and reduction in fertility arising from better standards of living (Heckman, 1980 and Goldin, 1990 and 1995). At this juncture, the substitution effect due to higher potential female wages dominates the income effect and female labour force participation is positively related to per capita income (Psacharopoulos and Tzannatos, 1989).

Thus, according to Boserup (1990) and others, there exist a U shape relationship between average national income and FLFP and this was generalised as the ‘Feminisation U hypothesis’. This exposition gives us the nod to hypothesise that per capita national income is indeed a determinant of female labour force participation.

Incidence of male unemployment is also one of the determinants of FLFP that has been identified (Bowen and Finegan, 1965). According to the Male Chauvinist theory, for married women, labour force participation increases during periods of high male unemployment. When males lose jobs their income falls implying a reduction in the married women’s non-labour income. In order to maintain the family’s total income, quality of life and to smooth
consumption women would join the labour market (Morrison, 2007). This increase in labour force participation or increase in labour supply of females as their male counterparts lose jobs is known as the added worker effect (Lundberg, 1985).

Concerning the general level of unemployment, it tends to induce low participation of females in the labour force. Higher general levels of unemployment result in prolonged periods of unemployment which makes unemployed females lose hope of finding a job in paid work. As a result they end up not looking for work (Lundberg, 1985). According to Hederman Jnr (2004), such persons of legal employment age who are not actively seeking employment due to long periods of unemployment are known as discouraged workers and they give rise to the "discouraged worker effect."  

Education is another major determinant of FLFP that has been identified under the human capital theory (HCT). The HCT considers qualitative issues such as education, skills development and health. According to Becker (1964), the HCT theory postulates that education is an investment which produces future flows of income. As such, education is obtained at a cost for instance the cost incurred in terms of foregone earnings and leisure, tuition costs, and stress experienced at school. In order to reap the returns from investment in education, the educated females would automatically join the labour force (Tansel, 2002).

Tansel (2002) noted that the other reason for education to induce a positive effect on decision to participate in the labour market is that education increases the earning prospects of the educated person. This means absconding in the labour market presents a higher opportunity cost hence the positive incentive for educated females to seek employment. Ackah et al (2009) referred this to as the opportunity cost hypothesis. Agreeing on the significance of education, Kofi (2003) noted that schooling allows women to become aware of production and consumption possibilities around them. Education also provides females with skills that enable them to access opportunities in various economic activities.

In addition to the preceding literature, Ackah et al (2009) pointed out that the increasing FLFP in developing countries can be explained in the context of the Stolper-Samuelson theorem of comparative advantage in international trade. Developing countries have a comparative advantage in producing unskilled labour intensive goods (Grossman, 1979). Opening up of economies therefore raises demand for labour-intensive goods in developing
countries. The labour-intensive goods industries tend to be relatively dominated by females because more females possess low skills and earn less than males. Ackah *et al* (2009) attributed the rapid growth experienced by the Asian countries that introduced export processing zones to this theory where the countries utilised cheap female labour.

Fertility and number of children aged five or less in a family has likewise been identified to be a factor affecting FLFP. Ackah *et al* (2009) argued that fertility affects FLFP because females with children have to select between market work and child care. Similarly, Contreras *et al* (2010) and Oppenheim and Palan (1981) argued that the number of young children in the household is a strong limiting factor to female participation.

According to the European Commission (2010), for developed countries, ageing is moreover one of the factors that significantly affect FLFP. The ageing of the population exerts a negative force on labour supply. As a result, output will eventually be reduced because the labour force will contract as aged workers retire (Burniaux *et al*, 2003). Therefore offsetting changes in FLFP would help to avert problems caused by population ageing.

Becker (1973) presented a theory based on traditional specialisation of labour. He argued that within marriages, spouses specialise in activities in which each of them has a relative advantage so that family utility is maximized. As a result more female often specialise in home production and more males specialise in market work. Therefore, in most cases, women’s labour force participation is often met with resistance by both males and females who value marriage more than anything else. The argument is that FLFP increases chances of divorce (Becker, 1981). Apart from psychological and social considerations such effects on children, divorce imposes costs on accumulated family property and wealth which has to be shared upon divorce. For low income families who live just above the total consumption poverty line (TCPL), division of family assets subjects either spouse to poverty after dissolution of marriage.

Refuting Becker’s (1981) arguments, Bargain *et al* (2010), publicised that, women may take up jobs as way to insure themselves in the event of a divorce, or when they expect a divorce. They argued that participation in the labour market allows females to secure other options in the case of divorce hence an increase in the risk of divorce is associated with increase in FLFP.
Kofi et al (2003) noted that participation of women in the labour market especially in the informal economy and particularly in the rural areas is likely to be influenced by the way the families are organised. Families in Africa are mainly organised and managed on the basis of informal rules that hinge on patriarchal and genealogical leadership. In these economies, especially in rural areas, women are inhibited from working for pay because their time is mostly spent on domestic tasks such as the collection of water, firewood, and laundry as well as caring for children and the sick.

Kofi et al (2003) observed that, for self-employment women’s participation is limited by lack of property to use as collateral to access loans. Coen-Pirani et al (2010) noted that availability and accessibility of technology improves FLFP. Home technology would reduce women’s propensity to work at home as they would substitute their effort at home with household appliances such as washing machines and hoovers.

Other determinants of FLFP that have been identified for both formal and informal labour markets include government policy, discrimination, law, health, culture, possession of property rights, productivity and social networks (Morrison et al, 2007).

3.2. Empirical Literature Review

Chaykowski and Powell (1999) observed that the wage rate has a positive effect on FLFP and income has a negative effect. They observed that labour supply elasticities for Canadian women showed a mean of 0.20 for substitution effect wage elasticities and a mean of -0.10 for income elasticities. Based on discrete probability models, Bargain et al (2011) found that labour force participation decisions increase when market wage rate increases. They established that wage elasticities on labour force participation in 17 European countries and USA were positive and ranged between 0.1 and 0.6 for married women and single mothers.

Time series and cross section models for Turkey based on 67 provinces by Tansel (2001) found that income proxied by GDP per capita has a positive effect on FLFP. Cross country data exploration conducted by Goldin (1990) and Mammen and Paxson (2000) also found that income positively influences FLFP. However, their results are solely based on descriptive statistics and are not supported by adequate empirical investigation techniques.
Klasen and Pieters (2012) used probit models to examine causes of FLFP in India’s urban areas between 1987 and 2004. They established that participation of females with low education is essentially motivated by income and insurance considerations, while for highly educated women participation is mainly driven by opportunities reflected in market wages. Thus at low levels of education, participation increases due to push factors while at higher education participation rises due to pull factors.

A Cross-country study by Psacharopoulos and Tzannatos (1991; 2008) for Turkey established that education has a positive effect on FLFP. Tansel (2001) in his time series and cross section studies also showed that the effect of education on FLFP was strongly positive for Turkey. In addition, evidence from a study by Contreras (2010) for Chile also contends that educational attainment is one of the most dominant determinants of participation and employability for both men and women. Further, Standing (1970), (1975) and (1976) found a positive effect of education on FLFP for Jamaica, Nigeria, Sri-Lanka and Nigeria. Results of a logit model for Punjab, Pakistan by Shaheen et al (2011) indicated that education for the head of the household is negatively associated with FLFP.


Many studies have established that fertility reduces FLFP. Studies by Ackah et al (2009) suggest that women’s fertility determine women's labour force participation in Ghana. The study by Euwals et al (2007), referred to earlier, for Netherlands also showed that the growth of the female participation rate has been necessitated by reduction in constraints imposed by the presence of children. Time series data for South Africa by Ntuli (2007) also established that fertility or number of children also reduces FLFP. Shaheen et al (2011) found that a larger family size is associated with higher FLFP in Pakistan. However, Kofi et al (2003) found that the presence of children less than five years of age has no significant effect on labor force participation in Zimbabwe and Ghana.

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The results of time series and cross section models for Turkey by Tansel (2001) also established that unemployment had a notable discouraging effect on FLFP.

Ntuli (2007) found that residing in urban areas has a positive effect on FLFP. Studies by Shaheen et al (2011) also indicated that the decision for a female person to participate in the labour market, in Pakistan, is strong if the household is based in an urban area.

Interpreting historical labour force participation rates as a proxy for culture, in the United States of America, Fernandez and Fogli (2005) found that culture is a significant determinant of FLFP.

A regression model by Psacharopoulos and Tzannatos (1987) found religion explains more than a third of the difference in the female participation in ninety countries. Religion was found to lower FLFP rate by more than half in Muslim countries, by 40 per cent in Hindu countries, and by 30 per cent in Catholic countries. The labour force participation of women in West Asia and North Africa is at less than 30 per cent and it is the lowest in the world due to religious influences (ILO, 2009).

Domestic work has been proven to be significant factor that negatively affects female participation. Morrison and Lamana (2006) found that for Kyrgyz Republic housekeeping, taking care of children, the sick and elderly limit 24.8% of females from working for pay. On the other hand, only 1.5% of men were prevented to work for pay due to the above reasons. Studies by Blackden and Wodon (2006) showed that while in South Africa, a developed country, women spend only 48 hours on average per annum gathering firewood, they spend 273 hours and 164 hours per year gathering water in Benin and Madagascar respectively. This indicates that women in developing countries have less time to allocate to market work due to domestic work that is relatively high due to absence of readily available utilities.

The kind of empirical evidence presented here is lacking in Zimbabwe.

3.3 Conclusion

The literature review provided the background to the determinants of female labour force participation and thus provided the groundwork for developing the empirical model. The identified factors include market wages, non-labour income, economic development, male unemployment, education, fertility, health, urbanisation, culture, religion among others.
Chapter four discusses the methodology that will be used to examine if some of the postulated or confirmed factors determine female labour force participation in Zimbabwe.

Chapter 4: Methodology

4.0. Introduction

The chapter discusses the econometric model, estimation techniques and the measurement of the explanatory variables together with their expected signs. The chapter also discusses the justification for the inclusion of the variables in the model used to estimate FLFP.

4.1 Model Specification

Theory and the available data allow us to specify an equation which models FLFP as follows:

\[ FLFP_t = \beta_0 + \beta_1 \log GDPPC_t + \beta_2 \log FET_t + \beta_3 \log MUN_t + \beta_4 \log FED_t + \beta_5 \log PUP_t + \beta_6 \log MLFPR_t + \beta_7 \log MDSRWI_t + \beta_8 \log NMWSI_t + \beta_9 \log LIFE - EXP_t + U_t \]

where: FLFPR - Female Labour Force Participation Rate
MLFPR - Male Labour Force Participation Rate
GDPPC - Gross Domestic Product Per Capita
Fertility - FET
PUP - Percentage Urban Population
MUN - Overall Unemployment Rate
FED - Female Education
MDSRWI - Male Dominated Sectors Real Wage Index (1990=100)
NMWSI - Nominal Market Wages and Salaries Index (1990=100)
LIFE-EXP - Life Expectancy
U_t - Error term
The specified model follows that used by Ackah (2009) for Ghana. The variables have been chosen mainly on the basis of the underpinning neoclassical labour supply model and the human capital theory presented in chapter 3.

The data will be transformed into logarithms in order to spread the data points more uniformly given that the data have different scales of measurement. For simplicity logarithms will be represented by the letter $L$ such that the abbreviation $\log$ on each variable will be represented by the prefix $L$.

4.2 Estimation Procedures

Time series data over a 33 year period from 1980 to 2012 will be used to develop an ordinary least squares (OLS) model for FLFP using Eviews 7 econometrics analysis software. The use of time series data enables the use of many observations which results in a larger representative sample. With time series it is also possible to forecast using historical numerical data.

4.3.0 Definition of the Explanatory Variables

Nominal Market Wages and Salaries Index (NMWSI)

Also due to absence of sex disaggregated data on wages and salaries, the nominal market wages and salaries index was used as a proxy for wages that would be considered by both males and females in making labour force participation decisions. The figures for wages and salaries as a percentage of gross national income (GNI) were collected from CSO national accounts report of August 2003 and various issues of the Quarterly Statistical Digest. The figures were then converted to indices using the 1990 figure as the base year.

According to Mincer (1962) higher real or market wage rates increase FLFP due to the positive substitution effect emphasised in chapter 3. However, Mincer also noted that for those already in employment higher market wage rates may result in lower participation due to the negative income effect. Social benefits arising from participation in the labour market may also exert a larger effect on FLFP (World Bank 1995a). As a result, the effect of the wage rate can be negated making it possible to have declining FLFP in face of rising wages or vice versa. In some instances, workers’ effort or willingness to participate in the labour market may be negatively related to wages due to money illusion (Akerlof et al, 2000 and
Shafir et al., 1997). Money illusion refers to the phenomenon where people underestimate inflation and confuse nominal with real magnitudes (Miao and Xie, 2012).

Therefore, the expected sign of the coefficient for nominal market wage rates on FLFP can either be positive or negative depending on factors such as the strength of the substitution and income effect, the strength of other factors such as social benefits and the possibility of money illusion among others.

**Male Dominated Sectors Real Wages Index (MDSRWI)**

There is little or no sex disaggregated data on earnings or wages and salaries in Zimbabwe therefore, the study uses the real wages index for the male dominated sectors (non-agricultural sectors) as a proxy for non-labour income for females. The rate compares the real average market wage for the non-agricultural sectors in a given year to the real average market wage rate prevailing in 1990. Wage rate for 1990 is taken to be 100 and wage rates below or above the 1990 rate take values below or above 100. The coefficient of male wages is expected to be negative because married females mainly consider their husband’s income in making labour force participation decisions (Mincer 1962, Becker 1964 and Mon 2000).

**Gross Domestic Product Per Capita (GDPPC)**

In this study gross domestic product (GDP) per capita is taken as a proxy for economic development. Economic development leads to high FLFP through improved opportunities for women mainly in services and white collar jobs (Mammen and Paxson, 2000). The expected sign for the effect of economic development on FLFP is therefore expected to be positive.

**Female Education**

The female literacy rate was used to represent education. Female literacy rate is the number of female adults aged 15 years and above who are able to read and write as a proportion of total adult population (World Bank, 2012). As discussed in Chapter 3, education is expected to increase FLFP because it increases the potential earnings and therefore the cost of not working (Bowen and Finnegan, 1969). Thus the expected sign of the coefficient for female education is positive.
Male Labour Force Participation Rate (MLFPR)

This refers to the percentage of the male population of working age (employed or unemployed) who are available to be engaged in paid activities (Zimstat, 2012). Higher MLFPR implies higher non-labour income for most of the females especially those who are married and high non-labour income would give result in lower FLFP (Mincer, 1962). In some instances, increased MLFPR leads to increased FLFPR because females would like to compete and catch up with their male counterparts in order to close the gender equality gap in employment. The competition is motivated by global efforts to promote gender equality associated with the Beijing conference, Millennium Development Goals and the Convention on the Elimination of Discrimination Against Women (CEDAW) among others. Therefore, the expected sign for the effect of MLFP on FLFP can either be positive or negative.

Percentage of the Urban Population (PUP)

Urbanisation refers to the physical growth of built up commercial, industrial and residential areas mainly as a result of rural migration (Kemal et al, 2009). In this study, the percentage of the total population living in urban areas represents the extent of urbanisation. According to Masika et al (1997) the factors responsible for formation of female-headed household (FHH) arise through urbanisation. Masika argued that FHHs are likely to be less constrained by patriarchal authority at the domestic level and female heads may experience greater self-esteem, more personal freedom, and more flexibility to take on paid work. Female participation rates are again high in urban areas or high-income areas because they have a large service sector which has many jobs that women prefer or are suitable for (Bloom et al 2007). The coefficient of urban population is for that reason expected to be positive.

Male Unemployment Rate (MUR)

Economic hardships associated with male unemployment give rise to the added worker effect where females who were outside the labour force would join the labour force in order to complement families’ income (Lundberg, 1985). Thus we expected a positive sign for the coefficient of male unemployment on FLFP.

Conversely, if high male unemployment is linked to high general level of unemployment it would be difficult for females to find jobs. In such a scenario, the economic and
psychological costs associated with job search will be high hence the discouraged worker effect (Bowen and Finegan, 1965). Thus, the effect of male unemployment will be offset by the effect of the overall rate of unemployment which largely results in the discouraged-worker effect.

**Fertility (FET)**

Fertility Rate refers to total birth per woman which represents the number of children that would be born if a female person were to live to the end of her childbearing years and bear children in accordance with the expected characteristics of her current age group (World Bank, 2012). The coefficient of fertility is expected to be negative because after giving birth mothers would spend most of their time on breastfeeding and childcare hence may choose not to engage in paid work (Contreras et al, 2010 and Ntuli, 2007). However, if child care facilities are accessible and if there are provisions for paid maternity leave at work places, fertility does not matter in labour force participation decision for females. For informal work and agricultural work, fertility is not of concern because women can combine child care with work (Goldin, 1990).

**Life Expectancy (LE)**

Life expectancy is the average number of years a person can expect to live, if in the future they experience the current age-specific mortality rates in the population. Higher life expectancy indicates better health especially physical and mental health which are necessary for one to be able to participate in the labour market (Sullivan et al, 2012). Healthy and able bodied females are more willing and able to participate in the workforce. The expected length of life of a worker determines the length of his working life before retirement. The expected length of working time before retirement will affect females' decisions on when to exit the labour market. Those who are not healthy will stay outside the labour force as homemakers or economically inactive people. The coefficient of health as measured by life expectancy is hence expected to be positive.
4.4.0 Diagnostic Tests

Test for Stationarity

A stochastic process whose statistical parameters, mean and variance, do not change overtime is said to be stationary. Running an OLS regression on non-stationary series results in spurious regression therefore tests for stationarity will be conducted.

Non stationarity will be detected using the Augmented Dickey Fuller (ADF) test. The test is conducted on the hypothesis that the series are non-stationary or contain a unit root. The hypothesis will be rejected if the modulus of the calculated t statistic is greater than the critical Dickey Fuller values. Rejecting the hypothesis implies the data is stationary. If a series is found to be non-stationary, a new series computed from subtracting the preceding period's observation from the current period's observation will be used and this process is called differencing (Engle and Granger, 1987 and Johansen, 1988).

If all the variables are integrated of the same order, it will be necessary to test for the existence of long run equilibrium relationship amongst the different exogenous variables. If there is existence of such equilibrium relationships the series will be referred to as co-integrated series. If the series are found to be co-integrated an Error Correction Model (ECM) will be used.

Tests for Multicolinearity

For OLS to be applicable there should be no problems of multicolinearity. Multicolinearity makes it difficult to separate the effects of individual explanatory variables on the dependent variable, results in higher standard errors and causes unexpected signs of the estimated parameters. To check if the independent variables are correlated, a correlation matrix will be used. High multicolinearity will be reflected by a correlation coefficient that is greater or equal to 0.8 (Enders, 1995). To correct for multicolinearity, the least important amongst the two correlated variables will be dropped from the model or a proxy variable for one of the variables will be used.
Tests for Model Specification and Significance of the Model

The significance of the whole model will be determined by the F-Statistic reported after running the regression. If the F statistic is less than 10%, the null hypothesis that none of the variables determine FLFP is rejected and we conclude that the model is significant at 1%, 5% and 10% levels. To check if the model is correctly specified the Ramsey Regression Error Specification Test (RESET test) will be used and to check if the variables included in the model are relevant, the Wald Coefficient restriction tests will be used.

Test for Heteroscedasticity

The classical linear regression model (CLRM) assumptions require that the error terms be homoscedastic. When there is heteroscedasticity the OLS estimators will still be unbiased and consistent but the estimators will inefficient. As a result, t tests and F- tests based on the OLS formulas will lead to spurious regression.

The number of observations available from 1980 to 2012, which is 33 observations, allows us to utilise the Breusch-Pagan Godfrey test to test for heteroscedasticity. From the regression results the number of observations (n) multiplied by R squared ($nR^2$) is computed and compared to a chi square distribution with m degrees of freedom (where m is the number of explanatory variables). If $nR^2$ is greater than chi square critical value with m degrees of freedom, the null hypothesis of homoscedasticity is rejected (Murray, 2006). Eviews computes the $nR^2$ value automatically. If evidence of heteroscedasticity is found, OLS will be abandoned and the Weighted Least Squares (WLS) method will be used to estimate the regression.

Test for Correlation

The presence of first order correlation will be detected using the Durbin Watson (DW) statistic and higher order serial autocorrelation will be tested using the Breusch-Pagan Godfrey LM test. The hypothesis of no serial correlation will be rejected if the $nR^2$ is greater than Chi-square (2) or if the p values are less than 10%.
4.5 Data Sources and Limitations

Data for nominal market wages and salaries and that for the male dominated sectors real wage index were compiled using various issues of Zimstat quarterly statistical digests and national income accounts reports. All other time series data were obtained from the World Bank Development Indicators database. The World Bank is the most preferred source because it has data for all periods between 1980 and 2012.

The limitations on Zimstat data is that there are some periods for which they do not have data because labour force surveys in Zimbabwe are usually carried out at five year intervals. Therefore Zimstat statistics was mainly used for describing the situation in the labour market at specific points in time for example 1980, 1990 and 2004 and 2011.

The possible limitation of labour statistics used by World Bank is that some of their data could have been derived through interpolation given that they largely rely on official statistics from Zimstat which does not have data for some points.

4.6 Conclusion

The chapter presented the log linear FLFP model, the estimation procedures and diagnostic tests conducted to verify that the model satisfies the classical linear regression model assumptions. The chapter also explained and justified the explanatory variables used in the FLFP model. The next chapter, Chapter 5, presents the results of the study.
Chapter 5: Presentation of Results

5.0 Introduction

Guided by the methodology and estimation techniques presented in chapter 4, this chapter presents the results of the tests. Section 5.1 presents the preliminary tests in form of descriptive statistics and section 5.2 presents the diagnostic tests that were conducted prior to estimation of the model. Section 5.3 presents the model and section 5.4 presents the analysis of the results.

5.1 Descriptive Statistics

Table 5.1: Descriptive Statistics

(a) Measures of central tendency

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFED</td>
<td>1.900</td>
<td>1.900</td>
<td>1.955</td>
<td>1.851</td>
</tr>
<tr>
<td>LFET</td>
<td>0.664</td>
<td>0.646</td>
<td>0.851</td>
<td>0.524</td>
</tr>
<tr>
<td>LFLFP</td>
<td>1.854</td>
<td>1.834</td>
<td>1.929</td>
<td>1.806</td>
</tr>
<tr>
<td>LGDPP</td>
<td>2.803</td>
<td>2.791</td>
<td>3.035</td>
<td>2.562</td>
</tr>
<tr>
<td>LLIFE_E</td>
<td>1.710</td>
<td>1.709</td>
<td>1.790</td>
<td>1.606</td>
</tr>
<tr>
<td>XP</td>
<td>1.734</td>
<td>1.845</td>
<td>2.041</td>
<td>0.903</td>
</tr>
<tr>
<td>LMDSR</td>
<td>1.926</td>
<td>1.925</td>
<td>1.969</td>
<td>1.881</td>
</tr>
<tr>
<td>LMLFP</td>
<td>0.892</td>
<td>0.845</td>
<td>1.079</td>
<td>0.623</td>
</tr>
<tr>
<td>LMUR</td>
<td>1.955</td>
<td>1.954</td>
<td>2.122</td>
<td>1.644</td>
</tr>
<tr>
<td>LNMW</td>
<td>1.477</td>
<td>1.505</td>
<td>1.591</td>
<td>1.342</td>
</tr>
</tbody>
</table>

For all the variables the maximum and minimum values are close to the mean or the median indicating that there are no problematic outliers.

---

4 The prefix letter L on each variable represents natural logarithmic of each variable.
### Measures of Spread

<table>
<thead>
<tr>
<th></th>
<th>LFD</th>
<th>LFT</th>
<th>LFLFP</th>
<th>LGDPP</th>
<th>LLI_IE</th>
<th>LMDSRW</th>
<th>LMLFP</th>
<th>LMU</th>
<th>LNWMS</th>
<th>LPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Std. Dev.</td>
<td>0.02</td>
<td>0.10</td>
<td>0.041</td>
<td>0.118</td>
<td>0.060</td>
<td>0.349</td>
<td>0.029</td>
<td>0.098</td>
<td>0.112</td>
<td>0.079</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.23</td>
<td>0.39</td>
<td>0.689</td>
<td>0.023</td>
<td>-0.278</td>
<td>-1.523</td>
<td>0.159</td>
<td>-0.060</td>
<td>-0.485</td>
<td>-0.234</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.83</td>
<td>1.89</td>
<td>1.852</td>
<td>2.383</td>
<td>1.740</td>
<td>3.794</td>
<td>1.764</td>
<td>3.098</td>
<td>3.073</td>
<td>1.618</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>0.33</td>
<td>2.53</td>
<td>4.421</td>
<td>0.526</td>
<td>2.608</td>
<td>13.63</td>
<td>2.241</td>
<td>0.033</td>
<td>1.303</td>
<td>2.930</td>
</tr>
<tr>
<td>Probability</td>
<td>0.84</td>
<td>0.28</td>
<td>0.110</td>
<td>0.769</td>
<td>0.271</td>
<td>0.001</td>
<td>0.326</td>
<td>0.982</td>
<td>0.521</td>
<td>0.231</td>
</tr>
<tr>
<td>Sum</td>
<td>62.73</td>
<td>21.91</td>
<td>61.18</td>
<td>92.50</td>
<td>56.42</td>
<td>57.23</td>
<td>63.54</td>
<td>29.42</td>
<td>64.52</td>
<td>48.74</td>
</tr>
<tr>
<td>Sum Sq. Dev.</td>
<td>0.02</td>
<td>0.33</td>
<td>0.054</td>
<td>0.448</td>
<td>0.115</td>
<td>3.906</td>
<td>0.027</td>
<td>0.306</td>
<td>0.404</td>
<td>0.190</td>
</tr>
<tr>
<td>Observations</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
</tr>
</tbody>
</table>

Except for only one variable LMDSRWI, the Jarque-Bera statistic for all other variables is less than a chi square critical value with 2 degrees of freedom at 10%. Thus the assumption that the residuals should be normally distributed is satisfied.

#### 5.2 Diagnostic Tests Results

The following tests were conducted prior to estimation of the model:
Stationarity

The variables that are integrated of order one were differenced once to make them stationary. Variables that are integrated of order two namely the natural logarithm of male labour force participation rate (LMLPR) and percentage of urban population (LPUP) were differenced twice. The natural logarithm of male unemployment rate (LMUR) was not differenced as it was found to be stationary at levels. The difference operator is represented by the letter D followed by the variable in parenthesis.

Table 5.2: Order of integration of the variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Order of Integration</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFLFPR</td>
<td>I(1)</td>
<td>**</td>
</tr>
<tr>
<td>LFED</td>
<td>I(1)</td>
<td>*</td>
</tr>
<tr>
<td>LFET</td>
<td>I(1)</td>
<td>***</td>
</tr>
<tr>
<td>LGDPPC</td>
<td>I(1)</td>
<td>***</td>
</tr>
<tr>
<td>LMLFPR</td>
<td>I(2)</td>
<td>***</td>
</tr>
<tr>
<td>LPUP</td>
<td>I(2)</td>
<td>***</td>
</tr>
<tr>
<td>LMUR</td>
<td>I(0)</td>
<td>***</td>
</tr>
<tr>
<td>LNMWS</td>
<td>I(1)</td>
<td>***</td>
</tr>
<tr>
<td>LMDSRWI</td>
<td>I(1)</td>
<td>***</td>
</tr>
<tr>
<td>LLIFE_EXP</td>
<td>I(1)</td>
<td>***</td>
</tr>
</tbody>
</table>

* Means significant at 10%, ** means significant at 5% and *** means significant at 1%

Since the variables are integrated of different order there is no need for an Error Correction Model (ECM). We then proceed to check for the possible presence of serious multicolinearity.

Multicolinearity

The differenced variables were subjected to multicolinearity test using the correlation matrix. The correlation matrix showed that the correlation coefficient for urban residence (LPUP)
and female education (LFED) exceeds 0.8. This means there is high multicolinearity between the two variables; as a result the urban residence coefficient will be dropped from the model.

Table 5.3: Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>D(LFED)</th>
<th>D(LFET)</th>
<th>D(LGDPPC)</th>
<th>D(LMLFPR,2)</th>
<th>D(LNMWSI)</th>
<th>D(LMDSRWI)</th>
<th>LMUR</th>
<th>D(LLIFE_EXP)</th>
<th>D(LPUP,2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(LFED)</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D(LFET)</td>
<td>-0.77</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D(LGDPPC)</td>
<td>0.31</td>
<td>-0.16</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D(LMLFPR,2)</td>
<td>0.36</td>
<td>-0.21</td>
<td>0.08</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D(LNMWSI)</td>
<td>0.15</td>
<td>0.11</td>
<td>0.21</td>
<td>0.14</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D(LMDSRWI)</td>
<td>0.17</td>
<td>-0.12</td>
<td>0.58</td>
<td>0.09</td>
<td>0.15</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LMUR</td>
<td>-0.07</td>
<td>-0.06</td>
<td>-0.25</td>
<td>0.11</td>
<td>-0.34</td>
<td>0.12</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D(LLIFE_EXP)</td>
<td>0.097</td>
<td>-0.07</td>
<td>0.19</td>
<td>-0.02</td>
<td>0.25</td>
<td>0.12</td>
<td>-0.26</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>D(LPUP,2)</td>
<td>0.83</td>
<td>-0.70</td>
<td>0.31</td>
<td>0.38</td>
<td>-0.03</td>
<td>0.16</td>
<td>0.09</td>
<td>-0.02</td>
<td></td>
</tr>
</tbody>
</table>

Model Specification

Wald Test for coefficient restrictions showed that the hypothesis that all the coefficients are collectively equal to zero was rejected. This indicates that the included variables are relevant. For the Ramsey regression error specification (RESET) test we failed to reject the hypothesis that there are no omitted squares of fitted values. This shows that the functional form of the model is correctly specified.

Heteroscedasticity

Heteroscedasticity was tested using the Breusch-Pagan-Godfrey tests under the null hypothesis of homoscedasticity. The hypothesis is rejected if $nR^2 > \chi^2_{0.1}(k - 1)$ where k is the
number of regressors which is 9. From the chi square tables, $\chi^2_{0.1}(8) = 13.36$. The Breusch-Pagan-Godfrey tests showed an $nR^2$ value of 4.41 so do not reject the hypothesis that the error terms are homoscedastic and conclude that there is no problem of heteroscedasticity.

**Test for Correlation**

The results showed a Durbin Watson statistic of 2.23. This indicates that there is no first order serial correlation. The Breusch-Godfrey Serial Correlation LM Test (Table A5) showed p values for the t-statistic and F-statistic which are greater than 10%. Therefore we conclude that there is no sufficient evidence to reject the hypothesis of no serial correlation.

**Table 5.4 Summary of Diagnostic tests**

<table>
<thead>
<tr>
<th>TEST</th>
<th>test statistic-obs*R squared</th>
<th>Test statistic</th>
<th>Critical value at 10%</th>
<th>P values</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAMSEY RESET</td>
<td>1.67</td>
<td>F(1,21)</td>
<td>2.96</td>
<td>0.209</td>
</tr>
<tr>
<td>Breusch-Pagan-Godfrey Heteroscedasticity test</td>
<td>4.41</td>
<td>Chi-square(8)</td>
<td>13.36</td>
<td>0.819</td>
</tr>
<tr>
<td>Breusch-Godfrey Serial Correlation LM Test</td>
<td>1.41</td>
<td>Chi-square(2)</td>
<td>4.61</td>
<td>0.4939</td>
</tr>
</tbody>
</table>

**5.3 The Ordinary Least Squares Model**

After having dropped percentage of urban population (PUP) on grounds of a linear relationship with female education we proceeded to regress the logarithm of the female labour force participation rate (LFLFPR) on the eight remaining parameters in their difference form as stated in table 5.2. The results showed that the logarithms of per capita income (GDPPC), female education (FED), and the male unemployment rate (MUR) were significant at 5% and the logarithm of real wages index for the male dominated sectors (MDSRWI) was significant at 1% level.
A p value of 0.95 was found for fertility meaning that the number of children or presence of children has no significant influence on FLFP. For formal employment, provisions for maternity leave and breast feeding as well as existence of child care facilities in schools are possible reasons why fertility does not matter. For informal employment fertility does not matter mainly because the nature of the jobs allows females to combine child rearing and work (Boserup 1970).

A p value of 0.1098 for Male labour force participation (MLFPR) was obtained again meaning that the study established that male labour force participation is not a significant determinant of female labour force participation. This is possibly an indication that male participation and female participation are independent of each other implying that to promote female participation does not necessarily require moderating male participation. Health as indicated by life expectancy (LIFE_EXP) and the nominal market wages and salaries index (NMWSI) were again found to have no significant influence on female labour force participation. Their p values were of 0.5425 and 0.459 respectively meaning the hypothesis that their individual coefficients are zero was not rejected at all levels.

Insignificance of nominal market wage index could be explained due to the fact that females largely base their labour force participation decisions on their husband’s wages which they view as part of their non-labour income (Becker, 1964 and Mincer 1962). The possible reason for the insignificance of health is that even if the labour force is healthy and fit to work, other factors such as educational requirements and availability of opportunities would hinder their participation.

In an effort to improve the strength of the model, we then dropped the insignificant variables and proceeded to regress the first difference of LFLFPR on the first difference of GDDPC, the first difference of MDSRWI, first difference of LFED and LMUR in level. The final results are shown in table 5.5. Diagnostic tests for the final model also showed no problems of heteroscedasticity and correlation.
Table 5.5: Table of final results (Significant variables only)

Dependent Variable: D(LFLFPR)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-0.045912</td>
<td>0.021156</td>
<td>-2.170179</td>
<td>0.0390</td>
</tr>
<tr>
<td>D(LFED)</td>
<td>1.034267</td>
<td>0.196424</td>
<td>5.265487</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(LGDPPC)</td>
<td>0.098995</td>
<td>0.047028</td>
<td>2.105023</td>
<td>0.0447</td>
</tr>
<tr>
<td>D(LMDSRWI)</td>
<td>-0.038504</td>
<td>0.016395</td>
<td>-2.348457</td>
<td>0.0264</td>
</tr>
<tr>
<td>LMUR</td>
<td>0.051714</td>
<td>0.023769</td>
<td>2.175686</td>
<td>0.0385</td>
</tr>
</tbody>
</table>

$R^2 = 61.5\%$  
Adjusted $R^2 = 55.8\%$

F-statistic=10.78  
Probability (F-statistic) =0.000024

Durbin Watson statistic=1.82

The information presented in table 5.5 implies the following model:

$$
\log FLFPR_t = -0.046 + 1.034 \log Femaleeducation_t + 0.099 \log Economicdevelopment_t + 0.052 \log Maleunemployment_t - 0.039 \log Malewages_t + U_t
$$

where $U_t$ is the error term and the figures in parenthesis represent standard deviations.
5.4 Analysis of the Results

The final results displayed in table 5.5 show that all the variables are significant at 5% level with the exception of education which is significant at 1%. This means that we are 95% confident that the coefficients for logarithms of GDPPC, MDSRWI and MUR are significantly different from zero thus these factors significantly influence FLFP. Likewise we are 99% confident that the coefficient of the logarithm of female education in the FLFP model is significantly differently from zero meaning FED significantly influences FLFP. The included variables explain 61.5% of variations in female labour force participation as shown by the $R^2$ value.

The $p$ value for the $f$ statistic (0.000024) shows that the whole model is significant at 1%, which we can refer to as highly significant. The Durbin Watson statistic 1.82 which is around 2 shows that there is no first order serial correlation and that the model is slightly positively skewed.

**Male Dominated Sectors Real Wages Index (MDSRWI) [1990=100]**

We found negative cross wage elasticity for FLFP. The results showed that an increase in male real wage rate as proxied by the real wage index for the male dominated sectors (MDSRWI) by 1% reduces FLFP by 3.9%. This is in agreement with Mincer (1962)’s argument that an inverse relationship characterizes husbands' income and wives' participation in the labour market. Falling real wages for males lead females who were outside paid labour to join the paid labour market in order to maintain or increase family incomes (Lundberg, 1985). The applicability of these arguments in Zimbabwe is possible because the majority (39%) of females in the labour force are married Zimstat (2012).

**Gross Domestic Product Per Capita (GDPPC)**

It was found that FLFP responds positively to unit changes in average national income. A 1% increase in per capita income has been found to raise FLFP by 9.9%. The reason for the positive effect of per capita income on FLFP is that expansion of the economy increases the available opportunities for females to participate in the labour market (Boserup, 1970). In addition, expansion of the economy also improves the availability of credit for females to engage in productive self-employment activities and vice versa (Sackey, 2005). On the other
hand contraction of the economy limits the opportunities available for females hence they may end up being discouraged from looking for paid work (Lundberg 1985 and Gaddis and Klasen, 2012).

**Female Education (FED)**

We found high positive elasticity of FLFP with respect to changes in female education. A 1% increase in female education increases FLFP by 103.4% all other things constant. This implies that a unit increase in female education doubles female labour force participation. The time series model results are in agreement with probit and logit simulations used by Sackey (2005) who found that education for females exerts a positive impact on their participation in the labour market in Ghana. The positive effect of education on FLFP is consistent with the human capital theory (HCT). As postulated by the human capital theory, educated females would seek paid employment to recover the cost of education. Kofi (2003) also argued that education exposes women to the norms of economic institutions of production and consumption and provides skills necessary to access opportunities and participate in the labour force. According to Standing (1981), education raises the opportunity costs of economic activity so that there is a positive relationship between educational investments and earnings potential. This gives educated people an incentive to seek employment (Bowen and Finnegan, 1969).

**Male Unemployment Rate (MUR)**

The study found that the elasticity of FLFP with respect to male unemployment is positive. A unit increase in the level of unemployment for males increases FLFP by 6.2%. As pronounced by Lundberg (1985), increase in unemployment would lead to an increase in labour force participation through the operation of the added worker effect. The increase in the male unemployment would result in a number of the breadwinners losing their jobs. As a result their female counterparts who were outside the labour force would participate in paid activities in order to maintain their families' consumption patterns.

**5.6 Conclusion**

The chapter conducted tests for stationarity to avoid running spurious regression. The non-stationary variables were then differenced and the model was estimated after further testing
for multicolinearity, correlation, model specification and heteroscedasticity. The factors that were found to significantly influence FLFP are female education, economic development, male wages and male unemployment. The chapter ended with analysis of the results. Chapter 6 summarises the findings as well as the major policy recommendations.

Chapter 6: Findings, Policy Recommendations and Summary of the study

6.0 Introduction

This chapter summarises the findings, policy recommendations and suggestions for further research. The findings and recommendations are based on the results obtained in the preceding chapter.

6.1 Findings

The study managed to provide answers to the question relating to the determinants of FLFP in Zimbabwe. The established determinants of FLFP are economic development as measured by gross domestic product per head, female education levels, male unemployment rates and the wages offered in male dominated sectors.

The hypotheses that economic development as well as education increase FLFP were not rejected. We established that economic development raises female labour force participation. We also established that increasing levels of education for females correspondingly raises FLFP. In addition to finding answers to the research questions, we found evidence for the added worker effect which says that FLFP increases as male unemployment increases. Evidence to support the male chauvinist theory which argues that women tend to participate less in paid work if their husband income is high was similarly found.

No evidence was found that the number of children as measured by fertility, health as measured by life expectancy, male labour force participation and nominal market wage rates are significant determinants of FLFP.

6.2 Policy Recommendations

The study’s findings imply that the government must formulate and implement macroeconomic policies that consistently raise economic performance. This would raise the level of FLFP as a way to achieve gender equality and empower women in line with MDG3.
targets. The resultant higher average national income would increase the opportunities available for females to participate in paid work especially in services and white collar jobs (Gaddis and Klasen 2012). If the economic performance is weak female participation in paid activities would be constrained by lack of new jobs. Weak economic performance (poor economic development) would also result in low capacity to finance income generating activities for women.

To achieve higher participation of females in paid activities Government must also address employability issues. This requires the Government to continue and uplift its education for all policy adopted since independence. It must ensure that education is accessible across gender and across geographical locations so that females in both rural and urban areas are employable. This entails not only investing in basic education but also in quality post primary education. With education females also become competitive in the labour market as employers or employees (Sackey, 2005). After receiving appropriate education females would be pushed into paid work as a way to recover the cost of education, exploit their potential and to enjoy the benefits to education attainment (Becker 1965 and Ackah, 2009).

To achieve equal participation in leadership positions Government must promote education for females. Female education increases the probability of females to outwit males in job selection interviews. When females perform better they do not just become equal to men but can even overtake males in terms of occupying managerial and leadership positions. Further, if educated, females would participate in paid work as a result of improved awareness to the available job opportunities, available business opportunities and more knowledge on job seeking or capital raising strategies (Sackey, 2005).

The established negative effect of real wages offered in male dominated sectors and of male unemployment on FLFP points to the need for government to promote family unity and heterosexual marriages. This would reduce the incidence of low income families falling below the poverty datum line (PDL) when there is need to increase fiscal revenue through taxes on incomes or when there is general economic decline. When taxes on incomes are increased, poverty will not significantly increase among families as non-participating females would join the labour force. Utilising the results of the study, assuming the majority of the labour market participants are married, a tax that reduces wages in male dominated sectors by 1% would result in a 3.9% increase in female labour force participation. Thus wages earned
by the added female participants would help to keep families’s standards of living constant and hence reduce the incidence of poverty. Therefore, programmes which promote stability of heterosexual marriages would act as social safety nets.

6.3 Suggestions for Further Research

This study did not examine behavioural, religious and cultural factors which influence FLFP. Future studies could investigate the empirical evidence on cultural, religious and behavioural factors such as attitudes of both females and males towards paid work for females. Other studies could also look at the same topic with focus on specific age groups for example labour force participation for females aged 15 to 20. Also warranting research in Zimbabwe is the effect of publicity campaigns for gender equality on FLFP. Such a study would help the Government to choose between direct funding of campaigns for gender equality or to approach the problem through indirect interventions in proven areas such as education.

Other studies could also look into the effect of minimum entry requirements in the job market on labour force participation across gender. This is necessary because aptitude in certain subjects is generally skewed towards males yet females could similarly be more talented in other subjects which are not core in job selection in the formal sector. A case in point is the requirement of a pass in ordinary level mathematics as one of the prerequisites for employment in the formal sector in Zimbabwe. The requirement may perhaps be responsible for the concentration of more females relative to males in the informal in Zimbabwe.

6.4 Summary of the study

Using time series evidence based on data from 1980 to 2012 for Zimbabwe, the study established that there are four major determinants of FLFP, namely economic development, female education, male unemployment rate, and male wages. The first three factors have been found to have a positive influence on female labour force participation while male wages has been found to influence female participation negatively. The major recommendations are that in order to empower women and promote gender equality in the labour market, the Government should prioritise upgrading levels of education for females as well as improving economic development.
Bibliography


Bloom et al (2007), "Fertility, Female labour force participation and the demographic dividend", Harvard University, Boston, USA.


Chaykowski, P and Powell, L.M. (1999), Women and work, McGill-Queen's University Press, Montreal, Canada

Cheney, P (1990), The Land and People of Zimbabwe, Lippincott, New York


Chiu and Chen (2012), Determinants of Labor Force Participation of Older Married Men in Taiwan, National Chengchi University, Taiwan

CIA, World Fact Book, 2012

Contreras D, de Mello L. and Puentes, E.(2010) The determinants of labour force participation and employment in Chile, Applied Economics, Department of Economics, Universidad de Chile, Santiago 1111, Chile


Biçerli, K. and Naci (2009), Female labor force participation in urbanization process: the case of Turkey, Anadolu University, Eskisehir, Turkey


Faridi et al (2009), An Analysis of the Determinants of Male Labor Force
Participation and Employment Status in Pakistan: The Case of Bahawalpur District, Bahauddin Zakariya University, Multan, Pakistan

Fuller, W. A. (1976), "Introduction to statistical time series" New York, USA


Institute of Development Studies, University of Sussex, Brighton, UK


Klasen, S. and Pieters, J (2012), "Push or pull? Drivers of female labor force participation during India's economic boom", IZA, Germany


Seguino, S. (2010), University of Vermont, "Does Gender matter for trade performance and competitiveness?"


http://www.zimweb.com/Embassy/Zimbabwe/

http://www.geographia.com/zimbabwe/

http://www.sadc-usa.net/members/zimbabwe/

http://www.everyculture.com/wc/Tajikistan-to-Zimbabwe/Zimbabweans.html#ixzz2Sb1m7Ggm

http://www.zimtreasury.gov.zw

http://www.nationsencyclopedia.com/Africa/Zimbabwe.html#ixzz2SazHEUoJ

www.indexmundi.com/facts/zimbabwe

www.tradingeconomics.com

http://data.worldbank.org/indicators

APPENDICES

Table A1: Results table for the model with 8 parameters

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-0.053810</td>
<td>0.024254</td>
<td>-2.218638</td>
<td>0.0371</td>
</tr>
<tr>
<td>D(LFED)</td>
<td>0.907958</td>
<td>0.326336</td>
<td>2.782277</td>
<td>0.0109</td>
</tr>
<tr>
<td>D(LFET)</td>
<td>-0.006167</td>
<td>0.104206</td>
<td>-0.059182</td>
<td>0.9533</td>
</tr>
<tr>
<td>D(LGDPPC)</td>
<td>0.136588</td>
<td>0.049838</td>
<td>2.740663</td>
<td>0.0119</td>
</tr>
<tr>
<td>D(LMLFPR,2)</td>
<td>0.379476</td>
<td>0.227705</td>
<td>1.666524</td>
<td>0.1098</td>
</tr>
<tr>
<td>D(LNMWSI)</td>
<td>-0.030170</td>
<td>0.040010</td>
<td>-0.754053</td>
<td>0.4588</td>
</tr>
<tr>
<td>D(LMDSRWI)</td>
<td>-0.048850</td>
<td>0.017112</td>
<td>-2.854650</td>
<td>0.0092</td>
</tr>
<tr>
<td>LMUN</td>
<td>0.062302</td>
<td>0.027523</td>
<td>2.263607</td>
<td>0.0338</td>
</tr>
<tr>
<td>D(LLIFE_EXP)</td>
<td>0.052916</td>
<td>0.085539</td>
<td>0.618627</td>
<td>0.5425</td>
</tr>
</tbody>
</table>

R-squared       | 0.707213    | Mean dependent var | 0.001224 |
Adjusted R-squared | 0.600745   | S.D. dependent var  | 0.018502 |
S.E. of regression | 0.011690   | Akaike info criterion | -5.822382 |
Sum squared resid  | 0.003007   | Schwarz criterion   | -5.406063 |
Log likelihood     | 99.24692   | Hannan-Quinn criter. | -5.686673 |
F-statistic        | 6.642501   | Durbin-Watson stat  | 2.226152 |
Prob(F-statistic)  | 0.000194   |                     |          |

Table A2: Heteroscedasticity test results (Top panel of the test results table)

Heteroskedasticity Test: Breusch-Pagan-Godfrey

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>Prob. F(8,22)</th>
<th>0.8737</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obs*R-squared</td>
<td>4.406821</td>
<td>Prob. Chi-Square(8)</td>
</tr>
<tr>
<td>Scaled explained SS</td>
<td>2.180821</td>
<td>Prob. Chi-Square(8)</td>
</tr>
</tbody>
</table>
Table A3: Test for higher order serial correlation (test results table top panel)

Breusch-Godfrey Serial Correlation LM Test:

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>Value</th>
<th>df</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>0.476861</td>
<td>0.6276</td>
<td></td>
</tr>
<tr>
<td>Obs*R-squared</td>
<td>1.410984</td>
<td>0.4939</td>
<td></td>
</tr>
</tbody>
</table>

The null hypothesis is that there is no serial correlation and we reject the hypothesis if $nR^2$ is greater than a chi square critical value with 2 degrees of freedom. The $nR^2$ value of 1.41 is less than the chi square critical value with 2 degrees of freedom at 10% that is 4.61; therefore we do not reject the null hypothesis of no higher order serial correlation.

Table A4: Wald Test for coefficient restrictions (Top panel)

Equation: Untitled

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>Value</th>
<th>df</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>5.942234</td>
<td>0.0003</td>
<td></td>
</tr>
<tr>
<td>Chi-square</td>
<td>53.48011</td>
<td>0.0000</td>
<td></td>
</tr>
</tbody>
</table>

Null Hypothesis:

$C(1)=0, C(2)=0, C(3)=0, C(4)=0, C(5)=0, C(6)=0, C(7)=0, C(8)=0, C(9)=0$

The p values reported in the top panel indicate that we reject the hypothesis that the coefficients are jointly equal to zero, thus the variables included in the model are jointly relevant.
### Table A5: The transformed variables

<table>
<thead>
<tr>
<th>Year</th>
<th>LFED</th>
<th>LFET</th>
<th>LFLFPR</th>
<th>LGDPPC</th>
<th>LIFFE_EXP</th>
<th>LMRDRI</th>
<th>LMLFPR</th>
<th>LMUR</th>
<th>LNMWSI</th>
<th>LPUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>1.851</td>
<td>0.8513</td>
<td>1.81</td>
<td>2.962</td>
<td>1.772</td>
<td>1.982</td>
<td>1.881</td>
<td>1.041</td>
<td>2.108</td>
<td>1.342</td>
</tr>
<tr>
<td>1981</td>
<td>1.857</td>
<td>0.8129</td>
<td>1.814</td>
<td>3.024</td>
<td>1.772</td>
<td>1.903</td>
<td>1.886</td>
<td>1.033</td>
<td>2.09</td>
<td>1.352</td>
</tr>
<tr>
<td>1982</td>
<td>1.86</td>
<td>0.8293</td>
<td>1.815</td>
<td>3.035</td>
<td>1.773</td>
<td>2.041</td>
<td>1.892</td>
<td>1.033</td>
<td>2.107</td>
<td>1.369</td>
</tr>
<tr>
<td>1983</td>
<td>1.863</td>
<td>0.8293</td>
<td>1.815</td>
<td>2.977</td>
<td>1.773</td>
<td>2.013</td>
<td>1.893</td>
<td>0.9912</td>
<td>2.073</td>
<td>1.371</td>
</tr>
<tr>
<td>1984</td>
<td>1.866</td>
<td>0.8228</td>
<td>1.814</td>
<td>2.872</td>
<td>1.782</td>
<td>1.959</td>
<td>1.899</td>
<td>0.9542</td>
<td>2.101</td>
<td>1.369</td>
</tr>
<tr>
<td>1985</td>
<td>1.877</td>
<td>0.7889</td>
<td>1.816</td>
<td>2.804</td>
<td>1.789</td>
<td>1.964</td>
<td>1.895</td>
<td>0.9138</td>
<td>2.122</td>
<td>1.377</td>
</tr>
<tr>
<td>1986</td>
<td>1.881</td>
<td>0.7959</td>
<td>1.817</td>
<td>2.831</td>
<td>1.748</td>
<td>1.944</td>
<td>1.896</td>
<td>0.8633</td>
<td>2.09</td>
<td>1.38</td>
</tr>
<tr>
<td>1987</td>
<td>1.892</td>
<td>0.7604</td>
<td>1.82</td>
<td>2.85</td>
<td>1.771</td>
<td>1.949</td>
<td>1.895</td>
<td>0.8129</td>
<td>2.094</td>
<td>1.398</td>
</tr>
<tr>
<td>1988</td>
<td>1.898</td>
<td>0.7459</td>
<td>1.832</td>
<td>2.899</td>
<td>1.78</td>
<td>1.968</td>
<td>1.881</td>
<td>0.8195</td>
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<tr>
<td>1989</td>
<td>1.9</td>
<td>0.7275</td>
<td>1.833</td>
<td>2.911</td>
<td>1.782</td>
<td>1.954</td>
<td>1.901</td>
<td>0.8195</td>
<td>2.045</td>
<td>1.415</td>
</tr>
<tr>
<td>1990</td>
<td>1.888</td>
<td>0.7118</td>
<td>1.833</td>
<td>2.924</td>
<td>1.784</td>
<td>2</td>
<td>1.915</td>
<td>0.8261</td>
<td>2</td>
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</tr>
<tr>
<td>1991</td>
<td>1.894</td>
<td>0.6532</td>
<td>1.834</td>
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<td>1.756</td>
<td>1.982</td>
<td>1.92</td>
<td>0.8261</td>
<td>1.953</td>
<td>1.431</td>
</tr>
<tr>
<td>1992</td>
<td>1.895</td>
<td>0.6767</td>
<td>1.834</td>
<td>2.787</td>
<td>1.74</td>
<td>1.845</td>
<td>1.925</td>
<td>0.9031</td>
<td>1.967</td>
<td>1.439</td>
</tr>
<tr>
<td>1993</td>
<td>1.896</td>
<td>0.6721</td>
<td>1.834</td>
<td>2.787</td>
<td>1.708</td>
<td>1.826</td>
<td>1.925</td>
<td>1.009</td>
<td>1.941</td>
<td>1.447</td>
</tr>
<tr>
<td>1994</td>
<td>1.897</td>
<td>0.6532</td>
<td>1.835</td>
<td>2.785</td>
<td>1.708</td>
<td>1.813</td>
<td>1.925</td>
<td>0.8325</td>
<td>1.909</td>
<td>1.477</td>
</tr>
<tr>
<td>1995</td>
<td>1.898</td>
<td>0.6435</td>
<td>1.835</td>
<td>2.785</td>
<td>1.72</td>
<td>1.826</td>
<td>1.919</td>
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</tr>
<tr>
<td>1996</td>
<td>1.899</td>
<td>0.6454</td>
<td>1.842</td>
<td>2.791</td>
<td>1.708</td>
<td>1.845</td>
<td>1.925</td>
<td>0.9031</td>
<td>1.947</td>
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</tr>
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<td>1997</td>
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<td>0.6375</td>
<td>1.833</td>
<td>2.849</td>
<td>1.712</td>
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<td>1.925</td>
<td>0.9395</td>
<td>1.977</td>
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<tr>
<td>1998</td>
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<td>0.6464</td>
<td>1.833</td>
<td>2.862</td>
<td>1.672</td>
<td>1.929</td>
<td>1.918</td>
<td>0.9494</td>
<td>1.967</td>
<td>1.519</td>
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<tr>
<td>1999</td>
<td>1.903</td>
<td>0.5955</td>
<td>1.806</td>
<td>2.743</td>
<td>1.643</td>
<td>1.875</td>
<td>1.911</td>
<td>0.9542</td>
<td>1.904</td>
<td>1.519</td>
</tr>
<tr>
<td>2000</td>
<td>1.904</td>
<td>0.6335</td>
<td>1.839</td>
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<td>1.636</td>
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<td>1</td>
<td>1.946</td>
<td>1.531</td>
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<td>2001</td>
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<td>1.881</td>
<td>1.939</td>
<td>1.079</td>
<td>1.954</td>
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</tr>
<tr>
<td>2002</td>
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<td>0.5611</td>
<td>1.886</td>
<td>2.702</td>
<td>1.606</td>
<td>1.778</td>
<td>1.949</td>
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