THE IMPACT OF FISCAL POLICY, INTEREST RATE AND INFLATION ON PRIVATE CONSUMPTION IN TANZANIA: 1972-2014

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CERTIFICATION

The undersigned certifies that has read and hereby recommends for acceptance a dissertation entitled: **"*The Impact of Fiscal Policy, Interest Rate and Inflation on Private Consumption in Tanzania: 1972-2014*"**, in a fulfillment of the requirements for the degree of Master of Science in Economics of the Open University of Tanzania.

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Dr. Felician Mutasa

Supervisor

……..

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DECLARATION

I, **Neema Ernest Mkemwa,** do herby declare that this dissertation is my own original work, and that it has not been submitted for a similar degree in any other University.

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Date

DEDICATION

This dissertation is dedicated to my beloved husband and sons.

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I would like to thank God for granting me health and ability to write this dissertation despite the obstacles I have encountered.

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ABSTRACT

Private consumption is one of the important components of aggregate demand contributing about two third of the gross domestic product. This study investigates the impacts of fiscal policy reforms, interest rate and inflation rate on private consumption in Tanzania so as assess the people' standard of living from 1972-2014. The study used cointegration approach and the Autoregressive Distributive Lag Model (ARDL) estimated by OLS technique to analyse the dynamics of consumption behaviour in the country with secondary aggregate annual time series data from various sources. All explanatory variables namely real disposable income, real interest and inflation rate were statistically significant where income had a positive impact while the other two had a negative impact on consumption. Two periods lags were not statistically significant except for consumption and first lag of disposable income. The analysis also revealed real private consumption to have slightly increased and as a result even the standard of living has improved. The average growth rate of real per capita consumption for the whole period under investigation was only 2.8 percent whereby, it was at an average of negative 2 percent, 4.8 and 5.4 percent before, during, and after reforms respectively. The study recommended that in order to improve standard of living, the government should increase disposable income through reducing direct and indirect tax, subsidize or design welfare programmes for the most need society so as to increase their income. Efforts should be taken to control inflation so as to reduce its negative impacts on consumption and welfare and finally financial institutions should lower real interest which so as to improve consumption and hence improve households' living standards.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Problem

Consumption is the most important component of national income accounting and aggregate demand. It is the ultimate economic activity on which the welfare of the economy depends. It plays a pivotal role in determining national income of the economy. It also constitutes a major portion of disposable income of households on microeconomic level Khan (2012). Existing literature describes households' final or private consumption choices as important to both growth and cyclical fluctuations. Regarding to growth, the distribution of society's resources between current consumption and human capital constitutes to long run changes in an economy's standards of living. Concerning the question of fluctuations, given the large size of consumption in overall demand recession may result if it is very low (Romer, 2006).

Analytically, consumption occupies a strategic role in macroeconomic models, whether of industrial or developing countries (Agenor and Montiel 2008). Indeed, in virtually all countries, consumption represents more than two-thirds of Gross Domestic Product (GDP). The World Bank Group (2016) provides household final consumption expenditures as percentage of GDP for member countries where for the years 2007, 2010 and 2012 Private consumption has occupied two thirds or more of GDP in German (55.1, 56.1 and 55.7 percent respectively), United Kingdom (63.5, 64.7 and 65 percent respectively), United States of America (67.3, 68.2 and 68.4

percent respectively) and South Africa (62.5, 59.5 and 61.2 percent respectively). Khan and Ahmad (2014) and Kazmi (2015) report consumption as the most important component of aggregate demand which has been proven to be the most important determinant of welfare accounting for two thirds of GDP in Pakistan, a fact making private consumption in Pakistan an extremely important component of aggregate demand. The importance of private consumption is East Africa region is seen through its share in the GDP for each country. In Kenya private consumption was reported to be 75, 78 and 80.2 percent of GDP in 2007, 2010 and 2012 respectively. In Uganda the share of private consumption was reported to be 78.4, 76.3 and 77.6 percent of GDP in 2007, 2010 and 2012 respectively; whereas consumption in Rwanda was 73.5, 77.7 and 77.5 percent of GDP in 2007, 2010 and 2012 (The World Bank Group, 2016).

Similarly, in Tanzania Private consumption expenditure for many years has been reported to account for about two third GDP. Private consumption expenditure as recorded in 2007 was 61.4, in 2008 63.8, in 2012 66.5, in 2013 69.1 and in 2014 64.5 percent of GDP (NBS, 2015). With such large percent in GDP contribution, the study of consumption is relevant not only in Tanzania but worldwide as well. Nevertheless Private consumption in Tanzania as any other macroeconomic variables is not static. According to Household Budget Survey (2011/12) nominal annual average per capita consumption increased from 119,964 in 2000/01 to 318,600 in 2007 to 620,268 Tanzanian shillings whereas real mean per capita private consumption expenditure per annum has increased from 719,964 in 2007 to 748,752 Tanzanian shillings in 2011/12. Real per capita private consumption expenditure has

increased by only 4.5 percent between 2007 and 2011/12. Aggregate national accounts data report an average growth of real per capita private consumption of 2.8 percent since 1972 to 2014, with real per capita consumption at 2001 prices being Tanzanian shillings 158,917 in 1972, 92,517 in 1985, 207,496 in 2001 and 393,942 in 2014 (NBS, 2014, 2015). Arndt, et al. (2015) also reports the household survey estimates of annual average nominal consumption per capita of 318,600 in 2007 and 620,298 Tanzanian shilling in 2011/12, implying annual growth rates of 99 per cent. However, for welfare analysis, it is necessary to track changes in real consumption over time where the same survey reported only a 4 percent increase in average real per capita consumption between 2007 and 2011/12 which can be termed as a slow growth. Real private consumption started declining as a result of economic crisis of experienced during the mid 1970s which was due to 1973/74 severe drought, 1973/74 and 1979 oil price shocks, the Uganda war in 1979 which led to increased scarcity of consumer goods and inflation to 19.6 and 20 percent in 1975 and 1976 respectively where prices of many goods rose sharply leaving households consumption and eventually the standard of living deteriorated, (Five Year Development Plan, Planning Commission, 2011). Inflation reached 32.5 percent in 1986 (NBS, 2014), the extent that forced government to introduce price control system.

Leyaro, e tal. (2007) reported a decline in welfare for most households during the 1990s and 2000s following a huge rise in real prices of commodities they consume, especially of staple foods to which they attach higher weights while real household income from different sources increased only modestly. Moreover, private

consumption as other macroeconomic variables is largely affected by the fiscal and financial policies implemented in the country. Fiscal policy particularly taxes directly affects private consumption through disposable income. A tight fiscal policy implemented since 1986 aiming at increasing tax revenue while reducing expenditure left people with less money for consumption. Financial policies affect private consumption through interest rate policy. With financial repression policy as it was in Tanzania prior to 1990's interest rate used to be very low and even negative hence discourage consumption smoothing during uncertainties (Agenor and Montiel, 2008). Following the macroeconomic imbalances, living standards were declining and poverty increased tremendously implying a decline in private consumption. In early 1980s the country embarked on economic reforms in order to pursue more market-oriented policies (Arndt, et al. (2015). In 1986 the Economic Recovery Programme was designed for macroeconomic stabilization and liberalization of prices along with the IMF and World Bank reforms which aimed at ending 'free services' and introducing user fees in some social services, removal of households' agricultural subsidies, freezing wages and employment in the public sector, retrenching public sector workers in an attempt to control the wage bill, restructuring the poorly performing parastatal sector, with a view of trimming it down (THDR, 2014). Generally the 1986 reforms forced the government to pursue a tight fiscal policy aiming at reducing expenditure while increasing taxes. Nonetheless, the above measures did not seem to favour human development or consumption. Policy makers and other researchers differ on their perspective towards the achievement of the 1986 reforms.

Arndt, et al. (2015) reports improved growth in per capita GDP and average per capita private consumption as reported by the national accounts data since around 2000s, though growth remained slow even in the 1990s. Adam et al (2012) presented evidence of high and volatile inflation in recent years which was successful kept lower a decade after macroeconomic reforms of 1986. Inflation rose to above 10 percent in 2008 due to the 2007 global financial crisis where it fell back again to 5.5 in 2009 and rising back to 16 percent per annum 2012. The effectiveness of fiscal policy in promoting households consumption which in turn improves their standard of living depends on the extent to which these policies can lead to: (i) increase in real disposable income through decreased direct and indirect taxes and increased social security benefits and (ii) decreased inflation. Thus, it is crucial for policy makers to be able to assess how private consumption in Tanzania has responded to changes in fiscal policies, interest rate and inflation since 1972.

1.2 Statement of the Problem

Private consumption which is used as proxy for standard of living in this study is one of the largest and important components of aggregate demand which directly affects the welfare of households over the world. Brewer and O'Dea (2012) postulates that, household's consumption has for a long time been treated as a proxy for its standard of living, where "consumption" includes all household's final expenditure, including durables. Other studies including Arndt, et al. (2015); Beegle et al. *(2010);* (2011); Jacobs and Šlaus (2010); Mannheim (2007); Noll, (2007); Zaidi de vos (2006); Deaton, and Grosh (1998); and Chai (1992) have also described household consumption as the core concept at the center of any attempt to assess living

standards. Apart from that, private consumption is used as a proxy for standard of living due to its ability to capture the benefits coming from the actual use of the good, rather than the expenditure and the fact that consumption can be "smoothed" over time makes it more directly related to current living standards than the fluctuating income and expenditure.

Theoretically private consumption is a positive function of disposable income (Keynes, 1936), total lifetime resources (Modigliani 1963), while being negatively or positively related to interest rate (Fisher, 1930) and negatively related to inflation. Despite the fact that, various economic reforms adopted since 1986 reduced macroeconomic imbalances, the standard of living of average household may have been affected particularly. According to THDR (2014) the reforms did not favour households' consumption rather affected incomes and put the majority in even more difficult position due to its tight fiscal policy objective. High and volatile inflation (NBS, 2014), negative real interest rate despite liberalization (BoT, 2011) and tax reforms particularly VAT that has been revenue-enhancing (BoT, 2008) did not prove to be of remarkable success towards improving consumption until early 2000s.

Until today very few researches in the country, including Ramadhani (2000) and Towo, (1989) have been undertaken to empirically investigate the impacts of these fiscal policies, interest rate and inflation on aggregate private consumption since 1972 to 2014. Given its importance to aggregate demand and to standard of living, the study seeks to empirically investigate the fall in of real private consumption

despite the reforms so as to assess its impact on the people's welfare or standard of living in Tanzania in the period 1972 to 2014.

1.3 Objectives of the Study

This study generally aims at investigating empirically how fiscal policies and inflation have affected aggregate real private consumption in Tanzania for the period from 1972 to 2014. The specific objectives are:

(i) To assess the impact of direct and indirect tax policies through personal disposable income on private consumption in Tanzania;

(ii) To assess the impact of inflation rate on private consumption; and

(iii) To assess the impact of real interest rate in the economy on private consumption.

(iv) To assess the growth rate of real per capita private consumption as a results of reforms

1.4 Research Hypothesis

From the stated research problem, objectives and the literature review presented, the study tested the following hypothesis:

(i) Current real per capita personal disposable income is positively related to real per capita private consumption;

(ii) Real interest rate is positively or inversely related to real per capita private consumption depending on substitution and income effect; and

(iii) Inflation rate is negatively related to the real per capita private consumption.

1.5 Significance of the Study

Consumption, saving and investment are one of the most researched components of aggregate demand. Private consumption is the most important of all as it determines both saving and investment. Saving is the postponed consumption for future consumption and also the main determinant for investment which enables economic growth, and higher living standards. Economists believe that, the level of consumption spending that a nation undertakes depends directly on the amount of disposable income that is available. This study focuses on the change in the household's living standards reflected by the private consumption expenditure which is associated with the change of real private disposable income for most household.

The findings of this study will provide more insight about the impact that fiscal policy, interest rate and inflation have had on consumption in Tanzania since 1972 to 2014 and add to the existing literature as well as provide policy recommendations on how to improve people's standard of living. Since not many studies have empirically investigated the impact of inflation, interest rate and fiscal policies on aggregate private consumption in Tanzania for the mentioned sample period.

1.6 Scope of the Study

The current study is intended for Tanzania and covers the period from 1972 to 2014. The rationale of choosing this period is because data is available and also it was during this time that the country experienced various economic episodes, from economic down turn to reforms and eventually recovery. This study uses variables related to fiscal policies, interest rate and inflation which are also used as separate

explanatory variable. The variables used include real per capita private disposable income including social security benefits, real interest rate and inflation rate for the whole period of the study. However, these are not the only variables capturing the effect of macroeconomic effects of fiscal policies on private consumption other variables may include government recurrent expenditure consumption.

As far as taxes are concerned, the study limits itself to indirect or consumption taxes and direct or personal taxes imposed on personal income. Consumer durable goods were considered as consumption in this study. Private consumption in this study follows the definition used in National Accounts where spending on new residential houses is not included.

However, the scope of the study does not touch how consumption is distributed across different income groups as Brewer and O'Deas' (2012) rather it confines itself in overall size of consumption. Private consumption is used to assess the living standards of households and the study cover the period of 1972-2012, the period which involves major policy changes, from regulated socialist economy to deregulated mixed economy.

CHAPTER TWO

2.0 THE TREND OF PRIVATE CONSUMPTION, DISPOSABLE INCOME INTEREST RATE AND INFLATION IN TANZANIA 1972-2014

2.1 Introduction

This chapter intends to define the key concepts as used in this study and present the consumption behaviour in presence of fiscal policy, interest rate and inflation changes. Thus it provides the picture of how private consumption is related to fiscal policy changes as captured in real disposable income, real interest rate and inflation. The chapter also analyses real per capita private consumption growth for the period under investigation.

2.2 The Trend of Fiscal Policy and Private Consumption

Sloman (2006) has defined fiscal policy as deliberate action by the government to influence the economy using taxes and government expenditure (purchases and transfers). Main sources of government finances are taxes, both direct and indirect. Indirect tax, also known as consumption taxes are regressive taxes imposed indirectly on purchases of goods and services (such as Value Added Tax) whose incidence fall on consumer or producer depending on the elasticity of the product from which tax is imposed. By definition, consumption taxes are divided into two broad categories namely, excise (domestic) and aggregate value added tax whereas indirect taxes consist of consumption taxes, other domestic taxes and international trade taxes. Being regressive in nature, indirect tax has more negative impact on private consumption through higher prices. Direct taxes are progressive taxes

imposed directly on income of households whose impact falls directly on the taxpayer. Personal taxes affect consumption through their effect on personal disposable income and consumption taxes through prices Lipsey and Christal (2003). The study uses direct and indirect taxes as factor reflecting fiscal policy because any action taken by the government using taxes or government expenditure must affect disposable income a main determinant of private consumption directly or indirectly. The increase in direct taxes affects disposable income directly and the impact would definitely be reflected in private consumption whereas, the increase in indirect taxes affects disposable income through higher prices which will reduce the purchasing power. The increase or decrease in government expenditure which constitute one of income sources to households be it wages and salaries or social security benefits and other purchases would also increase or decrease disposable income. Thus, direct and indirect taxes are used as fiscal policy entering the model indirectly through aggregate disposable income.

Private consumption expenditure as defined by Krueger (2007) refers to spending of households on all goods, such as durable goods (cars, televisions, and furniture), non-durable goods (food, clothing, gasoline) and services (massages, financial services, and education, healthcare) excluding spending on new houses. The System of National Accounts 2008 revisions, defines Final household or private consumption expenditure as the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), purchased by households including the expenditures of nonprofit institutions serving households excluding purchases of dwellings but includes imputed rent for owner-occupied dwellings. A

similar definition of private consumption expenditure to these two was also given by Sutberry (1998). This study adopts the National Accounts definition of private consumption expenditure (UN, 2009). Personal/private disposable income is total of all incomes accrued to households after deductions of total personal taxes. It is the income available for consumption or saving. Personal disposable income as defined by the System of National Accounts refers to income from employment and capital known as factor income together with transfers. In other words household disposable income corresponding to the value of gross national income at market price (GNI) consists of salaries and wages (compensation of employees) and national social insurance contributions, production taxes less subsidies, capital depreciation as well as operating surplus and mixed income. Households operating surplus mainly includes income received from own and holiday houses and mixed income is that received from business activities which partly include compensation of capital invested and work done by owners in their own enterprises. A generic name given to income from salaries and wages, operating surpluses, mixed income, interest rate and dividend is factor income or primary account. Thus the aggregate disposable income in this sense includes positive transfers and negative transfers which are taxes and contributions. (Eklund, et al 2000).

Prior to 1986 period the economy was growing and poverty was still widespread. Thus the fiscal policies implemented in 1970s to mid 1980s were mainly expansionary which to a large extent aimed at accelerating growth and development. The government provided free education and subsidies in agricultural sector and

basic consumer goods while taxing more the luxuries so as to ensure that the lower income group people afford basic consumption goods (THDR, 2014).

Income tax during that period tax was highly characterized by many exemptions with the equity objective as a priority in setting tax rates. However real per capita private disposable income was slightly increasing during the period and real per capita private consumption was below real per capita income as seen in Figure 2. 1. Real per capita disposable income in 2000 to 2005 is very close to real per capital consumption, this supports the fact that, many households in Tanzania can hardly possess the financial assets of high value, since the largest part of their disposable income is consumed and very little is saved.

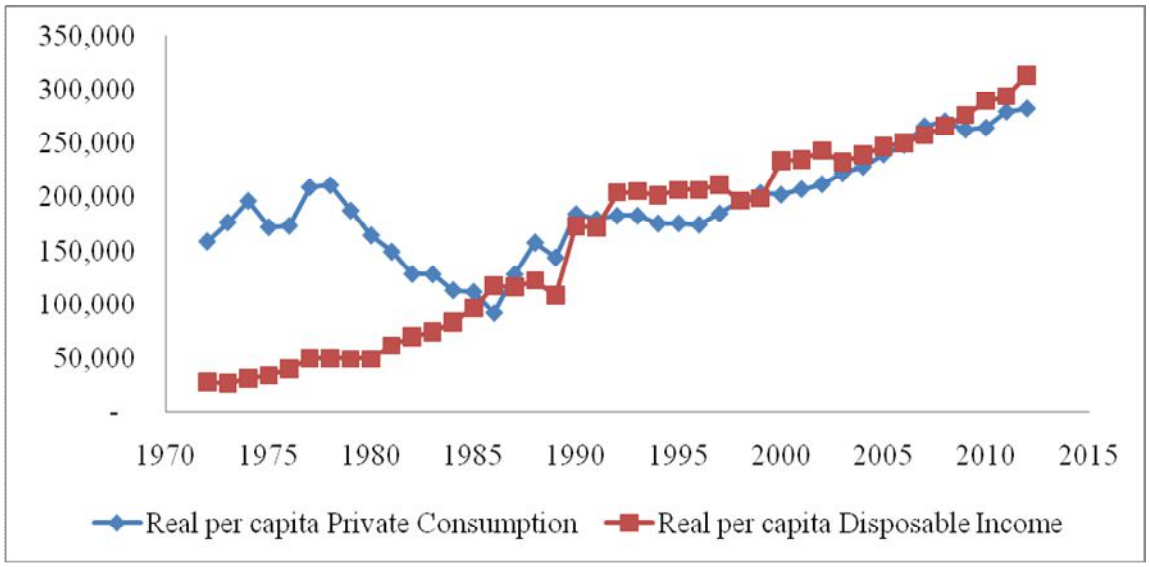

Figure 2.1 Trend of Personal Disposable Income and real per Capita Private Consumption 1972-2014

Source: National Bureau of Statistics (NBS), Tanzania Revenue Authority, Economic Surveys Reports (various issues), National Accounts Publications of NBS and own computation.

Real per capita consumption growth rate revealed slow growth in the period prior 1986 and was negative in some years including in 1986 when consumption dropped to 92,577 shillings a negative growth of 18 percent from 112,489 shilling in 1985 which was also a negative growth of 1 percent. In the same period disposable income grew from 96,376 to 117,324 Tanzanian shillings a growth rate of 16 to 22 percent respectively. This negative movement between growth of disposable income and private consumption during the start of reforms can be explained by the fear of households towards the uncertain future in their incomes which motivates precautionary saving and thus less current consumption. Real private consumption grows as real disposable income grows but former is always below the later, since not all disposable income is spent.

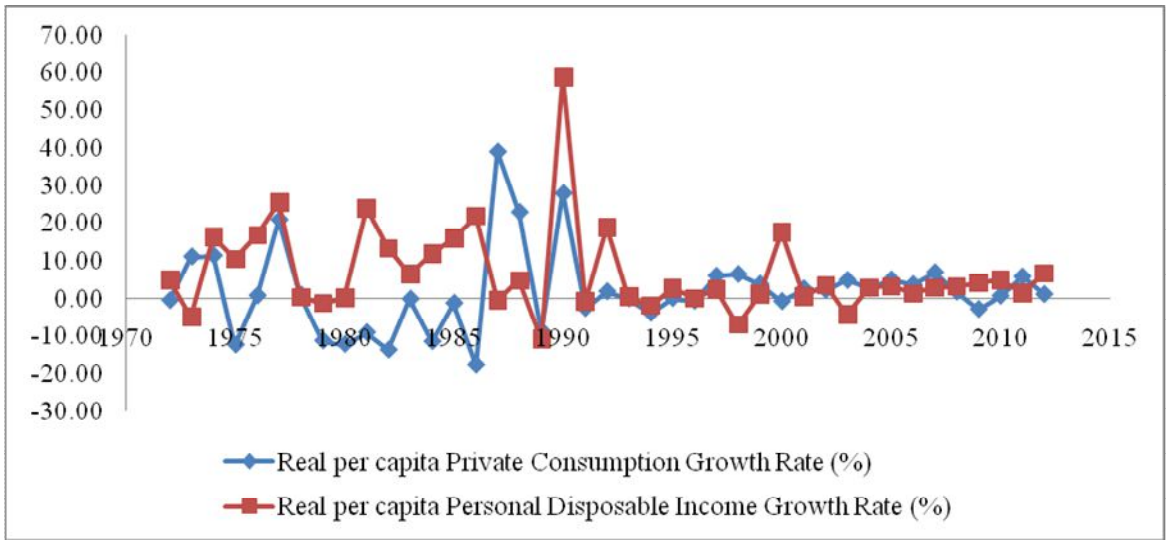

Figure 2.2: The Growth Rate of Real per Capita Private Disposable Income and Private Consumption

Source: National Bureau of Statistics (NBS), Tanzania Revenue Authority, Economic Surveys Reports (various issues), National Accounts Publications of NBS, Social Security Funds and own computation.

Among the post 1986 fiscal policy reform were the tax reforms whose major objective was to simplify the tax system and to enhance revenue collection hence more negative effects on disposable income, the main determinant of private consumption. The income tax reform included the removal or reduction of tax exemption, removal of loopholes (tax evasion), realization of capital gain in and introduction of withholding tax. Little emphasis was placed on distribution as the tax system was seen as an inefficient means of redistribution (Leyaro et al, 2007). The Value added Tax in 1998 was another pinch of the reforms to households though it became a major revenue source to the government Leyaro, e tal. (2007). Indirect tax was made more regressive and value added tax of 20 percent imposed on all goods and services at each stage was introduced to replace the sales tax. Value added tax which was reduced to 18 percent in 2009 made revenue collection rise significantly. However, concentrating on increasing revenue without considering the equity objective of tax tends to affect private consumption. Apart from that, taxes distort consumers' choice through substitution and income effect. The substitution effect occurs when the tax increase, increases price of the commodity giving the consumer no option than substituting the relative expensive commodity with the cheaper one whereas the income effect occurs when the tax increase reduces the purchasing

power of the consumer and make her worse off in real terms as she will have to lower her consumption (James and Nobes 1998). The figure below shows how private consumption behaves in presence of taxes.

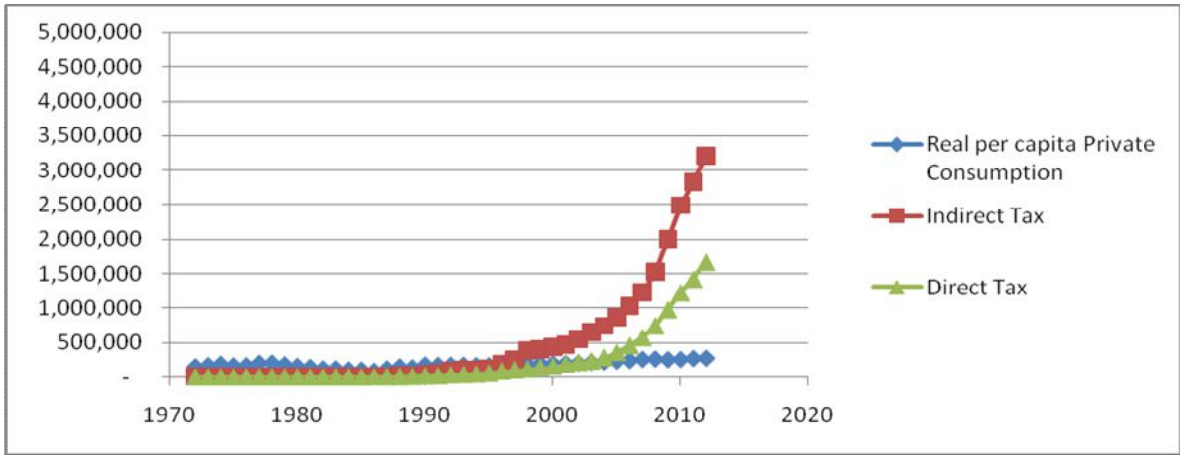

Figure 2.3: Trend of Direct and Indirect Taxes and Real Per Capita Private Consumption 2012-2014

Source: National Bureau of Statistics (NBS), Tanzania Source: National Bureau of Statistics (NBS), Tanzania Revenue Authority, Economic Surveys Reports (various issues), National Accounts Publications of NBS, Social Security Funds and own computation.

2.2.2 Trend of Interest Rate and Private Consumption

Interest rate is an important monetary policy variable which affects saving or consumption decisions of households as well as savers and borrowers decision in the financial intermediation process. Interest rate is defined as the cost of borrowing or lending money. It is the opportunity cost of borrowing or lending. The real interest rate (Rt) is defined as the difference between the nominal interest rate (it) and the inflation rate. There are two types of interest rates namely, deposit and lending rate.

This study uses real deposit interest rate which stands for rate of return on all financial assets held by households including savings in the financial institutions. Real deposit rate is used because it takes into account the prevailing inflation rate which reduces real returns as opposed to nominal interest rate. It is normal for nominal interest rates to rise with inflation, since lenders demand a higher nominal interest rate in times of high inflation as compensation for the loss of purchasing power of their money, resulted by such inflation.

Real interest rate affects private consumption through its substitution and income effect. According to Fisher (1930) and Douglas (1996) interest rate may increase or decrease current private consumption depending on the substitution and income effect of interest change. The substitution effect occurs when current private consumption responds negatively to an increase in interest rate which makes current consumption expensive relative to future consumption. Future consumption is gained by letting go of one dollar of today's consumption and by making today's consumption expensive household choose to save more and consume less today. This view assumes fixed level of utility or economic wellbeing between the two periods. The strength of substitution effect depends on an individual's elasticity of substitution and time preference which is a measure of impatience. The income effect occurs when an increase in interest rate lowers the present value of future consumption and thus making less current amount needed to finance future's consumption. This makes people better off as they can save less and consume more today. In the pre-reform period interest rate policy and the whole of financial sector in the country was repressed. Between 1972 and late 1990s Nominal rates were fixed

at very low rates whereas inflation was relatively high something which rendered real interest rate negative. (BoT 2011). For 5 years 1973-1977 nominal interest rates were lower and constant and it slightly started to increase in the following years. The liberalization of the financial sector allowed nominal interest rate to rise from 10 percent in 1986 to 26 percent in 1997. Despite the increase in nominal interest rates, real interest rates remained negative for all years under investigation except in 1994 and 1998-2000 as seen in Figure 2.4 due to prevailing high and volatile inflation and as a result real interest rate seems to have no effect on consumption.

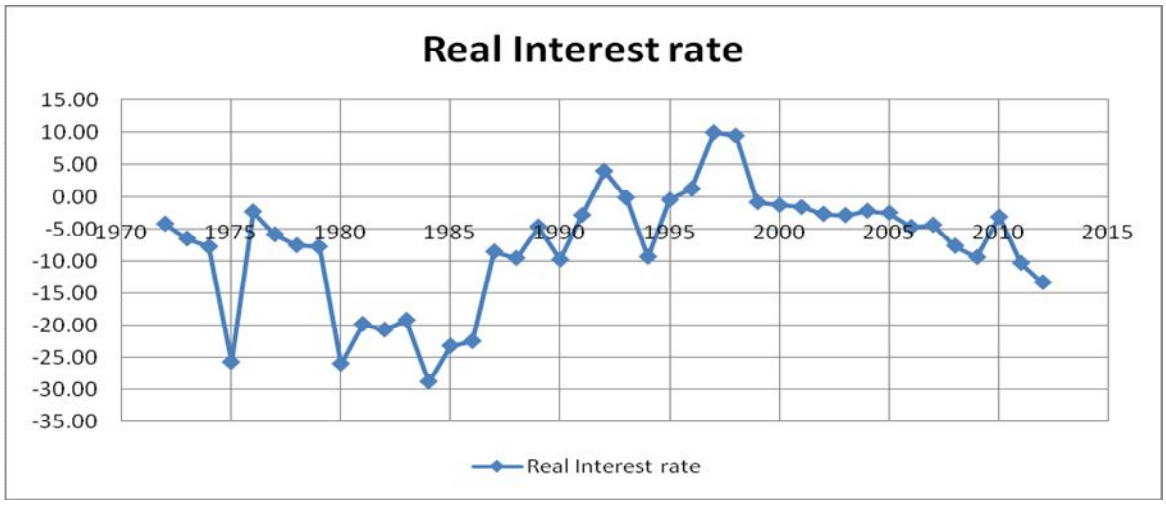

Figure 2.4: Real Interest Rate Behaviour for the Period 1972-2014

Source: The Bank of Tanzania, and own computation.

2.2.3 Trend of Inflation and Private Consumption

Jochumzen (2010) defines inflation between two time periods as percentage increase in price index between these two periods. Price index is calculated at a particular point in time but inflation over a time period, typically a year. It can as well be defined as percentage change in price level in the economy. Inflation rate measures

of how fast a currency loses its value. That is, it measures how fast prices for goods and services rise over time, or how much less one unit of currency buys now compared to one unit of currency at a given time in the past. Inflation affects real private consumption through declining the purchasing power of households and making them worse off in real terms. Every time inflation rises, the price of same basket of goods raises making the consumer spend more on the same fixed basket of goods or purchase less of goods. The only period Tanzania experienced very low inflation rate was during early 1970s. Since 1973 onwards inflation started to rise significantly, where it went from 7.7 percent in 1972 to 33.40 percent in 1985. This affected other macroeconomic variables including real private consumption. Higher inflation was among the reasons why the Tanzanian government had to embark on tight fiscal reform of 1986. The reforms to a small extent succeeded in controlling inflation where it dropped to 32.5 percent in 1986 to 24.1 percent in 1993 which was followed by a sharp increase once again to 35.3 percent in 1994 due to severe power supply problems the country experienced. This high and volatile inflation affected real per capita private consumption negatively as seen in the table below. Comparing inflation to private consumption in Figure 2.5 reveals that at higher inflation real consumption growth becomes lower and thus affecting the welfare of consumers.

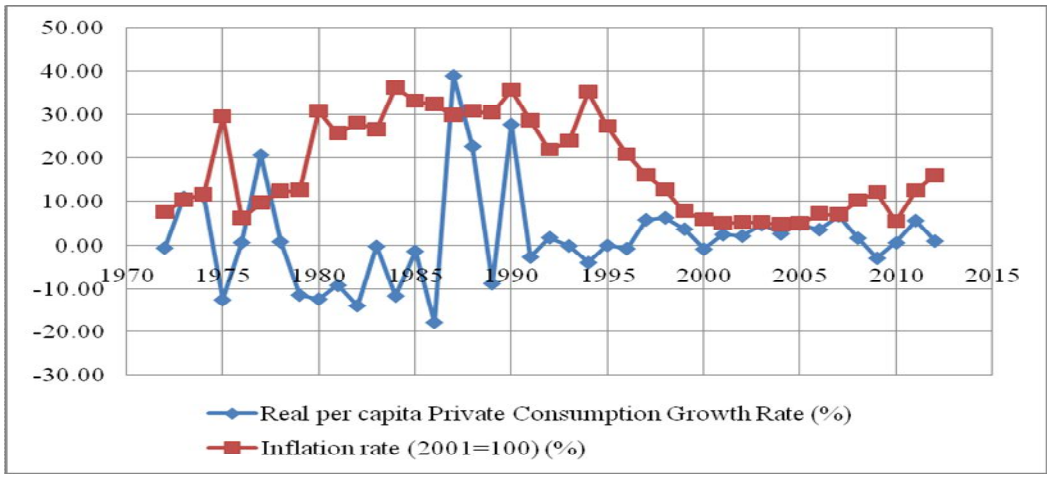

Figure 2.5: Trend of Inflation and Real Private Consumption

Source: Source: National Bureau of Statistics (NBS), Tanzania Revenue Authority, Economic Surveys Reports (various issues), National Accounts Publications of NBS, Social Security Funds and own consumption.

CHAPTER THREE

3.0 LITERATURE REVIEW

3.1 Introduction

This chapter reviews the relevant literature on private consumption and other macroeconomic variables used. The chapter has been divided into four parts. The first part presents theoretical literature review which covers the review of economic theory about the study; the second part presents the empirical literature review on other similar studies within and outside the country; the third part presents the research gap and the last part presents the summary of the chapter.

3.2 Theoretical Literature

As far as the review of the literature on consumption is concerned, many economists, including Fisher (1930), Keynes (1936), Duesenberry (1949), Modiglian (1950), Friedman (1954), and Hall (1978) have written a lot about aggregate private consumption since the beginning of macroeconomic as a field of study. Some of them specifically wrote about effects of fiscal policy on private consumption. Keynes (1936), knowing that consumption is the most predictable and reliable component of aggregate demand, argued that in order to get out of recessions and have any chance for long-term economic growth, the government must take an active role in encouraging aggregate demand, by increasing government spending or decreasing taxes. Across the globe, even in Tanzania, governments have attempted to manage aggregate demand by cutting taxes in order to boost government spending as a short-term macroeconomic stabilization objective. Keynes (1936) in Absolute Income Hypothesis (AIH) considered current disposable income as the main determinant of current consumption. According to Keynes, consumption is an increasing function of income and the marginal propensity to consume is used to explain the effect of a change in disposable income on current consumption. The Keynesian theory gives a static and deteministic explanation of the household behavior as he ignores the tradeoff between present and future consumption whereas in reality the relationship between current private consumption and disposable income is in no way exact. The hypothesis stressed the role of expansionary fiscal policy in promoting private consumption during economic hardship and recession and the importance of tax policy in reducing income inequality among households and raising their living standard through promoting their consumption levels. However, Keynes was

criticized by many other economists since he put much effort on fiscal policies and nothing on expectations and financial policies.

An alternative view to Keynes' was brought by Irving Fisher (1930) a neoclassical economist based on the assumption that the household seeks to maximize utility over a period that covers his entire life. Fisher's view ascertains that consumption depends on more than current income but expectations of income and interest rate play an important role in consumption as well. In other words, a household would sacrifice a certain amount of consumption at present in order to have a higher amount in the future which is what Fisher call intertemporal choice. Any change in the real interest rate results in two effects, a substitution effect and an income effect. As a result Fisher emphasized on the importance of financial policies in smoothing private consumption in the periods of low income consumption through interest rate. The income effect can be positive or negative depending on whether households are net debtors or creditors toward the banking system. If households are net creditors, an increase in real interest rates that would increase consumption. Whereas with substitution effect a rise in real interest rates, for instance, makes current consumption expensive relative to future consumption, induces households to substitute cheaper future consumption for more expensive current consumption thus reducing current consumption. However, if consumers face liquidity constraints, as is the case in developing country, then they may not be able to increase current consumption and consumption may behave as in the Keynesian theory even though they are rational & forward-looking. Fisher was criticized on the grounds that he

relied too much on interest rate effects and ignored the role of fiscal policy which influences current income and finally consumption. (Mankiw, 2003).

The Relative Income Hypothesis (RIH) by Duesenberry (1949) suggested that household consumption behavior can also be influenced by consumption behavior of other neighboring households, since individuals care about status. Duesenberry urged that satisfaction (or utility) an individual derives from a given consumption level depends on its relative magnitude in the society (e.g. relative to the average consumption) rather than its absolute level. Thus, current consumption of a person is not only an increasing function of the current disposable income but also of a relative consumption that has ever been reached before. People prefer their level of consumption to be more stable and cannot drop their consumption abruptly even in event of a fall in current income. The hypothesis implies that inclusion of lagged consumption term is important in explaining current consumption.

The Life Cycle Hypothesis (LCH) by Modigliani and Blumberg (1954) was primarily interested in the fact that current consumption does not depend on current income only but in lifetime income which changes systematically over the phases of the household‘s life-cycle. Households try to achieve smooth consumption through borrowing during early years of life time when income is low and pay off debt when income increases in mid years of their working life as well as starting saving for retirement. Thus apart from current income, wealth and interest rate are important in explaining consumption behavior of households as interest affects saving. This suggests that the consumption pattern is in most cases constant or less variable

compared to current income. If consumers divide all their income over finite life time, and consume almost equally each year, then transitory income shocks transitory taxes can be expected to have small effects on consumption (Jappelli, 2005). The life cycle hypothesis is to some extent consistent to private consumption in Tanzania as the individuals seem to maintain their standard of consumption throughout their lifetime period (Tesha, 2013). The very similar model but with slightly different conclusions to life cycle hypothesis is the permanent income hypothesis by Friedman (1957). Friedman who extended consumer's planning horizon to infinite, differentiated between permanent and transitory income. He based his hypothesis on the assumption that people prefer their consumption to be smooth rather than volatile.

According to the Permanent Income Hypothesis (PIH), current consumption is determined by permanent income. This implies that, temporary tax cut or increase may have little impact on consumption and that time pattern of income is not important to consumption, but critical to saving. Saving is future consumption since people save for the sake of maintaining same level of consumption in the future. Hence, the PIH introduces lags in the consumption function. An increase in income should not immediately increase consumption spending by very much, but with time it should have a greater effect.

Despite its main contribution toward consumption literature, there are some important features of consumption which seem to be inconsistent with the permanent income hypothesis. Both microeconomic and macroeconomic evidence suggest that

consumption often responds to predictable changes in income induced by fiscal policy. The permanent income hypothesis fails to explain some central features of consumption behavior. One of its key predictions is absence of relation between the expected growth of an individual's income over his or her lifetime and the expected growth of his or her consumption. Consumption growth is determined by the real interest rate and not by the time patterns of income and discount rate something which the hypothesis is silent about. Evidence from Carroll and Summers (1991) goes against the permanent income hypothesis because, individuals in countries with high income growth have high rates of consumption growth over their life time, and individuals in slowly growing countries like Tanzania typically have low rates of consumption growth. Similarly, typical lifetime consumption patterns of individuals in different occupation tend to match typical lifetime income patterns in those occupations. Besides, most households have little wealth. Their consumption approximately typically tracks their income and as a result, their current income has a major role in determining their consumption. Thus tight fiscal policy adopted by Tanzanian government might have affected current income and finally private consumption.

Hall (1978) suggests that, consumption follows a random walk. Hall was the first to derive the implications of rational expectations for consumption. He showed that if the permanent income hypothesis is correct and if consumers have rational expectations, then changes in consumption over time should be unpredictable. When changes in a variable are unpredictable, the variable is said to follow a random walk. Consumption will only change if new information about permanent income arises.

Hall tested his random walk hypothesis by regressing the change in consumption on lagged income and lagged consumption. Note that lagged income and consumption are known at current time, which is when expectations of the future are formed. Hence, according to the random walk hypothesis above, these lagged variables should have no effect on the current change in consumption (rational expectations). He found that neither lagged income nor lagged consumption was statistically significant and the null hypothesis that consumption follows a random walk could not be rejected. However, this is merely a necessary and not a sufficient condition for the random walk hypothesis to hold. We should control for all information which is informative of future income. As it happens, Campbell and Mankiw found that lagged income has almost no predictive power for future income (and hence permanent income) so Hall's finding that lagged income does not affect the current change in consumption is largely uninformative (Nelson,1985). A less frequently debated aspect in the literature from a theoretical point of view is the effects of inflation on consumer expenditure. A number of attempts to explain the phenomenon of rising saving rates in the presence of high inflation have drawn upon the work of Katona (1975). Katona maintained that inflation causes uncertainty and pessimism about the future, pushing consumers to save more and consume less today. Another direct effect of inflation upon consumption is due to the incentive of holding real assets rather than assets fixed to nominal values. In addition to the direct effects of inflation on consumption expenditures, there are also several indirect effects. For example, the erosion of the real value of nominal assets reduces the real value of wealth held in those assets. Inflation may change the distribution of income among households (creditor and debtor, employee and employer etc). Furthermore, if

different groups within the household show different propensities to consume and are subject to different taxes, redistribution will have an effect on their aggregate savings (Howard, 1978).

Households obtain their disposable income the following main sources: they receive wages and salaries for supplying labour to firms and to the government; they earn gross operating surplus of own enterprises and mixed income; enjoy dividends and interest from their bond holdings; and income transfers from the government and overseas. The total of all these income components net of taxes and social security contributions constitutes the overall disposable income available to households which is divided into savings and expenditure (Bayar and Mc Morrow, 1998). Thus, it is evident that the tight fiscal policy accompanied by increased taxes and cut in government expenditure including transfer incomes to households would negatively affect consumption. Kitao (2010) argues that a temporary tax cut and a temporary refund transfer intended to stimulate economic activity raises aggregate disposable income the main determinant of consumption which in turn improve the overall welfare of households. Jaramillo and Chailloux (2015) have used variables fiscal variables namely social benefits, personal income taxes and social security contribution as long-run determinants of private consumption in the study of effects of income and fiscal policy on consumption. Generally, all theories are in favour of the fact that consumption is a positive function of income and that current income plays vital role in consumption determination in developing countries which means policies to enhance disposable income would raise consumption. The major consumption theories of LCH and PIH show that consumption depends on life time

income and wealth and it well known that income available for consumption is net after taxes reduction which is disposable income. The effect of Interest rate on consumption may be positive or negative depending on substitution and income effect of the interest rate. However the effect of interest rate depends on the households' access of to financial services or the functioning of the financial system.

3.3 Empirical Literature

Many empirical studies on private consumption have either followed the Euler equation approach which estimates the optimal consumption path by first order conditions (marginal propensity to consume) or estimating the general aggregate consumption function using other explanatory variables on top of current disposable income or estimate private consumption basing on permanent income and life cycle hypothesis. This study follows the latter approach.

3.3.1 Empirical Literature from Outside Tanzania

A number of empirical studies have been carried out on the relationship between consumption and income, including; Engel (1857) who in his publication analysed income-expenditure data for Belgian working class households and summarized his insights, by the following statement that later has been called Engel's Law: "the poorer a family, the greater the proportion of its total expenditure that must be devoted to the provision of food". Naturally, income is not the only explanatory variable for food share but other factors like household size and price also affect food expenditure.

Engel studied how households' expenditures on food vary with income. He found that: food expenditure constitutes largest part of total expenditure of households; food expenditures are an increasing function of income and of family size, but food budget shares decrease with income; and the expenditure on luxuries increases with income. This relationship of food consumption to income, known as Engel's law, has since been found to hold in most economies and time periods, often with the function for food close to linear in log income. Benjamin and Joseph (2011) examine the Nigerian small scale farmers using the disaggregated Engel function analysis. The result showed that increase in total income would lead to a corresponding increase in each of the disaggregated expenditure groups. Household had high marginal propensity to consume more food for every naira increase in household income. That is, as household income rises, spending on necessities rises, but the proportion of income spent on them falls.

Nwabueze (2009) investigates the causal relationship between GDP and personal consumption expenditure in Nigeria, using data from 1994 to 2007. The result shows a non insignificant value as the slope coefficient, indicating that an increase in GDP has no significant effect on personal consumption expenditure in Nigeria. Singh (2005) carried out an empirical study aimed at modeling real private consumption expenditure in Fiji. The model is estimated over the period 1979 to 2001 as an error correction model (ECM), allowing for lagged terms so as to capture dynamic adjustment effects. The results suggest that Fiji's real private consumption adjusts fast to equilibrium levels in the current period (t), from a disequilibrium experienced in the previous period (t-1). In the short run, real private consumption growth is

significantly affected by changes in income, wealth, the real interest rate and net private transfers. The long run (steady state) model estimates the relationship between consumption, wealth and income. Both the wealth variable and income were significant in determining long run consumption growth.

Giavazzi and Pagano (1990 1996) and Giavazzi, Jappeli and Pagano (2000), argue that the size and persistence of fiscal adjustment play an important role in determining changes in expectations and thus in current consumption. If cuts in government expenditure are small, they will lead, at most, to the usual depressive effect on consumption, as predicted by the traditional income-expenditure model. A large reduction in government spending, may, on the contrary, signal low public expenditure in the future and thus lower taxes. This implies, in turn, an increase in permanent income which would be positively reflected in current consumption. Another study is by Alem and Söderbom in 2010 based on survey panel data for 2008, 2004 and 2000 covering 709 households located in Ethiopia aiming at investigating the effects of the food price shock (inflation) in 2008 on food consumption, and welfare using linear regression. Alem and Söderbom found out that, households with low asset levels, and casual workers, were particularly adversely affected by high food prices since, the share of household expenditure spent on food in urban Ethiopia is high, suggesting that welfare is sensitive to food price changes not all households in urban Ethiopia are in a position to smooth consumption. Nevertheless, the empirical literature for developing countries, which primarily is concerned with rural households, typically provides evidence that shocks tend to affect welfare suggesting limited ability of in particular poor households to

smooth consumption over time (e.g. Townsend, 1994; Gleewe and Hall, 1998; Dercon, 2004; Skoufias and Quisumbing, 2005). Akekere and Yousou (2012) investigate the impact of change in gross domestic product (income) on private consumption expenditure in Nigeria, from 1981 to 2010. Using the classical Oridary Least Square simple regression analysis, results reveal the existence of a positive significant impact of Gross Domestic Product (income) on Private Consumption Expenditure. The coefficient of determination (R-square) of 0.9838 implies that gross domestic product explains 98.4% of private consumption expenditure. Hence, there is a significant relationship between gross domestic product and private consumption expenditure.

Another study by Chigbu and Emmanuel (2015) on determinants of Aggregate Consumption Expenditure in Nigeria where aggregate consumption expenditure was a dependent variable explained by disposable income, inflation rate, interest rate and exchange rate found that all variables were statistically significant in explaining consumption behaviour in Nigeria. As far as interest rate are concerned, many researchers including Blinder (1975), Howard (1978), Boskin (1978) and Thorvaldur (1979) have reported a negative relationship between consumption and interest rate in United States using real interest rate. Thorvaldur (1979) also reported a positive relationship between propensity to consume and inflation. Possible explanation for a positive sign of inflation could be the fact that increased rate of inflation reduces real interest rate and thus stimulate consumption at least in the short run.

3.3.2 Empirical Literature from Tanzania

Ndashau (1998) investigated empirically the relevance of the Engel's law in Tanzania using micro-survey data of peasants households in Northen Tanzania that were randomly interviewed in three of the ten districts in Arusha region. He found that both statistical and econometric analyses demonstrate that household size and income significantly and positively determine expenditure on food and some other consumption items, depending on the area of the study. The age of the household is established to have no significant influence on expenditure on food, but only on other consumption items investigated. The Study has also established that education has no significant influence on any expenditure items of the sampled households.

The estimated significant relationship, at least between food consumption and the household size, has also been established by several other studies in Tanzania (see, Kapunda, 1988; Bamweguba, 1979; Mashuda, 1970; Ostby, 1968 and Guliat, 1969; and Adkins, 1976a, 1976b). Moreover, while the estimated household size elasticities with respect to clothing are all positive and statistically insignificant, that established by some of the previous studies are negative and statistically significant (see, for example, Kapunda, 1977; Ostby and Galilat, 1968). This could probably be explained by the unweighted household size used in the estimated functions. In another study by Kweka and Morrissey (1998) who worked on the impact of economic growth on consumption expenditure using Granger causality test with time series data in Tanzania, the study reported no evidence or impact of GDP on consumption expenditure in Tanzania. Folster and Henrekson (1999) argued that there is no correlation regarding the direction of causality between economic

growth (GDP) and consumption expenditure. Ramadhani (2000) in his study on effect of fiscal and financial policies on private consumption found current real per capita disposable income with and without social security and real interest rate lagged thrice to be positive and significant; current real interest rate to be negative and insignificant, current external debt servicing and a dummy for degree of monetization for the deficit to be negative and significant.

3.4 Research Gap

Given the empirical literature review presented above, it is clear that not so much has been done recently concerning the effects of fiscal policies on private consumption in Tanzania. Many studies have investigated the impact of income on consumption of individual items by households only, and very few have investigated effects of economic growth and fiscal policies on aggregate household consumption expenditure. There is a gap regarding how aggregate private consumption national wise and thus standard of living is affected by the tight fiscal policies reforms specifically, the impact of taxes on aggregate personal disposable income. Using per capita aggregate disposable income to study private consumption is more appropriate as people consume out of disposable income and not GDP. This study has gone beyond others by including inflation which for many years has been high and unstable in the dynamic consumption model of Tanzania. The study has also included social security contributions and claims in aggregate personal disposable income hence having a comprehensive measure of income.

3.5 Summary

The literature that has been reviewed so far shows that private consumption in many countries including Tanzania responds to changes in disposable income and inflation. Many studies have explained consumption behavior on bases of life cycle and permanent income hypothesis. Both the permanent income and life cycle hypotheses were derived from Fisher's intertemporal consumption theory. The impact of fiscal policy particularly tax changes enters private consumption model indirectly through its effect on personal disposable income whereas inflation and interest rate enter consumption function the model directly as additional explanatory variables as in some studies.

CHAPTER FOUR

4.0 METHODOLOGY

4.1 Introduction

This chapter has six sections. The second part presents the estimation model and its features, third presents the operationalization of variables used in the study, the fourth presents types and sources of data, the fifth presents estimation methods followed by the last section for the chapter's summary.

4.2 The Model

The current study makes use of the autoregressive distributed lag (ARDL) model as used by Kazmi (2015) and Ramadhani (2000) but without error correction model. In modeling private consumption based on disposable income two general models may be specified:

$$C_t = a_0 + a_1 Y_{d\,t} + a_2 Y_{d\,t-1} + u_t \quad (1)$$

Where;

C_t = current private consumption expenditure

Yd_t = current private disposable income

Y_{dt-1} = private disposable income lagged once

u_t = error term

This is a simple Keynes (1936) consumption model, modified by inclusion of lagged disposable income as exogenous explanatory variable. The model implies that current consumption is determined not only by changes in the current disposable income but also changes in past disposable income, as the impacts of change in income on consumption persist for more than one period. Another generalized consumption model may be in the form:

$$C_t = b_o + b_1 Yd_t + b_2 C_{t-1} + u_t \quad (2)$$

This model implies that, the past consumption can influence current consumption decision as in permanent income hypothesis. Most empirical studies [1]have used the consumption model with both lags of income, consumption and other independent variables. This study followed this approach by including other exogenous variables namely, interest rate and inflation as well as lagged values of consumption and income. In this study the model used private disposable income in its aggregate form meaning that, social security payments are included or added in the private disposable income as computed by the national income accounting. The model assumes that, in cases of liquidity constraints consumption mainly depend on current disposable income for their consumption. Apart from that, the model also assumes that past levels of consumption and income determine current consumption behavior of households in the country as in permanent income hypothesis.

Thus in its general form, the private consumption model in this study is specified as:

$$C_t = f(C_{t-1}, Yd_t, \pi_t, R_t)$$

(3)

Where by:

C_t = real per capita private consumption expenditure in the current period.

C_{t-1} = real per capita private consumption expenditure lagged once.

Yd_t = real per capita private disposable income in the current period.

R_t = real interest rate in the current period

[1] See empirical study by Adedeji and Adegboye (2013); Singh (2005); and Ezeji and Ajudua (2015).

π_t = the rate of inflation as measured by percentage change in Consumer Price Index (CPI) in the current period

From this general consumption function, the specific model for private consumption is specified as:

$$InC_t = \alpha_0 + \alpha_1 InC_{t-1} + \alpha_2 InYd_t + \alpha_3 \pi_t + \alpha_4 R_t + u_t \quad (4)$$

$\alpha_0>0$; $\alpha_1>0$; $\alpha_2>0$; $\alpha_3>0$; or $\alpha 3<0$; and $\alpha_4<0$

Where:

u_t = white noise (independent identically distributes residual term)

This is an autoregressive distributed lag model which captures both short run and long run marginal propensity to consume. In this model, the short run marginal propensity is α_2, whereas the long run marginal propensity to consume is given by $\gamma=\frac{\alpha_2}{1-\alpha_2}$. The effect of other variables such as direct and indirect consumption tax are reflected in the disposable income.

4.3 Operationalization of Variables

(i) Private Consumption

In this study private consumption expenditure (PCE) is used as a proxy for pure private consumption. Private consumption expenditure is used as the dependent variable. Private consumption expenditure in this study follows the National Accounts definition and since it is one of the best means to assess standard of living

and it is used for that purpose in this study too where the appropriate measure of PCE was real per capita private consumption Perhaps most central line of argument in favour of consumption expenditures as measure of standard of living follows the so-called "permanent income hypothesis" (Friedman 1957), arguing that household expenditures are more stable across time than current incomes, which may fluctuate considerably due to nature of economic activities, certain life events or other causes like running up or down savings or debt. At any point in time, consumption and income will differ because households can borrow or save and benefit from their stock of accumulated durable goods. Expenditures are thus supposed to better reflect "long-term" or "permanent" income and are from this point of view considered to be a better measure of economic well-being or standard of living. (Brewer, Goodman, Leicester 2006: 2).

Since private consumption expenditure is used as proxy for pure consumption, it is worthwhile noting that private consumption expenditure is not necessarily identical with consumption, which may even be a better indicator of well-being, for various reasons. Among them is the possibility of consumption without expenditures for instance households consuming housing after having paid off mortgages and consuming from stocks of durable goods bought in previous periods. While it thus seems to be important to be aware of the fact that expenditures do not necessarily reflect a household's total consumption level, expenditures may still be used as a better proxy of its living standard than income. However, in an economy where consumption depends only on permanent income, a pure consumption measure is appropriate. In the economy where consumption depends on current income,

consumption expenditure is an appropriate measure. In the economy consisting of the two groups of consumers, none of the two measures is appropriate (Aggel and Berg 1996).

(ii) Real Per Capita Private Disposable Income

Aggregate Personal disposable income measure takes both direct and indirect taxes into account. This is the reason it is used as a proxy of fiscal policy. This measure also includes social security contributions and benefits which are one of significant payroll taxes to households. Several studies have estimated the effects of expected tax changes on consumption, using features of the tax system, such as social security payroll caps (Parker, 1999), tax refunds (Souleles, 1999), preannounced tax cuts (Souleles, 2002), and the tax rebates or stimulus payments (Agarwal et al., 2007; and Misra and Surico, 2013) through personal disposable income.

The Total output, or national income identity can be described as:

$$Y = C + I + G + NX \quad (5)$$

Where Y is output, or national income, C is final consumption spending, I is investment spending, G is final government spending, and NX is net exports. This equation can be expanded to reflect taxes by the equation:

$$Y = C(Y - T) + I + G + NX \quad (6)$$

In this case, C(Y - T) captures the idea that consumption spending is based on both income and taxes. Disposable income is the amount of money available for consumption after taxes are deducted from total income. This form of output or national income equation reflects both elements of fiscal policy and is most useful for analysis of the effects of fiscal policy changes (Spark Notes Editors, 2017). The justification of relationship between disposable income and private consumption is obvious from theoretical point of view. All major theories of consumption are certain that people consume from income, whatever name it is used such as permanent income or lifetime income it all means the income after tax. Thus all theories discussed (AIH, RIH, LCH and PIH) are built on the same ground of positive relationship between consumption and disposable income. This study uses direct and indirect taxes indirectly through disposable income which it affects to assess their impact on private consumption.

A series of adjustments from GDP takes National Income (NI) to Personal Income (PI). In this study the measure of aggregate Personal Disposable Income (PDI) is given as:

GDP+ NIFA = GNP

(7)

GNP – d = NNP

(8)

NNP – I_t = NI

(9)

$$NI - C_{it} - R_e - P_d - S_{sc} + S_{sb} = PI \quad (10)$$

$$PI - D_t = PDI \quad (11)$$

Where NIFA is net factor income from abroad, GNP is gross national product, NNP is net national product, I_t is indirect business taxes, NI is national income, C_{it}, corporate income taxes, R_t is retained earnings, P_d is profits/dividends, S_{sc} is social security contributions, S_{sb} is social security benefits (transfer payments from government), PI is personal income, Dt is direct/personal tax. Deflating the PDI by an appropriate price index we arrive at the real personal disposable income in the current period. Real per capita disposable income determines an individual's ability to purchase goods or services. Both theoretical and empirical literature justifies the inclusion of current real private disposable income as the main factor which explains private consumption behaviour in many countries including Tanzania. This variable captures the impact of fiscal policy that is taxes on consumption. Duesenberry (1952) urged that, when households' income falls, consumption levels relate more to the previous highest income levels rather than falling to the same magnitude. But Tella (1998) argues that, if income raises consumption level relates more closely to the neighbourhood income levels (keeping up with the joneses). Real personal disposable income is preferably used by the researcher because it is what in reality the consumer has for consumption and is adjusted for inflation.

(iii) Inflation Rate

Most common the inflation rate is reported based on the Consumer Price Index (CPI), which the National Bureau of Statistics (NBS) determines every month. In this study inflation is measured by changes in the Consumer Price Index (CPI) using the year 2001 as base year. This variable is included to capture the effect of inflation on consumption because there has been a significant rise in inflation in previous and recently in Tanzania. According to economic theory, inflation is expected to have a negative relationship with private consumption expenditure. Inflation rate which is expressed as a percentage is given as:

$$\pi_t = \frac{CPI_t - CPI_{t-1}}{CPI_{t-1}} * 100 \quad (12)$$

The inclusion of inflation in explaining consumption behaviour is justified theoretically and empirically. In 1970s a considerable effort was made in analyzing the relationship between inflation and household consumption and saving. Most empirical analyses suggested that inflation has a significant negative effect on consumption and saving [Deaton, 1977; Howard 1978; Davidson et al. 1978].

(iv) Real Interest Rate

Real deposit interest rate used in this study represents the rate of return earned by households from all financial assets they hold including savings from banking and non-banking financial institutions. It is conventional for many empirical studies to use real interest rate because it is adjusted for inflation. The justification of inclusion of interest rate in private consumption in Tanzania is the fact that, it determines the

cost of current consumption relative to the future. Real interest rate is obtained using the following formula:

$$R_t = i_t - \pi_t \quad (13)$$

Where; i_t is the nominal interest rate

πt= inflation rate

4.4 Data Types, Sources and Limitations

This study used secondary annual time series data of the variables explained in the previous section to estimate the private consumption in Tanzania in the period 1972-2014. The study period has been selected due to major fiscal policy changes, financial policy liberalization and inflation changes which have occurred in the country for the past 43years. The study used data from various sources. The main sources of data were: the National Bureau of Statistics (NBS) from National Accounts Publications; Economic Survey (various issues) International Monetary Fund: International Financial Statistics (IFS) (various issues) websites; the annual financial reports from websites of social security funds (Public Service Pension Fund, Parastatal Pension Fund, National Social Security Fund and National Health Insurance Fund). Data on direct and indirect taxes, GDP deflator and social security contributions and claims and for National Social Security Fund previously known as National Provident Fund from 1972-1997 were obtained from Ramadhani (2000)[2] and Economic Survey Publications (various issues).

[2] Masters dissertation on impact of Fiscal and Financial policies on Private Consumption in Tanzania (1967-1997)

Data on aggregate private consumption expenditure, CPI, inflation, GDP deflator, population and national income, GDP and GNI were obtained from National Account Publications of NBS, Economic Survey Publications from Ministry Finance. Data on interest rate were obtained from the Bank of Tanzania (BoT) in the independence report (1961-2011) and from 2012 to 2014 from annual financial report 2014/15 of BoT. Data on Retained earnings, Government transfers (pension/claims) to households and households' contribution to government from 1998-2012 were obtained from Social Security Pension Funds (PSPF, PPF, NSSF, GEPF and NHIF) websites and complemented by data from the Economic Survey Publications (various issues). Data on income tax, corporate tax, indirect taxes were obtained from Tanzania Revenue Authority website from 1997-2014. The major limitation of the study was availability of data where it was difficult to get private consumption expenditure data for households, instead aggregate private consumption data were used as defined by the system of national accounts and as collected by National Bureau of Statistics. The same applies to personal disposable income which is not provided by the National bureau of Statistics and was computed using aggregate variables available from National Bureau of Statistics. It was also difficult to obtain some data such as retained earnings used in computation from private sector, and as a result data used were from parastatals only whereas data for dividends were not available. Another challenge was the difference in the period of reporting. Some data from central government and some parastatals were reported in financial year whereas those from other parastatals were reported in calendar year.

However, data were reconciled to be in calendar year for meaningful analysis and reporting.

4.5 Estimation Methods

Modern econometrics work suggest that, prior to estimation of the functional relationship involving time series data, one requires to determine the nature of the long run relationship of the variables studied. Most of the macroeconomic, finance, monetary variables are non-stationary presenting trending behaviour and in most cases they remain non-stationary even after eliminating deterministic trends due to the presence of unit roots, that is, they are generated by integrated processes. Stationarity is the tendency of the variable to return to its original position after a disturbance. Gujarat (2006) defines a stochastic process to be stationary when its mean and variance are constant over time and the value of the covariance between two periods depends only on the distance or lag between two periods and not on the actual time covariance is computed. When non-stationary time series are used in a regression model one may obtain apparently significant relationships from unrelated variables. This phenomenon is known as *spurious regression* (Granger and Newbold, 1974). There is a need to determine stationarity of variables and if they are stationary the regression can be estimated directly, if they are not, they cannot be estimated directly. Spurious regression is a problem as it makes the conventional t and F tests inappropriate and they may look significant while they are not (Dickey and Fuller, 1988). Spurious regression can be avoided by making the non-stationary variables stationary through differencing them. However if the time series functional relationship is not stationary there may still be some long run stable /equilibrium

relationship between the variables. If this is the case, the time series variables are said to be cointegrated and so they can be estimated without suffering from spurious regression (Gujarat, 2006).

Cointegration requires the variables of interest to be integrated of the same order that is they become stationary after differencing them the same number of times. Cointegration theory states that if a linear combination of non-stationary time series is itself stationary, these series can be viewed as cointegrating and form a long run equilibrium relationship. One can conceptualize that, in long run market forces or government intervention act to bring this series together although in short run they may drift apart. Therefore this study employs the cointegration approach in studying the short run and long run dynamics of consumption using the ARDL model. The ARDL model requires variables to be estimated in their first difference. The first step was checking for the characteristics of the variables of the study if they are stationary or determine the number of differencing required to make them stationary. The stationarity test for each variable was performed using the Dick-Fuller and Augmented Dick-Fuller. The basic Dick Fuller equation used to test for presence of unit root was

$$\Delta X_t = \delta_t + \alpha X_{t-1} + U_t$$

(14)

While the Augmented Dick-Fuller equation used was the one that removes the problem of serial correlation as given below:

$$\Delta X_t = \delta_t + \alpha X_{t-1} + \sum_{i=1}^{k} \beta i \Delta X_{1t-1} + U_t$$

(15)

Where in both equations;

i=1, 2 …k

k= is the lag order of the first-differences autoregressive process depending on number of lags

α= is the coefficient presenting process root, i.e. the focus of testing

Δ represents the first difference operator. X stands for real per capita private consumption expenditure as well as other explanatory variables and the Greek delta (δ) is a constant. The Augmented Dick Fuller tests for the statistical significance of the coefficient of the lagged Consumption expenditure (α). The null hypothesis is: H_O; α=0 (there is unit root/the time series is non-stationary) and alternative hypothesis is: H1; α≠0. We reject the null hypothesis implying that there is no unit root if, the computed t-ratio of the coefficient α with negative sign is greater than its critical value. Therefore the variable X_t is stationary or integrated of order (d) i.e. X_t ~I (d), where (d) is the number of times the variable was differenced to become stationary. The second step involved using variables of the same order of integration that is non stationary (I- 1) in testing the long run relationship or co-integration of variables involved in the model. This was done using the Johansen co-integration test. The Johansen technique of co-integration tests the statistical significance of the trace statistics. If the trace statistic is greater than its critical value then null hypothesis of no cointegration is rejected in favor of the alterative hypothesis that

there is an "r" number of cointegrating relationships among the variables, where "r" is maximum rank of cointegration.

Lastly the dynamic private consumption model was estimated as seen below:

$$\Delta LC_t = b_0 + b_1 L\Delta C_t + b_2 L\Delta Yd_t + b_3 \Delta L\pi_t + b_4 L\Delta R_t + U_t \quad (16)$$

Where:

b is the estimator of β

Capital cases represent natural logarithm and

L = a lag operator

This model is autoregressive distributed lag (ARDL) because it allows non-contemporaneous or lagged (dynamics) relationship between the dependent and independent variables. In regressing private consumption expenditure (PCE) on personal disposable income (PDI) it is possible that the current PCE depends on the lagged values of PDI and PCE itself. But due to limitation of the degrees of freedom, the lags of PCE and PDI were limited to two. Introducing too many lags reduces the degrees of freedom which affects the precision of estimates (Gujarat, 2006).

CHAPTER FIVE

5.0 ESTIMATION RESULTS

5.1 Introduction

This chapter presents the findings of the study based on the available data and enables the researcher to give the recommendations and conclusions on the study. The chapter has four sections where the first part discusses the characteristics of the data, the second presents the estimation of the dynamic model for private consumption in Tanzania, the third presents the economic implications of the results, and the fourth part presents comparisons with other studies and the last part presents summary of the chapter.

5.2 Characteristics of Time Series Data

Variables were tested for stationarity using Dickey Fuller (DF) and Augmented Dickey Fuller (ADF). Prior to hypothesis testing of unit root through the DF and ADF tests, data were plotted (appendix 5) against time to reveal their behavior and they were non-stationary without significant trends hence trend was not included in the tests. The basic Dickey Fuller and Augmented Dickey Fuller results are presented in Table 5.1.

Table 5.1: Unit Root Test for Variables at Level

Variable	DF test	P-value (Z(t))	ADF Test	Max No. of lags	Order of integration	P-value (Z(t))	Conclusion
C_t	-0.211	0.9371	-0.064	2	I(1)	0.9529	Non-stationary
Yd_t	-1.303	0.6278	-1.577	2	I(1)	0.4952	Non-stationary

π_t	-2.101	0.2442	-1.261	2	I(1)	0.6469	Non-stationary
R_t	-2.856	0.0507	-1.865	2	I(1)	0.3487	Non-stationary

All variables namely private consumption (C_t), personal disposable income (Yd_t), inflation (π_t) and interest rate (R_t) were found to be non-stationary at their level or integrated of order one I ~ (1), meaning that they have unit roots. Since time series requires all variables used to be stationary to avoid estimating spurious regression, they were induced to stationarity through differencing. Variables were differenced onl once which implies they were intergrated of order zero and the results are as seen in the table below.

Table 5.2: Order of Integration

Variable	DF test	P-value	ADF Test	Max No. of lags	Order of integration	P- value	Conclusion
ΔLC_t	-6.269	0.0000	-3.099	2	I(0)	0.0267	Stationary
ΔLYd_t	-7.362	0.0000	-3.769	2	I(0)	0.0032	Stationary
$\Delta L\pi_t$	-8.569	0.0000	-5.037	2	I(0)	0.0000	Stationary
ΔLRt	-8.779	0.0000	-5.371	2	I(0)	0.0000	Stationary

From Table 4.2 all variables were found to be stationary and thus integrated of order one I ~ (0) after being differenced once. Next step was to check for co-integration where, Johansen co-integration test was used and evidence was found that there was at least one co-integrating relationship among the variables in the long run. Results are presented in the table below.

Table 5.3: Johansen Tests for Cointegration

Rank	Eignvalue	Trace statistics	Critical value 1%
0	-	50.2611	45.5811
1	0.49827	21.9837*	29.75
2	0.28878	8.0122	16.31

The Johansen tests for co-integration which is mainly used in multiple time series models compares the trace statistics to the critical value. In this case the trace statistics value of 50.2611 is greater than its critical value of 45.58 indicating the presence of r (rank) =1 co-integrating relationship among the variables of the model. This implies that variables can stay in a fixed long run relation hence allowing modeling for long run. Having performed all the necessary tests on the characteristics of the time series variable used in the study, the dynamic Autoregressive Distributed Lag model for private consumption expenditure in its first difference was estimated.

5.3 The Dynamic Model for Private Consumption and Growth of Consumption in Tanzania

The dynamic model allows modeling of non contemporaneous relationship, where the change in the independent variables affects the dependent variable over time hence enables to assess both short run and long run dynamics in consumption. The effect of personal disposable income on private consumption expenditure over may be felt for over a number of years. The results of the dynamic autoregressive distributed lag model for private consumption in Tanzania which was estimated using OLS for the period from 1972 to 2014 are presented below;

Table 5.4: Dynamic Private Consumption Model Results

Dependent variable is ΔLCt

Variables	Coefficient	Std Error	t-value	t-prob
Δ LCt $_{-1}$	.832135	.1787141	4.66	0.000 ***
Δ LCt$_{-2}$	-1.084883	.0178668	-6.07	0.000 ***
ΔLYd_t	0.208477	0.101241	2.06	0.040 **
ΔLY_{dt-1}	.3342003	.2048801	1.63	0.071 *
ΔLY_{dt-2}	-.2859753	.1941373	1. 47	0.152
Δp_t	-0.0107795	0.006209	-1.74	0.094*
ΔLpt$_{-1}$	-.001125	.006513	-0.17	0.864
ΔLp_{t-2}	-.003223	.007059	-0.46	0.652
ΔR_t	-.0134971	.006246	-2.16	0.039 **
ΔR_{t-1}	-.0018098	.007030	-0.26	0.799
ΔR_{t-2}	-.0054255	.005524	-0.98	0.334
Constant	2.496846	1.217537	2.05	0.050 **

Notes: ***Indicates significance at 1%, ** significance at 5% and *significance at 10%

Number of obs = 43

F(11, 28) = 6.52

Prob > F = 0.0000

R-squared = 0.7193

Adj R-squared = 0.6090

RSS =0.313767534

Post-estimation Regression Tests

ARCH ($\chi 2$, Prob) = (0.214, 0.8983) H_0**:** no Arch effect (constant variance)

RESET (F, Prob) = (1.23, 0.3205) H_0**:** model is correctly specified (no omitted variable)

Durbin Altern. Test (χ^2 , Prob) = (0.394, 0.8210) H_0**:** no serial correlation

D-Watson statistic (12, 40) = 2.05

Table 5.5: Normality test: Skewness and Kurtosis

Variables	Skewness = (0 or 0.5)	Kurtosis (=3 to 3.5)
C_t	0.3	3.3
Yd_t	-0.6	2.2
p_t	0.3	1.5
R_t	0.6	3.1

5.3.3 Growth of Real per Capita Private Consumption in Tanzania

Real per capita private consumption was very low in the whole period prior reforms (1972-1985) and it exhibited negative growth as seen in Table 5.1.

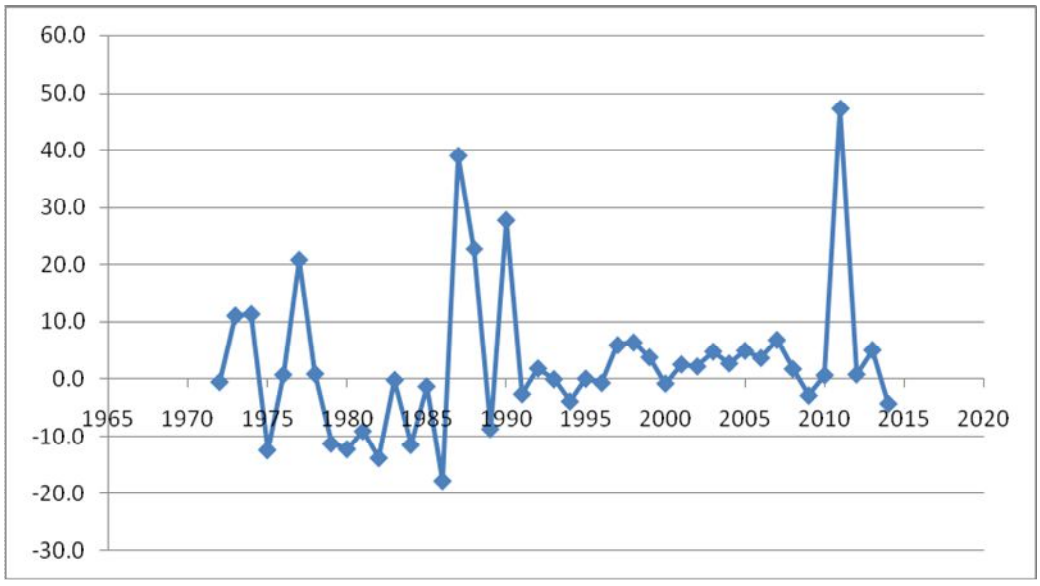

Figure 5.1: Real per Capita Private Consumption Growth Rate 1972-2014

5.4 Discussions of Findings and Economic Interpretation

From the results table, the regression post-estimation test which include Autoregressive Conditional Heteroscedasticity (ARCH), the functional misspecification test or omitted variable test (RESET) and Durbin Alternative test for autocorrelation under the null hypothesis of no autoregressive heteroscedasticity, no omitted variables and no serial correlation respectively were found to be significant since the probability values were greater than 5 percent meaning the null hypotheses are not rejected. This means that the model is correctly specified and does not suffer from heteroscedasticity or autocorrelation. The Durbin Watson statistics of 2.05 was found to be greater than R-square of 0.60 implying that the model does suffer from spurious regression.

Table 5.4 shows that the F test for the overall significance of the model under the null hypothesis that all slope coefficients of the model are jointly equal to zero is rejected at 1% significance level in favor of the alternative hypothesis that none of the slope coefficient is equal to zero, making the model significant. The adjusted R-square of 0.61 percent as a measure goodness of fit tells us that about 62 percent of the variations in the private consumption is explained by the model (independent variables). This means 38 percent is explained by other factors apart from the ones in the model. Table 5.4 reports a positive constant of 2.50 which is the level of consumption when income is zero. The level of autonomous consumption economically helps to prove the function of borrowing where consumers still have to consume even when they have no income. The constant was found to be statistically

significant at 1 percent level of significance. The significance of the constant proves it to be important in explaining private consumption in Tanzania.

The slope coefficient of current disposable income namely the marginal propensity to consume (MPC) amounting to 0.208477 had a correct sign and was found to be statistically significant at 5 percent level of significance. Economically the MPC means that a one percent increase in personal disposable income will on average lead to 20 percent rise in private consumption. The statistical significance of the MPC implies that personal disposable income is important factor that explains consumption in Tanzania therefore if the aim is boost private consumption there is a need to raise disposable. The first lag of disposable income was significant at 10 percent significance level, with the slope of 0.3342003 meaning that on average the unit change in (past year) income will lead to a positive impact of 33 percent on consumption. The second lag of disposable income was found to be statistically insignificant with a negative impact of approximately 0.2859753 (20 percent) in the period t_{-2}. Therefore current private consumption decision is affected by income changes in the short and long run.

Supporting the results that disposable income is eminent to consumption, Singh (2004) reported that Fiji's real private consumption expenditure experienced weak growth in the early 1980s which was resulted mainly from low levels of household disposable income. Both lags of real per capita consumption were found to be statistically significant at 1 percent level of significance meaning that, past consumption do affect current consumption decision. There effect of change in

consumption will increase consumption by 0.832135 (83 percent) in period t_{-1} and will decrease consumption by 1.084883 (-108 percent) in period t_{-2}.

The real interest rate was found to be statistically significant at 5 percent level of significance and negatively related to private to consumption. One percent rise in real interest rate decreases private consumption approximately by 0.0134971 unit equivalent to 1.3 percent. An increase in interest rate makes current consumption expensive thus reducing it while increasing the future's consumption. This result proves that, interest rate has a negative impact on consumption regardless of its magnitude and thus consumption smoothing is also practical in Tanzania. Both lags of interest rates were found to be statistically insignificant, meaning that, the effect of change in interest rate last only in the short-run. Singh (2004) reported a dramatically fall in real private consumption growth reaching the all-time-low of negative 6.5 percent in 1994 that was largely attributable to a sharp rise in the real interest rate (from a negative 0.2 percent in 1988 to a -10.7 percent 1994). Inflation rate was found to bear a negative sign and statistically significant at 10 percent level of significance. A one percent rise in inflation rate decreases private consumption approximately by 0.0107795 equivalent to 1.1 percent. People tend to lower consumption whenever inflation increases because it erodes their real income and thus lower purchasing power. Keeping inflation rate lower in Tanzania would help to boost consumption since inflation in most cases affect food prices whereas food forms larger percent of consumption in developing countries. Both lags of inflation were found to be statistically insignificant, meaning that, past inflation does not affect current consumption decisions. According to Adam et al (2012) in a country

where food accounts for 51 percent of consumption basket and energy and transport cost accounts for a further 9 percent, inflation should be expected to have major impact on private consumption. Thus inflation ought to be closely watched with policy makers. Regarding the growth of consumption, the study reveals that Tanzania has achieved positive growth rate of real per capita consumption from 2000s onward. Prior the reforms of 1986, (1972-1985) average real per capita consumption was very low exhibiting negative growth rate in almost all years as seen in Figure 5.1. Real per capita consumption growth to a large extent reflects the economic hardships people endured due to macroeconomic imbalanced which characterized the economy prior and during reform periods. In 1974 real per capita consumption growth was 11.3 percent which declined to negative 12.4 and 0.7 percent in 1975 and 1976 respectively the periods in which inflation was 29.7 and 6.3 percent respectively.

Real per capita consumption growth rate declined tremendously reaching the all-time-low of negative 17.7 percent in 1986 when tight fiscal policy reforms started. This was caused by the sudden introduction of cost sharing, reduction of subsidies on basic consumption goods, increased taxes, high inflation and probably the fear of the reform forced people into precautionary saving. The growth continued to be negative for almost whole period of reforms 1986 to 2000, with exception of 1987, 1988 and 1990 where its growth rose to 38.9, 22.8 and 27.7 percent respectively. In the post reform period (2001 to 2014) growth has been positive with the average of 5.4 for the whole period. Thus in general the real per capita consumption of a household has increased implying that the standard of living has improved as well although the achieved growth is low. For 14 years (2001-2014) after reforms, real per capita

consumption has grown at an average of 5.4 percent whereas during 15 years (1986-2000) of reforms, consumption has grown only at an average of 4.8 percent a difference of 0.6 percent only.

5.5 Comparisons with other Studies

This section compares the current study with other similar studies within and outside Tanzania. The studies were not necessarily of the same methodology but with similar dependent variables and similar or slightly different explanatory variables. Table 5.6 in appendices shows the comparison. The Table shows that in all studies income in the current period was found to have a positive and significant impact on private consumption which is also consistent with the results of this study. The current study has also managed to establish a negative and significant impact of real interest rate on private consumption as it was found by Ramadhani (2000). As far as inflation is concerned, this study found a negative impact of inflation though Adedeji and Adegboye (2013) found a positive impact of inflation on consumption.

5.6 Summary

The study investigated the impact of fiscal policy and inflation on private consumption in Tanzania for the period of 43 years from 1972-2014. After the necessary pre-estimation time series test on the data, estimation of the ARDL was done using OLS. The results showed current real per capita disposable income, inflation rate and consumption to be statistically significant. The empirical findings of this study were also compared to other studies within and outside the country.

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary

This study aimed at investigating empirically the impact of fiscal policy, inflation and interest rate on the private consumption in Tanzania with aim of assessing the standard of living of the people through the goods and services (consumption) they consume. Specifically the study examined the effect of direct and indirect taxes, impact of interest rate and inflation on private consumption. Annual time series data were used and an ARDL model as used by Kazmi (2015) and Ramadhani (2000) was estimated without error correction term using OLS.

Private Consumption expenditure which has been used as a proxy of pure consumption is a good way to measure people's welfare since welfares is directly affected by the things people consume in their daily life. Tanzania has undergone many macroeconomic and financial policies reforms including tight fiscal policy since independence to date that is why the period of 1972 to 2012 was chosen to assess whether these reforms have in one way or another improved the living standard of the people. The study was able to estimate the private consumption model for Tanzania which is mainly explained by disposable income, inflation and interest rate. The values of all coefficients had the right and expected signs and the current variables were found to have statistically significant impact on private consumption. Real per capita private consumption was found to be increasing from 2000s.

6.2 Findings

The study used real per capita private consumption expenditure as the dependent variable with current and two lags of real per capita personal disposable income, real interest rate and inflation rate as explanatory variables. The values of all coefficients were found to bear right and expected signs. The real per capita personal disposable income had a positive sign implying a positive relationship between private consumption and disposable income. This slope coefficient namely the marginal propensity to consume was also found to be statistically significant at one percent level of significance. The first lag of disposable income was significant whereas the second lag of real disposable income was statistically insignificant. The coefficient of inflation had a negative sign which implies an inverse relationship between private consumption and inflation. Thus an increase in inflation rate decreases private consumption. Inflation was also found to be statistically significant at ten percent level of significance. This makes inflation another variable which explains private consumption in the country.

Lastly, real interest rate had a negative sign indicating a negative relationship between private consumption and was statistically significant. In other words this means that, the higher the interest rate the lower the today's consumption. This is due to the dominance of the substitution effect of change in interest rate. Being significant, it means real interest rate is among important factors which explain consumption in Tanzania and that household smooth consumption in Tanzania regardless of financial interest and very low interest rates. The constant or autonomous consumption was positive and statically significant which means people

consume even when they have no income something proving presence of consumption smoothing through borrowing running down saving.

Generally, the findings show that private consumption has responded positively to changes in fiscal policy and negatively to inflation and real interest rate. During the pre reform period 1972 to 1985 when the country pursued expansionary fiscal policy real per capita private consumption grew at an average rate of -1.9 percent whereas during the whole period of reforms from 1986 to 2000 when the government implemented tight fiscal policy it grew by an average of 4.8 percent and for the whole post reform period 2001-2014 it has grown at an average of 5.4 percent.

6.3 Policy Implication and Recommendations

The private consumption model in this study investigated what impacts real per capita disposable income, interest rate and inflation rate have on private consumption given the tight fiscal policy implemented since 1986. Real personal disposable income with social security benefits as a significant positive determinant of private consumption in the country has to be increased in order to increase households' purchasing power which in turn improves their welfare. Policy makers are therefore advised to improve households' disposable income through reduction in direct tax and subsidizing basic goods so that majority can consume them. Also, since the study used disposable income in aggregate form including social security benefits which help to increase disposable income, the government through the social security funds is advised to create awareness to households so they participate in this compulsory saving scheme for their wellbeing particularly in the old age when they cannot work.

High indirect tax policy is among the factors contributing to inflation which in turn lowers private consumption. Many indirect taxes and other charges imposed on various goods and services exert upward pressure on prices. Both domestic and imported goods and services are heavily taxed especially since the establishment of value added tax in 1998 and other tax reforms of 2000s. Effort should be taken by the government to review its indirect tax policy so as to reduce its negative impact on consumption through higher prices. Moreover, given the regressive nature of indirect taxes such a as value added tax imposed at flat rate, those with lower income pay more than those with higher income. Considering the contribution of value added tax to total revenue, and the redistribution function of tax, the government should find a way to redistribute part of its income to the poor households through provision of low cost services. The government through policy makers should take time to identify and subsidize or design welfare programs for the most need groups like the old and other special groups which for one reason or another do not have labour income but still they have to meet their daily consumption, so as to improve their standard of living.

As far as inflation is concerned, policy makers should by every means keep inflation low or at targeted level because if left to rise beyond desirable/targeted level it always has detrimental impacts not only on private consumption and welfare but also on other macroeconomic variables. The findings imply that, in order to improve private consumption inflation has to be reduced. The monetary authority and the government should use the appropriate policy mix which can reduce inflation

without strong negative effect on private consumption. Tight fiscal policy and other policies directed towards increasing production especially in agricultural sector can be productive as they would increase food supply and lower food price inflation. Tight fiscal policy relating to retrenchment of workers as implemented in early 1990s should not be used due to its negative impact on private consumption though it may successful reduce inflation.

Lastly, given the opposite relationship established the study between consumption and interest rate, lower real deposit interest rate would improve consumption through substitution effect. The financial sector has to be competitive enough to offer lower real interest so as to reduce the opportunity cost of current consumption and enable households possess financial assets of high value for consumption smoothing. Financial institutions also should take initiative to improve households' financial assets possession through provision of soft loans.

6.4 Areas for Further Study

This study used was concerned with how fiscal policy through direct and indirect taxes, inflation and interest rate affect private consumption from 1972 to 2012. Though direct and indirect taxes form the largest part of government revenue and thus affect disposable income of households which is the main determinant of private consumption, they are not the only variables of fiscal policy. Other variables like budget deficit, various categories of government expenditure such as expenditure on health and education may also affect consumption. Also further studies in this area should try to use other methodology with the same variables and see what are the

results when the relationship between private consumption and personal disposable income is non contemporaneous. Direct and indirect taxes may also be used as separate explanatory variables to assess their individual impact on private consumption.

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APPENDICES

Appendix 1

Table 2.1: Trend of Personal Disposable Income, Inflation and Private Consumption

Year	Private Consumption **(in million tshs)**	Real per capita consumption **(tshs)**	Real per capita consumption growth **(%)**	Personal Disposable Income **(in million tshs)**	Real per capita disposable income **(tshs)**	Real per capita disposable income growth **(%)**	Inflation 2001= 100 **(%)**
1972	8,118	158,917	-0.52	8,412	27,179	4.91	7.7
1973	9,259	176,453	11.03	9,335	26,797	-4.93	10.5
1974	11,818	196,402	11.31	11,580	28,114	16.20	11.7
1975	14,171	172,058	-12.40	13,496	26,728	10.46	29.7
1976	15,167	173,318	0.73	16,973	31,058	16.78	6.3
1977	20,658	209,316	20.77	21,847	34,307	25.32	9.8
1978	25,714	211,209	0.90	24,884	40,064	0.29	12.5
1979	27,146	187,400	-11.27	27,712	50,209	-1.32	12.7
1980	31,369	164,503	-12.22	28,816	50,357	0.23	31.0
1981	37,035	149,578	-9.07	36,820	49,690	23.81	25.8
1982	42,261	128,987	-13.77	44,381	49,806	13.24	28.2
1983	55,128	128,758	-0.18	53,169	61,663	6.45	26.7
1984	68,652	113,957	-11.50	68,233	69,828	11.89	36.3
1985	93,130	112,489	-1.29	93,808	74,329	15.88	33.2
1986	104,934	92,577	-17.70	123,162	83,170	21.74	32.5
1987	195,928	128,579	38.89	166,317	96,376	-0.52	30.0
1988	312,816	157,853	22.77	242,838	117,324	4.76	31.0
1989	385,667	144,149	-8.68	269,592	116,709	-10.96	30.6
1990	687,706	184,144	27.75	539,614	122,263	58.95	35.7
1991	887,124	179,336	-2.61	705,663	108,863	-0.75	28.8
1992	1,133,195	182,628	1.84	1,081,284	173,033	18.83	22.0
1993	1,445,366	182,568	-0.03	1,391,752	171,734	0.55	24.1
1994	1,931,976	175,460	-3.89	1,840,182	204,071	-1.95	35.3
1995	2,532,841	175,561	0.06	2,464,352	205,193	2.64	27.4
1996	3,130,072	174,369	-0.68	3,023,710	201,183	0.00	21.0

Year	Private Consumption **(in million tshs)**	Real per capita consumption **(tshs)**	Real per capita consumption growth **(%)**	Personal Disposable Income **(in million tshs)**	Real per capita disposable income **(tshs)**	Real per capita disposable income growth **(%)**	Inflation 2001= 100 **(%)**
1997	3,968,072	184,712	5.93	3,844,466	206,499	2.29	16.1
1998	4,909,250	196,508	6.39	4,693,201	206,493	-7.01	12.8
1999	5,667,437	203,974	3.80	5,423,651	211,216	1.07	7.9
2000	6,069,576	202,346	-0.80	6,992,110	196,416	17.60	5.9
2001	6,822,466	207,496	2.54	7,709,946	198,510	0.44	5.1
2002	7,499,647	212,060	2.20	8,730,714	233,452	3.53	5.3
2003	8,442,113	222,252	4.81	9,249,510	234,487	-4.18	5.3
2004	9,352,717	228,293	2.72	10,489,885	242,761	2.87	4.7
2005	10,581,908	239,598	4.95	11,822,766	232,609	3.17	5.0
2006	12,195,212	248,401	3.67	13,073,458	239,273	1.33	7.3
2007	14,231,135	265,395	6.84	14,952,193	246,860	2.84	7.0
2008	16,460,068	270,031	1.75	17,491,133	250,136	3.09	10.3
2009	18,476,811	262,263	-2.88	20,153,394	257,245	4.07	12.1
2010	20,209,449	263,991	0.66	23,269,857	265,201	4.83	5.5
2011	24,815,658	279,122	5.73	26,583,092	275,996	1.49	12.6
2012	29,399,092	282,105	1.07	31,894,756	289,335	6.66	16.1
2013	49,001,703	411,580	5.07	55,023,317	461,262	47.27	7.9
2014	51,226,640	393,942	-4.29	62,316,602	469,441	1.77	6.1

Source: Source: National Bureau of Statistics (NBS), Tanzania Revenue Authority, Economic Surveys Reports (various issues), National Accounts Publications of NBS, Social Security Funds and own computation.

Table 2.2: Trend of Taxes, Inflation and Real Interest Rate in Tanzania 1972-2014

Year	Nominal interest rate **(%)**	Real interest rate **(%)**	CP1 (2001= 100) **(%)**	GDP Deflator (2001= 100) **(%)**	National Income **(ml tshs)**	Indirect Taxes ml **(ml tshs)**	Personal income tax **(ml tshs)**
1972	3.5	-0.10	0.3	2.2	9,310	1,208	602
1973	4	-1.20	0.4	2.5	10,450	1,729	693
1974	4	-4.16	0.4	2.6	12,916	2,207	1,007
1975	4	-6.45	0.5	2.6	15,603	2,447	1,369
1976	4	-7.71	0.6	2.8	19,260	2,932	1,397
1977	4	-25.73	0.6	2.8	24,570	3,392	1,664
1978	5	-2.25	0.7	2.9	28,322	3,915	1,878
1979	5	-5.80	0.8	3.1	31,109	4,199	2,407
1980	5	-7.50	1.1	3.2	33,473	5,176	2,730
1981	6	-7.70	1.3	3.2	41,654	5,730	3,224
1982	7.5	-25.99	1.7	3.3	49,833	6,594	3,773
1983	7.5	-19.81	2.2	3.6	60,282	8,391	4,087
1984	7.5	-20.71	2.9	4	75,824	11,016	4,678
1985	10	-19.17	3.9	4.6	104,580	12,855	6,176
1986	10	-28.82	5.2	4.8	132,739	19,018	7,351
1987	21.5	-23.20	6.7	6.3	178,723	26,573	8,792
1988	21.5	-22.46	8.8	8.8	266,245	38,035	16,611
1989	26	-8.48	11.5	10.7	312,799	54,172	20,195
1990	26	-9.48	15.6	13.1	607,648	95,608	32,413
1991	26	-4.59	20.1	16.7	773,188	101,815	40,143
1992	26	-9.73	24.6	21.0	1,156,945	107,089	45,455
1993	24	-2.79	30.5	26.1	1,488,294	131,409	58,505
1994	26	4.04	41.2	34.2	1,988,278	187,554	86,645
1995	27	-0.05	52.5	43.4	2,628,416	247,745	103,871
1996	22.3	-9.28	63.5	51.8	3,259,025	381,022	114,789
1997	26.1	-0.40	73.8	62.5	4,119,088	396,153	137,621
1998	22.3	1.31	83.2	79.6	4,951,798	433,805	154,737

Year	Nominal interest rate **(%)**	Real interest rate **(%)**	CP1 (2001= 100) **(%)**	GDP Deflator (2001= 100) **(%)**	National Income **(ml tshs)**	Indirect Taxes ml **(ml tshs)**	Personal income tax **(ml tshs)**
1999	7.1	10.00	89.8	88.3	5,750,448	465,682	185,753
2000	4.7	9.49	95.1	95.0	7,345,485	546,700	213,983
2001	3.6	-0.78	100.0	100	8,172,875	651,895	236,286
2002	2.7	-1.24	105.3	107.1	9,325,587	740,468	284,308
2003	2.5	-1.55	110.9	116.1	9,985,834	864,599	358,976
2004	2.6	-2.62	116.2	124.3	11,388,967	1,024,026	458,192
2005	2.6	-2.80	122.0	132.3	12,925,587	1,222,558	574,356
2006	2.6	-2.14	130.8	139.3	14,494,465	1,526,451	745,668
2007	2.7	-2.43	140.0	151.8	16,802,075	1,996,484	979,625
2008	2.7	-4.65	154.4	167.1	19,851,627	2,486,468	1,227,799
2009	2.8	-4.33	173.2	179.5	22,818,713	2,821,037	1,423,912
2010	2.4	-7.58	182.7	191.9	26,311,122	3,207,589	1,668,953
2011	2.4	-9.34	205.8	209.5	30,601,532	3,753,155	2,155,719
2012	2.8	-3.07	238.9	233.4	36,975,146	4,310,486	2,810,463
2013	3.1	-4.82	257.7	258.2	30,601,532	5,002,655	4,032,455
2014	3.2	-2.93	273.5	279.2	36,975,146	5,084,830	5,452,030

Source: National Bureau of Statistics (NBS), Tanzania Revenue Authority, Economic Surveys Reports (various issues), National Accounts Publications of NBS, Bank of Tanzania and own computation.

Table 5.6: Comparison with other studies

Author &Year	Country	Variables	Coefficient	t-value/std error

Nwabueze (2009)	Nigeria sample (1994-2007)	gross domestic product	0.0514	1.54[9]
Tella (1998)	Nigeria	current per capita income	1.0192	6.54***
		per capita income lagged once	-0.5591	-0.54[9]
		per capita consumption lagged once	0.6145	1.83**
		current real interest rate	-0.0230	-0.91[9]
Akereke; and Yousuo (2012)	Nigeria sample (1981-2012)	Gross domestic product	0.67	3.666***
Adedeji; and Adegboye (2013)	Nigeria sample (1984-2010) dependent var: Lagged consumption	Disposable income Lag1	0.459	7.878***
		Inflation	0.003	3.109***
		Real interest rate(-1)	-0.014318	-8. 561***
Singh (2004)	Fiji sample (1979-2001)	Log Private Consumption L1	0.064	0.736[9]
		Log Private Consumption L1	0.161	1.780[9]
		Log Disposable Income	0.109	11.787***
		Log Disposable IncomeL1	0.380	9.700***
		Log Disposable Income L2	0.181	3.303***
		Log Real interest rate (rir)	-0.016	-12.330***
Khan e tal (2014)	Pakistan sample (1975-2012)	Income	0.785	5.399***
Kazmi (2015)	Pakistan sample (1971-2012) dependent var: Lagged consumption	National disposable income Lag1	-1.3871	-0.57[9]
		Interest rate lag1	0.596	0.43[9]
Ramadhani (2000)	Tanzania sample 1967-1998) dependent var: Lagged consumption	Per capita consumption lagged once	-0.19031	2.058*
		Per capita consumption lagged thrice	0.26701	2.243**
		Per capita income lagged once	0.139	3.939***
		Current Real deposit rate	0.003	-1.412[9]
		Real deposit rate Lag1	-0.0054	0.248[9]
		Real deposit rate Lag2	0.002	1.107[9]
		Real deposit rate Lag3	0.003	2.249
Mkemwa (2016)	Tanzania sample 1972-2014)	Real per capita consumption Lag1	.832135	4.66***

	dependent var: Lagged consumption	Real per capita consumption lag2	-1.084883	-6.07***
		Current real per capita disposable income	0.208477	2.06 ***
		Real per capita disposable income L1	.3342003	1.93 *
		Real per capita disposable income L1	-.2859753	1. 47 ϑ
		Current inflation	-0.0107795	-1.74 *
		Inflation rate Lag1	-.001125	-0.17 ϑ
		Inflation rate Lag2	-.003223	-0.46 ϑ
		Current real interest rate	-.0134971	-2.16 *
		Real interest rate Lag1	-.0018098	-0.26 ϑ
		Real interest rate Lag2	-.0054255	-0.98 ϑ
		Constant	2.496846	2.05 **

Notes: ***indicates significance at 1 percent; **Indicates significance at 5 percent; and ϑ =not significant

Appendix II:

Data used in regression (in million tshs)

Year	GDP	NIFA(-)	GNP	Depreciation	NNP	Indirect Tax	NI
1972	11172	42	11130	612	10518	1208	9310
1973	13103	52	13051	872	12179	1729	10450
1974	15994	37	15957	834	15123	2207	12916
1975	19011	54	18957	907	18050	2447	15603
1976	23373	181	23192	1000	22192	2932	19260
1977	29293	171	29122	1160	27962	3392	24570
1978	33580	45	33535	1298	32237	3915	28322
1979	36839	71	36768	1460	35308	4199	31109
1980	40426	111	40315	1666	38649	5176	33473
1981	49102	176	48926	1542	47384	5730	41654
1982	58226	231	57995	1568	56427	6594	49833
1983	70503	211	70292	1619	68673	8391	60282
1984	88892	173	88719	1879	86840	11016	75824
1985	120621	704	119917	2482	117435	12855	104580
1986	159721	3281	156440	4683	151757	19018	132739
1987	221678	11038	210640	5344	205296	26573	178723
1988	329718	18542	311176	6896	304280	38035	266245
1989	406645	29377	377268	10297	366971	54172	312799
1990	758,050	40,430	717620	14,364	703256	95,608	607648
1991	935,074	40446	894628	19,625	875003	101,815	773188
1992	1,369,874	67,080	1,302,794	38,760	1,264,034	107,089	1,156,945
1993	1,725,535	61,185	1,664,350	44,647	1,619,703	131,409	1,488,294
1994	2,298,866	62,430	2,236,436	60,604	2,175,832	187,554	1,988,278
1995	3,020,499	63,379	2,957,120	80,959	2,876,161	247,745	2,628,416
1996	3,767,642	36,921	3,730,721	90,674	3,640,047	381,022	3,259,025
1997	4,703,459	75,782	4,627,677	112,436	4,515,241	396,153	4,119,088
1998	5,571,255	52,394	5,518,861	133,258	5,385,603	433,805	4,951,798
1999	6,432,911	55,193	6,377,718	161,588	6,216,130	465,682	5,750,448
2000	8,152,790	66,699	8,086,091	193,906	7,892,185	546,700	7,345,485
2001	9,100,274	38,939	9,061,335	236,565	8,824,770	651,895	8,172,875
2002	10,444,507	87,477	10,357,030	290,975	10,066,055	740,468	9,325,587
2003	12,107,062	45,340	12,061,722	1,211,289	10,850,433	864,599	9,985,834
2004	13,971,592	193,957	13,777,635	1,364,642	12,412,993	1,024,026	11,388,967
2005	15,965,294	211,431	15,753,863	1,605,718	14,148,145	1,222,558	12,925,587
2006	17,941,268	80,733	17,860,535	1,839,619	16,020,916	1,526,451	14,494,465
2007	20,948,403	96,007	20,852,396	2,053,837	18,798,559	1,996,484	16,802,075
2008	24,781,679	141,282	24,640,397	2,302,302	22,338,095	2,486,468	19,851,627

Year	GDP	NIFA(-)	GNP	Depreciation	NNP	Indirect Tax	NI
2009	28,212,646	97,866	28,114,780	2,475,030	25,639,750	2,821,037	22,818,713
2010	32,293,479	109,899	32,183,580	2,664,869	29,518,711	3,207,589	26,311,122
2011	37,532,962	305,546	37,227,416	2,872,729	34,354,687	3,753,155	30,601,532
2012	44,717,663	315,120	44,402,543	3,116,911	41,285,632	4,310,486	36,975,146
2013	70,953,227	137,570	70,815,657	4,675,366	66,140,291	5,002,655	61,137,636
2014	79,442,499	197,510	79,244,989	5,142,903	74,102,086	5,084,830	69,017,256

Data used in regression (data in millions Tshs)

Year	Corporate tax	Retained earnings	Personal income tax	Social security contr.	Social security pension/Claims	PDI SS (Y_d)
1972		235.5	602	85.6	24.8	8,411.7
1973		350	693	100.7	28.3	9,334.6
1974		214.1	1007	135.3	20.2	11,579.8
1975		636	1369	141.9	39.5	13,495.6
1976		811.1	1397	149	69.7	16,972.6
1977		955.8	1664	158.7	55.6	21,847.1
1978		1455.3	1878	164.5	60.1	24,884.3
1979		803.6	2407	243.5	56.9	27,711.8
1980		1676.8	2730	313.4	63.1	28,815.9
1981		1296.5	3224	393.6	80.3	36,820.2
1982		1261	3773	490.7	72.7	44,381.0
1983		2612.8	4087	504.4	91.1	53,168.9
1984		2393.2	4678	661.6	141.3	68,232.5
1985		4063.5	6176	674.2	141.9	93,808.2
1986		1553.1	7351	824.4	151.4	123,161.9
1987		2669.4	8792	1125.4	180.5	166,316.7
1988		5326.8	16611	1627.9	159	242,838.3
1989		20743	20195	2524.3	255.7	269,592.4
1990		31696	32413	4289.5	364.5	539,614.0
1991		22496	40143	5563.4	677.5	705,663.1
1992		24,015	45,455	7,335	1,143	1,081,283.8
1993		30,043	58,505	10,118	2,124	1,391,752.0
1994		49,755	86,645	14,973	3,277	1,840,182.0
1995		44,067	103,871	21,137	5,011	2,464,352.0
1996	54,690	47,500	114,789	28,901	10,565	3,023,710.2
1997	59,731	52,400	137,621	40,360	15,490	3,844,466.5

Year	Corporate tax	Retained earnings	Personal income tax	Social security contr.	Social security pension/Claims	PDI SS (Y_d)
1998	64,780	13,675	154,737	44,834	19,428	4,693,200.7
1999	59,644	49,856	185,753	55,436	23,891	5,423,651.0
2000	50,568	54,016	213,983	63,779	28,972	6,992,110.4
2001	51,846	85,535	236,286	104,348	15,084	7,709,945.8
2002	67,724	120,769	284,308	153,801	31,728	8,730,713.9
2003	93,731	139,470	358,976	185,173	41,025	9,249,509.6
2004	130,908	136,822	458,192	228,037	54,877	10,489,884.9
2005	178,037	135,286	574,356	276,621	61,480	11,822,765.6
2006	235,281	192,350	745,668	360,710	113,001	13,073,457.7
2007	320,936	289,122	979,625	464,921	204,720	14,952,192.6
2008	394,686	399,879	1,227,799	608,668	270,537	17,491,133.1
2009	416,500	464,596	1,423,912	736,960	376,649	20,153,394.3
2010	477,915	492,725	1,668,953	905,491	503,818	23,269,857.2
2011	658,709	616,605	2,155,719	1,195,476	608,068	26,583,092.0
2012	909,790	657,458	2,810,463	1,475,935	773,256	31,894,756.0
2013	1,261,812	561,521	4,032,455	1,416,685	1,158,153	55,023,317.2
2014	1,690,221	490,794	5,452,030	1,608,921	851,091	62,316,602.0

Appendix III: Social Security Contribution (data in millions Tshs)

Year	Contr PPF	Contr PSPF	Contr NSSF	Contr GEPF	Contr NHIF	Total SS contribution

Year	Contr PPF	Contr PSPF	Contr NSSF	Contr GEPF	Contr NHIF	Total SS contribution
1972			86			85.60
1973			101			100.70
1974			135			135.30
1975			142			141.90
1976			149			149.00
1977			159			158.70
1978	19.6		145			164.50
1979	78.2		165			243.50
1980	109.3		204			313.40
1981	155.9		238			393.60
1982	236.6		254			490.70
1983	226.7		278			504.40
1984	319.8		342			661.60
1985	274.2		400			674.20
1986	323.6		501			824.40
1987	326.9		799			1,125.40
1988	481.3		1,146.60			1,627.90
1989	630.0		1,894.30			2,524.30
1990	1,189		3,100.50			4,289.50
1991	1,764		3,799.40			5,563.40
1992	2,969		4,365.60			7,334.60
1993	3,518		6,600			10,118.00
1994	4,573		10,400			14,973.00
1995	6,837		14,300			21,137.00
1996	11,401		17,500			28,901.00
1997	14,960		25,400			40,360.00
1998	18,684		26,150			44,834.00
1999	25,806		29,630			55,435.60

Year	Contr PPF	Contr PSPF	Contr NSSF	Contr GEPF	Contr NHIF	Total SS contribution
2000	27,646		36,133			63,778.95
2001	3,152	44,900	44,908		11,388	104,348.00
2002	35,600	48,955	56,619		12,627	153,801.40
2003	33,700	58,051	72,530	3,804.80	17,088	185,173.45
2004	42,970	68,861	89,607	4,109.75	22,490	228,037.15
2005	51,240	80,188	112,226	4,766.70	28,201	276,621.20
2006	63,833	106,593	144,673	6,986.55	38,624	360,709.75
2007	83,214.70	139,531	182,057	9,625.20	50,494	464,921.15
2008	109,780.80	191,825	227,539	12,094.00	67,430	608,668.29
2009	126,963.50	235,638	274,565	15,056.75	84,736	736,960.26
2010	146,493.60	280,259	345,234	21,016.70	112,488	905,490.92
2011	188,100	382,683	447,588	27,930.45	149,174	1,195,476.00
2012	229,100	480,321	547,552	33,482.50	185,480	1,475,935.00
2013	275,015	550,785	512,290	44,493	226,339	1,416,685
2014	332,517	623,389				1,608,921

Appendix IV: Social Security Payments/Claims (Data In Millions Tshs)

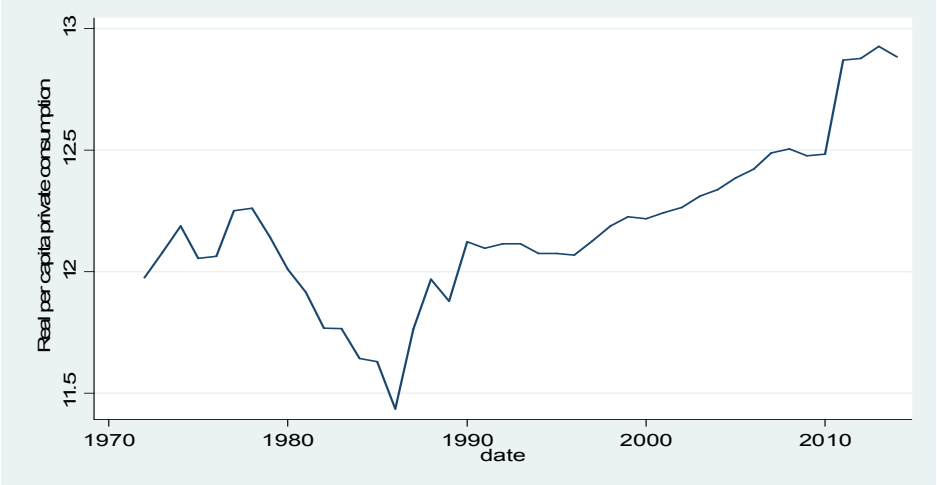
Year	Pension PPF	Pension PSPF	Pension NSSF	Pension GEPF	NHIF claims	**Pension/claims Total**
1970			13.9			13.90
1971			20.5			20.50
1972			24.8			24.80
1973			28.3			28.30
1974			20.2			20.20
1975			39.5			39.50
1976			69.7			69.70
1977			55.6			55.60
1978	0.4		59.7			60.10
1979	1.4		55.5			56.90
1980	3.3		59.8			63.10
1981	7.1		73.2			80.30
1982	7.9		64.8			72.70
1983	12.6		78.5			91.10
1984	18.2		123.1			141.30
1985	41.9		100			141.90
1986	46.7		104.7			151.40
1987	60.8		119.7			180.50
1988	33		126			159.00
1989	105		150.7			255.70
1990	148		216.5			364.50
1991	253		424.5			677.50
1992	550		593.4			1,143.40
1993	744		1,380			2,124.00
1994	1,332		1,945			3,277.00
1995	2,061		2,950			5,011.00
1996	5,220		5,345			10,565.00

Year	Pension PPF	Pension PSPF	Pension NSSF	Pension GEPF	NHIF claims	**Pension/claims Total**
1997	7,750		7,740			15,490.00
1998	10,569		8,859.45			19,428.45
1999	12,198		11,692.98			23,890.98
2000	15,832		13,139.68			28,971.68
2001	1,657		13,152.75		274.4	15,084.15
2002	14,300	0	16,631.00		796.7	31,727.70
2003	16,800	0	21,622.45	28	2,575.0	41,025.45
2004	14,710	9,519.00	26,595.69	47.4	4,004.5	54,876.59
2005	15,360	6,290	34,979.58	396.7	4,453.5	61,479.73
2006	21,653	38,714	45,353.30	795.8	6,485.5	113,001.10
2007	24,826	103,386	66,170.45	1,109.5	9,228.5	204,720.40
2008	35,167.90	137,403	83,228.21	1,464.8	13,273.5	270,536.91
2009	47,191.25	208,350	97,901.69	2,449.9	20,756.6	376,649.34
2010	63,527.80	278,157	123,880.83	3,499.6	34,752.9	503,817.58
2011	79,100	318,997	155,312.45	4,461.4	50,197.7	608,068.05
2012	99,400	412,862	184,121.95	7,205.0	69,667.2	773,256.10
2013	131,971	613,086	269,501.25	11,561	107,662	1,158,153
2014	177,886	673,205				851,091

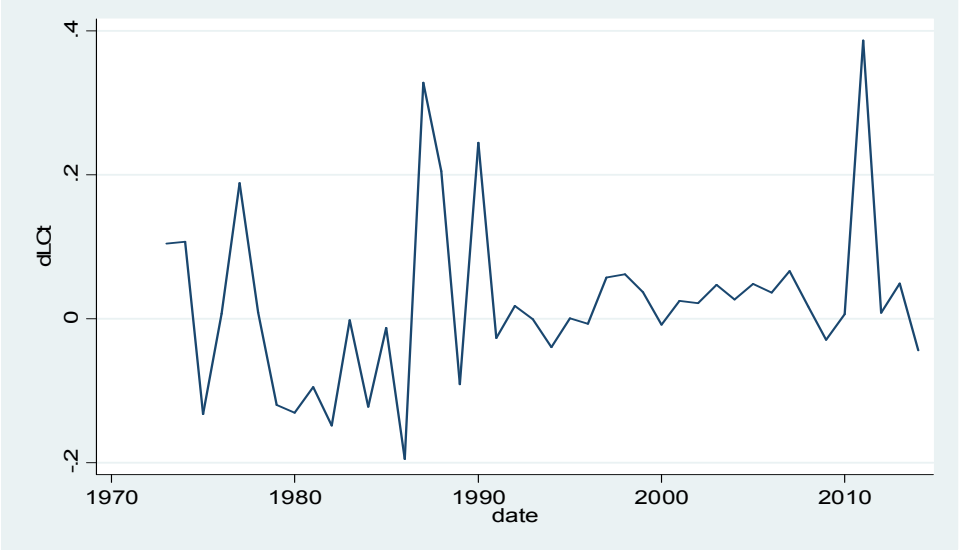
Appendix V:

Graphical Examination of Time Series Characteristics of Data at Level and First Difference

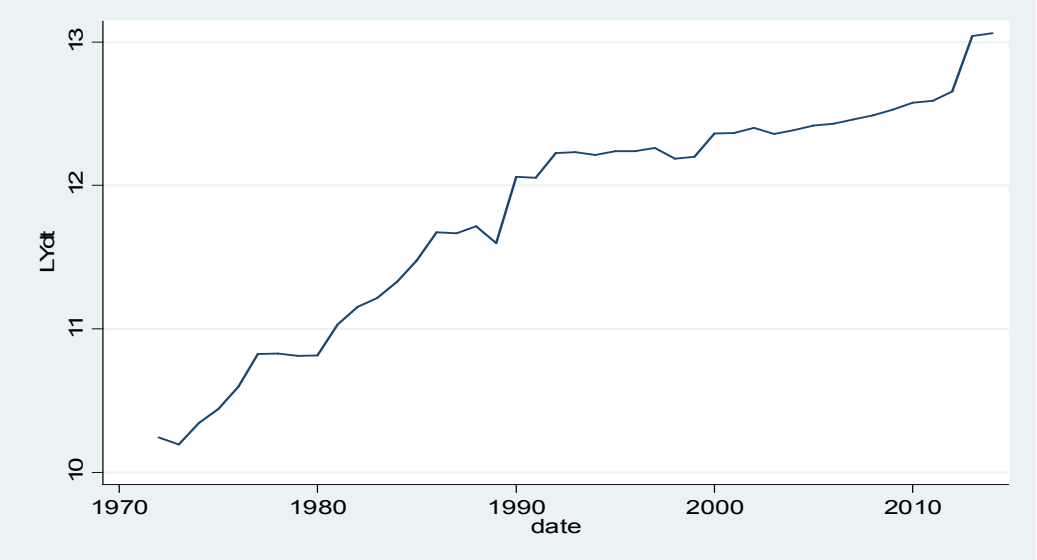
Real per capita private consumption 1972-2014 (At level)



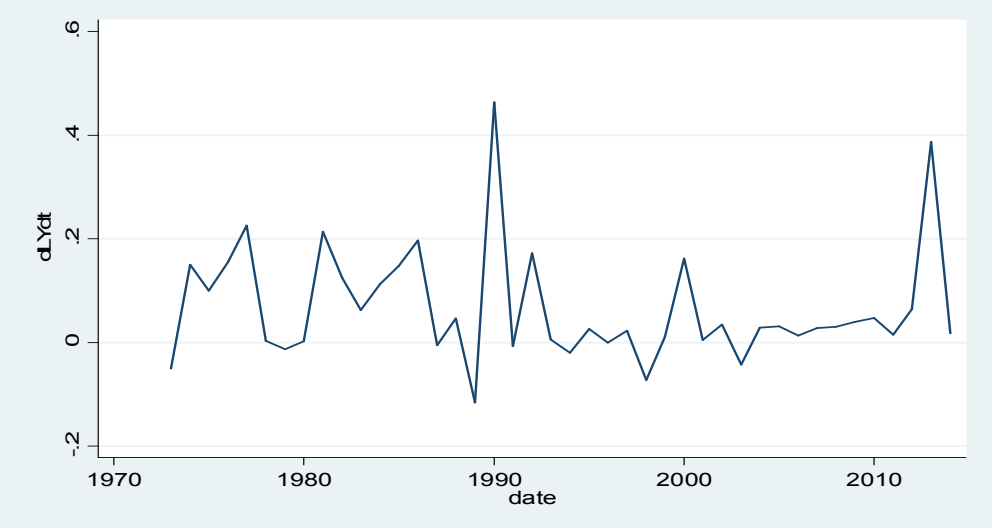
Real per capita private consumption 1972-2014 (At First difference)



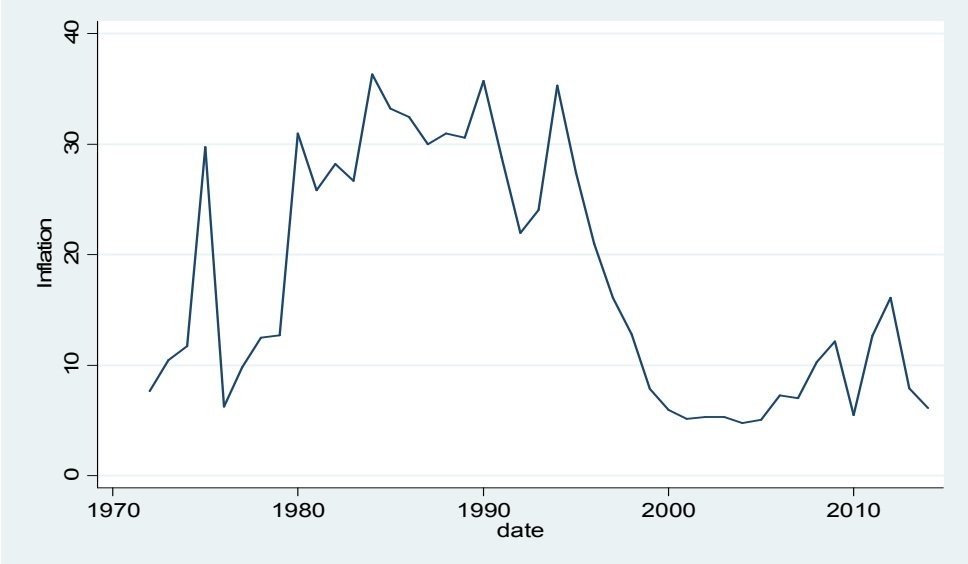
Real per capita personal disposable income 1972-2014 (At Level difference)



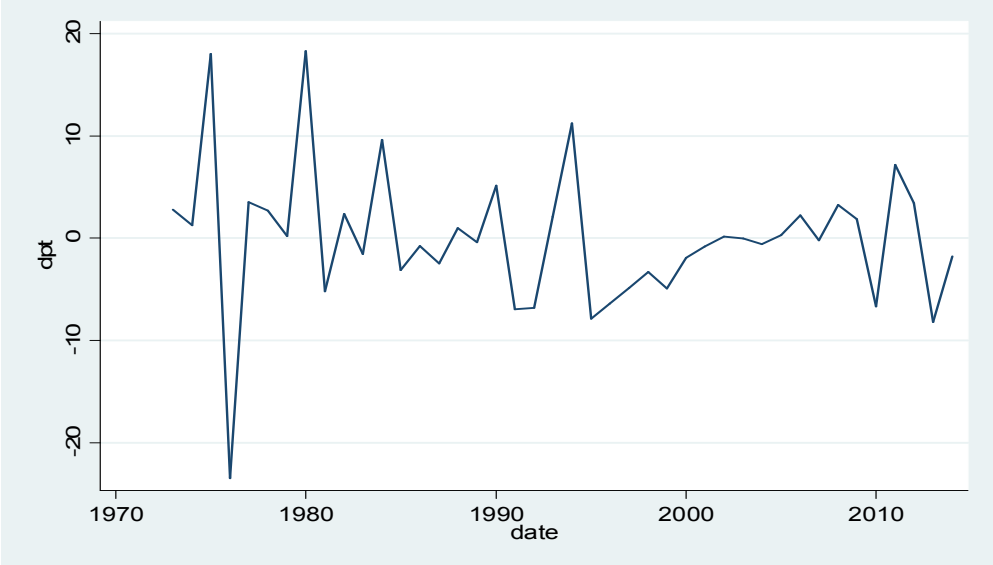
Real per capita personal disposable income 1972-2014 (At First difference)



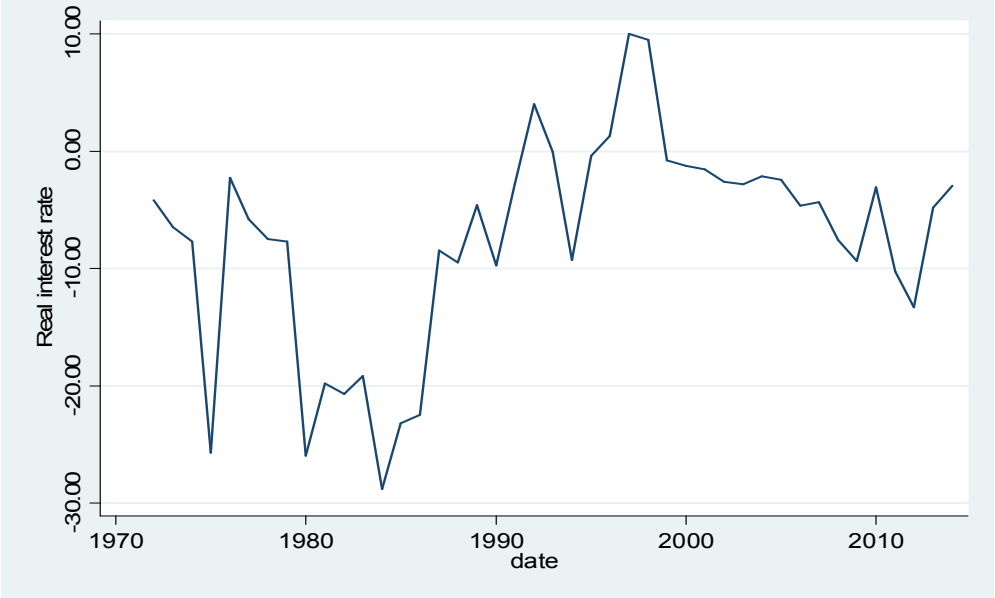
Inflation 1972-2014 (At Level)



Inflation 1972-2014 (At First difference)



Real interest rate 1972-2014 (At Level)



Real interest rate 1972-2014 (At First difference)