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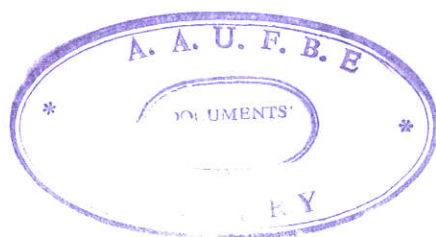
*HOUSEHOLD CONSUMPTION BEHAVIOURS IN ETHIOPIA: AN
URBAN-RURAL COMPARISON USING MICRO DATA*

A thesis submitted to the School of Graduates of Addis Ababa
University in partial fulfilment of the requirements for the degree

of

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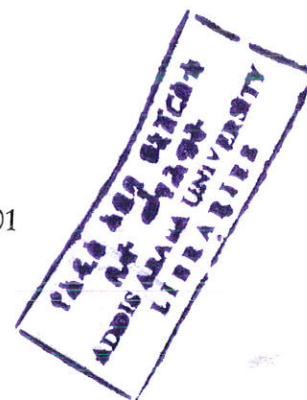
(Economic Policy Analysis)



By

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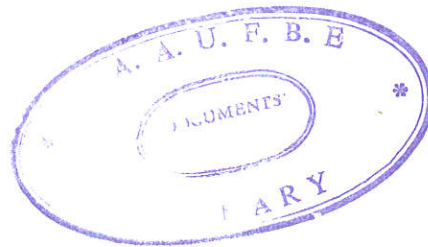


Addis Ababa University
School of Graduate Studies

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TABLE OF CONTENTS

<i>Acknowledgments</i>	<i>i</i>
<i>Table of Contents</i>	<i>ii</i>
<i>List of Tables</i>	<i>iv</i>
<i>Abstract</i>	<i>v</i>
 SECTION ONE.....	 1
1. INTRODUCTION.....	1
1.1. Statement Of The Problem	1
1.2. Objective Of The Study	2
1.3. Hypotheses	3
1.4. Significance Of The Study	4
 SECTION TWO	 6
2. REVIEW OF LITERATURE.....	6
2.1. Review Of Theoretical Literature.....	6
2.1.1. The Static Theory Of Consumer Behaviour	6
2.1.2. A Brief Review Of Alternative Hypotheses	11
2.1.3. Life Cycle/Permanent Income Hypothesis	15
2.2. Review Of Empirical Literature	17
2.2.1. Literature On Static Theory Of Consumption Behaviour	17
2.2.2. Literature On Life Cycle/ Permanent Income Theories.....	25
 SECTION THREE.....	 32
3. METHODOLOGY.....	32
3.1. Data Source	32
3.2. Measurement Of Variables	37
3.2.1. Categories Of Consumption Items.....	37
3.2.2. Determinants Of Consumption	43
3.3. Model Specification.....	50
3.3. Estimation Issues	53

SECTION FOUR.....	56
4. THE ANATOMY OF THE CONSUMPTION PATTERN OF ETHIOPIAN HOUSEHOLDS	56
4.1. Household Characteristics And Household Welfare	56
4.1.1. Basic Household Characteristics.....	56
4.1.2. Household Welfare Comparisons.....	58
4.2. Patterns Of Consumption	64
SECTION FIVE.....	66
5. ANALYSIS OF EMPIRICAL RESULTS	66
5.1. Empirical Results For Urban Households	68
5.2. Empirical Results For Rural Households.....	80
5.3. Comparison Of Urban-Rural Consumption Patterns.....	87
SECTION SIX.....	95
6. SUMMARY AND CONCLUSION.....	95
REFERENCES	99
APPENDICES	105
Appendix 1. Some agro-climatic and socio-economic characteristics... ..	106
Appendix 2. Descriptive statistics for urban households... ..	109
Appendix 3. Descriptive statistics for rural households... ..	110
Appendix 4. Condition indices for the explanatory variables... ..	111
Appendix 5. The calculated F-values for urban households... ..	112
Appendix 6. The calculated F-values for rural households... ..	112
Appendix 7. Budget share regressions for urban households... ..	113
Appendix 8. Budget share regressions for rural households... ..	114
Appendix 9. The derivative of total expenditure elasticity... ..	115
Appendix 10. The derivative of household-size elasticity... ..	116
Appendix 11. The derivative of the marginal budget shares... ..	117

LIST OF TABLES

<i>Table</i>	<i>Page</i>
4.1. Characteristics of urban households by expenditure types	59
4.2. Characteristics of rural households by expenditure types	60
4.3. Mean annual per capita expenditures for rural-urban regions	63
4.4. Percentage distributions of average yearly consumption expenditure	65
5.1. Budget shares regressions for urban households	73
5.2. Estimated total expenditure and household-size elasticities for urban households	77
5.3. Estimated marginal budget shares for urban households	79
5.4. Budget shares regressions for rural households	82
5.5. Estimated total expenditure and household-size elasticities for rural households	85
5.6. Estimated marginal budget shares for rural households	87
5.7. Test results for differences in variances and estimated parameters	89
5.8. Comparison of the estimated total expenditure elasticities	94

Abstract

This paper presents a study of the consumption behaviours of the rural and urban Ethiopian households. It estimates a complete set of consumption equations for expenditures on different group of commodities, applying the Working-Leser model. The estimation of the required parameters is based on data from the rural and urban household surveys conducted by the department of Economics.

The urban-rural welfare differences are observed across different regions, categories of education levels, categories of age groups and sex groups. Apart from this, significant welfare differences between the rural and urban households have also been observed. Both the rural and urban household's expenditure elasticities show that clothing, durable goods, housing, education and medical care and drinks and stimulants turn out to be luxury good while the rest are becoming necessity goods. Differences in elasticities between the two groups are also obtained. Disaggregated by income groups the estimates of elasticities show that the expenditure elasticity is inversely proportional to total expenditure, while marginal budget shares are declining for necessity goods and increasing for luxury goods.

The marginal budget shares for food are quite high in both sectors. In addition, the estimates for food conform to the findings of other studies. This attribute makes the agricultural sector the springboard for development strategies.

SECTION ONE

1.INTRODUCTION

1.1 Statement of the Problem

During the 1970s and 1980s the Ethiopian economy had experienced a worsening economic situation. The occurrence of recurrent draught and famine, the exploding population growth rate together with the inappropriate policies implemented by the then government had resulted in the poor performance of the economy. Consequently, this has left the majority of the population in varying degrees of poverty. Even though various studies has come out with different results, according to World Bank (1994) report on average about 52 percent of the total population has been undergoing poverty situation during this period.

Besides the problems mentioned above, governments bias towards the urban sector, by implementing policies that have been intended to promote urban development, have further aggravated the poverty situation in rural Ethiopia. In 1992, the extent of poverty has reached about 66 percent of the rural population (Hadgu, 1995). Following this the fall in agricultural productivity was inevitable. This decline in productivity, in turn, has resulted in a reduction in rural income and hence the living standards of rural households. Since then disparities in living standards between the rural and urban households has become a matter of increasing concern.

Therefore, efforts to improve the living standards of the rural population through various policy measures have been underway since the existing government has taken power.

These policy measures which have included the provision of extension services, credit facilities, improved seeds and fertilizers and decontrolling of agricultural marketing institutions have been implemented with the intention to raise the output and income, and hence, the well-being of rural households, thereby narrowing the rural-urban disparities in living-standards. As a result of these policy interventions, it is evident that the welfares of rural households would be improved. Thus to what extent the welfares of the rural and urban households differ is the problem that this paper wants to address. Among the host of instruments available to measure the economic components of the living-standards, consumption, being a valuable approximation to utility, constitutes the best measure of the effectiveness of these policies.

1.2 Objectives of the Study

The consumption behaviours of households are assumed to be different between the rural and urban households. Also supposed is that their consumption patterns are influenced by several factors such as income, household demographic characteristics, sex, age, education and geographical location. The main objective of this study is, thus, to examine the extent to which the rural and urban households consumption behaviours differ from each other. It also has the objective to investigate the extent and direction of the effects of various factors, which are likely to affect the behaviour of rural and urban consumption patterns differently.

Specifically, the study attempts to address the following objectives.

- Compare the budget shares of different commodity groups for the two groups;

- Analyze the effects of income (or total expenditure) on rural and urban households consumption pattern of different expenditure groups;
- Analyze the impact of a series of household characteristics on the consumption pattern of the two groups;
- Estimate the income elasticities and marginal budget shares of the two groups across different income levels for the purpose of comparative analysis.

1.3 Hypotheses

The following series of hypotheses are going to be tested in the study:

- Urban households are better off than rural households in consumption
- The marginal budget share and the income (or expenditure) elasticity of necessity goods in rural areas are greater than its urban counterpart where as in the case of non-necessity goods the reverse happens;
- Where households are divided into different income groups the marginal budget share falls for necessity and rises for luxury goods as income increases
- Income elasticity is inversely proportional to the level of consumption, i.e. total expenditure elasticities will decline as total expenditure increase.

1.4 Significance of the Study

Taking agriculture as the primary basis to generate employment and income, the long-term development strategy of the Ethiopian government is predicated on the agricultural sector. The ultimate goal of this strategy is to raise the welfare of the rural households. Thus any improvement in income that comes through various policy interventions in rural areas directly translates into the change in expenditure. This paper hence attempts to examine the implied changes in the rural households, drawing on data from the rural and urban household surveys of Ethiopia. The purpose of this paper is twofold.

First, because future patterns of production and employment will be strongly influenced by the demand of both rural and urban households, an understanding of their consumption preferences is important for various development strategies. Certain policy interventions in developing countries, like Ethiopia, may be more likely to succeed if they are directed towards the rural sector. If the well being of the rural households is improved in relation to the urban households, the claim that development strategies should be predicated on the agricultural sector receives additional support.

Second, the test for the pattern of household expenditure has been underway in Ethiopian for a long period of time. But almost all of these studies have limited their investigation either to the urban or, very rarely, to the rural sector only. Because of data incompleteness, no comparative analysis of rural-urban household's behaviour has been conducted so far. This paper hence attempts to narrow this gap. In addition, the parameter estimates of the present study have been based on the most recent primary data from the household expenditure survey conducted in the selected urban and rural

areas during 1999 and 2000 by the Department of Economics, Addis Ababa University. The study has also applied the Working-Leser model, which has been popular and widely adopted by economists in recent years, to estimate a complete set of consumption equations.

The organization of the remaining parts of the study is as follows: the second section reviews the theoretical and empirical works conducted by different authors. The third section describes the general characteristics and consumption patterns of both rural and urban households based on the mean values and percentage points. The fourth section deals with the data sources and methodological issues such as the specification of the model, econometric issues and estimation problems. Section five discusses the findings of the regression results. Finally, in section six the summary and conclusion have been given. Supplementary information has also been provided in the appendix section at the end of the paper.

SECTION TWO

2.REVIEW OF LITERATURE

2.1 Review of Theoretical Literatures

In this subsection attempts are made to present variants of the theoretical frameworks upon which the empirical investigation of the household's consumption behavior relies. Engel first set out the study of static theory of consumption behavior a century and half-ago which later on was developed by Stone and others. However, the inability of this theoretical proposition to yield consistent estimates over time and groups led to the formulation of others in the 1950s. For this reason, three alternative theories of consumption were independently developed to explain the actual consumption patterns. Two of these alternative theories, the permanent income and lifecycle hypotheses, have drawn much more attention than the other one, relative income hypothesis. Lucas' critique of rational expectation, however, attenuates the empirical importance of them and gives rise to the formulation of the more recent theoretical framework - life cycle/permanent income hypothesis.

2.1.1 The Static Theory of Consumer Behaviour

The consumption behaviour of a household has found its theoretical background from the utility theory in that a household is assumed to maximize utility subject to certain constraints. The utility function that represents the household's consumption behaviour

is required to satisfy the separability restriction ¹. In this case, the utility function is defined over a set of consumption goods and is subject to a budget constraint. Thus, the maximization problem is expressed as

$$\max u = u(x_1, \dots, x_k) \dots \dots \dots (2.1)$$

$$\text{subject to} \quad \sum_{i=1}^k p_i x_i = y$$

where x_i , p_i and Y are the quantity of consumption of good i , the price of good i , and the consumer's income, respectively.

This maximization problem yields the demand function for a given consumption good x_i , which is a function of all the market prices and total income, Y . In a cross - sectional budget studies, in which case all the consumers face the same price, the resulting demand equation for a certain commodity or a group of commodities can be rewritten as a function of income only, i.e.

$$x_i = f(Y) \dots \dots \dots (2.2)$$

This functional form, including the expenditure function that is obtained by multiplying (2) by the respective price is known as the Engel curve ². As the name indicates, such a relationship was first established by Engel. In his budget studies he employed pure statistical approach to grasp the basic relationship between income and consumption, i.e. the effect of the increase in income on the proportion of food consumption.

¹ Under the separable utility function, the whole vector of commodities are partitioned into different group so that each group provides subutility which can be maximized subject to the budget allocation to that group. Thus, this enables allocation within groups to be determined solely by the within group relative prices and allocation of expenditure to that group.

Different choices of the utility function of the form in equation (1) results in numerous functional forms of the Engel curves. For example, the maximization of the Stone-Geary utility function, which is defined as

$$U = \sum_{i=1}^k \beta_i \ln(x_i - \gamma_i) \dots \dots \dots (2.3)$$

where γ_i is a minimum required quantity of commodity i, subject to the budget constraint that

$$\sum_{i=1}^k p_i x_i = y \dots \dots \dots (2.4)$$

yields the following demand equation,

$$p_i x_i = p_i \gamma_i + \beta_i (y - \sum_{j=1}^k p_j \gamma_j) \dots \dots \dots (2.5)$$

in the absence of price differences across consumers the demand equation in (5) can be written as

$$x_i = \gamma_i + \beta_i (y - \sum_{j=1}^k \gamma_j) \dots \dots \dots (2.6)$$

by rearranging

² See, Deaton, Angus, and Muellbauer J. (1980), Economics and Consumer Behavior, Cambridge University Press, New York. P.19

$$x_i = (\gamma_i - \beta \sum_{j=1}^k \gamma_j) + \beta_i y$$

if $\alpha_i = (\gamma_i - \beta \sum_{j=1}^k \gamma_j)$ then

$$x_i = \alpha_i + \beta_i y \dots \dots \dots (2.7)$$

This relationship underlies the various functional forms that are formulated to estimate the marginal propensities and income elasticities. The income elasticities thus estimated are used as a basis to categorize the commodity group or a specific commodity as luxury, necessity or inferior. In addition to this, Engel's law describes that, as income increases, the share of budget that goes to food in the total consumption falls while that of luxury goods rises. It is worthy mentioning at this point that this Engel's law underlies Keynes's consumption function³.

Actually, the Engel curves that had been in use in subsequent periods of family budget analysis have been a mere representation of mathematical relationships until Stone (1954) makes use of it in the economic theory of consumer behaviour. Thereafter, given the additional influential works of Leser (1963) and Barten (1964), the choice of the functional form of the Engel curve to be employed in the analysis of household economic behaviour is made dependent on some economic criteria. Consequently, it is

³ Houthakker notes "there is a clear line of descent from Engel's law to Keynes' 'fundamental psychological law' according to which the proportion of total consumption to income falls as income goes up. " Houthakker, Hedrick, S. (1968) "The Biography of Earnest Engel." International Encyclopedia of the Social Sciences vol. 3&4 P. 328

desirable that the Engel curves to satisfy the adding-up, saturation and representatives of the utility function criteria.

Firstly, the adding- up criterion states that the total value of the resulting functional form given by (2.2) and (2.7) should add up to the total income, i.e.

$$\sum_{i=1}^k p_i x_i = y \dots \dots \dots (2.8)$$

Alternatively, the sum of elasticities for each good i in the consumer's basket weighted by the respective budget share of the good should be unity. This entails that a single functional form must be employed to estimate the complete set of consumption equations.

Secondly, many commodities are luxuries at low level of income and tend to become necessities when income increases. Accordingly, income elasticities that are greater than one in the former case will fall to zero if the saturation level sets in. Hence, the functional form being used should consider the existence of the saturation level of consumption for each commodity. Finally, the functional form is required to directly or indirectly represent a particular utility function, i.e. the functional form has to be derived from a particular representation of the household behaviour. Only when the Engel curve satisfies either all or some of these considerations does it represent the household's consumption behaviour.

However, the empirical investigations, which were conducted in the 1940s and 1950s using different functional forms of Engel curves, provided income elasticity estimates that are not consistent with the theoretical explanations. More specifically, Reid (1968) explained that, even if large categories of consumption goods are included in the family budget studies, the income elasticity with a coefficient of greater than one was a very rare case. He also mentioned that the resulting estimates from Engel curves are not consistent across groups and time. In addition, Brady and Friedman (Tobin, 1968), who performed household budget studies in the prewar period by collecting consumption data starting from 1901, observed that the Engel curve under-predicted the cross-section data of the postwar period.

Such difficulties with the Engel curve, together with the failure of the Keynesian consumption function ⁴, which is the macroeconomic replica of the relationship between consumption and current income, gave rise to the formulation of alternative theories of consumption theories.

2.1.2 A Brief Review of Alternative Hypotheses

Because of the problems mentioned above, three different theories were independently developed to formulate and test hypotheses that are capable of explaining the pattern of consumption behaviour. These are the relative income of Duesenberry (1949), the permanent income of Friedman (1957) and the lifetime income of Modigliani and

⁴ Kuznets' study of the consumption behaviour, using US data over a long period of time revealed that the long run average propensity to consume remained constant and, thus, the marginal propensity to consume was identical to it as income rises.

Brumberg (1954). All of them underlie the choice-theoretic model, i.e. the consumer maximizes his utility function subject to the budget constraint, on an intertemporal basis.

In this analysis of the consumption behavior of households, individuals are classified into different income groups. Those individuals who are at the bottom of the income groups try to conform their consumption pattern to those in the upper groups of the income distribution. According to this theory, the consumption behavior of a household is influenced not only by the absolute level of consumption but also by the relative position in the income distribution. For instance, if an individual is found at the lower income group, his basket of consumption goods is more influenced by the wealthier individuals' consumption behavior than the one in the average income group. Hence the lower the relative position of an individual in the income group, the higher will be his marginal propensities to consume owing to the higher pressure from the social competition. As income increases along the income distribution the pressure on the consumption bundle declines and, hence, the marginal propensity to consume declines.

Similarly, the average propensity to consume falls along the income distribution as income increases in cross-sectional budget studies. However, such a declining tendency in the average propensity to consume is not observed over time. In the long run the increase in income may result in a proportionate increase across the income groups, in which case the relative incomes position as well as the average propensity to consume do not change. If it is not proportionate, since the movement from the lower income group to the reverse movement offsets the upper by some individuals by some others, the overall average propensity to consume does not change. Hence in the long run the average propensity to consume remains unchanged. This constancy of the APC in the

long run is governed by the persistence of the individual's habit, i.e. the individual household has the desire to keep the consumption habit of the previous period. Thus, if individuals' current income exceeds (falls short of) the previous period level, they consume a lower (greater) proportion of their earned incomes.

The life-cycle hypothesis is the second attempt made by Brumberg and Modigliani. According to this hypothesis the rational consumer maximizes his adaptively separable inter-temporal utility function subject to the equality between his lifetime consumption and lifetime resource. Thus, the consumer smoothes out his consumption pattern from his lifetime income rather than from his current income, i.e. the change in consumption does not respond to the change in current income. In other words, through the household's expected lifetime income, only a fraction of the change in current income goes to current consumption. The lifetime income of a household unlike the lifetime consumption, depends on his age structure, i.e. it is low at the beginning and end of his life and high during the middle. In order to circumvent the difficulty the consumer faces at the edges of his life, the theory assumes the absence of liquidity constraint in that he can borrow and lend without constraint. This consumer is further assumed to leave a bequest as much as his inheritance so that there doesn't exist lifetime saving in this model. In short, what is saved during the earning years will be consumed during the retirement years.

The other theoretical explanation of the consumption function was the permanent income hypothesis developed by Friedman. Here the resistance of current consumption pattern to the changes in current income is explained based on the hypothesis that the consumption of a household is proportional to its permanent income. According to this

theory the income of an infinitely lived consumer involves permanent and transitory income. The latter is considered as deviations of measured income from the former. On the other hand, the permanent income is defined as the return on the discounted present value of his lifetime income that will leave his wealth unchanged. In a similar manner, the consumption of a household is divided into permanent and transitory consumption components. Afterwards, he uses the assumption that both transitory and permanent components of income and of consumption and the transitory components of income and of consumption are uncorrelated with each other.

Because of the fact that the permanent and transitory components of income are unobservable, Friedman suggested the possibility that the former is computed from the distributed lag system. Specifically, permanent income is formulated as the sum of the weighted value of current and lagged income where the weights assigned to current and past values are successively decreasing.

All of the competing hypotheses outlined above are formulated in such a manner that current income has no direct effect on current consumption. In each of these hypotheses, however, different factors have been suggested to determine the level of current consumption: past consumption habit for relative income hypothesis, lifetime resource for LCH and permanent income for PIH.

Although RIH and PIH theories provide completely different determinants of current consumption, the equation that is used to estimate the consumption function in these two theories is the same. The specifications of the explanatory variables, which involve the current income and lagged consumption in both equations, are similar. However, the

coefficients being estimated from this equation are further used for quite different purposes. For instance, in the RIH, they are used to compute the long run APC but in the case of PIH they are used to compute the magnitude of MPC out of current income.

- On the other hand, the PIH and LCH theories are closely related to each other since in both cases current income affects current consumption, via its influence on total wealth. There are, however, some differences between the two models; first, the LCH is more concerned with the relationship between consumption, on the one hand, and age and wealth, on the other hand. But the PIH rather emphasizes the relationship between consumption and permanent income, which is defined as the annuitised value of expected income. Second, in the LCH model the individual is concerned only with his remaining lifespan in planning consumption whereas in PIH model the planning horizon for consumption is infinite.

2.1.3 Life Cycle/Permanent Income Hypothesis

The adoption of such adaptive expectations to determine the permanent income was, however, criticized by Lucas because the formation of such expectations does not take into account the anticipated government policy changes. Since consumers are rational economic agents, they incorporate any information available to them, including government policy changes, in forming future expectations. Thus, modification of the theory with the perspective of rational expectation becomes important.

Hall (1978) was the first to incorporate rational expectations in the life cycle-permanent income hypothesis. In his theoretical explanation, Hall stated that, if the maximization of

an inter-temporal utility function follows the Euler's approach, the marginal utility function derived from the same utility function should follow a stochastic process. In short, the marginal utility, by further assumption of the equality between the rate of interest and the rate of time preference, obeys the random walk process.

Consequently, the consumption function, which is derived from the marginal utility of consumption, obeys the same property of random walk provided that the additively separable utility function is assumed. This implies that any past information other than lagged consumption should have no role on current consumption. In particular, lagged income should not have a statistically significant coefficient in the consumption function. This is because of the fact that lagged consumption captures all the relevant information for that period, including the information about lagged income.

However, the assumption of perfect capital market, which enables to avoid the liquidity constraint, is highly restrictive. Particularly in developing countries, because of credit rationing and high interest rates in the informal money market, consumers are not able to smooth their consumption from borrowing, when their income falls short of consumption. Consequently, apart from the lifetime budget constraint, the standard inter-temporal utility function of a consumer with borrowing constraint must be optimized subject to another constraint that assets are nonnegative. It implies that the consumer cannot borrow but save or accumulate assets. Then, the resulting optimization problem will be different for the liquidity-constrained household, i.e. current consumption will depend on current income when current income falls below the lifetime consumption level.

2.2 Review of Empirical Literature

2.2.1 Literature on Static Theory of Consumption Behaviour

The empirical analysis of household consumption behaviour is pioneered by the work of Engel. He in the mid-nineteenth century proposed his famous law of consumption, which is formulated on the basis of the family budget studies of different countries. The establishment of this law itself is thus taken as the first significant quantitative approach contributed to the field.

Subsequent studies by Bennet and Williams (1966)⁵ using this law of consumption have proved that the share of food consumption in poor countries is higher than that in rich countries; and, even within a country it declines over time as its national income rises. Several studies were also attempted to derive generalizations about the other categories of consumption, particularly for housing and clothing; but the results lack harmony by themselves to provide a universally accepted law like the one for food. But later on, based on the results obtained from Praise and Houthakker⁶, Houthakker (1957) employed the log- linear model to estimate the income elasticities for food, clothing and housing. Based on the result from his study of international comparison of consumption behaviour, and by analyzing the evidence from earlier studies, he reached the conclusion that the income elasticity of food, clothing, housing and other expenditures is 0.6, 1.2,

⁵ In the United States the food share of urban families of a wage earner head was 41% in 1888-91 and has fallen to 35% in 1934-36. It was also observed that in 1962 the food share of Ghana was 51% while at the same time that of United States was 21% Reid, M.G. (1968), International Encyclopedia of the Social Sciences, Vol.3.

0.8 and 1.6, respectively. He also stressed that these estimates are expected to vary between rural and urban households. Since then these figures served as a basis of comparison for the results obtained in later works.

In what follows, an attempt is made to review some of the empirical investigations that have been undertaken in developing countries. In most of these nations micro-data was not adequately available until the 1960s to carry out an extensive analysis of household consumption behaviour. However, the family budget surveys conducted during the 1960s and 1970s for living standard measurement purposes have allowed the cross-sectional budget studies in some of these developing nations. Several of these studies have been done for the Asian and Latin American countries. An attempt to review some of them will be made below.

Howe (1968), Massell (1969) and Humphrey and Oxley (1976) postulate that the consumption pattern between rural and urban households is different and conduct their studies in three African countries. These countries were Uganda, Kenya and Malawi. Except in Howe, other studies make use of the double-log functional form, which is estimated by two stages least squares method while Howe used six alternative functional forms and estimated all of them by OLS. Moreover, in these two studies, total expenditure, instead of income, is used as the independent variable, together with household size, which enabled them to estimate household- size elasticities. However, unless a broad classification of the items are made for all goods, the correspondence of results in these studies is very weak, even though many of the luxury items produced similar results in the latter two studies. Among others, the failure to test alternative

⁶ Praise and Houthakker in 1955 made an estimation of Engel curve using UK data of family budgets with

Engel functional forms is mentioned as a reason for the lack of coherence between the results (Humphrey and Oxley, 1976).

The comparison of rural-urban elasticities indicates that most of the time the expenditure elasticities for non-durable goods are higher in rural areas than urban areas. But, in the case of Massell and Humphrey and Oxley, the expenditure elasticities of durable goods are higher in urban areas than in rural areas. However, some of the elasticity estimates appear to have been surprising, in their studies. For instance, the expenditure elasticities of education and transport are found to be higher in rural than urban areas in Humphrey & Oxley's studies. Again, the household-size elasticities of durable goods are not found to be insignificant in both studies.

Being the best specification in estimating parameters, the double-log functional form has been more appealing than the others. Conceptually, the double-log functional form is a monotonically increasing function, i.e. as total expenditure increases, and the expenditure on a certain good also increases. However the proportion of total expenditure that is spent on necessity goods does not respond in a similar way instead it declines as total expenditure increases. Thus, it is the semi-log⁷ rather than the double-log functional form that is convenient for the analysis of necessity goods. Therefore,

five functional forms, but except the logarithmic & semi-logarithmic forms, the rest three were not good fits to the data. Thomas, R.L. (1993), Introductory Econometrics, P.211.

⁷ The functional form of the semi-log function is given by $c_i = \alpha_i + \beta_i \log x + u_i$ Where C_i & X are the consumption level of good of i and total expenditure respectively; and α_i, β_i and u_i are the parameters to

be estimated and the error term. Then the MPC is $\frac{\partial c_i}{\partial x} = \frac{\beta_i}{x}$,

and the income elasticity of item i with respect to x is $\frac{\partial c_i}{\partial x} \times \frac{x}{c_i} = \frac{\beta_i}{c_i}$

Mayer (1979) for St. Kitts and Rahman and Hossain (1988) for Bangladesh employed two functional forms in their studies of household consumption behaviors: semi-log forms for necessities and double - log form for non- necessities on the basis of a priori classification. Their empirical results have lent strong support to the suggestion that semi-log form is the best fit for food items.

Furthermore, Mayer uses the results obtained to compare the rural- urban differential in the consumption behaviour. Accordingly, the expenditure elasticity of food items, which exhibits a declining trend as income increases, appears to be lower in the case of urban areas than that of rural areas. On the other hand, in spite of being insignificant, many of the double- log estimates of non- food items tend to be high in rural areas. Mayor ascribed the failure of double-log specification to small sample size and the level of aggregation applied for non-food items. If alternative functional forms are applied to the consumption behaviour of St. Kitts households, he added, the coefficients might be significant and consistent with theoretical expectation.

Unlike Mayer, Rahman and Hossain managed to obtain statistically significant and theoretically consistent results in their study of the consumption behaviour of rural Bangladesh households. Also included in the regressors of the estimation of the eight commodity groups is the household size.

The foregoing discussions have attempted to show how prominent the logarithmic models are in the analysis of consumption behaviour of households. The main advantage of this model lies in that it provides a unit-free parameter, thereby enabling comparisons across expenditure items and sectors more plausible than the other estimates. However,

it is not consistent with particular consumption behaviour of a household because no logarithmic functional form is derived from the optimization problem. Moreover, according to Leser (1963) and Stone (1954), a competent Engel curve is required to fulfill the adding-up and saturation criterion. But, the logarithmic function does not satisfy these requirements. Thus the desire to have such an Engel curve with this property has increased the effort to develop a variant of functional forms of Engel curves⁸.

Among others, the Extended linear Expenditure system (ELES) and the Almost Ideal Demand System (AIDS) models are found to be the best candidates that satisfy the required considerations.

The Extended Linear Expenditure system is derived from the utility function that allows for the minimum required quantities, or subsistence level, for each good under consideration. That is, the utility function is expressed as a function of the quantity of the good to be consumed in excess of the subsistence requirement. Thus, the model can be considered as a behavioral equation with a particular representation of consumer behaviour. Gaag (1984) employed the ELES model to analyze the rural-urban consumption expenditure differential of Chinese households. He estimated the coefficients of marginal propensity to consume (save), the income elasticities and price elasticities.

Based on the estimates of the marginal propensity to save, the result revealed that the saving rate is higher in rural areas than in urban areas, partly because rural income was

⁸ Leser provides five different types of Engel function with the kinds of requirements each satisfies. Leser, C.E.V. (1963) "Forms of Engel Function", *Econometrica*, vol. 31, No.4.

approximated by total expenditure. Using income data rather than total expenditure is found to be misleading because individuals are more reluctant to give information about their income than about their consumption. The subsistence levels, which are calculated from the estimated parameters for food, is higher in rural than urban areas. As to the estimates of income elasticities, with the exception of some, the results are not only consistent with theoretical explanation but also conform to the average values of the estimates of 16 countries compiled by Lluch et al. (1973). Gaag, however, observed that the parameters of own-price elasticities are above the international averages while cross-price elasticities fall below the respective averages.

Although the ELES model provides estimates of expenditure and price elasticities that are consistent with prior theoretical expectation, there exists a co-movement between the two elasticities for which no theoretical background is available. In other words, Deaton and Muellbauer describes it as "the ordering of commodities in terms of price elasticities is identical to that by expenditure elasticities . . . We have good reason for considering the linear expenditure system too restrictive and for passing on to more general models."⁹ Accordingly, attempts to formulate a fully satisfactory model have evolved.

Based on the model proposed by Working-Leser, Deaton and Muellbauer (1980) have developed the almost ideal demand system (AIDS) model that maintains the essential elements of the other more recent models: Rotherdam and translog models. This model, which relates the value shares to the logarithm of total expenditure, meets the adding-up criterion and is consistent with the utility theory. Several researchers have also found it appealing to use it in their study of consumption behaviour. The study by Giles and

⁹ See, Deaton, A and Muellbauer, J (1980) Op cit p.66

Hampton (1985) is one of the empirical works worth mentioning. Instead of directly applying an *a priori* selected model to analyze the consumption behaviour of New Zealand households, they leave the choice of a specific functional form for the empirical results.

They began their study by considering six functional forms of Engel curves, each of which satisfies the adding-up and saturation requirements to a varying degree. Unlike in some of the earlier studies, the application of a single functional form for different expenditure groups- the jointness of the Engel curves¹⁰ - have been given due consideration in this study. Given this, they employ the Full Information Maximum Likelihood (FIML) estimation technique to estimate the parameters of jointly related group of equations. This estimation procedure provides them with the technique that attenuates the endogeneity problem associated with the total expenditure, which is the only explanatory variable in each expenditure equation. Then, the Engel curves are ranked based on the calculated Akaike's Information Criterion value, according to which the Almost Ideal Demand System is the preferred specification.

The availability of data in 22 average weekly income groups enabled them to carry out the sensitivity test of the six functional forms. Thus regressions are made on the basis of the lower income groups, the upper income groups and at the sample mean of the data. The expenditure elasticities obtained from these regressions are not found to be sensitive to the choice of functional form for many of the expenditure groups. More specifically, the expenditure elasticities for food and household operation become necessities, and

¹⁰ Op cit p.17

transportation and alcohol and tobacco become luxuries in almost all functional forms. Also interesting is many of the estimated elasticities in Giles and Hampton study were found to be virtually similar with previous studies of other countries.

Instead of leaving the choice of the functional form to empirical results, Odedukun (1993) directly chooses the AIDS model to perform a study for the LDCs. There are 65 developing countries were included in his cross-country study with a special emphasis on African countries. In this study, all the commodities are classified into ten broad types. But the interest to know the effects of other factors than price and income variables led this study not to follow the traditional way. Consequently, the level of development, age, urbanization, literacy level, inflation, exchange rate, credit and foreign reserves were considered to be the likely factors that influence the consumption pattern.

Having specified his model on the basis of these explanatory variables, he applied the ordinary least square procedure to estimate the parameters of all expenditure equations. These expenditure groups include the share of food, clothing and footwear, medical and education, transport and communication, rent and others in the total consumption expenditure. The results so obtained yield that age, real exchange rate and inflation rate were not statistically significant in any of the expenditure equations. In addition, literacy level and per capita income do not affect the share of expenditure on clothing and footwear. Even though other explanatory variables were significant in the expenditure equations, the coefficient of determination was very low for clothing and footwear, transport and communication and rent shares. Furthermore, the budget share of food was found to be reduced by both factors while that of medical and education expenditure

increased with the availability of credit, urbanization and literacy level. The regional dummy variable, which was incorporated into the model to capture the consumption behaviour of African countries, showed that the budget share of food and medical care were found to be lower in African countries on the average than it is in the other LDCs.

As to the reliability of the findings, Odedokun observed that the inadequacy of the required data in accordance with the period under study reduced the reliability of the results. Apart from the unavailability of the data for some of the years, some of the used data were collected for certain urban areas or for major capital cities, instead of representing the nation as a whole.

2.2.2 Literature on Life Cycle/Permanent Income Theories

The test of the permanent income hypotheses started to be carried out immediately after the formulation of the theory. Then, the estimation procedures of the consumption functions adopted the distributed-lag formulation as a proxy for the unobservable permanent income variables. Such an estimation technique, which are referred to as adaptive expectations approach had been in use until Lucas criticized it. After wards, the test of the permanent income theory was heavily dominated by the Euler's approach. Using this approach, Hall and Mishkin (1982) were the first to develop a model for micro data. This model enables them to see whether consumers are sensitive to current fluctuations in income.

Being the first to implement the Euler's approach to microeconomic data, Hall and Mishkin derive the statistically estimable consumption function. As a first step, they run regressions of income and consumption on socio-economic variables, including the relative price variable, to identify the deterministic component from the residual term. Then, the residuals obtained from these regressions are used to examine the dynamic relations that are theoretically expected to exist between consumption and income. According to the permanent income theory, in the consumption function in which the change in consumption is regressed on residuals from permanent and transitory income variables, the coefficient of the latter should be close to zero.

In their investigation, they used a data set of food consumption and income, which was collected for a panel of 2309 US households. The major result of this study is that consumption is not too smooth because the coefficient of the transitory income is found to be stronger than the theoretical prediction. In addition, the orthogonal test, being conducted between current consumption and lagged income, has provided a negative and significant result. To the extent that there exists negative correlation between the change in consumption and the change in lagged income, the permanent income hypothesis is not correct.

These theoretically unexpected results of the study led them to employ a technique suggested by Hall (1978), according to which consumers are divided into two groups. The first group consists of a fixed proportion of individuals who are liquidity constrained or rule-of-thumb consumers. In addition, the second group consists of those who follow the Euler's equation. In this case, the estimation of the equation provides that 20% of the households are liquidity constrained, i.e. their current consumption follows their current

disposable income. Hall and Mishkin, thus, ascribed the failure of the permanent income hypothesis to the presence of liquidity-constrained consumers.

Although they suggest that liquidity constraint is the major source for the lack of orthogonality, the extent that this source accounts for the failure of PIH is not made clear in their study. Apart from this, their methodology is criticized for not taking into account the measurement error in income, as it does for consumption. Thus, Altonji and Siow (1987) attempted to approach the problem from this point of view.

Altonji and Siow applied the log-linear version of the Euler equation for consumption in their analysis. By initially assuming a constant relative risk aversion utility function, they incorporate the taste shock and measurement errors in the consumption and income equations. Nevertheless, the treatment of the effect of measurement error in income, and consumption involves the errors-in-variables problem in the OLS regression. Thus, to avoid this problem Altonji and Siow applied the instrumental variables method, in which the change in income is instrumented on lagged income, wages and other employment information. The inclusion of these variables as instruments, accordingly, results in the improvement of the estimated coefficient of the change in income. In other words, the permanent income hypothesis is rejected.

Furthermore, they carried out their study to test whether lagged variables (particularly lagged income) have significant effect on the change in consumption. Of course, in this test they found that the lagged variables are orthogonal to the change in consumption. Nevertheless, the orthogonality result of this estimation is attributed to their exclusion of

the extreme income groups. This indicates that the orthogonality test is more sensitive to the high and low-income groups than the medium groups.

To clearly identify the cause of the existence of non-orthogonality between the change in consumption and the lagged change in income, Hayashi (1985) used a panel data set from Japanese households. He states that there exists a certain degree of durability in many of the consumption goods so that the concept of consumption and expenditure differs. If the commodity is durable, the increased expenditure refers to the higher level of the stock of consumption that lasts to the next periods. It means that next period's expenditure (not consumption) falls. As a result, the change in expenditure is negatively related to the change in lagged income.

Therefore, his main interest was to detect the degree of durability among the commodity groups, which are disaggregated into seven groups. He finds durability for all groups of commodity, to a varying degree except for food. Following this finding, he concluded that it is the consumption of a commodity not its stock that follows a stochastic process. Even though the effect of durability was taken into account in Hayashi's model, the evidence of negative correlation was still observed in the analysis.

He also conducted the excess sensitivity test by regressing the change in food expenditure, of which purchases and consumption is almost identical, on the change in anticipated and unanticipated income. In this analysis, the unanticipated change coefficients are found to be more significant than the anticipated ones. He ascribed this result to the existence of measurement errors in income.

Apart from the test of permanent income hypothesis, large number of studies has been conducted to estimate the model of inter-temporal choice using household consumption data. The study by Zeldes (1989) and Runkel (1991) are the most frequently cited works to address this issue.⁷ The main premise of their model is, although the interest rate across individuals is assumed the same, because of the difference in the marginal tax rate the net interest rate varies between them. This is because taxes on interest vary with the interest earnings. Thus, any variation in expected real interest rate affects the rate of growth of consumption especially for liquidity-constrained consumer. The lower the income of a household, the greater the effects of not being able to borrow on today's consumptions, thus, the higher will be the rate of growth of consumption. However, their independent study results yield in different outcomes. Only Runkel's study does indicate that the interest rate is strongly significant.

Because of the paucity of panel data on households, the test whether Euler's approach of permanent income hypothesis is applicable to developing countries has been found difficult. However, by making a strong assumption that individual income processes are stationary, Deaton (1992) has carried out a study in Ivory Coast households. Using two panels for each household, he accounted for measurement error by employing areas of various crops, hour worked and weather conditions as instruments for income.

Thus he constructed a model of current consumption, in which lagged consumption and lagged income are explanatory variables. If the permanent income hypothesis is true the coefficient of lagged income should be equal to zero and that of lagged consumption is unity. Although Deaton's estimate using these two years observation results in a zero coefficient of lagged income, the coefficient of lagged consumption could not give a

statistical value of unity. Slow adjustment of consumption and the incorrect formulation of instrumental variables are ascribed as the possible causes of this failure.

Taye and Ostby (1969) study of the household consumption behaviour of Addis Ababa dwellings is the pioneering work in the Ethiopian case. The study uses the linear and double-log functional forms, which are estimated by OLS estimation technique, to analyze the consumption pattern for twenty groups of commodities. The result obtained from the regression has supported that the double-log form is a better fit. Asmerom (1973) does another work with a similar functional form but for five groups of food items. Here, the interest has been to estimate quantity elasticities, thus the quantities of these food items are considered in the regression analysis. Similarly the double-log model provides a better result for the elasticity parameters. However, since the study has been undertaken using the price information of Dessie, the results obtained are not expected to be a representative of the nation as a whole.

Although the unavailability of nation-wide data limited their study to a very few urban areas, like that of Taye and Ostby, Getachew (1982) and Dejene (1982) have examined the consumption behaviour of salary and wage earners. Getachew's study focuses in Addis Ababa household demand behaviour by including the direct and cross price variables. As a result, it has been observed that the cross price elasticity of the coefficient of the price of food in all the commodity groups is strongly significant. Also interesting in this study is that the classification of households into two income groups enables to observe the significant variation in income elasticities between the two groups across all the commodity groups. On the other hand, Dejene has also found differences in income elasticity for the two groups of income constructed with different cut-off

income level and between Addis Ababa and the other two regions, Dire Dawa and Asmara. The income elasticity for food of the former has revealed to be lower than the latter.

The effort to obtain national representative studies of Ethiopian households has been delayed by the unavailability of nation- wide estimation procedures. In this case, the regression was run for 37 commodity groups. And, many of the results family budget data, of which publication was made in 1988 for the first time. Based on this data, Abebe (1989) has undertaken a study on the consumption pattern of rural households using the familiar are consistent with the theoretical foundation and fall within the range of other studies of LDCs. Although this study overcomes the problem of finding representative estimates of the nation as a whole, it could not (of course, was not intended to) provide results to what extent the rural households consumption behaviour differs from its urban equivalent. Thus, to grasp the degree of variation of the consumption behaviour of the two sectors is the major concern of this study.

SECTION THREE

3. METHODOLOGY

3.1 Data Source

The data on which the estimation of results are based is derived from the 1999 Ethiopian Rural Household survey (ERHS), collected by the Department of Economics of Addis Ababa University in collaboration with the USAID, and the 2000 Urban Socio-Economic Survey (USES) collected by the same department and Goteborg University. A total of 1472 urban households and 1681 rural households were surveyed. The rural survey was conducted in eighteen rural sites of the country, which represents the main agro-ecological rural areas of the country.

Background to the Rural Household Survey

The rural household survey was carried out in 18 rural peasant associations (sites) over 1681 households by the Department of economics, Addis Ababa University in collaboration with the USAID. Bereket (1994) has explained that a sample of clusters (sites) was chosen so as to obtain very relevant information rather than having a representative of the rural Ethiopia. Given the importance of having this relevant information the clusters were drawn on the basis of socio- economic and agro-ecological diversity of the rural areas.

Accordingly, Harresaw and Geblen were chosen from Tigray region; Shumsheha (Lalibela), Yetmen, Dinki-Ankober, and Debre Brhan from Amhara region; Sirbana-

Godit (Debre Zeit), Koro- Degaga, Turfe - Kecheme (Shashemene), Adele- Keke, Eteya, Bako-Tibe, and Jimma-Somodo from Oromia region; and Imdibir, Aze Deboa (Kembata), Adado- Dilla, Gargodo- Areka and Doma from Southern Nations Nationality and People (SNNP).

Having chosen these agro-ecologically representative sites, random sampling has been used within each site to draw the households to be interviewed. Thus the sample size in each site is proportional to the total population of the selected peasant association to the national population. Their population size was estimated by the Central Statistical Authority (CSA). In view of that, 1681 households were chosen in such a way that 150 households in Tigray, 466 in Amhara, 625 in Oromia and 440 in SNNP were sampled (the distribution of the regional sample into each rural site is given in Appendix 1).

TIGRAY REGION

The two sites in Tigray region are characterized by cropping activities. The major cropping items produced in these two sites include *teff*, wheat, barely, maize and sorghum. Sedentary agriculture is the major economic activities during the *Meher* season. About 80 per cent of the population follows on orthodox religion.

AMHARA REGION.

Shumsheha is located in North Wollo and characterized by poor cropping. Using the *Meher* and *Belg* rainy seasons, *teff*, barley, maize, sorghum, wheat and millet are produced in the area. Because of the inadequacy of the rainfall crop production is poor. 90 percent of the population follows orthodox religion.

Yetmen is located in East Gojjam. Because of adequate rainfall the area is characterized the area is by cereal production including *teff*, wheat, millet, sorghum, maize, barely beans, lentils and other cereals. Sales of these crops and animal products are the main income sources of the region. Almost all of the dwellers are orthodox.

Debre Brhan and Dinki-Ankober are found in North Shewa but with different characteristics. In Debre Brhan the adequate rainfall enables the dwellers to be self-sufficient in the cropping status whereas in Dinki-Ankober even though there is the production of main cereals the cropping status is poor. The dominant religion in Dinki-Ankober is Moslem and in Debre Brhan Orthodox. In both areas production during the *Meher* and *Belg* season is common with the high importance of *Belg* season. Being a highland site, Debre Brhan's major crop production includes barely, wheat, beans, etc and sales of these crop products and sales of cattle, local drinks and weaving constitute the major cash source of the site.

OROMIA REGION

Sirbana-Godit, located near Debre Zeit in East Shoa, is rich area and much targeted by agricultural policy and known for its production of cereals mainly *teff*, wheat, and beans. With the ox-plough system it is a surplus cereal producing area of which sale constitutes the main cash income source of the dwellers. Orthodox is the dominant religion. Another site with an almost similar characteristic in cash source, major crop production and cropping status are Turfe Kechem (Shashemene). Likewise, Eteya, Bako-Tibe and Jimma-Somodo have almost the same characteristics in these variables but they are located in different location. Coffee production, however, is peculiar to Jimma-Somodo.

Meher season, which is the main rain season in these areas, constitutes their major economic activity period.

Unlike the above sites but in the same region, Koro-Degaga and Adele Keke have poor cropping status with the dominant religion of Moslem. With inadequate rainfall, they produce sorghum and beans mainly, especially during *Meher* season.

SNNP REGION

Imdibir, Aze Deboá, Garagodo, Doma, and Adado- Dilla are found in this region. With the exception of Adao- Dilla, due to land scarcity and hence being densely populated area, their cropping status is characterized by food deficit. Christians of different types dominate almost all of these regions. *Enset*, which is mainly produced in each rural area, is the major and common crop product. The production of such crops as chat, trees, other root crops and vegetables contributes a lot in their cash source next to *enset*. Although it is not as important as the other crop products, with the exception of Adado- Dilla, coffee production has a contribution in their income source.

On the other hand, the urban survey was carried out in selected seven major urban centres -- Addis Ababa, Awassa, Bahr Dar, Dessie, Dire Dawa, Jimma, and Mekele. A sample of 1500 households were prearranged and allocated in proportion to the total population of these selected urban centres, based on the estimates of the Central Statistical Authority (CSA): 900 households in Addis Ababa, 125 in Dire Dawa, 75 in Awassa, and 100 in each of the rest of the towns. These respective sample sizes were further allocated into all *woredas* (districts) in the urban centers and then into 50 per cent of the *kebeles* (urban dwellers association). Each of the *woredas* and the *Kebeles* were

selected randomly in proportion to their total population size. Finally, a systematic sampling procedure was applied to select households from each *Kebele*, i.e. households were selected on a fixed interval from the *kebeles'* registration list of residents.

On both household surveys information about socio-economic variables, including household demographics, employment and income, food and non-food expenditure, health status, and migration is collected from each household. For the consumption part of the questionnaire, different recall periods were applied for different types of expenditure items. It ranges from a shorter period of one week for high-frequency purchases, like vegetables and dairy products, to a longer period of a year for rarely purchased items such as durable goods. Households were also asked to state their consumption from own harvest, loans, aid and gifts, and consumption of purchased prepared food. In this paper total expenditure includes all types of expenditure including the imputed values for owner-occupied houses and durable goods.

The analysis of this study is also based on the annual income of the household. This includes income from wages and salaries, formal businesses, female and children business income, remittances and pension, agricultural and non-agricultural (off-farm) income. It also includes consumption from own harvest and income in kind as part of income.

The welfare comparison between the rural and urban households become accurate when this expenditure and income information thus obtained is adjusted by the price indices. However, no adequate price information is easily accessible for the regions under investigation.

Hence, when the total expenditures and the physical quantities purchased are reported, the easiest way is to divide the reported expenditures by the reported quantities to arrive at a unit value, and then to weight these values to yield household-specific price indexes. Nevertheless, reports of the quantity purchased along with total expenditures are limited to food expenditure items only. Price information for non-food items is, thus, collected from some other independent source. In this case, the price information on 38 non-food expenditure items is collected from the Central Statistical Authority (CSA) to fill this gap.

It is also obvious from the rural and urban household survey that the interviews have been conducted in different seasons, i.e. the rural household survey was carried out during August- September 1999 while that of the urban survey was during February-March 2000. Consequently, such a difference in the survey period has inevitably led to seasonal price variations. Thus, the seasonal price variations have been adjusted by using the general price index reported for the period mentioned above by the Central Statistical Authority.

3.2. Measurement of Variables

3.2.1 Categories of Consumption Items

Both the rural and urban household expenditure surveys collect data on 118 individual expenditure items. For the purpose of the analyses the variable for household consumption expenditures are disaggregated into eight for rural and nine for urban

households, in accordance with the groupings used in the survey and in many literature.

Thus, the variables used in this study are as follows:

C_1 = Food (including cereals, pulses, vegetables and fruits, and meat and milk products)

C_2 = Drinks and stimulants (including local and alcohol drinks, chat and cigarettes)

C_3 = Clothing (including clothing and foot wear for men, women and children)

C_4 = Cultural and Social Expenses (including expenses on gifts, ceremonial expenses, contributions to IDIR and donation to religious institutions)

C_5 = Taxes (including taxes and other contributions)

C_6 = Educational and Medical care Expenses (expenditures on education's and medical cares made by the household itself and by other outside the household)

C_7 = Other goods and service (including fuel, Utilities, household equipment and other non-durable goods)

C_8 = Durable Goods (including different types of assets which are available in section 4.4 of urban and section 1.3 of rural household surveys)

C_9 = Housing Expenses (rent paid for different types of tenancy including imputed rent values for owner- Occupied houses this expenditure group is analysed for urban households only).

While interviewing households, the respondent is required to recall how much the household consumed or spent on a given item or group of items during a certain period.

This time is referred to as the recall or reference period. Depending on the frequency of

purchases of an item or a list of items, the recall period varies from item to item. For instance, the recall period on the food expenditure is shorter than that on clothing because of high-frequency purchases of the former. Accordingly, both the Ethiopian Rural Household Survey (ERHS) and the Urban Socio-Economic Survey (USES) have employed almost a similar technique of assigning shorter recall periods for food expenditures and a longer period for non-food items. In these surveys, the shorter recall periods range from a week, for example, for vegetables and meat products to a month for cereals and pulses.

Because of such differences in recall periods, the information on expenditures in both surveys is available on different time units. Among others, comparisons that are made on annual expenditure basis are preferred to the other periods in this study. This is because, with the exception of food expenditures, information on the annual purchases of all the expenditure items is easily available on the surveys. The annual expenditures on food items are obtained by multiplying weekly expenditures by 52 and monthly expenditures by 12. Since annual expenditure information on the less-frequent purchases (non-food items) is directly available in the questionnaire, no further calculations are needed except for durable goods.

To measure welfare accurately, Deaton and Zaidi (1999) stressed that the consumption concept must be made as comprehensive as possible by including all the necessary individual (for that matter, group of) goods and services. Accordingly, at least three main adjustments are necessary to correct the differences between consumption and expenditures.

Firstly, it is obvious that consumption from own harvest, gifts, loans and aid do not go through the market, but the welfare to households is increased out of such consumption. Since such consumption behavior is familiar in the Ethiopian households context, the value of consumption out of these sources has been imputed by using the regional average prices. These average prices are calculated on the basis of the prices of purchased goods of similar types for a given region. Then the imputed values of home-grown foodstuffs, together with the purchased food items, constitute the food expenditure groups.

Secondly, if a given commodity lasts for a short period, it is possible to assume that expenditure and consumption will approximate each other. Nevertheless, when commodities are durable, expenditure and consumption is not the same thing. Actually, expenditures on durable goods represent a stock of consumption that can provide a flow of services for longer periods than a year. Including the expenditure value of an item on annual expenditure will thus overstate the services consumed, while complete exclusion of it understates the well being of the household. Usually, the common practice is to impute the value of the consumption stream on the basis of some further information.

Consequently, in this study the use value of the services provided by consumer durable is imputed using the standard procedure (for full discussion see Deaton and Grosh, 1999) According to this procedure, two components are identified: the replacement cost and the average lifespan. The replacement cost refers to the cost at which the item can be realized through its resale. An estimate of the average lifespan of an item is obtained by multiplying the average age of each type of consumer durable by two. The average age of a consumer durable, in turn, is the average of the life of a given consumer durable,

which ranges from the new one to that almost obsolete, for all households reporting the possession of the item. Given the replacement cost and the average lifespan thus obtained, the use value, which measures the value of the services provided by consumer durables, has been estimated. This can be written as:

$$v_i = \frac{RC_i}{L_i} \dots\dots\dots (3.1)$$

where

v_i is the value of the services provided by the consumer durables

RC_i is the replacement cost

L_i is the average lifespan of the item

$$L_i = 2 \times \frac{\sum_{i=1}^k A_i}{n} \dots\dots\dots (3.2)$$

$$i = 1, 2, \dots, k$$

Finally, unlike the other durable goods, rents paid by tenants are claimed to be the correct measure of the use value of housing. In fact, this approach works for households that rent their dwellings. For households that live in their own dwellings, the common practice is to impute the rent value, which approximates the opportunity cost of the dwelling (see Dollar, et. al, 1998). The imputation of the equivalent rent value for owner-occupied dwellings are made by running a stepwise regression of the reported rent values on the housing characteristics (including income, household size, number of rooms, area of the house, construction material of the wall, roof and floor). The coefficients that result from this regression are used to obtain the predicted rental values for owner-occupied dwellings.

Likewise, a log-linear regression of rent values has been run on a common set of explanatory variables for 579 Ethiopian households who report for rents. Then the resulting coefficients (the coefficients of income and floor area have been found to be insignificant) have been used to obtain the predicted rental value of owner-occupied dwellings. It is worthy noting that housing expenses have been computed for urban households because in rural areas rented dwellings hardly exist. In functional form,

$$\ln R_i = \alpha_1 + \alpha_2 \ln Y_i + \alpha_3 \ln Z_i + \alpha_4 \ln N_{Ri} + \alpha_5 \ln A_i + \alpha_6 W_i + \alpha_7 F_i \dots \dots \dots (3.3)$$

where

- R is the rent paid per month for rented dwellings
- Y_i is the income of the household
- Z_i is the household size
- N_{Ri} is the number of rooms available in the house
- A_i is the floor area in square meters
- C_i is the dummy variable for the construction material of the wall
- F_i is the dummy variables for the construction material of the floor

It is obvious that expenditures on taxes, and social and cultural expenses do not increase the welfare of the household. Particularly, the latter groups, which include medical and educational payments made to anyone outside the household, donations to religious institutions, gifts and ceremonial expenses, only provides psychological satisfactions to the individual and is not likely to be added to current well-being. Nevertheless, they are maintained for the interest to observe the behaviour of households towards them as their income increases.

3.2.2. Determinants of Consumption

Economic theory suggests that a set of commodity prices and budget levels are likely determinants of different categories of consumption items. However, there are many other determinants that exert influence on consumption. Other variables such as the size of the household, age compositions, education level, sex distribution, regional location, etc. have an effect on different groups of commodities in varying degrees. In this study, hence, the various factors that are likely to influence expenditures have been considered as listed below.

(a) Income

Among the various determinants of household consumption behaviour, income or expenditure constitutes the major factor in the household budget study. Of course, any change in income or expenditure may have effects on total expenditure, but its effect on different commodities is inevitable. The direction of the effect of this change, however, depends on the income or expenditure elasticity of the given commodity that is the consumption pattern of the welfare of the household. The choice between income and expenditure as a better measure of the welfare of the household is one of the controversial issues in the existing literature.

Even though it is controversial that which variable is to be used as a determinant of the consumption of a given commodity, there are many reasons - both theoretical and practical - according to which total expenditure is considered as a better measure. Theoretically, according to the permanent income theory, it is consumption rather than income that reflects the living standards of individuals because the consumption patterns

of households are smoothed out from past, present and future incomes. Hence, it is argued, "consumption is a more useful and accurate measure of living standards than is income"¹¹. In the light of practical considerations, expenditure data is more reliable and easily measured than income data because respondents do not clearly know the level of their income, particularly not exclusively, when the source of income is self-employment. In addition, for different personal reasons individuals are not willing to disclose their income source and level properly. Because of both these practical and theoretical considerations, expenditure is preferred to income in many of the household budget studies.

Notwithstanding these advantages, there is a debate on how total expenditure is to be used. The total expenditure obtained by aggregating across various groups of commodities ignores differences in the standard of living between households that have different family sizes but similar total expenditures. It is evident that the small size family enjoys more welfare than the large family. Thus the most commonly used mechanism to account for such differences is to use the total expenditure per capita - total household expenditure divided by the number of household members.

Measuring of the living standards of households using per capita expenditure, while taking into account differences between households, still ignores the intra-household differences that exist between household members. This measure assumes that each and every member of the household have similar needs and receive equal share of the household resource. Also ignored by this measure are the economies of scale that are more likely to occur in and benefit the large family than small families. Consequently,

¹¹ Deaton and Grosch (1999), p.94

welfare measures that are based on per capita expenditure are likely to overstate children's share and understate the benefits that the large family enjoy due to the economies of scale. To attenuate the former problem, the equivalent scales, according to which children are weighted as a certain fraction of adults in accordance with their age, have been recommended in several studies, together with the method of its estimation. However, many of the estimation methods for equivalent scales are criticized for their usage of less transparent assumption (Deaton, 1998). Even so, it is advisable to estimate a country-specific adult equivalent, which takes into account several factors of the particular country.

In spite of these problems, the total per capital expenditures are used as the measure of welfare, and hence the major determinant of household consumption for the purpose of this study. The reasons for selecting this welfare measure are twofold. First, although expenditures weighted by equivalent scales are more preferable than the per capita expenditures, the country-specific estimation of the former is not easily available. The second reason is that the consumption concept is made as comprehensive as possible so that there are a certain category of non-food items of which intra-household allocation cannot be represented by adult equivalents. For instance, a child needs more in terms of such components of household expenditure as education, clothing, and medicine.

An additional aspect of differences exists between households living in separate regions. Households residing in different regions, indeed, face different prices. Thus, any type of comparisons between regions requires price adjustments. An adjustment of regional price variation is accomplished by deflating total expenditures for the appropriate price

index calculated across regions. For this purpose the Laspeyres price index has been calculated as

$$c_r = \sum_{i=1}^n w_{il} \left(\frac{p_{ir}}{p_{il}} \right) \dots\dots\dots(3.4)$$

where c_r is the price index for region r , w_{il} is the share total expenditure in the base region for commodity i , P_{ir} and P_{il} are the price of commodity i in region r and base region. Accordingly, an attempt is made to calculate the price index of the regions using the average price of 32 food items and 38 non-food items, which constitute the common consumption basket of each region.

In order to get a better measure of welfare, the per capita expenditure is thence deflated by the price indices for each region. The real per capita expenditure thus obtained is employed as a measure of welfare and a determinant of the consumption of each group of commodities, as well.

(b) Household size and composition

Since it is directly associated with needs, household size may be expected to affect consumption next to income. Also important in this instance is household composition in that needs differ according to age (and possibly sex). Therefore, finally size can be expressed either in terms of absolute family size or in terms of adult-equivalent units. As explained above the adult equivalent scales assign different weights for adult and child members of the households. However, the difficulty of finding a satisfactory and country-specific transformation scales have led us to use the absolute rather than the effective household size.

(c) Sex, Age and Educational level of the Household Head

Apart from income and household size, other household characteristics have a significant role to exert influence on the consumption behaviour of households. These include sex, age and education of the household head. It is obvious that among the members of the household, the head has more decision-making authority than any other members of the household. In addition, most of the time the head contributes and controls the greater share of the household's resource. However, care must be taken that the decision role of the other members of the household is not minimized. Hence, information about the head as compared to the other members of the household is of enormous importance. This enables us to make any comparisons between households.

Many studies often infer that the way resources are allocated into different groups of expenditures is influenced by the sex of the head due to differences in preferences between men and women (Hoddinott and Haddad, 1994). For example, recent studies have suggested that children are more beneficiaries from the resource allocation in the female-than male-headed households. This is because expenditures on food and children's clothing are higher when larger shares of household's resources are earned by women. Hence, to account for the effect of sex differences on the consumption behaviour of Ethiopian households, a dummy variable for sex difference between households has been applied.

Similarly, differences in preferences across different age groups, for example, young and older household heads result in differences in the consumption behaviours. In addition, the dependency ratio does not appear to have similar pattern across different age groups.

In the highly productive and reproductive age groups, the numbers of dependents are expected to be high. This leads to an increase in the consumption share of such necessity items as food and clothing.

Also important are the educational characteristics of the household head. The level of education, by affecting the type of economic activity to which individuals have access and hence the socio-economic group to which they belong, is also likely to influence the living-standards of households.

From the above explanation, it is evident that age and educational level of the household head are the possible determinants of the consumption behaviour of the household head. Accordingly, in order to capture their effects on the consumption pattern of different groups of commodities, there are two approaches on how to incorporate these variables into the regression equations.

For education, the first approach is to divide the whole level of education into few groups and then to assign consecutive values for each group. For instance, the data on various levels of education can be divided into four groups according to which a value of zero is assigned to illiterate household heads, 1 for primary, 2 for secondary and 3 for tertiary level of education. The difficulty with this approach is that it assumes a similar increment in consumption at each threshold, i.e. the difference between expenditure of a certain good with illiterate household head and the primary level and between the post-secondary and secondary level remains the same.

However, this is so unlikely that other flexible procedure, which allows such differences, becomes necessary. The alternative approach is thus to use the dummy variables for

these categories of education level. By so doing we will have $n-1$ dummy variables for education, where n is the number of categories of the level of education. Hence, in the study the level of education has been divided into five categories – none, primary, lower-secondary, upper-secondary and post-secondary. Grades 1,6,8&12 are used as the cut-off classes. Thus, four dummy variables have been used. In this case, the illiterate group has been taken as the reference educational level. Likewise, the age level of the household head has been divided into four categories – below 25, between 25 and 45, between 46 and 60, and above 60. Here, also, three dummy variables have been used and the age group below 25 represents the base.

(d) Regional Location

It is also possible that preferences of individuals are affected by the regions where the household resides in. That is, taste difference between and within the rural and urban sectors is likely to exist. Hence, this taste difference, in turn, will affect the expenditure patterns. By using dummy variables, we are able to capture the effects of such region-specific factors as consumption habit, religion, culture, cropping pattern, etc on the expenditure patterns.

The seven major urban cities on which the urban household expenditure survey conducted have been directly used to represent the six dummy variables and one base region. Accordingly,

Region 0 (R_0) =	Addis Ababa
Region 1 (R_1) =	Awassa
Region 2 (R_2) =	Bahir Dar

Region 3 (R_3) =	Dessie
Region 4 (R_4) =	Dire Dawa
Region 5 (R_5) =	Jimma
Region 6 (R_6) =	Mekele

Addis Ababa is taken as the base region.

On the other hand, for the rural households for making a rural–urban household comparison, the 18 rural sites have been classified into seven categories on the basis of the nearest urban sites and some similarities in the region – specific factors (for the socio–economic background see Appendix 1). The rural–urban welfare comparison becomes more meaningful if the classification of the rural sites corresponds with the urban classification. Thus, the rural regions are classified in a corresponding way as follows:

Region 0 (R_0) =	Sirbana – Godit and Shashemene
Region 1 (R_1) =	Imdibir, Durame, Adado-Dilla, Garagodo, and Domma
Region 2 (R_2) =	Yetmen and Debre Birhan
Region 3 (R_3) =	Ankober and Shumsheha
Region 4 (R_4) =	Adele keke and Korodegaga
Region 5 (R_5) =	Jimma – Somodo, Eteya and Bako-Tibe
Region 6 (R_6) =	Harresaw and Geblen

Sirbana-Godit and Shashemene are taken as base regions.

3.3 Model Specification

As mentioned above, this study is concerned with the analysis of the effects of various determinates on the consumption behavior of households. The influences of quantitative and categorical variables, which include sex, age, education and region, have been

examined by using dummy variables as explanatory variables in the regression model. Also included in the model, indeed the most important determinant, have been the total household per capita expenditure and the size of the household. It is worthy to note that for each category or item the model has been estimated using only those observations with nonzero consumption. Attempt has been made to adopt an extension of Working-Leser expenditure function, which may be derived from the almost ideal demand system (AIDS) model of Deaton and Muellbauer (1980). Thus, the expenditure function estimated is the form.

$$w_{ij} = \alpha_{0i} + \alpha_{1i} \ln x_j + \alpha_{2i} \ln n_j + \phi_i D_j + \sum_{k=1}^4 \beta_{ik} E_{jk} + \sum_{k=1}^3 \gamma_{ik} A_{jk} + \sum_{k=1}^6 \theta_{ik} R_{jk} + u_{ij} \dots \dots \dots (3.5)$$

where

- w_{ij} is the budget share of the i^{th} category (the total amount spent on that good divided by the total amount of the household expenditure) by the j^{th} individual;
- x_j is the total per capita real expenditure;
- n_j is the household size;
- D_j is the sex dummy indicating the sex of the head;
- E_j is vector of dummy variables indicating education of the head;
- A_j is vector of dummy variables indicating age of the head;
- R_j is vector of dummy variables indicating household location;
- u_{ij} is the error term; and
- α_{0i} is the constant term and; $\alpha_{1i}, \alpha_{2i}, \phi_i, \beta_{ik}, \gamma_{ik},$ and θ_{ik} are coefficients of the variables they are paired with

Means and standard derivations for the budget shares of all commodity groups, and the independent variables are given in Appendix 2 and Appendix 3

Consumer theory implies a number of restrictions that must be satisfied by any estimated demand system for theoretical consistency. If the estimated demand system satisfies these restrictions, which included additivity, homogeneity, symmetry and negativity conditions,

the demand system, and hence the compatible Engel curve, will directly or indirectly represent a particular utility function. Because the Working-Leser model most notably satisfies the adding – up constraint, it becomes appealing in recent works. While it is employed in the analysis of household consumption behaviour, the elasticity coefficients calculated across different income groups demonstrate that goods which are luxuries at low levels of income (and total expenditure) become necessities as income (or total expenditure) increases. Because of this advantage, this model has been chosen for the analysis of consumption behaviour of households in this study.

Data Cleaning Procedure

In a huge data set, like the one used in this study, it is highly likely that data errors occur in various forms. Hence, before we use the data for descriptive or regression analysis, it is necessary to screen the data and identify the errors and outliers. In this study, after organizing the variables in the manner explained in subsection 3.1, each expenditure group has been examined to identify the outliers. The detection procedure is carried out using histograms and box-plots for each variable independently using the statistical package SPSS. The outlier results thus obtained are likely to bias any comparative analysis between rural and urban households, which is based on the mean expenditure values of these variables. Then on the basis of the appropriate statistical results, which include skewness, kurtosis and interquartile range, values above 1.5 box lengths from the 75th percentiles have been considered as outliers and singled out from the data.

Although this procedure enables us to detect and correct the outliers of a single variable, it may not be a sufficient instrument to identify outliers when we study the relationship between two or more variables. Some observations have strong influence on the regression estimates in that the estimated coefficients before and after the inclusion of this influential observation will differ markedly. Thus to detect these influential observations the DFBETA values have been calculated using the same statistical package. Absolute values greater than two have been considered as outliers and excluded from the data set.

3.4. Estimation Problems

In the model outlined above, the share of expenditures on a good is a function of the logarithm of total per capita expenditures, the logarithm of household size; and the vectors of dummy variables reflecting the sex, age and education of the household, and location of the household. The estimation of the coefficients of a different set of consumption groups on the basis of the model thus specified is subject to a number of problems. Hence the estimates of the coefficients that show the effects of the explanatory variables will be biased. Among others, the endogeneity bias is more common in consumption behaviour studies.

Endogeneity bias occurs when an independent variable in a given regression equation becomes a dependent variable in some other relationship. In the model specification being employed in this study, the total per capita real expenditure is specified as an explanatory variable. However, this variable also represents the sum of various

categories of expenditures in another model. This implies that total per capita real expenditure may be an endogenous variable. If this variable is found to be endogenous, the application of OLS procedure will generate biased parameter estimates. This leads us to implement the Hausman specification tests that provide us with a statistical result to reject whether the suspected explanatory variable is exogenous or not. The Hausman specification test is given by.

$$m = \frac{\hat{\beta}_1 - \hat{\beta}_0}{\text{var}(\hat{\beta}_1) - \text{var}(\hat{\beta}_0)} \dots \dots \dots (3.6)$$

Where $\hat{\beta}_1$ is a vector of estimated parameters obtained using the two stage least squares (2SLS) method & $\hat{\beta}_0$ is that obtained by OLS procedure. The respective matrices of variances are given by $\text{var}(\hat{\beta}_0)$ and $\text{var}(\hat{\beta}_1)$. Given the null hypothesis that the variable is exogenous, we accept that endogeneity problem exists if m is greater than the critical χ^2 - value.

Once the exogeneity hypothesis has been rejected, the next task would be to employ 2SLS procedure in the estimation of the parameters. Under this procedure total expenditure has been regressed on total income and the other explanatory variables given in equation (3.5) in the reduced form equation. Then equation (3.5) has been regressed by OLS using this predicted value, which was obtained from the reduced form equation.

In addition, as the number of explanatory variables increases, it is highly likely that some of the explanatory variables are correlated with each other. If this is the case,

coefficients will have the wrong signs or an implausible magnitude. Thus, it is necessary to detect if there exists the problem of multi-collinearity. Most frequently, the correlation matrix has been employed to identify the problem but this procedure is effective only when the correlation exists between two variables. Since the variables used in this study are greater than two it is highly likely that correlation may exist between three or more variables. Thus to detect this multi-collinearity problem the condition index, which is calculated as the square root of the ratio of the largest eigen value to the smallest eigen value (Green, 1999), has been adopted. Those variables with a condition index greater than 30 have been considered to have a multicollinear problem. The condition indices calculated for each of the explanatory variables for each of the expenditure group have been reported in Appendix 4.1 and 4.2.

SECTION FOUR

4. THE ANATOMY OF THE CONSUMPTION PATTERN OF ETHIOPIAN HOUSEHOLDS

4.1. Household Characteristics and Household Welfare

An overview of Ethiopian households, both for the urban and rural sector, is presented in Table 4.1 and Table 4.2. These two tables provide descriptive information about the regional location and size of households; and the sex, age and educational level of the household head.

4.1.1 Basic Household Characteristics

Table 4.1 shows that almost three-fifths of the households in the sample are found in Addis Ababa. The remaining two-fifths of the sample consists of the other six urban centres in a somewhat similar fashion. It should thus be stressed that the analysis of urban households is highly likely to be influenced by the specific features of Addis Ababa's households. However, since the sample is proportional to the total population of households in each urban centre and is randomly drawn, the influences of some peculiar characteristics are assumed minimal. For the purposes of urban-rural comparison, the rural households are classified into seven regional groups, which are reported in Table 4.2. With the exception of region 2, the classification of the other regions is composed of almost equal amount of household members.

Although education is increasingly considered as the basic determinant of growth, only a little greater than half of the rural households' head are literate. A substantial variation is being observed as compared to its urban counterparts. However, the variation is dramatically lowered to a difference of 4 percent for primary level of education. In brief, in rural areas about 90 percent of the population lives in households in which the head has at most primary education, while in urban areas about the same number of population lives under the head who has at least attended primary education level.

Another urban-rural difference is observed in the size of female-headed households. On average, the gap between female-and male-headed households in urban areas is very much below the one revealed in rural areas. Indeed, this gap in urban areas, while looking across the quintiles, widens up after the second quintile though lower than the gap in rural areas in all the quintiles. This reflects that female-headed households are more common in urban areas and worse-off than those headed by men.

Table 4.1 and 4.2 also characterize the population according to the age of the household head and household size. In both cases, the rural and urban households are observed to have almost similar trends in these two demographic characteristics. According to the urban and rural Household Survey data, more than 75 per cent of Ethiopia population lives together with a family of at least five members. A similar proportion of the population resides under the households, in which the age of the head lies between 26-60 years old, thus implying high dependency ratio.

4.1.2 Household Welfare Comparisons

Deaton and Zaidi (1999) suggest that among the competing candidates that are used to measure the living standards of households, per capita expenditure is taken as the best, valuable indicator of household welfare. For this reason, the mean per capita expenditure is used as an instrument to compare the rural–urban household welfare difference. Table 4.1 and 4.2 also provide the relevant information along with the five-quintile groups for both rural and urban households.

When households are grouped by the household head's sex, age and educational level, welfare differences become evident. The sex difference demonstrates that in rural areas no sizable difference is observed between the female-and male-headed households even though the mean per capita expenditure of households headed by men exceeds the female-headed ones. But in urban areas, where female-headed households are more common (Table 4.1 shows that they are 43 per cent of the total households) they are relatively worse off than male-headed households. The female-headed households in urban areas are still worse off than the same sex household head in rural areas (the per capita expenditures of the former is 18 per cent lower than their rural counterpart)

Table 4.1: Characteristics of urban households by expenditure quintile and mean per capita expenditure

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	All	Mean per capita expenditure (In Birr)
Region of the household*							
Region0	54.30%	60.20%	58.50%	56.80%	66.20%	59.20%	1628.15
Region1	1.50%	3.40%	4.40%	7.60%	9.10%	5.20%	1249.36
Region2	6.70%	6.40%	5.80%	7.60%	7.10%	6.70%	1248.71
Region3	12.60%	7.50%	5.10%	6.10%	2.30%	6.80%	1056.20
Region4	10.40%	9.00%	9.50%	7.90%	6.50%	8.70%	1336.40
Region5	8.90%	7.10%	6.80%	6.50%	3.60%	6.60%	1367.31
Region6	5.50%	6.40%	9.90%	7.60%	5.20%	6.90%	1308.17
Schooling of the head							
None	12.60%	7.10%	6.80%	5.80%	3.60%	7.30%	1212.49
Primary	46.00%	40.20%	40.80%	35.60%	24.70%	37.50%	1574.42
Lower secondary	13.20%	13.20%	16.00%	10.40%	10.10%	12.60%	1364.06
Upper secondary	25.20%	31.60%	27.20%	33.80%	30.50%	29.50%	1872.73
Post secondary	3.10%	7.90%	9.20%	14.40%	31.20%	13.20%	3040.74
Age of the head							
Below 25 years	5.80%	2.30%	3.40%	2.50%	1.30%	3.10%	1438.29
26 - 45	40.50%	47.40%	44.90%	40.60%	36.40%	41.80%	1773.62
46 - 60	29.80%	31.60%	37.40%	38.50%	42.90%	36.00%	1984.72
Above 60	23.90%	18.80%	14.30%	18.30%	19.50%	19.10%	1583.64
Household size							
1-2 members	17.80%	5.60%	2.40%	1.10%	1.00%	5.80%	2675.77
3-4 members	22.40%	20.30%	18.00%	8.60%	7.10%	15.40%	2176.77
5-6 members	27.90%	26.70%	22.80%	27.30%	17.90%	24.50%	2069.75
7-8 members	20.20%	22.90%	28.60%	30.20%	21.40%	24.50%	1389.3
9 and above	11.70%	24.40%	28.20%	32.70%	52.60%	29.80%	1560.64
Sex of the head							
Male	42.30%	47.70%	61.90%	60.80%	73.70%	57.30%	2038.07
Female	57.70%	52.30%	38.10%	39.20%	26.30%	42.70%	1487.67

Notes: per cartage refers to individuals not households (10345 individuals reside in 1472 households in urban areas).

*The number after each region stands for the name of the cities – 0 stands for Addis Ababa, 1 for Awassa, 2 for Bahr Dar, 3 for Dessie, 4 for Dire Dawa, 5 for Jimma, and 6 for Mekele.

Source: Calculations based on February – March, 2000 Ethiopian Urban Socio-Economic Survey

Table 4.2: Characteristics of rural households by expenditure quintile and mean per capita expenditure

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	All	Mean per capita expenditure (in Birr)
Regional of the household							
Region0	3.00%	6.30%	11.30%	15.30%	21.10%	11.40%	1020.42
Region1	33.90%	38.10%	27.90%	13.00%	18.00%	26.20%	648.10
Region2	13.20%	11.50%	15.10%	16.10%	14.30%	14.00%	959.87
Region3	20.10%	12.60%	10.70%	13.30%	12.40%	13.70%	905.14
Region4	7.20%	9.60%	14.80%	16.70%	11.80%	12.10%	829.89
Region5	7.60%	13.40%	13.90%	15.90%	16.80%	13.60%	980.60
Region6	15.10%	8.50%	6.20%	9.60%	5.60%	8.90%	838.52
Schooling of the head							
None	60.90%	52.60%	42.40%	43.30%	39.10%	47.50%	1564.21
Primary	31.90%	38.60%	45.10%	46.20%	46.30%	41.80%	1988.26
Lower secondary	4.60%	4.10%	5.00%	5.70%	8.10%	5.50%	1943.28
Upper secondary	2.60%	4.10%	6.80%	4.80%	5.30%	4.80%	2145.33
Post secondary	0.00%	0.50%	0.60%	0.00%	1.20%	0.50%	1957.14
Age of the head							
Below 25	2.60%	0.80%	2.10%	1.40%	0.90%	1.50%	2149.74
26 - 45	44.70%	43.30%	56.40%	51.00%	46.90%	48.50%	2042.19
46 - 60	21.40%	28.50%	21.70%	27.80%	35.40%	27.00%	1625.3
Above 60	31.30%	27.40%	19.90%	19.80%	16.80%	23.00%	1433.85
Household size							
1-2 members	13.50%	5.20%	2.70%	2.00%	1.20%	4.80%	3082.85
3-4 members	29.30%	21.10%	20.50%	12.70%	8.70%	18.30%	2083.7
5-6 members	24.00%	24.90%	24.90%	26.10%	17.40%	23.60%	2143.43
7-8 members	18.40%	24.70%	23.70%	25.50%	26.10%	23.80%	1648.21
9 and above	14.80%	24.10%	28.20%	33.70%	46.60%	29.60%	1237.7
Sex of the head							
Male	61.50%	70.70%	71.80%	71.40%	77.30%	70.70%	1804.44
Female	38.50%	29.30%	28.20%	28.60%	22.70%	29.30%	1760.55

Notes: per cartage refers to individuals not households (11933 individuals reside in 1681 households in rural areas).

*The number after each region stands for the name of the rural sites – 0 stands for Sirbana- Godit and Shshemene, 1 for Imdibir, Durame, Adado-Dilla, Garagodoand Domma, 2 for Yetmen and Debre Brhan, 3 for Ankober and Shumshaha, 4 for Adel-Kike and Korodegaga, 5 for Jimma-Somodo, Eteya and Bako- Tibe, and 6 for Harresaw and Geblen.

Source: Calculations based on August – September, 1999 Ethiopian Rural Household Survey

The differences in consumption level among the four age groups vary between the two sectors. In rural areas, the per capita expenditures of the younger age groups are better off than the two elder groups. However, in urban areas higher per capita expenditures are observed in the middle age groups, in which the household heads with the age between 45-60 years enjoy the highest per capita expenditure. In a rural-urban comparison the younger

rural households head are better off than their urban counterparts. This reflects that many of the urban household heads with age below 25 are composed of unemployed and those who engaged in low jobs.

Educational attainment of the household head is also used as a means of comparing welfare levels of households. As expected, households with better-educated heads are better off (Kinh, 1997). Except for rural household heads with post secondary education the rest are consistent with this expectation. In rural areas, the differences are not very large. Households headed with upper secondary education, which enjoy the highest per capita expenditure in rural areas, have per capita expenditures only about 37 percent higher than households without any educational background. However, these differences become larger in urban areas where a considerable difference is observed between households headed by post secondary and uneducated head - the difference between them is two fold.

Both Table 4.1 and 4.2 also show the average per capita consumption of households distributed by household size. In general, in both rural and urban areas as the size of family increases its mean per capita declines. However, urban households with a member of 9 and above individuals enjoy about 11 percent higher mean per capita than the next lower group (7-8 members). This can be explained by the possibility that in the extended family, apart from the head, any other members who reside on the households may earn income. Similarly, rural households with a member of 5-6 individuals have a 3 percent higher per capita mean expenditure as compared to households with 3-4 members.

The regional location, in which the household lives, has a significant role in household welfare differences. Several factors such as differences in prices, climatic conditions,

culture, cropping patterns and religion have resulted in spatial inequality of expenditure. To verify whether differences in mean per capita expenditure exist between regions and sectors, real rather than nominal figures provide the accurate measurements. Thus Table 4.3 presents the real as well as the nominal mean per capita expenditures which is further subdivided into food and non food consumptions

As is shown in Table 4.3, at the mean, urban areas show greater per capita food expenditure than the rural areas. But the nominal term differences are substantially reduced when real term comparisons are used - it falls from a difference of 240 Birr per capita to that of 200 Birr per capita. The within sector comparisons yield that Dessie is the poorest region and Addis Ababa is the richest region among the urban areas, using the crude welfare comparison. In rural areas, the rural sites of the Southern region, which includes Imdibir, Durame, Garagodo, Domma and Adado-Dilla, are the lowest in food consumption while Debre zeit and Shashemen are the highest.

On the other hand, the rural-urban differences in non-food consumption are much higher than the differences in food-consumption between sectors. In real terms, the rural sites of the Southern region comprises the lowest non-food consumption region in rural areas, while the rural sites of Southwestern regions, in which Jimma-Somodo, Bako and Eteya are included, achieve the highest within the rural sector. Within the urban sector, the most urbanized region, Addis Ababa, enjoys the highest non-food consumption than the rest of the urban areas. Like in the food consumption, Dessie is the lowest region in non-food consumption, too.

Table 4.3: Mean annual per capita expenditures for rural urban regions by real and nominal terms (amounts are expressed in Birr): 1999/2000

Regions	Nominal			Real		
	Food	Nonfood	Total	Food	Nonfood	Total
<i>Rural areas</i>						
Region0	758.87	261.55	1020.42	705.66	253.13	958.79
Region1	450.82	197.28	648.10	407.2	178.20	585.4
Region2	722.45	237.42	959.87	671.79	220.77	892.56
Region3	685.16	219.98	905.14	663.09	204.55	867.64
Region4	602.26	227.63	829.89	582.89	220.30	803.19
Region5	685.37	295.23	980.6	663.32	285.74	949.06
Region6	600.87	237.65	838.52	527.69	208.74	736.43
average	621.92	232.65	854.57	580.92	217.29	798.21
<i>Urban areas</i>						
Region0	1133.23	494.92	1628.15	1049.29	558.26	1607.55
Region1	818.79	430.57	1249.36	779.79	410.07	1189.86
Region2	872.71	376.50	1248.71	760.59	369.12	1129.71
Region3	706.07	350.13	1056.20	672.94	327.27	1000.21
Region4	909.21	427.19	1336.40	811.79	381.42	1193.21
Region5	943.66	423.65	1367.31	899.15	415.34	1314.49
Region6	832.22	475.95	1308.17	798.22	435.53	1233.75
average	862.08	450.92	1313.00	781.05	421.99	1203.04

Note: regions are as defined as above

Source: Calculated from February – March 2000 EUSE survey & 1999 Rural Ethiopian Household Survey

While examining the urban–rural difference on the basis of the total real mean per capita expenditure, it is easily shown that it follows almost identical pattern with the food consumption figure. It indicates that Addis Ababa, and Debre Zeit and Shashemene remain the richest region in the urban and rural sectors respectively, whereas Dessie and the rural sites of the Southern region are the poorest ones. It is evident that food accounts for a greater share of households budget so that its influence in the total real expenditure difference within sectors is also high.

In addition to these, such non-income quality indicators as source of drinking water, electricity, toilet facilities, type of tenancy, access to sanitation and type of fuel for cooking are used to compare rural-urban differentials. However, since data in these variables are not

collected for the rural households, these welfare indicators are not used for comparison purposes.

4.2. Patterns of Expenditure

In the preceding section we have observed the differences on the level of welfare on the basis of per capita total expenditures. However, these total expenditure magnitudes provide an overall information about the consumption patterns of both rural and urban households. Further investigation of these total expenditures patterns is expected to yield a better mechanism by which the rural-urban differentials become clearer. The percentage distribution of household consumption expenditures, which presents the percentage share of each groups of commodities out of the total expenditure, shows the consumption preferences of household.

Expenditure on Food is by far the most important group in the urban household budget. It accounts for 51.8 percent of the budget. It implies that slightly less than half of the household budget is devoted to the other non-food consumption items (see Table 4.4). Next in importance are Other Goods and Services, and Clothing's; they account for 10.6 and 9.3 percent, respectively. While Social and Cultural Expenses, Housing, Durable Goods, Drinks and Stimulants, and Education and Medical Care have budget shares that range from 2.4 percent to 6.9 percent. In the urban household's budget share, Taxes have the least share, which accounts for 0.5 percent.

Likewise, food expenditure stands first in the budget share of rural households by accounting for 67.3 percent of the budget. In this case, a slightly less than a third of the budget share is left for non-food expenditures. Drinks and Stimulants, Durable Goods, Education and Medical Care, Social and Cultural, and Taxes together account for 14.8 percent; Other Goods and Services for 10.4 percent; and Clothing for 7.8 percent.

Table 4.4: Percentage distribution of average yearly consumption expenditure for rural and urban areas

Expenditure	Percentage Distribution of Expenditures			t-values
	Urban	Rural	Difference	
Food	51.8	67.3	-15.5	-35.06
Drinks & Stimulants	5.2	5.0	0.2	1.789
Clothing	9.3	7.8	1.5	7.821
Durable Goods	5.0	4.6	0.4	13.532
Education & Medical	6.9	2.6	4.3	30.774
Social & Cultural	2.4	1.8	0.6	16.035
Other Goods & Serv.	10.6	10.4	0.2	9.872
Taxes	0.5	.06	-0.1	-11.049
Housing	3.9	-	-	-

Source: Calculated from February – March 2000 EUSE survey & 1999 Rural Ethiopian Household Survey

In order to compare the mean values of the expenditure share of each commodity groups, there is a need to test the significance of the difference in the expenditure shares of each group of commodities, in relation to their standard error. The resulting t-values, which are reported in Table 4.4, show that the entire mean expenditure share for all but Drinks and Stimulants are different between the rural and urban households. The Budget share of Food for rural households exceeds that of the urban households by 15.5 percent indicating that the rural households are highly worse off than the urban households in their consumption of non-food consumption items. Among others, the expenditure share of Education and Medical Care is heavily influenced because of such a consumption pattern.

SECTION FIVE

5 ANALYSIS OF EMPIRICAL RESULTS

In this section the empirical results obtained from the estimation of the Working-Leser model for both the urban and rural Ethiopian households will be presented and discussed. To make the desired comparison of the consumption behavior of the rural and urban households, the regressions are performed separately for the two groups for different groups of commodities on a given set of variables. The dependent variable involves the share of each commodity groups while the independent variable constitutes total expenditure, family size, and dummy variables for sex, age, education and regional differences.

Usually, the relationship between the shares and the per capita total expenditure is assumed to be linear. Sometimes, in order to capture the remaining non-linear relationships, the quadratic specification of the logarithm of the per capita expenditure, $(\text{long PCE})^2$, is suggested. As a result, in the preliminary regression this variable was included in the estimation. However, many of these regression results demonstrated that the quadratic term, apart from having insignificant coefficients, did not improve the explanatory power of the model. Thus, the estimation technique follows the linear specification along with dummy variables for sex, education, age and regions.

Before discussing the results, it is also worth to note some issues about the estimation. Firstly, per capita total expenditure and the share of each commodity groups are expected to be endogenous in that the sum of the latter gives the former. The application

of the ordinary least square estimation procedure (OLS) under such a condition would hence result in biased parameters unless the hypothesis that the two variables are endogenous is rejected. Thus, the Hausman specification test is carried out for each of the regression equations to identify whether the endogeneity problem exists or not. When the problem of endogeneity emerges, the two stage least squares (2SLS) procedure is applied. Secondly, as outlined in the previous section dummy variable techniques are employed to capture the varying effects of sex, education, age and regional differences on the consumption behaviour of households. And, the effect of these variables on the share of a certain group of commodity is examined using the joint significance tests, which are carried out for each of these variables on the basis of the regression results. Thirdly, the null hypothesis of homoscedasticity is being rejected for all of the budget share equations. Hence, to correct the problem of heteroscedasticity White's consistent estimator for heteroscedasticity (Green, 1999), which is available in the statistical package of LIMDEP, is being employed.

Finally, the application of the Working-Leser model necessitates the assurance of the additivity criterion, according to which except one of the groups, in these case Taxes, all the regression equations are estimated by the relevant estimation procedure. Then, the coefficients of the dropped variable are obtained from the restrictions imposed by the model. According to this model the adding-up restriction is assured if:

$$\sum \alpha_{0i} = 1$$

$$\sum_{j=1}^2 \alpha_{kj} = \sum_{k=1}^4 \beta_{ik} = \sum_{k=1}^3 \gamma_{ik} = \sum_{k=1}^6 \theta_{ik} = \sum \phi_i = 0$$

$i=1,2,\dots,8$ for rural households

$i=1,2,\dots,9$ for urban households

Where α_{0i} 's are the coefficients of the constants; and $\alpha_{ji}, \beta_{ji}, \gamma_{ji}$ and θ_{ji} are the coefficients of all the independent variables of the i^{th} equation and the j^{th} variable. To see whether these residual coefficients of the budget share of Taxes are statistically equal to the already estimated results, a t -test is carried out. According to this test result except for some of the dummy variables, all are found to have statistically the same value, i.e. the 95 percent confidence intervals for the estimated parameters include the values that are obtained from the restriction.

5.1. Empirical Results for Urban Households

Table 5.1 presents the regression results for urban households. Nine commodity groups are used to perform the model estimation. According to the Hausman specification test, the endogenous problem between the budget share and the per capita real total expenditure is obtained in Food, Durable goods, and Housing. This implies that 2SLS is the suitable procedure for the estimation of the parameters of these three commodity groups. Nevertheless, in the other five commodity groups, it is found to be exogenous and thus the equations are estimated by OLS estimation procedure. Afterwards, the coefficients of the final commodity group, in this case Taxes, are derived by imposing the restrictions of the model. In addition, the coefficients of determination R^2 show that the explanatory powers of the models vary between 80 per cent and 30 per cent. This implies that the model has a better fit for some of the groups than the others.

The analysis of this subsection is organized in such a way that the results of the dummy variables are discussed first on the basis of Table 5.1. Next, since the discussion of expenditure and household size elasticities require more information than the direct

regression results, they are postponed to the later part of this section where they are accompanied by additional results.

As outlined above, dummy variables are used for education, sex age and regional variation. Except for sex, the other dummy variables are classified into different categories. To identify the effects of these variables on the budget share of different groups of goods, two types of tests are suggested. First, it is expected that these dummy variables affect the expenditure pattern of households. Thus, to know if they are important the null hypothesis that

$$H_o : \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0 \dots\dots\dots(5.1)$$

$$H_o : \gamma_1 = \gamma_2 = \gamma_3 = 0 \dots\dots\dots(5.2)$$

$$H_o : \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = 0 \dots\dots\dots(5.3)$$

Where β_i, γ_i and θ_i stands for the coefficients of the i th educational, age and regional dummies, are tested against the alternative that they are jointly significant. Secondly, even if they are found to be jointly significant, it is still important to know if there exists any variation across the different categories of a given dummy variable by taking one of the groups as a base group. The equivalent null hypotheses are thus given by:

$$H_o : \beta_1 = \beta_2 = \beta_3 = \beta_4 \dots\dots\dots(5.4)$$

$$H_o : \gamma_1 = \gamma_2 = \gamma_3 \dots\dots\dots(5.5)$$

$$H_o : \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 \dots\dots\dots(5.6)$$

Where β_i, γ_i and θ_i are as defined above. They are tested against the alternative that they are different from the respective base group. For the two types of tests, the computed values are reported in Appendix 5.

As the joint significance tests of each of these variables, which are annexed in Appendix 5, indicate the variations across different categories of education of the household heads are observed in all the expenditure groups except in Clothing and Taxes. This implies that education plays a significant role in the allocation of expenditures as compared to the base group, which has no any educational background. The effect of education at higher levels is strong particularly for the budget share of Durable Goods, Education and Medical Care Expenses and Drinks and Stimulants. The higher the educational level of the household head, the higher will be his earnings and the higher proportion of income is expected to be spent on these groups of goods and services. On the contrary, the decreasing proportion of income goes to Food expenditure as it is indicated in the same Appendix. A somewhat surprising result is that the lower level of education has more effect than the upper-levels on the budget share of Taxes. This implies that as the educational level increases, so does the source of incomes. Thus, the possibility to exempt taxes will be high.

A comparison across different age groups of the head of the household shows no variation in the expenditure allocation for Clothing, Housing and Other Goods and Services across the age groups. In this case, the base age group constitutes those household heads that are below 25 years old. This implies that there is no significant variation in the budget share of these groups of commodities whether the household is young, adult or old. Table 5.1 also presents the regression results in which the age group above 60 has a positive and significant coefficients for Durable Goods, Social and Cultural Expenses and Drinks and Stimulants. In the case of durable goods, it is to be expected that durables are usually purchased in the early years and hence their accumulation at the late years will be high. In addition, expenditures on durables are

considered as saving and thus expenditure shares on them appear to rise in the years-preceding retirement (Musgrove, 1984). The estimated coefficient for the age group 45 – 60, while running regression after avoiding all insignificant values (Appendix 7), reinforces this result. Apart from this, at the late years the interaction of household heads in the social and cultural institutions increases. As a result of this, the accompanying expenditures complements with this affiliation tendency.

On the contrary, the expenditure share of Educational and Medical Care Expenses and Food (Appendix 7) are found to be higher at a relatively low level of age groups than the others. For the age group 25 – 45 constitutes highly productive households, the dependency ratio is expected to be high as compared to the other age groups. For example, in rural areas, on average 8.06 family members reside in the household whose head age lies between 25 and 45, while this figure declines to 7.55 in the case of urban households. Consequently, the higher budget share for these expenses due to the extended family in this group reflects this expectation. Also surprising in the age coefficients is the budget share of Taxes, which has declining share as age increases (Appendix 7).

The next dummy variable, which is incorporated into the regression equation, is the regional dummy. According to the regression results obtained from the estimation of the Working-Leser model, no regional variation has been observed in the expenditure allocation of Durable goods, Clothing and Drink and Stimulants. In the analysis, Addis Ababa is taken as a basis of comparison. This shows that the consumption behaviour of households across the seven urban centres is similar regarding to the budget share of these goods. On the other hand, when we look at the estimated coefficients of

Educational and Medical Care, and Social and Cultural Expenses equations, the regional variation becomes significant in all the six regions. It is demonstrated that the budget share on them is significantly lower in all of the six regions than in Addis Ababa. It is clear that educational and medical services are better provided in the latter region with improved qualities and higher prices than in the other regions, where public organizations have dominated the provision of these services at low prices and low qualities. However, the regression results for Social and Cultural Expenses could possibly be explained by the data inadequacy since expenditure in kind for such expenses are more common in the other regions than Addis Ababa.

Similarly, regional variation in the budget share of Other Goods and Services is also observed between Addis Ababa and the rest of the regions except Awassa and Mekele. Since this group is a broad category of different goods and services, the explanation might arise from several sources. High cost of natural fuel materials and a relatively higher consumption of personal care goods and public utilities are expected to raise the budget share for this group of commodities.

On the other hand, a positive and significant regional variation is observed in Food except for Awassa and Dessie. This indicates that the share of food in other regions constitutes a greater proportion of the total expenditure unlike the case in Addis Ababa. In the latter region, as outlined above, Education and Medical care and Other Goods and Services involve a considerable share of the total expenditure so that the share of Food will be relatively lower. A somewhat similar variation is also shown in Table 5.1 that the

Table 5.1: Budget Share Regressions for urban households

Independent Variable	Food	Clothing	Drinks & Stimulant	Education & Medical Care	Social & Cultural Expenses	Other Goods & Services	Taxes	Housing	Durable Goods
CONSTANT	1.8132 (20.39)	-0.4996 (-40.58)	-0.1821 (-15.99)	-0.0992 (-7.21)	0.0937 (17.64)	0.3502 (24.16)	0.0288 (6.13)	-0.1981 (-7.73)	-0.3908 (-25.44)
LNREXP	-0.1467 (-13.00)	0.0646 (50.57)	0.0235 (18.25)	0.0169 (10.34)	-0.0083 (-13.92)	-0.0286 (-18.93)	-0.0021 (-5.99)	0.0289 (9.45)	0.0494 (25.59)
LNSIZE	-0.1456 (-16.51)	0.0632 (31.75)	0.0219 (11.67)	0.0253 (12.36)	-0.0039 (-4.70)	-0.0143 (-6.01)	-0.0010 (-1.25)	0.0208 (7.21)	0.0458 (28.36)
SEX	0.0064 (0.90)	-0.0015 (-0.83)	0.0233 (17.74)	-0.0026 (-1.37)	0.0014 (1.60)	-0.0061 (-2.74)	-0.0005 (-0.80)	0.0008 (0.41)	-0.0009 (-0.73)
E1	0.0019 (0.14)	-0.0010 (-0.30)	-0.0011 (-0.41)	0.0019 (0.53)	0.0033 (2.22)	-0.0031 (-1.71)	-0.0024 (-1.61)	-0.0056 (-1.30)	-0.0013 (-0.51)
E2	0.0173 (1.11)	-0.0036 (-0.96)	0.0023 (0.74)	0.0018 (0.43)	-0.0016 (-0.94)	-0.0076 (-1.58)	-0.0018 (-1.09)	-0.0057 (-1.23)	-0.0027 (-0.95)
E3	-0.0045 (-0.31)	0.0001 (0.04)	0.0041 (1.46)	0.0063 (1.70)	0.0035 (2.28)	-0.0002 (-0.05)	-0.0022 (-1.40)	-0.0051 (-1.21)	-0.0008 (-0.33)
E4	-0.0281 (-1.61)	0.0001 (0.04)	0.0106 (3.17)	0.0159 (3.75)	0.0004 (0.20)	0.0129 (2.54)	-0.0015 (-0.93)	0.0041 (0.79)	0.0054 (1.76)
A1	0.0219 (0.94)	0.0032 (0.62)	0.0044 (1.04)	0.0093 (2.03)	0.0033 (1.47)	-0.0011 (-0.16)	-0.0052 (-1.51)	-0.0038 (-0.64)	0.0009 (0.24)
A2	0.0095 (0.40)	0.0049 (0.92)	0.0062 (1.43)	0.0055 (1.19)	0.0016 (0.70)	-0.0033 (-0.51)	-0.0040 (-1.18)	0.0005 (0.09)	0.0037 (1.00)
A3	-0.0080 (-0.33)	0.0070 (1.26)	0.0101 (2.23)	0.0033 (0.69)	0.0054 (2.26)	-0.0079 (-1.15)	-0.0026 (-0.76)	0.0011 (0.18)	0.0096 (2.46)
R1	0.0032 (0.22)	0.0057 (1.80)	0.0004 (0.13)	-0.0156 (-3.38)	-0.0088 (-6.24)	-0.0048 (-0.99)	0.0019 (2.28)	0.0003 (0.08)	-0.0011 (-0.46)
R2	0.0412 (3.37)	-0.0041 (-1.26)	-0.0009 (-0.35)	-0.0133 (-4.04)	-0.0195 (-11.80)	-0.0241 (-6.32)	0.0029 (2.09)	-0.0102 (-1.85)	-0.0023 (-1.03)
R3	0.0001 (0.01)	0.0035 (0.77)	0.0025 (0.91)	-0.0126 (-3.23)	-0.0190 (-13.47)	-0.0129 (-2.98)	0.0041 (3.81)	0.0010 (0.19)	0.0022 (0.81)
R4	0.0262 (2.59)	0.0104 (4.14)	0.0017 (0.74)	-0.0142 (-4.87)	-0.0160 (-11.49)	-0.0132 (-3.687)	0.0004 (0.26)	0.0044 (1.78)	0.0030 (1.59)
R5	0.0296 (2.26)	0.0046 (1.34)	0.0024 (0.79)	-0.0265 (-8.38)	-0.0207 (-16.53)	-0.0264 (-5.80)	0.0028 (2.93)	0.0025 (0.52)	0.0014 (0.52)
R6	0.0467 (4.31)	0.0010 (0.33)	0.0009 (0.43)	-0.0290 (-9.49)	-0.0247 (-21.65)	-0.0060 (-1.28)	0.0061 (5.20)	-0.0003 (-0.05)	-0.0023 (-1.04)
R ²	0.55	0.80	0.64	0.42	0.43	0.31	0.32	0.51	0.81
Adj-R ²	0.54	0.80	0.63	0.40	0.42	0.29	0.27	0.50	0.80
F-value	50.22	222.43	61.44	29.44	52.51	30.41	7.77	17.32	132.17
χ ²	29.89 [0.019]	5.92 [0.989]	10.48 [1.841]	22.59 [0.125]	8.56 [0.930]	18.80 [0.279]	5.39 [0.994]	34.04 [0.005]	35.48 [0.003]
N	1362	1015	852	796	957	1128	303	666	1312

Notes: the t-statistics appear in parenthesis

The variable LNREXP stands for the logarithm of total per capita real expenditure; LNSIZE for logarithm of household size; SEX for sex of the head; E1 for heads with primary level; E2 for lower secondary level; E3 for upper secondary level; and E4 for post secondary level; A1 for age below 25; A2 for age group between 25 and 45; A3 for age group between 45 and 60, and A4 for age group greater than 60; and R1 region1, R2 for region2, R3 for region 3, R4 for region 4, R5 for region 5, and R6 for Region 6 (region numbers are as defined above). χ²-value refers to the Hausman specification tests and the values in square brackets are the p-values for these tests.

budget share of Taxes is higher in the remaining regions except for Dire Dawa than in Addis Ababa. As the regional economic activities, including the informal sector, however notorious it is, expand the number of households, who earn income from different sources will increase. It is thus highly likely that incomes derived from the informal sector evade tax payments. Therefore, the lower budget share of Taxes could possibly be explained by a relatively more concentration of households, who earn their income from the informal sector, in Addis Ababa and, to a lesser extent, in Dire Dawa than somewhere else.

In spite of the fact that the cost of housing in Addis Ababa is expected to be very high as compared to the other regions, the regression result fails to capture this difference. Only if the level of significance is raised to 10 percent do the coefficients of Bahir Dar and Dire Dawa become significant. In this case the budget share of Housing in Bahir Dar is lower and in Dire Dawa higher than that in Addis Ababa. The overall failure to provide the expected results can be ascribed to the regression equation that is used to impute the rent value of owner occupied houses. In this regression equation such independent variables as income and floor area, which are theoretically considered as the most important explanatory variables in the stepwise regression, are found to be insignificant in the Ethiopian households' case.

The other dummy variable, which is included in the regression equation, is the sex of the household head. This variable is used to capture the differences in the consumption behaviour of households between male-headed and female-headed households, by taking the latter as the base sex. According to the regression results except for the budget shares on Drinks and Stimulants and Other Goods and Services, the remaining equations yield

no significant variation in expenditure allocation. It is evident that the budget share of Drinks and Stimulants in the male-headed household is greater than the female-headed one. On the contrary, the expenditure allocation on Other Goods and Services is expected to be higher in the female-headed households since this group of commodities constitutes expenditures on such items as personal care goods and household equipment. Thus, the signs obtained from the estimated results coincide with the given expectations.

Total Expenditure and Household-size Elasticities

The explanation of the relationship between total expenditure and household size, on the one hand, and the budget share of a group of commodities, on the other hand, becomes more meaningful if the relevant elasticity coefficients are estimated. Thus, the following discussion is based on Table 5.2, which reports the expenditure and household-size elasticities for each of the commodity groups. It is comforting to note at this point that all of the total expenditures and many of the household size coefficients are found significant in the estimated regressions.

The expenditure elasticities, ε_i , are computed both at the quintile and the whole sample mean of each budget share, and are based on the estimated parameters of LNREXP on Table 5.1.

$$\varepsilon_i = 1 + \left(\frac{\alpha_{li}}{\bar{w}_i} \right) \dots\dots\dots (5.7)$$

Where α_{li} stands for the coefficients of LNREXP; and $\bar{w}_i$ is the sample mean value of the *i*th budget share over the total households (*see in Appendix 9 for derivation*). The subdivision of the elasticity coefficients into the five quintiles enables us to observe

what happens to the expenditure elasticity for a particular group of commodities as total expenditure increases. We can easily show from Table 5.2 that as total expenditure raises the elasticity of all groups of commodities except that of Taxes declines. This proves one of the hypotheses being suggested at the beginning of this paper. As the rate of decline varies across the groups, i.e. the relatively highly luxury goods, Durable goods, show the highest rate of falling while the elasticity of Other Goods and Services has shown a slower rate. This reflects that Durable Goods and Clothing are considered as super-luxuries until the third quintile since the respective expenditure elasticities for these groups are greater than the average elasticities. When we look at the elasticity coefficients of Food and Housing up to the third quintile, the estimated results are rising instead of falling. This can be explained in such a way that, for the case of Food, as income increases more and more of non-basic food components such as fruits, meat, milks products and vegetables are becoming part of the consumption basket. These food types are taken as luxury goods at the lowest expenditure quintiles. For the case of Housing the reason might lie on the imputation of rent values for owner-occupied houses.

According to the results presented in Table 5.2, Clothing, Durable goods, Drinks and Stimulants, Housing and Educational and Medical care, Expenses turn out to be luxury goods in this sample. This shows that as incomes change, expenditures on these items increase more than proportionately, reflecting a strong demand for them. Of particular interest is an expense on Educational and Medical care. The higher elasticity coefficient indicates that in the urban households that desire to have an educated and healthy family is strong. On the other hand, Food, Other Goods and Services and Social and Cultural Expenses emerge as necessities, indicating a less than proportionate increase in these

items in response to an increase in earnings. Although the expenditure elasticity for food is found to be less than unity, it is considerably higher than the average figure (*about 0.6*) reported for developing countries thus reflecting a lower level of per capita expenditure in Ethiopia.

Table 5.2: Estimated total expenditure and household-size elasticities for urban Households

Expenditures	Total expenditure elasticity coefficients for						Household-size elasticity
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Sample mean	
Clothing	3.3887	2.4763	2.0941	1.5464	1.3977	1.6914	-0.015
Drinks & Stimulants	1.6765	1.7692	1.8878	1.3776	1.2588	1.4535	-0.029
Durable Goods	5.8960	3.7009	3.0277	1.6258	1.4013	1.9360	-0.060
Education & Medical	1.2868	1.3003	1.3019	1.2199	1.1658	1.2440	0.117
Food	0.7577	0.7785	0.7879	0.6854	0.5119	0.7307	0.020
Housing	1.8728	2.2947	2.6952	1.5406	1.2589	1.6844	-0.205
Social & Cultural	0.7439	0.7049	0.6612	0.6220	0.5569	0.6605	0.164
Other Goods& services	0.7903	0.7538	0.7362	0.7055	0.6367	0.7303	0.141
Taxes	1.002	1.0018	1.0018	1.0018	1.0018	1.0018	0.171

Notes: These elasticity coefficients for total expenditure are calculated at the quintile and total sample mean values of the data using estimates of Table5.1. The household-size elasticities are calculated only at the sample mean values

Table 5.2 also presents the household-size elasticities for the share of each group of commodities. The household size elasticities for each group of commodities is calculated on the basis of the estimated parameters of LNSIZE and LNREXP and the sample mean of each budget shares

$$\eta_i = \frac{\alpha_{2i} - \alpha_{1i}}{\overline{w}_i} \dots\dots\dots(5.8)$$

In this case, the household–size elasticities are defined as the percentage change in the share of (not in the expenditure of) a given group of commodities for a one-percentage change in household-size. In equation (5.8), α_{21} stands for the coefficient of LNSIZE and

others are as defined before (for the deviation of (9) see Appendix 10). Many of the commodity groups, which emerge as luxury expenditure groups, turn out to have negative coefficients for household-size elasticities. It is easily understandable that as the household size increases the share on luxury goods will fall absolutely to adjust the demand for other necessity goods of the extended family. It is evident that housing possesses the property of public goods, i.e. such type of goods can be shared by several people without affecting the enjoyment of each. Thus, the existence of economies of scale because of public good consumption does not put pressure on the budget share of housing up to the point of congestion, when the household size increases. However, as household size increases, the share on Food, Education and Medical Care, Social and Cultural Expenses, Other Goods and Services and Taxes increases less than proportionately. The resources that are released from the luxury expenditure groups due to large family size are used to finance the increasing demand for Other Goods and Services, Educational and Medical Care and Food in the order of importance. The surprisingly low magnitudes indicate that the substitution of resources between luxuries and necessities is not considerable enough to maintain the already existing per capita expenditure on these items. In other words, as the household size rises, the share on Food and Education and Medical Care falls substantially. Finally, unless the increasing household members are mainly adults, the positive results for Social and Cultural expenses are not theoretically persuasive.

The Marginal Budget Shares

Finally, the hypothesis that the marginal budget shares of necessity goods fall while that of luxury goods rise as total expenditure increases is tested using the estimated marginal budget shares for each groups. The marginal budget share, which is the change in the budget share of a certain group of commodities for a unit change in the total expenditure, is given by

$$MBS_i = \varepsilon_i \times \overline{w}_i.....(5.9)$$

Where ε_i and $\overline{w}_i$ are as defined above. The derivation is given in Appendix 11. As it is clear from Table 5.3, Clothing, Durable goods, Social and Cultural Expenses, Other Goods and Services and Taxes confirm to the above-hypothesized statement properly. However irregular the change in the marginal budget share is, even the estimated results for the remaining group of commodities confirm to the proposed hypothesis.

Table 5.3: Estimated Marginal Budget Shares for Urban Households

Expenditures	Estimated results of marginal budget shares for					
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Sample mean
Clothing	0.0916	0.1083	0.1236	0.1827	0.2269	0.1580
Drinks & Stimulants	0.0581	0.0540	0.0499	0.0856	0.1141	0.0752
Durable Goods	0.0559	0.0636	0.0693	0.1206	0.1620	0.0960
Education & Medical	0.0759	0.0733	0.0730	0.0939	0.1190	0.0863
Food	0.4359	0.4900	0.5176	0.3036	0.1461	0.3782
Housing	0.0572	0.0472	0.0424	0.0759	0.1295	0.0656
Social & Cultural	0.0246	0.0198	0.0162	0.0136	0.0104	0.0161
Other Goods & Serv	0.1079	0.0876	0.0799	0.0686	0.0502	0.0775
Taxes	0.0093	0.0066	0.0063	0.0042	0.0034	0.0051

Notes: The budget share s are calculated at the quintile and total sample mean values of the data, using the estimates of Table 5.1 & Table 5.2 above

The reasons for the unsteady movement for the marginal budget share of Food and Housing are similar to those given under expenditure elasticities. The reason for Education and Medical Care lies in that the household prefers the services of the private sector to the public one due to the higher quality of services as their income increases. Hence, at the higher income group the marginal budget share for such services starts to rise. In the case of Drinks and Stimulants, local drinks are expected to dominate this specific budget share in the lower income groups. Thus as income increases, the marginal budget share for Drinks declines until the earning of the household becomes high enough to substitute industrial products for local drinks.

5.2 Empirical Results for Rural Households

Unlike the case in urban households, the Hausman specification test implemented for each of the eight commodity groups of the rural households yields results that enable us to treat the per capita real total expenditure as exogenous in all the equations. Thus for all commodities groups except budget shares of Taxes OLS procedure is applied to estimate the regressions. As usual the coefficients of Taxes are obtained by applying the restrictions being imposed by the model. It is worth noting that the same commodity breakdown as for the urban households is applied in order to make the comparison between the two sectors simple. However, the analysis for housing expenditure is excluded from the set of commodity groups because in the rural sector the market for housing hardly exists.

Table 5.4 presents the effects of different groups of the educational level of the rural households' head on each of the expenditure group as compared to the base level of

households without any type of education. To understand whether education has any role in the expenditure allocation of rural households, the joint significance tests are carried out (the computed F-values are reported in Appendix 6). Accordingly, education has found not to have any role in the budget share of Durable Goods and Food. Similarly, for these two groups of commodities there is no significant variation across different groups of educational level. The difference in educational level of the post secondary and illiterate group is reflected in Food share provided that the level of significance is raised to 10 percent. Even if the effect on different educational level on expenditure allocation is different from the base group, the effect of the upper educational group is rarely noticed in Education and Medical Care, Food, Clothing, Durable Goods and Other Goods and Services. This might be due to the existence of a few numbers of household heads with post secondary education levels. They constitute only 0.5 percent of the total household size. Also available in Table 5.4 is the estimated parameters of the age dummy variables, as compared to the base group of less than 25 years old of the household head. Except in Drinks and Stimulants, Other Goods and Services and Taxes, the age variable has no role in influencing the expenditure allocation and there is no variation between the base group and the other groups. The result for Drinks and Stimulants indicate that the higher age group undertakes more expenditure on these items while expenditures for Other Goods and Services (see Appendix 8) show an opposite trend, reflecting that there exists a substitution between these two groups of commodities as age increases. In the rural areas where older people are more guaranteed for land ownership than younger ones, they are more liable to land tax than the younger household heads. Thus, Tax shares are expected to be higher in the former groups than

in the latter groups. As it is easily seen from the Appendix, the result obtained in the study confirmed to this statement.

Table 5.4: Budget Shares Regressions for Rural Households

Independent Variable	Food	Clothing	Drinks & Stimulants	Educatio& Medical Care	Social & Cultural Expenses	Other Goods & Services	Taxes	Durable Goods
CONSTANT	1.3827 (22.62)	-0.2503 (-25.51)	-0.2257 (-24.99)	-0.1259 (-15.59)	0.0341 (10.09)	0.3945 (18.05)	0.0386 (28.60)	-0.4346 (-36.87)
LNREXP	-0.0832 (-12.90)	0.0359 (36.12)	0.0293 (31.30)	0.0158 (19.24)	-0.0031 (-8.81)	-0.0297 (-14.53)	-0.0037 (-28.35)	0.0545 (46.09)
LNSIZE	-0.0881 (-10.65)	0.0194 (32.07)	0.0298 (21.16)	0.0173 (15.96)	-0.0006 (-1.20)	-0.0319 (-9.36)	-0.0030 (-15.66)	0.0341 (37.24)
SEX	-0.0011 (-0.17)	0.0018 (1.68)	0.0012 (1.13)	0.0005 (0.53)	-0.0012 (-2.17)	-0.0109 (-3.24)	-0.0003 (-1.93)	0.0014 (1.21)
E1	0.0031 (0.48)	-0.0002 (-0.24)	-0.0016 (-1.50)	-0.0017 (-1.85)	0.0027 (4.93)	0.0046 (1.41)	0.0005 (2.97)	.00001 (0.09)
E2	-0.0024 (-0.19)	0.0049 (2.42)	0.0033 (1.17)	0.0020 (1.02)	0.0031 (2.79)	0.0199 (3.16)	0.0002 (0.66)	0.0018 (0.44)
E3	-0.0018 (-0.14)	-0.0015 (-0.79)	-0.0043 (-1.73)	0.0041 (1.97)	0.0071 (4.62)	0.0109 (1.61)	0.0012 (3.20)	0.0024 (1.06)
E4	0.0355 (1.95)	0.0079 (2.32)	0.0173 (4.96)	-0.0012 (-0.38)	0.0128 (2.23)	-0.0116 (-0.73)	0.0016 (1.89)	0.0033 (0.60)
A1	0.0188 (0.78)	-0.0028 (-0.65)	0.0069 (2.14)	0.0020 (0.50)	0.0005 (0.36)	-0.0051 (-0.42)	0.0005 (0.99)	-1.1144 (-0.34)
A2	0.0202 (0.83)	-0.0039 (-0.90)	0.0094 (2.83)	0.0028 (0.69)	0.0002 (0.11)	-0.0115 (-0.94)	0.0010 (1.80)	-0.0035 (-0.79)
A3	0.0278 (1.14)	-0.0035 (-0.81)	0.0084 (2.52)	0.0022 (0.55)	0.0002 (0.10)	-0.0235 (-1.91)	0.0013 (2.28)	-0.0030 (-0.69)
R1	-0.0046 (-0.32)	0.0001 (0.038)	-0.0021 (-0.93)	-0.0009 (-0.53)	0.0023 (2.25)	-0.0094 (-1.62)	-0.0020 (-6.14)	0.0028 (1.11)
R2	0.0042 (0.22)	0.0016 (0.52)	-0.0056 (-1.38)	-0.0027 (-1.01)	-0.0062 (-4.59)	-0.0265 (-2.77)	-0.0023 (-4.99)	-0.0010 (-0.27)
R3	0.0153 (1.05)	0.0011 (0.74)	0.0025 (1.25)	-0.0048 (-2.60)	-0.0008 (-0.78)	-0.0381 (-7.08)	-0.0027 (-8.19)	0.0036 (1.42)
R4	-0.0074 (-0.44)	0.0007 (0.31)	-0.0009 (-0.36)	0.0143 (5.18)	-0.0018 (-1.37)	0.0582 (6.89)	-0.0028 (-7.91)	-0.0023 (-0.75)
R5	0.0074 (0.50)	0.0003 (0.24)	0.0011 (0.54)	0.0003 (0.15)	-0.0022 (-2.28)	-0.0212 (-3.89)	-0.0001 (-0.21)	0.0011 (0.45)
R6	-0.0406 (-2.40)	0.0060 (2.89)	0.0016 (0.67)	-0.0010 (-0.47)	-0.0060 (-5.58)	-0.0058 (-0.82)	-0.0047 (-12.95)	0.0070 (2.38)
R ²	0.31	0.72	0.70	0.42	0.17	0.28	0.51	0.84
Adj -R ²	0.30	0.71	0.69	0.40	0.16	0.27	0.50	0.84
F-value	31.92	249.62	126.7	59.68	16.48	39.05	69.04	167.58
χ^2	5.86 [0.990]	5.20 [0.995]	4.00 [0.999]	2.83 [0.999]	12.07 [0.739]	9.47 [0.893]	19.81 [0.229]	3.35 [0.999]
N	1145	1555	880	1353	1417	1614	1441	932

Notes: the t-statistics appear in parenthesis

The variable LNREXP stands for the logarithm of total per capita real expenditure; LNSIZE for logarithm of household size; SEX for sex of the head; E1 for heads with primary level; E2 for lower secondary level; E3 for upper secondary level; and E4 for post secondary level; A1 for age below 25; A2 for age group between 25 and 45, A3 for age group between 45 and 60, and A4 for age group greater than 60; and R1 region1, R2 for region2, R3 for region 3, R4 for region 4, R5 for region 5, and R6 for Region 6(region numbers are as defined above). χ^2 -value refers to the Houseman specification tests and the values in square brackets are the p-values for these tests.

To identify the effect of regional variation on the budget share of the different group of commodities, region 1 is taken as the reference region. The joint significance test being conducted to see the regional effects results in a significant outcome except for Clothing even which varies across regions at 10 percent significance level. While comparing Region 0 with other regions the budget shares for Taxes, Drinks and Stimulants Other Goods and Services and Social and Cultural Expenses are observed to be higher than many of the other regions. The two sites in Region 0, apart from being surplus regions in cereal production, are located near to Debre Zeit and Shashemene where a relatively better economic activity takes place. Thus, the relatively high income and location plays a more significant role in emulating the consumption behaviour of their nearby urban dwellers.

In spite of these advantages, an expenditure allocation on Durable Goods is found to be higher in Region 1, Region 3 and Region 6 than Region 0. This reflects that rural households in the latter regions have more tendencies to purchase durable goods than the former because many of the sites in these regions are poor cropping areas and affected by recurrent draughts (for detail see Appendix 1). Thus they prefer to spend their income on the purchase of Durable Goods, which serves to mitigate the shortfall of consumption in times of draught seasons. As to Food and Clothing higher expenditure shares are observed in Region 3 and Region 6 respectively than the base region. Higher costs of the respective items seemed to have some influence on this regional variation.

To understand the influence of sex differences of the household on the consumption behaviour, the results of sex dummies are also reported in Table 5.4. The reported results indicate that the budget share of female-headed households on Other Goods and

Services, Social and Cultural Expenses and Taxes are significantly higher than that of the male-headed ones. The results of the first two groups are self-explanatory and reasonable, while that of Taxes are inconsistent. In the remaining cases no significant difference has been observed. However, the regression for Drinks and Stimulants did not provide satisfactory results – possibly a data problem at the field survey level.

Total Expenditure and Household-size Elasticities

Table 5.5 presents the results of expenditure and household size elasticity. It is obvious from the table that Clothing, Drinks and Stimulants, Durable Goods, and Educational and Medical Care emerge as luxury goods in rural areas. The elasticity result for Durable Goods indicate that it is very highly elastic as compared to the other luxury goods. Food, Taxes, Other Goods and Services, and Social and Cultural Expenses emerge as necessity goods. Here Food bears a higher elasticity coefficient than the average value for many of the developing countries (Weisskoff, 1971)¹². The elasticity coefficient for Taxes exhibit that its share increases less than proportionately as income increases in rural areas. This is because of the fact that many of the rural households pay taxes on a flat rate basis.

On the basis of numerous studies of consumption patterns, it is concluded that many goods, which are luxuries at low levels of income (and total expenditure) turn out to be necessities as total expenditures increase if satiation sets in. To verify the plausibility of this statement the elasticity coefficients are then computed for five different income

¹² In his study of the demand elasticity for ten developing countries, he reported 0.82 as the average food elasticity estimate.

groups. Accordingly, the estimated elasticity coefficients yield a consistent result that the elasticity values are declining as total expenditure increases across the quintiles.

Table 5.5: Estimated total expenditure and household-size elasticities for rural households

Expenditures	Total expenditure elasticity coefficients for						Household-size elasticity
	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Sample mean	
Clothing	1.8561	1.5942	1.4847	1.4252	1.2931	1.4642	-0.2115
Drinks & Stimulants	2.0305	2.1373	2.0268	1.5334	1.3406	1.6014	0.0105
Durable Goods	5.2455	4.1567	1.9969	1.8436	1.3893	2.1921	-0.4430
Education & Medical	1.5517	1.7216	1.7978	2.0152	1.3352	1.5898	0.0574
Food	0.8797	0.8811	0.8765	0.8706	0.8200	0.8751	0.0313
Social & Cultural	0.8774	0.8474	0.8519	0.8179	0.7313	0.8356	0.1369
Other Goods & Services	0.7596	0.7114	0.7081	0.6115	0.5084	0.6805	0.0215
Taxes	0.6972	0.5033	0.3684	0.2392	-0.2871	0.4280	-0.5224

Notes: These elasticity coefficients for total expenditure are calculated at the quintile and total sample mean values of the data using estimates of Table 5.4. The household-size elasticities are calculated only at the sample mean values

The income groups used in this study, however, are too small to demonstrate the above argument that luxury goods become necessities at higher level of expenditure. In fact Food, Drinks and Stimulants, and Education and Medical Care Expenditure elasticities (Table 5.5) respond differently up to the third quintile because the condition of satiation is not sometimes met at lower levels of income. Nevertheless, in the fourth and fifth quintiles, with the exception of Education and Medical Care, the coefficients start to fall. The strong demand of the rural households to have a better access for educational and medical provisions is explained by an increasing elasticity coefficients that continues to rise until the forth quintile.

The results of the last column of the same table indicate that the household-size elasticities for each group of commodities. It is obvious that budget shares on Clothing Durable Goods and Taxes absolutely fall while in others it increases less than proportionately as the size of the household increases. Since former commodity groups

are considered as luxury goods, the budget share on them declines absolutely as the family extends in order to finance the additional demand for necessity goods. In other words, the rural households allocate additional resources to such commodity groups as Food by diverting resources away from luxury goods at the rate indicated in Table 5.5. This reflects that the latter groups of commodities, which possess positive household – size elasticities, consist of the basic component of the rural household’s consumption bundle, for which more priority is given as household size increase. However, the rate of reduction on the consumption of the negative household-size elasticity goods varies across the items. More resource is withdrawn from Taxes and Durable Goods than from Clothing. By the same token, the reallocation of this released resource gives more weight for social and Cultural Expenses than for Food and Other Goods and Services. Even though social institutions as Idir and Iqub have a significant role as risk sharing and thus practiced more commonly among the rural households, it is inexplicable that the related costs of social institutions are more important than food consumption while the household size increase.

The Marginal Budget Shares

Table 5.6 presents the marginal budget shares of all the commodity groups. These marginal budget share estimates show the way the rural households allocate their budget as total expenditures increase by one unit. This marginal budget share allocation is mainly influenced by the magnitude of the elasticity coefficient. In other words, if a group of commodities emerges as luxury, its marginal budget shares increase simultaneously. The marginal budget share estimates, which are presented in Table 5.6 for Clothing, Drinks and Stimulants, Durable Goods and, to a lesser extent, Education

and Medical Care expenses, are a case in point. Since educational and medical services are publicly provided at low cost, the marginal budget share for this group might not increase as income increases until the household's income is raised to the level where it can afford private services. On the other hand, the marginal budget share of the remaining commodity groups including Food declines as income increase. Except for the value of Taxes at the fifth quintile, the other results are self-explanatory. The negative coefficient for Taxes could be explained due to tax evasion, which is mostly practiced at higher levels of income.

Table 5.6: Estimated Marginal Budget Shares for Rural Households

Expenditures	Estimated results of marginal budget shares for					
	<i>Quintile 1</i>	<i>Quintile 2</i>	<i>Quintile 3</i>	<i>Quintile 4</i>	<i>Quintile 5</i>	<i>Sample mean</i>
Clothing	0.0785	0.0971	0.1108	0.1213	0.1596	0.1141
Drinks & Stimulants	0.0593	0.0566	0.0595	0.0866	0.1185	0.0802
Durable Goods	0.0674	0.0719	0.1093	0.1193	0.1948	0.1004
Education & Medical	0.0440	0.0373	0.0353	0.0311	0.0623	0.0422
Food	0.6151	0.6239	0.5971	0.5662	0.3834	0.5894
Social & Cultural	0.0218	0.0169	0.0175	0.0137	0.0083	0.0155
Other Goods & Serv	0.1046	0.0816	0.0803	0.0521	0.0342	0.0705
Taxes	0.0086	0.0036	0.0022	0.0012	-0.0083	0.0028

Notes: The budget shares are calculated at the quintile and total sample mean values of the data, using the estimates of Table 5.4 & Table 5.5 above

5.3. Comparison of Urban-Rural Consumption Patterns

In the previous two sections, an attempt has been made to distinguish the most important factors that exert influence on the consumption pattern of both rural and urban households. It was also explained that the expenditure elasticities and the marginal budget shares of different groups of commodities for a given sector vary across different quintiles of expenditures in both the rural and urban sectors. Differences in elasticities and marginal budget shares are, however, highly likely to exist not only within a sector

but also between sectors. The extent to which these differences exist and which variables that represent the socio-economic characteristics of households are more important in rural than urban households will be examined in this section.

The comparison of the consumption patterns of rural and urban households is made possible by using the estimated coefficients of each share equation if the coefficients are statistically different from each other. Usually, the dummy variable procedure is suggested to determine if the consumption patterns between the two sectors are different. That is, the parameters of the dummy variables estimated from the pooled regression should provide results that are statistically different from zero. Only when this result is obtained is the hypothesis that there is no difference in consumption patterns between the rural and urban sectors to be rejected. However, this procedure is handicapped by the necessity of the equality of variances between the two sectors (Green, 1999). If the two sectors have unequal variances, the alternative procedure is to estimate the two coefficients separately, and, then to use the Wald test for the existence of differences. Consequently, this procedure entails two types of tests; first the equality of the two variances are tested using the ratio of the variances of the two groups, each of which are divided by the respective sample size. If the resulting estimate is found to be significant for an F-test, then the second step is to apply the Wald test, which is given by

$$W = (\hat{\beta}_1 - \hat{\beta}_2) [VAR(\hat{\beta}_1) + VAR(\hat{\beta}_2)]^{-1} (\hat{\beta}_1 - \hat{\beta}_2) \dots \dots \dots (10)$$

with χ^2 – distribution of $k+1$ degrees of freedom .

Accordingly, both tests are performed and reported in Table 5.7. It is clear from the table that in the entire share equations the variances between the urban and rural households are significantly different from each other. Thus, the Wald tests are conducted for each of the commodity groups and the results are reported in the same table. The critical values for 16 degrees of freedom at 5 per cent and 1 per cent are 26.3 and 32.0, respectively, while the computed Wald test results are all outside the critical region. This indicates that the coefficients of the regression equations of the rural and urban households are jointly different from each other, i.e. the null hypothesis of no difference between rural and urban sector coefficients is rejected. The significance of the Wald results thus led us to compare the rural-urban differentials on the basis of the estimated coefficients. In the discussion that follows both the dummy variables for education, age, region and sex and the estimated elasticity and marginal budget share coefficients are selected for the purposes of comparison.

Table5.7: Test results for Differences in Variances and Estimated Parameters

Expenditures	F-value	Wald-test
Food	16.292	338.48
Drinks and Stimulants	23.359	188.75
Clothing	22.020	56.82
Education & Medical Care	719.208	1067.37
Social & Cultural Exp.	193.209	37.28
Taxes	283.886	215.40
Durable Goods	243.263	193.64
Other Goods & Services	14.194	191.33

Examining the effects of education on consumption, it has a more strong influence in the expenditure allocation of Education and Medical care, Durable Goods and Drinks and Stimulants in urban than rural areas. In each of these commodity groups, the coefficient difference, for the post-secondary level, is positive and has found significant at one tail

t-test. Since in principle, Although the role of education appear to be the same in both rural and urban areas, the education difference in the consumption pattern could be observed due to differences in the distribution of household heads into different grades of schooling in each category. As a matter of fact, in the frequency distribution of schooling of household heads the number of household heads with higher grades is relatively higher in urban areas than in rural. For instance, the number of rural heads with lower secondary, upper secondary and post secondary level is 92,80 and 8, respectively while for urban households it is 185, 434 and 194, respectively. Because of this, more significant coefficients of education are observed for those urban households that attended the upper secondary (or above) level of education. (Lockheed, et al., 1980) has found that more educated households are more willing to adopt modern farming system that hence leads to a higher agricultural productivity. Consequently, this rise in agricultural productivity has resulted in an increase in income, and in expenditure, too. However, the distinction between the higher and the lower categories of education is found to be consistent with this argument for some of the commodity groups in rural areas.

Of the age categories included as explanatory variables in the regressions, for only a very few of the commodity groups has the distinctions between the younger and the other elder groups been observed in both urban and rural areas. Even for these few expenditure items the rural-urban difference is highly observed in that the eldest group in urban areas tend to behave more differently from their rural counterparts by spending more on Durable Goods and Social and Cultural Expenses. In this case, the difference in both the age level groups is positive but the difference is significant only for the elder groups. The tendency of the eldest age group to hold goods those are more durable as a

guarantee for future uncertainties appear to happen in urban areas only. Somewhat exceptional in the rural-urban difference is the budget share of Taxes. In rural areas, the eldest groups spend greater share than the youngest groups whereas a different situation is observed in urban areas where the latter spend more than the former.

As to the effects of the regional factors on the consumption behaviour of households, almost no regional variation is observed within each sector for durables, clothing and Drinks and Stimulants share. Also interesting is the regional variations that exists for social and cultural Expenses and Other Goods and services. The variations among regions for the expenditure allocation of them within a sector follow a somewhat similar fashion, i.e. almost similar signs of variation is observed between the corresponding regions. This implies that the grouping of rural sample sites under the seven major urban areas on the basis of their similarities in the consumption pattern is well performed for these five groups of commodities. However, more regional variations are observed in urban areas than rural areas for food and Education and Medical care Expenses. It is obvious that the prices of food are markedly different among the major urban cities than between rural areas. A more significant variation in the expenditure share of food in urban areas than rural areas have resulted from a more marked differences in food prices between the major urban cities than between rural areas (Thomas, 1987)

Sex difference has no significant role in the rural-urban consumption pattern differentials for many of the commodity groups. It is only for the case of Drinks and Stimulants and other Goods and Services that the effect of sex becomes significant. Although the budget share for Drinks and Stimulants are expected to be higher in male-than female-headed households, it turns out to be significant for the urban households only. The case for

other Goods and services budget share appears to have a similar sign for both rural and urban households. Thus, the only difference between the rural and the urban male- and female-headed households emerges from Drinks and Stimulants.

The elasticity coefficients, which is explained as the percentage change in the consumption of a certain good when income changes by one percent, are independent of the unit of measurement. Because of this, it is considered as the more meaningful measures of the consumption behaviour of households in the traditional consumer theory. In this section, hence, the comparison of rural-urban household consumption behaviour is performed using the estimated expenditure and household-size elasticities. With the exception of Taxes, the results show a relatively stable pattern in that the group of commodities, which are elastic (inelastic) in urban areas, are also elastic (inelastic) in rural areas. For instance, Food is a necessity with an expenditure elasticity ranging from 0.731 in urban areas to 0.875 in rural areas. Moreover, the elasticity coefficients of urban households are less than that of the rural households when the estimates of all expenditure groups but clothing and other Goods and Services are observed. This rural-urban difference in elasticities reflects that the per capita income in urban areas is much greater than the rural per capita income.

Household-size, in addition to the total expenditure elasticities, are the other measure of the consumption behaviour of households. According to the household size, elasticities on both Clothing and Durable Goods are considered as luxuries and their consumption shares absolutely decline as family size increases in both sectors. However, the rate of falling of the consumption of these two groups of commodities is faster in rural than urban areas. This is because in rural areas no other groups of commodities except Taxes

are considered as luxuries unlike the case in urban areas. Nevertheless, in urban areas, Housing, and Drinks and Stimulants are also taken as luxury goods that serve as a source of finance as household size increases.

Examining the marginal budget share estimates of each group of commodities of the two sectors, marginal budget share of about 60 percent is spent on Food in rural areas for a unit change in total expenditure. This amount is substantially different from the figure reported to urban households who spent 40 percent of their additional total expenses on Food. On the other hand, the marginal budget share of Clothing and Education and Medical Care Expenditure in urban areas turns out to be higher in urban areas than rural areas. Particularly the marginal budget share of Education and Medical care of urban household is almost twice that of rural households. This implies that the urban households attach a greater priority for health and education than rural ones. Unlike these groups of commodities, the marginal budget shares of Durable Goods and Drinks and stimulants yield a somewhat similar result between the two sectors. Out of each additional unit of total expenditure, the shares that go to these groups of commodities in rural as well as urban sectors are observed to be almost the same.

The discussion of this section is completed with the comparison of the estimated elasticities with those obtained by other studies. Table 5.8 presents the elasticity coefficients estimated by different author. It should be understood in advance that numerous variations between the estimated results are expected to minimise the importance of our comparative analysis. These include differences in estimation techniques, functional forms, time periods and tastes and preferences. It should also be noted that as different studies employ different classification of expenditure groups, only

Food and Clothing are selected for the purposes of comparison. Given these differences, the total expenditure elasticity of food for rural household obtained in this study is marginally different from the results obtained by Abebe (1988) for rural Ethiopian households. Similarly, our urban result of total expenditure elasticity for food is very similar in magnitude to Getachew's estimation for the Ethiopian urban households, but greatly in excess of the figures from MEDaC recent study. In comparison with other countries studies, our results, though well within the range presented by Lluch and Powell (1975)¹³ for developing countries, are greater than those estimated for Cote d'Ivoire. This apparent difference may be due to the lower per capita in Ethiopia than Cote d'Ivoire. In the case of Clothings, the result obtained from this study is highly in excess of that obtained in the previous studies. The luck of obtaining corresponding results may be partly because the elasticity coefficient of Clothing is sensitive to the choice of the functional forms.

Table 5.8: Comparison of the Estimated Total Expenditure Elasticities

Studies	Model	Elasticity Coefficients for		Country	Sector
		Food	Clothing		
Abebe	Double-log	0.89 ¹	0.69	Ethiopia	Rural
Dejene	Double-log	0.82	-	Ethiopia	Urban
Hoddinot and Haddad	Working-Leser	0.70	0.98 ²	Cote d'Ivoire	National level
Getachew	Double-log	0.73	0.89	Ethiopia	Urban
MEDaC	Double-log	0.67	-	Ethiopia	Rural

Note: 1-the elasticity coefficient for food includes drinks and stimulants
2-since the estimation on clothing is made for adult and children, the average value of the two elasticity coefficients has been reported here.

¹³ Lluch and Powell's study over 19 countries reported that the total expenditure elasticities for Food ranges from 0.64 for developed countries to 0.92 for poorer countries.

SECTION SIX

Summary and Conclusion

In this study an attempt has been made to analyze the household consumption behaviour in Ethiopia by estimating the Working-Leser model on the basis of the 1999 rural and 2000 urban Household Surveys conducted by the Department of Economics, Addis Ababa University. The key features of the analyses are: the use of mean per capita expenditures and percentage distribution of expenditures to compare the rural-urban welfare discrepancies; the treatment of the different expenditure groups using both OLS and 2SLS procedures to obtain consistent and asymptotically efficient estimates; the use of elasticities for different income groups to prove the inverse proportionality between income elasticity and the level of consumption, and the use of marginal budget shares to observe the households allocation of additional budgets.

As far as the mean per capita expenditure is concerned, sex, age education and regional differences have been observed among and within the rural and urban sectors. In urban areas female-headed households have been found to be worse off than male-headed in the same sector, and female headed households in the rural sector. This result might be claimed to be different from the one obtained in another study, which found that female-headed households in 10 developing countries including Ethiopia were not obviously poorer than male-headed households (Quisumbing, 1995). There have also been age differences in that younger heads in rural areas have been better off than any other age group in the same sector and the younger group in the urban sector. But the middle age

group in the urban sector has constituted the wealthiest group. A theoretically consistent result has been found in education in which the higher level of education has enjoyed more welfare than the others. In the regional welfare difference comparison, Dessie in the urban sector, and those sites in the Southern region in the rural sector have been the lowest while Addis Ababa has become the richest region in both food and nonfood consumptions. The mean per capita expenditures for all urban regions have been higher than for all rural regions. In brief, the urban households are better off than the rural households.

With regard to the distribution of expenditures, food accounts for the largest share in both rural and urban sectors. Thus, it has left only slightly less than a third of the rural household's budget for the consumption of nonfood items. Whereas its budget share of the urban households is slightly above half. This has enabled the urban household to enjoy one-third more of the nonfood consumption.

The original suspect that the total per capita expenditure is an endogenous explanatory variable have appeared to happen in the urban areas for food, durable goods and housing. Only for these three expenditures have we employed the 2SLS procedure while for the remaining groups the OLS procedures have been adopted. Thus the estimates have appeared to be consistent and efficient and could be used for further analysis. Based on the estimates from these procedures, it has been found that durable goods, clothing, drinks and stimulants, and education and medical care emerged as luxuries whereas the remaining expenditure groups except housing emerged as necessities for both rural and urban households. The expenditure elasticities for necessity goods have appeared to be greater in rural areas than urban areas except for other goods and

services. In the case of luxury items the expenditure elasticities except for clothing have been lower in rural areas than urban areas. The observation of the changes in expenditure elasticity across different income groups have enabled us to accept the hypothesis that expenditure elasticities are inversely proportional to the level of consumption.

The marginal budget share values, which calculated at the sample, mean of the rural and urban households budget share have shown that still food accounts for the greatest additional budget in both rural and urban households, followed by clothing. However, it accounts for a greater share of the budget in rural than urban households. Beyond that the marginal budget shares declines across the different income groups for necessity goods while increasing for the luxury goods. Thus the result of this study is consistent with the prior expectation. For the significance of the differences between the urban and rural household estimated parameters the Wald statistic results have proved that all the estimates are jointly significant.

The result obtained for food in this paper has also been found to be consistent with previous studies in the Ethiopian households. But in the case of clothing our result has indicated that clothing is a luxury good where as earlier studies have obtained a different result in that it is a necessity good rather. Because of the differences in the classification for other expenditure items, it has been found difficult to make the comparison with other groups of expenditures.

With regard to the dummy variables represented by education and sex, the importance of the education variable in the consumption pattern has been consistent with the result

obtained in Mauritania (Coulombe and McKay, 1994). As to sex in this paper, except for drinks and stimulants in urban areas and other goods and services in both sectors, there has not been existed any expenditure variation between the female-and male-headed households.

At the beginning of this paper it was stressed that the successful implementation of rural development policies requires an understanding of the resource allocation among different expenditure groups. As a result, the high expenditure elasticities of demand for food in both rural and urban areas suggest that policies that are intended to promote income are expected to foster higher levels of consumption for food items, and hence, a steady growth in production and employment in the rural sector by enhancing the effective demand. And from our result the total expenditure elasticity for food in rural areas are much higher than that in urban areas. Thus government programs (such as credit programs for the poor, labor-intensive infrastructure development, and investments in irrigation, extension services and agricultural services) have the potentials to bring a sustainable economic development.

Further research may reveal that the use of country specific adult equivalent scales will result in different outcomes.

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PENDICES

Appendix 1: Some Agro-Climatic and Socio-economic Characteristics of the Sites Covered by the Survey

Region	Site/PA	Location		Rainfall (mm)	Altitude (meters) altitude-zone	Major economic activity and rain season	Major crops Produced	Main cash sources	Cropping Status	Dominant Religion (%)
		Woreda	Zone							
Tigray	Harresaw	Atsbi		350-500 (Inadequate)	2,700-3000	Sedentary agriculture <i>Meher</i>	Sorghum, Maize, <i>teff</i> , wheat, and barely	Trade, weaving, food selling & spinning	Poor cropping area	Orthodox Christian (80)
	Geblen	Subhasan esie	East Tigray	Erratic & inadequate		Sedentary agriculture. <i>Meher</i>	<i>Teff</i> , barley, maize, sorghum, millet, wheat, lentils, oil seeds	Production of sesame, <i>Gesho</i> , cactus, and selling goat.	Poor cropping area	Orthodox Christian (80)
Amhara	Shumsha-lalibela		North Wollow	Inadequate		Sedentary agriculture <i>Meher</i> & <i>Belg</i>	<i>Teff</i> , barley, maize, sorghum, millet, wheat, lentils, oil seeds		Poor cropping area	Orthodox Christian (90)
	Yetmen	Enemey	East Gojjam	Adequate	1800-3500 (Woina Dega)	Agriculture <i>Meher</i>	<i>Teff</i> , wheat, millet, sorghum, maize, barely, beans, lentils, chickpeas, potatoes, peppers and cabbage.	Seals of crops and animal products	Surplus cereal producer	Orthodox Christian (95)
	Dinki-Ankober	Basso and worana	North showa	Adequate	2714 (Dega)	Agriculture during <i>Meher</i> and <i>Belg</i> with high importance of <i>Belg</i>	Sorghum, maize, <i>teff</i> , soy beans, chick peas, and tree crops (<i>chat</i> , coffee, <i>gesho</i>) and vegetables	Chat and vegetables sales of animals & milk producers	Poor crop production	Moslem (75)
	Debre-Brhan (4P/A)	Basso and worana	North Showa		2714 (Dega)	Agriculture during <i>Meher</i> and <i>belg</i> with high importance of <i>Belg</i>	Barely, wheat, horse beans, peas, lentils, gremial, teeming, and linseed	Sales of cattle, sheep, crop weaving, local drinks, and fire woods	Self supporting high land site	Orthodox Christian

Continued

Region	Site/PA	Location		Rainfall (mm)	Altitude (meters) altitude-zone	Major economic activity and rain season	Major crops Produced	Main cash sources	Cropping Status	Dominant Religion (%)
		Woreda	Zone							
Oromiya	Debrezeit-sirbana Godit	Ada	East Showa	860	1800-1900 (Woynadaga)	Agriculture. <i>Meher</i>	<i>Teff</i> , wheat, beans, chickpeas, barley, maize, and sorghum	<i>Teff</i> , wheat, animal products, sheep, trade, local drinks	Surplus cereal producer	Orthodox Christian
	Koro Dagaga-Sodere	Dodota	Arsi	Inadequate	1300-1500	Agriculture <i>Meher</i>	Cornitef, sorghum, beans	Cropping, sales of animal products (dung cakes mild) and fire wood	Poor cropping area	Moslem (100)
	Turfe Kechema-Shashemmane	Shashemmane	East Shewa		200	Subsistence agriculture. <i>Meher</i> and <i>Belg</i>	Wheat, barley, maize, millet, sorghum, beans, peas, lentils, linseed, sesame vegetable, and <i>enset</i>	Crop seals, Animal products, wearing, local drinks, and sales of firewood	Self sufficient	Moslem (80)
	Adele-keke	Alamyia	East Oromiya	Inadequate	200	Diversified crop cultivation during <i>Meher</i> and <i>Belg</i>	Sorghum, maize, barley, wheat, <i>teff</i> , say beans, chick peas, and tree crops (<i>chat</i> , coffee, <i>gesho</i>) and vegetables	<i>Chat</i> , and vegetables sales of animals & milk products	Poor crop production	Moslem (100)
	Eteya	Tiyo	Arsi	Adequate	Woynadaga	Crop production mainly during <i>Meher</i>	Wheat, Barley, hoarse bean, maize and sorghum	Sales of crop	Surplus cereal producer	Orthodox Christian
	Bako-Tibe	Bako-Tibe	West Showa	Adequate	Kolla	Agriculture <i>Meher</i>	Maize, sorghum, <i>teff</i> , <i>nug</i> .	Sales of pepper and maize	Surplus crop production	Christian
	Jimma-Somodo		Jima	"	Woynadaga	Agriculture, <i>Meher</i>	Coffee, <i>chat</i> , <i>teff</i> , maize, <i>enset</i> , tree crops	Sales of coffee chat, <i>teff</i> , banana	Self sufficient	Orthodox Christian

Continued

Region	Site/PA	Location		Rainfall (mm)	Altitude (meters) altitude Zone	Major Economic activity and rain season	Major crops Produced	Main cash sources	Cropping Status	Dominant Religion (%)
		Woreda	Zone							
Southern Nation Nationalit y and People (SNNP)	Imdibir	Wolkite	East Showa	50-60 inches	1500-2300 (Woinadaga)	Agriculture <i>Meher</i>	<i>Enset, chat</i> , coffee, cabbage, maize, potato, tobacco	<i>Chat</i> , sales of sheep, donkeysh oarses, migration, and trade	Food deficit mainly due to land scarcity	Orthodox Christian (67)
	Aze-Deboa- Kembata	Kedida Gamesa	Alaba and Timbar a	1200-1350	1700-3028	Agriculture <i>Meher</i>	<i>Teff</i> , barley, Wheat, <i>dagussa</i> , maize, sorghum, pulses, <i>ensete</i> , coffee, other tree crops, and vegetables	Coffee, <i>teff</i>	Food deficit mainly due to land scarcity	Protestants
	Adado-Dilla	Dilla	Gedeo	Sufficient	2200	Mixed farming	<i>Enset</i> , coffee barley, cow beans, tobacco, lid seed, and Jamie	Coffee, <i>chat</i> , sugarcane,	Self sufficient	Orthodox Christian
	Gara Godo- areka	Bolosso (Wolayta)	North Omo			Intensive farming	<i>Enset</i> , other root crops, maize, <i>teff</i> , sorghum and barley tree crops	Livestock, tree crops, trading weaving	Vulnerable area mainly due to shortage of agricultural land	Christians protestants and Orthodox
	Doma		North Omo	Unimodal	<1500	Subsistenc e farming and weaving	Maize, <i>teff</i> , sweet potatoes, and <i>enset</i>	Weaving, wood works, sales of local drinks, and animal products	Recurrent drought affects the area	Christians

Source: Compiled from Ethiopian Village Studies by Addis Ababa University (1996)

Appendix2: Descriptive Statistics for urban households

Variables	Mean	Std. Deviation	Size
<i>Dependent variables</i>			
Share of food consumption	0.5182	0.1491	1461
Share of clothing	0.0932	0.0364	1049
Share of drinks and stimulants	0.0521	0.0605	1241
Share of education and medical care	0.0692	0.1129	1362
Share of social and cultural expenses	0.0245	0.0525	1308
Share of taxes	0.0051	0.0248	354
Share of durable goods	0.0502	0.0482	1414
Share of other goods and services	0.1063	0.0929	1461
Share of housing	0.0391	0.0484	1359
<i>Independent variables</i>			
Logarithm of total per capita expenditure	7.0694	0.862	1472
Logarithm of household size	1.8322	0.5318	1472
Primary level dummy	0.38	0.48	1472
Lower sec_ level dummy	0.13	0.33	1472
Upper sec_ level dummy	0.29	0.46	1472
Post secondary level dummy	0.13	0.34	1472
Age dummy for 25-45	0.42	0.49	1472
Age dummy for 46-60	0.36	0.48	1472
Age dummy for >60	0.19	0.39	1472
Awasa region dummy	0.05	0.22	1472
Bahir Dar region dummy	0.07	0.25	1472
Dessie region dummy	0.07	0.25	1472
Dire Dawa region dummy	0.09	0.28	1472
Jimma region dummy	0.07	0.25	1472
Mekele region dummy	0.07	0.25	1472

Appendix3: Descriptive Statistics for Rural Households

Variables	Mean	Std. Deviation	N
<i>Dependent Variables</i>			
Share of food expenditure	0.676	0.141	1679
Share of clothing	0.078	0.033	1583
Share of drinks and stimulants	0.050	0.080	1535
Share of education and stimulants	0.026	0.033	1432
Share of taxes	0.007	0.007	1514
Share of social and cultural expenses	0.019	0.027	1590
Share of durables	0.046	0.019	1145
Share of other goods and services	0.104	0.078	1668
<i>Independent Variables</i>			
Logarithm of total real exp. per capita	7.061	0.784	1681
Logarithm of household size	1.843	0.514	1681
Primary level	0.420	0.490	1681
Lower sec_ level	0.055	0.230	1681
Upper sec_ level	0.048	0.210	1681
Post secondary level	0.005	0.069	1681
Age between 25 and 45	0.480	0.500	1681
Age between 46 and 60	0.270	0.440	1681
Age above 60	0.230	0.420	1681
Region1	0.260	0.440	1681
Region2	0.140	0.350	1681
Region3	0.140	0.340	1681
Region4	0.120	0.330	1681
Region5	0.140	0.340	1681
Region6	0.089	0.290	1681

Appendix4.1: Condition indices for each of the explanatory variables in the regression equations of urban households

Explanatory variables	Regression equations for								
	Clothing	Drinks& Stim	Durable Goods	Educ & Medical	Food	Social& Cultural	Other G&S	Housing	Taxes
LNREXP	2.278	2.251	2.288	2.115	2.302	2.217	2.300	2.296	2.858
LNSIZE	2.448	2.466	4.355	4.106	2.417	2.290	2.454	2.364	5.236
SEX	2.508	2.493	2.386	2.301	2.483	2.418	4.260	2.439	2.218
E1	2.562	2.598	2.810	2.682	2.581	2.457	9.910	2.529	2.877
E2	2.820	2.906	2.497	2.451	2.766	2.469	2.527	4.112	2.443
E3	5.145	5.502	2.589	2.413	4.938	2.517	2.750	3.112	2.443
E4	4.186	4.671	2.432	2.137	4.955	2.535	2.499	3.724	10.339
A1	10.091	10.795	10.569	11.692	9.686	2.574	5.142	9.912	12.947
A2	12.392	13.971	13.092	22.005	13.711	2.761	12.31	11.592	2.505
A3	21.990	22.413	22.451	25.938	20.504	2.789	21.76	16.190	2.540
R1	2.213	2.168	2.226	2.075	2.212	4.333	2.208	2.196	2.752
R2	2.412	2.396	5.883	15.938	2.361	5.303	2.408	2.654	2.428
R3	2.469	2.490	2.567	2.365	2.471	9.911	2.454	2.418	4.301
R4	2.524	2.500	2.492	2.326	2.537	12.273	2.572	2.337	23.336
R5	2.747	2.760	2.728	2.589	2.720	23.113	14.98	2.498	19.568
R6	4.265	4.377	5.155	9.323	4.275	7.154	2.791	2.398	2.542

Appendix4.2: Condition indices for each of the explanatory variables in the regression equations of rural households

Explanatory variables	Regression equations for							
	Clothing	Drinks& Stim	Durable Goods	Educ & Medical	Food	Social& Cultural	Other G&S	Taxes
LNREXP	2.325	2.347	2.325	2.330	2.335	2.315	2.319	2.300
LNSIZE	2.401	2.384	2.408	2.412	2.399	2.416	2.401	2.382
SEX	2.469	2.439	2.456	2.464	2.452	2.504	2.448	2.742
E1	2.586	2.581	2.555	2.616	2.559	2.563	2.570	2.673
E2	4.320	3.693	3.273	3.428	3.568	4.322	4.296	4.162
E3	3.399	3.271	3.257	3.453	3.252	3.413	3.683	3.393
E4	4.383	4.323	4.242	4.262	4.215	4.558	3.326	4.783
A1	10.511	10.183	9.826	9.931	9.576	9.452	9.742	11.345
A2	12.007	12.255	11.601	11.479	11.324	11.613	11.595	12.771
A3	16.815	18.033	17.590	17.254	17.076	19.940	17.491	20.075
R1	2.211	2.206	2.221	2.216	2.222	2.217	2.213	2.185
R2	2.712	2.719	2.660	2.672	2.657	2.675	2.691	2.728
R3	2.388	2.356	2.375	2.359	2.378	2.371	2.374	2.342
R4	2.524	2.523	2.417	2.539	2.490	2.543	2.513	2.602
R5	2.442	2.425	2.507	2.443	2.421	2.437	2.433	2.452
R6	2.488	2.471	2.475	2.502	2.460	2.454	2.496	2.540

Appendix5: The calculated *F-values* for the joint significance of the dummy variables (for urban households)

Expenditures	H ₀₁ (E)	H ₀₁ (A)	H ₀₁ (R)	H ₀₂ (E)	H ₀₂ (A)	H ₀₂ (R)
Clothing	0.74	1.34	3.31**	0.58	1.11	3.89**
Drinks & Stimulants	8.12**	4.14**	0.25	6.29**	3.37**	0.34
Durable Goods	4.56**	13.11**	1.24	3.49**	8.97**	1.04
Education & Medical	8.30**	3.14**	6.05**	6.70**	2.90**	24.69**
Food	3.54**	5.34**	2.42**	2.66**	3.70**	5.24**
Social & Cultural	6.18**	4.95**	22.65**	5.35**	3.95**	107.84**
Other Goods & Service	9.33**	2.57*	4.68**	7.02**	1.78	12.15**
Housing	2.73**	2.96*	1.32	2.39**	1.99	1.24
Taxes	0.48	5.57**	2.68**	0.94	4.20**	7.29**

Notes: ** significant at 5 percent *significant at 10 percent

H₀₁() stands for the hypothesis that all of the categories of a dummy variable are the same

H₀₂() stands for the hypothesis that all of the categories of a dummy variable are equal to zero

E, A, & R stands for education, age and regional dummies

Appendix6: The calculated *F-values* for the joint significance of the dummy variables (for rural households)

Expenditures	H ₀₁ (E)	H ₀₁ (A)	H ₀₁ (R)	H ₀₂ (E)	H ₀₂ (A)	H ₀₂ (R)
Clothing	4.39**	0.54	2.04*	3.31**	0.55	1.82*
Drinks & Stimulants	11.90**	2.10	2.29**	9.29**	3.38**	1.98*
Durable Goods	0.55	1.34	2.85**	0.47	0.97	2.53**
Education & Medical	3.60**	0.31	12.95**	3.00**	0.31	10.84**
Food	1.23	0.70	4.73**	1.03	0.72	3.95**
Social & Cultural	3.72**	0.25	24.38**	11.01**	0.19	20.83**
Other Goods & Serv	2.64**	13.23**	40.50**	3.06**	9.06**	36.93**
Taxes	2.25*	8.90**	64.63**	4.53**	6.52**	61.60**

Notes: ** significant at 5 percent *significant at 10 percent

H₀₁() stands for the hypothesis that all of the categories of a dummy variable are the same

H₀₂() stands for the hypothesis that all of the categories of a dummy variable are equal to zero

E, A, & R stands for education, age and regional dummies

Appendix7: Budget share regression results only with significant variables for urban households

Expenditures	Clothing	Drinks& Stml.	Durabl Goods	Educ & Medical	Food	Social & Cultural	Other G&S	Housing	Taxes
CONS	-0.4964 (47.28)	-0.176 (16.57)	-0.382 (28.6)	-0.093 (6.96)	1.819 (23.17)	0.094 (19.52)	0.343 (27.4)	-0.194 (8.58)	0.021 (8.14)
LNREX P	0.0646 (52.85)	0.0234 (18.71)	0.048 (29.1)	0.017 (10.46)	-0.148 (15.77)	-0.008 (14.35)	-0.028 (19.1)	0.028 (10.81)	-
LNSIZE	0.0634 (34.65)	0.022 (12.30)	0.045 (30.6)	0.024 (12.53)	-0.144 (17.39)	-0.004 (4.65)	-0.015 (6.38)	0.021 (8.21)	-
SEX	-	0.023 (18.28)	-	-	-	0.002 (1.74)*	-0.007 (3.05)	-	-
E1	-	-	-	-	-	0.004 (3.78)	-	-0.009 (2.95)	-
E2	-	-	-	-	-	-	-	-0.009 (2.63)	-
E3	-	0.004 (2.76)	-	0.005 (2.31)	-	0.004 (3.81)	-	-0.009 (3.25)	-
E4	-	0.011 (4.52)	0.007 (3.95)	0.013 (4.97)	-0.027 (2.69)	-	0.015 (4.81)	-	-
A1	-	-	-	0.005 (2.61)	0.029 (3.27)	0.002 (1.87)*	-	-	-0.003 (3.41)
A2	-	-	0.003 (2.36)	-	0.017 (1.82)*	-	-	-	-0.002 (2.31)
A3	-	0.005 (2.76)	0.008 (5.32)	-	-	0.004 (3.21)	-	-	-
R1	-	-	-	-0.016 (3.41)	-	-0.009 (6.14)	-	-	-0.002 (6.12)
R2	-	-	-	-0.013 (4.11)	0.042 (3.51)	-0.019 (11.84)	-0.023 (5.91)	-	0.002 (2.11)
R3	-	-	-	-0.013 (3.34)	-	-0.019 (13.57)	-0.012 (2.74)	-	0.005 (4.50)
R4	0.0096 (3.97)	-	-	-0.014 (4.89)-	0.025 (3.51)	-0.016 (11.57)	-0.011 (3.19)	-	-
R5	-	-	-	0.027 (8.57)	0.030 (2.34)	-0.021 (16.77)	-0.024 (5.48)	-	0.003 (3.22)
R6	-	-	-	-0.028 (9.57)	0.047 (4.42)	-0.025 (21.62)	-	-	0.007 (5.90)
Adj- R ²	0.80	0.63	0.80	0.41	0.55	0.43	0.30	0.50	0.29
F-value	1117.12	137.28	413.80	42.15	87.93	64.40	58.19	46.51	14.23
N	1015	852	1312	796	1362	957	1128	666	303

Notes: All the values are significant at 5 percent except those with *.

All the regression results are reported after the insignificant variables are dropped(- stands for the dropped variables)

Appendix8: Budget share regression results only with significant variables for rural households

Expenditures	Clothing	Drinks & Stml.	Durabl Goods	Educ & Medical	Food	Social & Cultural	Other G&S	Taxes
CONS	-0.252 (31.57)	-0.226 (26.61)	-0.438 (43.36)	-0.127 (20.7)	1.398 (26.5)	0.031 (12.3)	0.377 (22.1)	0.039 (33.1)
LNREXP	0.036 (39.56)	0.029 (31.9)	0.055 (47.7)	0.016 (22.2)	-0.082 (13.3)	-0.003 (8.60)	-0.028 (14.7)	-0.004 (28.7)
LNSIZE	0.389 (32.77)	0.029 (21.71)	0.054 (38.16)	0.018 (17.5)	-0.088 (11.1)	—	-0.031 (9.38)	-0.003 (15.7)
SEX	0.002 (1.68)*	—	—	—	—	-0.001 (2.41)	-0.011 (3.28)	-0.0003 (1.90)*
E1	—	—	—	-0.002 (2.38)	—	0.003 (5.13)	—	0.0004 (2.92)
E2	0.005 (2.76)	—	—	—	—	0.003 (2.87)	0.016 (2.65)	—
E3	—	—	—	0.004 (1.82)*	—	0.007 (4.67)	—	0.0012 (3.16)
E4	0.008 (2.42)	0.018 (5.67)	—	—	—	0.013 (2.22)	—	0.0016 (1.88)*
A1	—	0.007 (2.13)	—	—	—	—	—	—
A2	—	0.010 (3.02)	—	—	—	—	-0.008 (2.33)	0.0005 (2.75)
A3	—	0.010 (2.73)	—	—	—	—	-0.019 (5.67)	0.0008 (4.03)
R1	—	-0.004 (2.70)	0.003 (2.20)	—	—	—	—	-0.002 (8.98)
R2	—	-0.007 (1.94)*	—	—	—	0.003 (4.31)	-0.018 (2.13)	-0.002 (5.96)
R3	—	—	0.003 (2.05)	-0.004 (4.20)	0.016 (2.22)	-0.005 (4.69)	-0.032 (9.40)	-0.003 (12.9)
R4	—	—	—	0.015 (6.35)	—	—	0.064 (8.90)	-0.003 (11.3)
R5	—	—	—	—	—	-0.001 (2.31)	-0.014 (3.95)	—
R6	0.006 (3.22)	—	0.006 (3.07)	—	-0.041 (3.68)	-0.005 (6.81)	—	-0.005 (18.6)
Adj- R ²	0.72	0.69	0.84	0.42	0.31	0.16	0.27	0.50
F-value	315.75	181.90	515.38	109.15	53.64	25.67	57.2	85.16
N	1555	880	932	1353	1145	1417	1614	1441

Notes: All the values are significant at 5 percent except those with *.

All the regression results are reported after the insignificant variables are dropped (- stands for the dropped variables)

Appendix9: The derivative of total expenditure elasticity:

Given the model that

$$w_{ij} = \alpha_{0i} + \alpha_{1i} \ln x_j + \alpha_{2i} \ln n_j + \phi_i D_j + \sum_{k=1}^4 \beta_{ik} E_{jk} + \sum_{k=1}^3 \gamma_{ik} A_{jk} + \sum \theta_{ik} R_{jk} + u_{ij} \dots \dots \dots (1)$$

where

- w_{ij} – the budget share of commodity group i^{th} for the j^{th} individual
- x_j - the per capita real total expenditure
- Z_j – the total household member size
- E_{ij} – the education dummy variables
- A_{ij} - the age dummy variables
- R_{ij} – the regional dummy variables

and

$$w_{ij} = \frac{c_{ij}}{x_j} \dots \dots \dots (2)$$

where

c_{ij} -is total expenditure on commodity group j

$$\frac{\partial w_{ij}}{\partial x_j} = \frac{\partial}{\partial x_j} \left(\frac{c_{ij}}{x_j} \right) = \frac{1}{x_j} \frac{\partial c_{ij}}{\partial x_j} - \frac{c_{ij}}{x_j^2}$$

then by multiplying both sides by $\frac{x_j^2}{c_{ij}}$

i.e.

$$\frac{x_j^2}{c_{ij}} \left(\frac{\partial w_{ij}}{\partial x_j} \right) = \frac{x_j}{c_{ij}} \frac{\partial c_{ij}}{\partial x_j} - 1 \dots \dots \dots (3)$$

and

using equation (1)

$$\frac{\partial w_{ij}}{\partial x_j} = \frac{\alpha_{1i}}{x_j}$$

using equation(2)

$$\frac{x_j^2}{c_{ij}} = \frac{x_j}{w_{ij}}$$

then by rearranging equation (3) we will get

$$\varepsilon_{ij} = 1 + \left(\frac{\alpha_{li}}{w_{ij}} \right)$$

where ε_{ij} is the total expenditure elasticity of commodity group I

Appendix 10: *The derivative of household-size elasticity*

The model, which is given in equation (1) of appendix 8, can be written as

$$w_{ij} = \alpha_{0i} + \alpha_{li} \ln \frac{X_j}{n_j} + \alpha_{2i} \ln n_j + \phi_i D_j + \sum \beta_{ik} E_{jk} + \sum \gamma_{ik} A_{jk} + \sum \vartheta_{ik} R_{jk} + u_{ij} \dots (5)$$

$$w_{ij} = \alpha_{0i} + \alpha_{li} \ln X_j - \alpha_{li} \ln n_j + \alpha_{2i} \ln n_j + (otherterms)$$

$$w_{ij} = \alpha_{0i} + \alpha_{li} \ln X_j + (\alpha_{2i} - \alpha_{li}) \ln n_j + (otherterms)$$

thus

$$\frac{\partial w_{ij}}{\partial n_j} = \frac{\alpha_{2i} - \alpha_{li}}{n_j} \dots \dots \dots (6)$$

multiplying both sides by $\frac{n_j}{w_{ij}}$

$\Rightarrow$

$$\eta_{ij} = \frac{\partial w_{ij}}{\partial n_j} \times \frac{n_j}{w_{ij}} = \frac{\alpha_{2i} - \alpha_{li}}{n_j} \times \frac{n_j}{w_{ij}}$$

$$\eta_{ij} = \frac{\alpha_{2i} - \alpha_{1i}}{w_{ij}} \dots\dots\dots(7)$$

where η_{ij} is the household size elasticity if the share of commodity group I

Appendix11: The derivative of marginal budget shares

From (4) above in appendix 9 we have

$$\varepsilon_{ij} = \frac{\partial c_{ij}}{\partial x_j} \times \frac{x_j}{c_{ij}} = 1 + \frac{\alpha_{1i}}{w_{ij}} \dots\dots\dots(8)$$

thus the marginal budget shares which show the change in c_{ij} for a given change in x_j , $\left(\frac{\partial c_{ij}}{\partial x_j} \right)$, is

obtained by multiplying both sides of equation (8) by $\frac{c_{ij}}{x_j}$

$$\Rightarrow \frac{\partial c_{ij}}{\partial x_j} = \varepsilon_{ij} \times \frac{c_{ij}}{x_j}$$

or by using equation (2) in appendix (9)

$$MBS_i = \varepsilon_{ij} \times w_{ij}$$

Where MBS_i is the marginal budget share of commodity group i.

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any university and all the sources of materials used for the thesis are duly acknowledged.

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