Abstract: The study investigates the empirical determinants of poverty in Zimbabwe using cross section data for 2005. The study focuses on consumption function since poverty is defined as lack of basic needs of which food is included. A regression model was estimated based on this data, with per capita consumption as the dependent variable and a set of economic and demographic variables as explanatory variables. Variables that are significant and positively correlated with per capita consumption thus negatively correlated to poverty are: age squared, gender (male), widow, maximum level of education, attaining primary education, employment in any sector except working in the informal sector, migration status, engaged in secondary business, number of sources of income, credit availability and land area cultivated. Variables significant and negatively correlated with per capita consumption and positively correlated to poverty are: age and household size. Employment in the informal sector, days missed due to illness, and land ownership were some of the insignificant variables.

Key words: Poverty, Multivariate function

Introduction
Zimbabwe is a landlocked Southern African country with a land area of 390 757 km² of which 85% is agricultural land and the remaining comprises national parks, state forests and urban land. Zimbabwe had a lower poverty rate and better social indicators than most African countries (World Bank 1995). In an effort to increase equity rapidly following independence in 1980, Zimbabwe gave priority to human resource investments and support for smallholder agriculture. Social indicators improved quickly.

Some key social indicators began deteriorating during the 1990s, in comparison to a commendable improvement in the same indicators during the 1980s. The life expectancy at birth was estimated at 43 years for the
period 2000-2005, as compared to 61 years in 1990. In 2002, about 34 percent of the adult population was Human Immune Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) infected. The impact of HIV and AIDS on the reduction of life expectancy and other social indicators cannot be over emphasised.

The success in improving social indicators before 1990 was not matched by economic growth, which failed to keep pace with population growth, and hence expectations for rising living standards were partially fulfilled. Employment growth was not adequate to absorb the number of new entrants into the labour force. Moreover, the earlier gains in smallholder agriculture were not sustained due to lack of know-how which led to low productivity.

According to World Bank, (1995) twenty-five percent of the people in Zimbabwe were poor in 1990/91 (that is, had insufficient purchasing power to buy a basic consumption basket of food, clothing, shelter, education, health services and transport), while 7 percent were very poor (that is, had insufficient}

The period of 1996-2003 has been marked by accelerated deterioration in the socio-economic situation. During this period ESAP was replaced with a “home grown” reform package, the Zimbabwe Programme for Economic and Social Transformation (ZIMPREST) in April 1998 by the government. Millennium Economic Recovery Programme (MERP) was launched in August 2001 as a short-term 18-month economic recovery programme. Its objective was to restore economic vibrancy and address the underlying macroeconomic fundamentals. Unfortunately MERP was also rendered ineffective In February 2003, government launched yet another 12-month stabilisation programme the National Economic Revival Programme (NERP). Though NERP was received with more optimism by donors, the programme failed to generate the foreign currency required to support economic recovery.
By mid 1990s, Zimbabwe had achieved near universal primary education. In 1994, the net enrolment ratio was 81.9 percent, improving to 93.0 percent in 2002. Consequently, literacy levels for 15-24 year olds rose from 95 percent to 98 percent between 1992 and 1999 and average years of schooling rose by 28 percent. However, during the same period the primary school completion rate was 82.6 percent, declining to 76.1 percent by 1995 and further to 75.1 percent by 2000 (CSO, 2003).

There has been significant improvement in the quality of teaching personnel in the primary education sector in 1990. 51.5 percent of 60,886 primary school teachers were trained, while 48.5 percent were untrained. By 2000, the proportion had increased to 88.4 percent trained and 11.6 percent untrained, out of an increased total of 66,640 primary school teachers (UNDP Zimbabwe, 2004).

Child malnutrition is a major problem associated with poverty. According to the Ministry of Health and Child Welfare 13 percent of the under fives were undernourished by in 1988, rising to 17 percent in 1994, falling to 13 percent in 1999 and rising to 20 percent in 2002. It was estimated that 11 percent of the children in urban areas and 26.5 percent of the children in rural areas were malnourished by 2002 National Nutrition Assessment Study.

Generally poverty has been on increase since 1980 and further worsens during the ESAP period (1990-1995) in Zimbabwe as indicated by high percentage of people living below poverty lines, decreasing HDI and high teacher to pupil ratio. High levels of inequality, rapid economic decline, high prevalence of HIV and high structural unemployment have mainly caused the poverty. The decade of the 1990s witnessed a turnaround of economic fortunes, as economic decline set, structural problems of high poverty and inequality persisted.

**Statement of the problem:** Although the construction of poverty profiles is useful because it allows us to know whether poverty is increasing or decreasing as well as the changes in the composition of the population in poverty, poverty profiles do not throw much light about the causes of poverty.
They only provide a description of poverty according to several economic, demographic or social characteristics. In Zimbabwe other studies have been carried out but no study looked at the determinants of poverty that is on the increase. This gave rise to the need to find those variables that most cause poverty.

**Objective:** The main objective of this study is to determine different determinants of poverty approximated by per capita consumption, especially the effect of education, ownership of physical assets and demographic effects on poverty.

**Materials and Methods**
Various approaches have been followed in examining the determinants of poverty. These include classical regression approach, to estimate per capita expenditure function (Grootaert, 1997). Others have utilized the probit estimation technique (Oyugi, 2000) and some used the discriminating factorial analysis (Kamgnia and Timnou, 1999). This serves as evidence to show that poverty models cannot be in any fixed form but one can choose any functional form depending on objectives or goals.

Following these arguments the econometric methodology that was used to analyze the linkages is a modified version of a multivariate model used by the National Economic Council (NEC) (1998) in analyzing the determinants of poverty in Malawi. Since the relationship between explanatory variables and consumption is likely to be nonlinear a log transformation of consumption is used. The simplest form of such a model could be as follows:

$$\text{Inc}_j = \beta_j \text{x}_j + \varepsilon_j$$

Where $\text{c}_j$ is consumption of household $j$ usually on a per capita basis, $\text{x}_j$ is a set of household characteristics (for example educational level, age, household size, gender, and ownership of physical capital of household head), and other determinants, and $\varepsilon_j$ is a random error term. Total consumption per capita is used as the welfare measure throughout the subsequent analysis. We use the following function:

$$\text{Iperc} = \beta_0 + \beta_1\text{age} + \beta_2\text{age}^2 + \beta_3\text{hsize} + \beta_4\text{gender} + \beta_5\text{married} + \beta_6\text{edu} + .. + \varepsilon_j$$

Where $\text{age}$ = Age of household head (years), $\text{age}^2$ = Age of household head
squared, $gender = $Gender of household head (male=1), $hhsise = $Number of individuals in a family, $gender = $Gender of household head (male=1), $married = Household head is married (married=1), $educ = $Maximum level of education completed by household head

**Per capita consumption:** We use per capita consumption for the basic measure of individual welfare as the dependant variable. The preference to use a consumption-based rather than an income-based measure of individual welfare in this research is motivated by the following consideration. Income can be interpreted as a measure of welfare opportunity, whereas consumption can be interpreted as a measure of welfare achievement. Since not all income is consumed, nor is all consumption financed out of income, the two measures typically differ. Consumption is arguably a more appropriate indicator since we are concerned with realized, rather than potential, welfare.

**Demographic variables:** The demographic data used include age of the household head in years as a variable and it is continuous. Age is justified as an explanatory variable as it is adopted from Becker 1975 “Human capital” theory (1975), his theory maintains that the patterns of individual’s earnings are such that they start out low (when the individual is young) and increase with age (Becker 1975, p.43), although earnings tend to fall somewhat as individuals near retirement.

**Sex/gender** of household head is also considered as a variable and takes the value of 1 if the household head is male and zero otherwise. In this research gender is also considered an important variable so as to establish if it is applicable in Zimbabwe. It is expected that there is a positive relationship between male-headed households and welfare.

**Household size** is another demographic variable used in this research. It is the number of individuals in the household, and it is a continuous variable. Given that household size can capture the effects the quality of the household composition expectation can be positive or negative. If the quality is low, we expect a high probability of being poor. Based on experience in numerous other
countries (Lanjouw and Ravallion 1995; Deaton and Paxson 1998), we expect a negative relationship between total household size and total consumption per capita.

We include measures to capture educational attainment. They are maximum education level attained by the household head. This is a categorical variable where the categories have never attended school, completed secondary, attended tertiary education. This variable is also a dummy variable where each category takes the value of one if the household head has attained that level of education.

We also need to capture the effects of the distribution of different sorts of occupation. The variables used include household heads employed in private sector, cooperative and other sectors, being formally (professional) and informally employed. Employment has a high correlation with poverty because occupations, which require low amounts of capital, either human or physical, is associated with low earnings and finds that working in a professional occupation or in a middle level occupation decreases the probability of being poor, while working in a rural occupation or in a domestic occupation increases it.

We also include a variable that measures diversification of income sources within the household, with a view to examining the hypothesis that multiple income sources contribute to lower risks and higher income for the household. This variable is specified as a count of the distinct number of income sources for the household.

Another variable is physical asset defined as the ownership of land. This has important implications for poverty as land ownership can serve as collateral for credit in addition to its primary function of providing shelter.

Land size occupied in acres is another variable. We therefore introduce a quadratic term in land size to allow for nonlinearities in the relationship between land size and living standards. We have considered land size/availability of land as a potential determinant; it is essential to recognize that in the context of Zimbabwe there is much scope for increasing land-holding sizes.
Livestock possession is also considered as an important variable that determines poverty. To permit for nonlinearities in the relationship between livestock ownership and living standards a quadratic term is used for this variable. Livestock is considered as important as a means of livelihood in Zimbabwe especially in rural areas.

The household head was asked if s/he had been sick. The days that person had been sick were taken as a health variable. This variable is justified for the Zimbabwean situation since it is hypothesised that health status of a person also contributes to the welfare of the household.

Results
We present the results of the estimation and their interpretation. The results of the model are presented in table below.

Regression results
Dependent variable is logarithm of per capita consumption (lperc).

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>COEFFICIENT</th>
<th>T-STATISTIC</th>
<th>P-VALUE</th>
</tr>
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<tbody>
<tr>
<td>cons</td>
<td>-1.7728</td>
<td>-1.54</td>
<td>0.127</td>
</tr>
<tr>
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<tr>
<td>agesq</td>
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<td>0.001</td>
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</tbody>
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D-W statistic = 1.6
R-squared = 0.6863
Adjusted R-squared = 0.6175

Discussion of results: From the results we find that the constant is insignificant. This signifies that in this model autonomous consumption is not all that important in explaining poverty. Besides the constant, other variables that are
insignificant are land ownership, livestock total, health status, and remittance status. Variables that were significant at 1 percent level are: age, age squared, gender (male), being employed in private sector, number of sources of income and personal business status.

Age of the household head is statistically significant in explaining household welfare (poverty), although the effect is not very strong. Households headed by older individuals in rural areas, holding other variables constant, will tend to be poorer than those headed by younger individuals. One reason for this finding might be the nature of economic activities in rural areas. If they have insufficient labour within their households, older household heads are at a disadvantage economically in undertaking the heavy physical labour required in agriculture in Zimbabwe.

For the gender of the head of household, we find expected result in that the effect of a male-headed household is positive. The coefficient is 71.3 percent and highly significant. The results show that male headed households are better off. This means that addition of a male headed households increases per capita consumption thus reduction of poverty by 71.3 percent.

Given the strong negative relationship between household size and per capita consumption already noted in earlier work (Lanjow and Ravallion 1995), it is not surprising that the estimated parameters are negative and statistically significant. That is, according to the regression estimates, ceteris paribus, an additional person in the household will reduce consumption per capita in the household by 10.4 percent.

The coefficient for the variable for maximum level of education of any adult in the household is consistently positive and significant. Attainment of higher levels of education will provide higher levels of welfare for the household. Raising the maximum level of education attained by household head by one step will raise household per capita consumption on average by 29.9 percent.

The three variables for household heads employed in different economic sectors (private, cooperative and other) show the
expected pattern. They are statistically significant, and all are positive, indicating that, other things being equal, employment of any kind in rural areas leads to higher consumption per capita than being unemployed. Cooperative was significant at 5 percent level of significance, and then other sector is significant at 10 percent level of significance. Comparing the incremental gain in per capita consumption is smallest for those employed in cooperative (153.9 percent) and largest for those employed in private sectors (158.3 percent), a category that consists principally of non government institutes. The coefficient for other sectors is 155.1, which means that being employed in other sectors will increase per capita consumption by more than 155.1 percent.

Having household head engaged in formal wage employment will lead to a significant increase in per capita consumption, all other things being equal. The coefficient is 93 percent and being statistically significant at 10 percent level of significant. This means that being employed in the formal sector will raise per capita consumption by 93 percent.

The coefficient of employment in the informal sector, although negative, is statistically insignificant. This can be seen by the probability value its coefficient which is greater than 10 percent. The returns in household welfare to employment in informal sector therefore, appear to be inconsequential. These results show that even though there are people employed in the informal sector it is not productive.

Operating a secondary business such as cross-border trading and poultry is significant in determining poverty in Zimbabwe and has expected positive sign. Engagement of an additional person in secondary business will therefore reduce poverty by a noted magnitude.

The variable which measures access to credit at household level shows, as expected, that the more people have access to credit the more positive is the effect on welfare. Credit availability is significant at 10 percent level of
significant. This shows that increase in people accessing credit result in 40 percent increase in per capita consumption and the less people access credit per capita consumption decrease by the same magnitude. Turning to poverty the results show that it falls as people access more credit.

Migration related factors are found unauthentic, reflecting the effects of age and human capital characteristics of rural areas. Human capital characteristics are generally found to be crucial determinants of poverty. It is therefore, interesting to note that migration status is a significant determinant of poverty with a positive coefficient but remittance status is insignificant with unexpected negative coefficient.

Among the agriculture- and livestock-related variables, area of land cultivated (with square root transformation) is statistically significant but land ownership is not significant. Total holding of land seems to be important. The coefficient for the land area cultivated illustrates that the magnitude of welfare increase, which would result from increasing the acreage, cultivated, if it were feasible to do so. Shortage of land will mean households will produce less for the family and lead to less consumption. Thus, we find that an increase in cultivated area by one acre increases per capita consumption by 0.23 percent meaning reduction of poverty.

Our regression results show that the value of livestock for household welfare is statistically insignificant in Zimbabwe with positive coefficient of 39 percent. This might suggest that the importance of livestock as a means of livelihood is on the decline in Zimbabwe.

Days missed at work due to illness is the health variable included in the study. This variable is insignificant showing that it is not important in determining level of consumption. Results also show that poverty is not determined by days a person fail to go for work. The explanation for these findings might be that most workers earn fixed monthly salaries not wages such that earnings are not affected by days a person work.

**Policy Recommendations**

The results show that employment in private sector; number of sources of
income, owning secondary business, gender, age, age squared and education has a bearing on poverty. These findings may imply that using these variables in policy making could have a significant impact on poverty. Other significant variables are household size, being a widow, primary education, cooperative, other sectors of employment, migration status, being formally employed, credit availability, and land size.

The fact that human capital element (maximum level of education attained), was found significant mean that government and/or policy makers should use the instrument to reduce poverty. The government should invest more in education as a way of reducing poverty. Land area cultivated is another important factor to consider when looking at ways of reducing poverty. Since this variable is significant, the government should increase the land area cultivated through distributing land to the poor so as to increase asset owned or controlled by the poor.

Policy makers should give emphasis to employment creation as a way of reducing poverty because findings from this study show that formal employment is important and has the great impact on poverty. There are three areas where the government has a comparative advantage in the quest to create employment, namely the regulatory environment, investment policies, and the creation of local level alliances.

Employment-intensive investment policies can be used to re-direct already allocated resources for a stronger impact on job creation. The government can create new jobs by adopting methods, which, at the margin, are both cost-effective and labour-intensive, while at the same time yielding high quality results.

Since health status, remittance status, livestock ownership, being separated and having attended secondary education are insignificant in determining poverty in this study we would recommend that the government place less emphasis on these issues and concentrate more on the important determinants such as expanding employment sectors.

Since operating secondary business is important in determining poverty it is recommended that the government
promote them. Providing loan facilities to the people who need to start their own secondary business can do this. The corporate world should also offer loans at affordable interest rates so that the poor can access the loans and start their business.

REFERENCES


