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THE DETERMINANTS OF RURAL HOUSEHOLD SAVINGS
IN KISUMU DISTRICT: A CASE STUDY OF
SOUTH NYAKACH LOCATION

BY

AMBROSE RAMSON MWAMBA OGANGO

DEPARTMENT OF ECONOMICS

KENYATTA UNIVERSITY

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DECLARATION

This research paper is my original work and has not been presented for a degree in any other university.

MR. Ogango

AMBROSE R.M. OGANGO
ECONOMICS DEPARTMENT
KENYATTA UNIVERSITY

This research paper has been submitted for examination with our approval as university supervisors.

Dr. Pius Owino 6/2/96

DR. PIUS OWINO

LECTURER
ECONOMICS DEPARTMENT
KENYATTA UNIVERSITY

Mr. Almadi Obere 6/2/96

MR. ALMADI OBERE

CHAIRMAN
ECONOMICS DEPARTMENT
KENYATTA UNIVERSITY

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Ambrose R.M. Ogango

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LIST OF ABBREVIATIONS

- APS - Average Propensity to Save
- CBS - Central Bureau of Statistics
- GDI - Gross Domestic Investment
- GDP - Gross Domestic Product
- GDS - Gross Domestic Saving
- MPC - Marginal Propensity to Consume
- MPS - Marginal Propensity to Save
- NGO - Non Governmental Organization
- ROSCA - Rotating Saving and Credit Association

ABSTRACT

Savings play a very important role in economic development as it involves mobilization of resources, which is consequently invested with an aim to accelerate the growth process. Understanding the savings behaviour is therefore critical in formulating policy measures. As a result, the study has investigated the determinants of rural household savings behaviour.

Both primary and secondary data were collected and fitted into a multiple linear regression model. Questionnaires were administered to the randomly selected households. Econometric tools were then used to analyze the data collected.

The results show that income is the most significant determinant of savings. Other significant determinants include dependency, age, and education. The results also indicate a widespread existence of informal savings groups, which in contrast reveal a loose association with savings.

Based on the empirical findings, the study recommends among others the following:

- a) that to increase savings, dependency level should be reduced through the enhancement of family planning measures.

- b) that the informal savings and credit groupings be strengthened through some form of education and credit assistance, so that they can be able to undertake economic activities.
- c) that programmes on the virtues of savings be included in the existing awareness and public education programmes.
- d) that income generating activities and self-employment be encouraged as they contribute more to savings than the wage employment.
- e) that effective ways of availing savings and credit facilities, particularly banks and cooperative societies, to the rural areas be designed.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Countries strive to mobilize resources both internally and externally to finance their investment needs. The major sources through which this can be achieved includes savings, taxation, fines, public borrowing and foreign assistance.

As noted by Jhingan (1992), savings play an important role in economic development as it calls for resource mobilization through curtailing consumption expenditure and augmenting available savings for an accelerated investment in the community. It is a policy instrument critical to planning purposes in most economies as also recognized in Kenya Government's current Development Plan, 1994 - 1996, whose theme is "resource mobilization for sustainable development". The principle means by which sustainable development can be achieved is resource mobilization. One source of resource mobilization is savings which is the major focus of this paper.

In spite of the significance of savings in national development, existing studies have tended to ignore the determinants of rural household savings behaviour. The major objective of this study is therefore to bridge this gap.

1.2 Statement of the Problem

Savings trend in Kenya has not been steady for the last two decades. Gross Domestic Savings (GDS) as a percentage of Gross Domestic Product (GDP) has been varying between 13.5% & 27.0% with Gross Domestic Investments (GDI) being between 16.1% to 29.8% in 1970-1993 (See Appendix I). Except for 1976, 1977, 1986, 1992 & 1993 GDS had been below GDI. It suggests in part that resources accumulated locally was not able to meet the country's investment needs. Investments was thus financed by domestic savings through budget deficits and perhaps this explains why the Government was a dissaver by running large deficits in the 1980s. Worse, public sector investments were largely supported by foreign savings like programme loans and grants (Development Plan, 1994-1996).

As can be seen, there seems to exist a resource gap of low savings in the economy (refer to appendix I). This calls for an indepth understanding of the savings behaviour. The study attempts to bridge the gap by investigating the determinants of savings in Kisumu District.

Many studies analyzing the savings behaviour have tended to concentrate on the use of macro data which may be subject to serious limitations. First, the use of aggregate data derived from National Product Accounts is subject to wide margins and error as noted by Mikesell and Zinser (1973).

Secondly, using total savings data leaves one unsure of whether the results actually reflect household saving behaviour (Klaus et al 1991). As also pointed out by Gupta (1970), a study of urban and rural household sectors together is likely to introduce serious aggregation bias since they respond to different factors or respond differently to the same set of factors. Different behavioural patterns between the rural and urban household sector make such an analysis achieve reliable results if the sectors are disaggregated into business, urban household and rural household sectors savings.

In particular, those studies relating to Kenya have not only used macro data as Kagira (1988) whose limitation has been pointed out but also concentrated their analysis in urban areas as Lillydahl (1976), neglecting the rural areas. These limitations provide the central thrust of this study. Generally there are many factors including age, family structure, education and accessibility to savings facilities that macro studies tend to neglect yet they influence the saving behaviour. This paper therefore attempts a microeconomic study on the household saving behaviour.

Unlike previous studies, our investigation was based on the use of micro data to overcome the limitations experienced in using aggregate data. Secondly, the study is rural based - a sector that has so far been neglected by the previous studies especially those relating to Kenya like Jorgensen (1968) and Lillydahl (1976).

1.3 Objectives of the Study

The overall objective of this study was to analyze the factors that influence rural household savings in Kisumu District and, on the basis of this analysis, consider what changes are necessary to encourage savings amongst rural households. More specifically the sub-objectives were;

- a) To investigate the factors affecting rural household savings.
- b) To determine the motives behind the decision by the household head to save.

1.4 Importance of the Study

Savings is a major source of investment finance as it enhances economic growth in any country. This study therefore was significant for various reasons.

First, the study was micro oriented and used primary data unlike past studies as of Kagira (1988), Klaus et al (1991) that used macro or aggregated data which may be prone to many aggregation errors and assumes similar savings behavioural patterns in both rural and urban areas.

Secondly, previous studies (Jorgensen 1968, Lillydahl 1976) tended to concentrate their analysis in the urban areas either because

data on rural areas is not readily available and that the cost of collecting it could be immense or that the government development initiatives in the past like industrialization have been more in favour of the urban centres. The study considered the rural sector despite encountering some difficulties¹

Thirdly, the study may provide useful information to policy makers on various explanatory variables that may be targeted for policy changes in order to encourage savings in the rural households.

1.5 The Study Site

The choice of Kisumu District for the study was based on the following reasons. First is its familiarity. The researcher knows the district well and has previously conducted some surveys in the district. Being well conversant with the area, minimal problems were encountered. Communication in general was not a barrier.

Second, the district is fairly well endowed with economic activities like fisheries, farming and irrigation, tourist attractions and some industries. Coupled with other resource avenues like salaries, wages and business earnings, these provided a wide source of resource mobilization and hence savings.

Third, the district (Kisumu) is among the highly populated districts in Kenya and therefore the influence of population

(captured by the dependency variable) on savings is most likely to present a true picture of other districts.

1.6 Organization of the paper

The rest of the paper is organized as follows. Chapter two presents the literature review from past studies. The model used in the analysis is developed in chapter three, while in chapter four information on data collection, analysis and definition and measurement of variables is provided. Chapter five discusses the study results, particularly how the independent variables influence savings. The paper is concluded in chapter six, where policy recommendations are prescribed.

CHAPTER TWO

2.0 LITERATURE REVIEW

In this section previous studies on savings are reviewed in line with the research problem and objective. The section is divided into two parts. Part one discusses the determinants of savings with particular reference to developing countries including Kenya. Part two analyses the motives behind the households' decision to save.

2.1 Determinants of Savings in Developing Countries

2.1.1 Saving and income

Many of the studies on saving and income have commonly used the simple Keynesian and permanent income functions to estimate the relationship between saving and income. Johnson and Chiu (1968), in a macro study of the relationship between private savings and income, estimated simple Keynesian equation for a sample of 30 countries - developed and underdeveloped. The results showed that income was a significant determinant of savings and it had a positive coefficient.

Gupta (1970), in a study to examine the household saving behaviour in India ran regression equations for the urban and rural sectors separately. His study was based on an annual time series data

between 1950-1966 obtained from India Reserve Bank. He defined both income and savings in real per capita terms and estimated the simple keynesian function, $S/N = a + b Y/N$, and the permanent income hypothesis, where S/Y is per capita savings and Y/N is per capita income. The former was found to fit the rural sector well and gave a measure of good fit of 91% compared to 49% for the urban sector. The latter function improved the results and the coefficient of determination for the rural and urban sectors rose to 94% and 66% respectively. Income coefficient was positive and significant in both equations.

Using same models in a study of urban and rural household saving behaviour in China, Qian (1988) confirmed Gupta's results. Both studies portray substantial difference in the saving behaviour between the sectors, yet they make contradictory conclusions. Unlike Gupta, Qian finds a high propensity to save in the rural sector. This may be attributed to the varying definitions of income used in the study. Gupta used per capita income which was highest in urban India while Qian used current income which was highest in rural China.

In a similar study, Mikesell and Zinser (1973), using data from Latin American countries, reached the same conclusions despite going further to test the loglinear savings model of the nature

$$\ln S = C_0 + C_1 \ln Y_g,$$

where $\ln S$ is Log of savings and $\ln Y_g$ is Log income growth.

Using a similar model, Pickersgill (1976) investigated the determinants of Soviet household saving behaviour. She used data on real per capita savings and disposable income for 1955-1971. Her estimates for the simple linear model showed a good fit of 86% with a positive marginal propensity to save (MPS). Results of the permanent income hypothesis were not any different, while the intercept term was negative and significant, implying that MPS was greater than average propensity to save (APS).

Unlike the above studies, Klaus et al (1991) extended the linear savings function to include not only per capita disposable income but also its growth and deviation from trend as separate variables. He sampled 10 countries namely Botswana, Colombia, Ecuador, Honduras, Korea, Philippines, Paraguay, Thailand, South Africa and Taiwan in a study of household saving behaviour. Using time series data for the period 1970-1985, they found all the income variables to have positive effect on savings with the per capita disposable income being the most significant.

The study to investigate the measure of private savings in Mexico by Arrau and Oks (1992) was prompted by a sharp decline in the private savings level between 1980-1990. The findings revealed that the decline was caused primarily by a fall in disposable income and a fast growing consumption. Disposable income was noted to have been fluctuating in the 1980s. This supports the view that savings and income are positively related.

Elbadawi and Majd (1993) studied the savings stability in Bahrain. They wanted to establish an optimal savings rate that would sustain the economy in the event of oil depletion. In their observations, private savings rate increased during boom periods and declined in slump i.e in the 1981/82 recession, ratio of private saving to GDP was at its lowest (29%) while between 1983-1988 when the economy was expanding it was about 35%. This supports the view of a positive relationship between savings and income growth.

From the preceding literature review, there seems to be a general consensus that savings and income are positively related. Various studies using different models, data and sample sizes as already shown, confirm this view. A deviation from this finding therefore will contradict theory.

2.1.2 Saving and wealth

Whereas income refers to earnings realized from services offered or goods sold, wealth is the value/worth of assets that individuals own eg land. In this subsection we shall review studies on the effects of wealth on savings.

According to economic theory, wealth affects household savings but many studies on the relationship between savings and wealth have been hampered by the problem of definition and measurement. Proxy variables are often used but their movement frequently reflects the

influence of other variables besides wealth. Also income and wealth are highly correlated, causing estimation problems.

Equating wealth to land ownership, Kelly and Williamson (1967) ran a simple regression for the Indonesian farmers in their study of the household saving behaviour. Both MPS and APS tended to rise with greater land ownership and thus supporting a positive relationship between savings and wealth.

Yusuf and Peters (1984) proxied wealth by financial assets in the study of the Korean saving behaviour but found it to be insignificant. Similar proxy was used by Corbo and Hebbel (1991) in a study of the influence of public policies and savings in LDCs. Even though the proxy variable (monetary asset) became significant unlike in the case of Yusuf and Peters, it had a negative impact on private savings in Latin America.

Combining monetary and financial assets as a proxy to wealth, Klaus et al (1991) found the same results as Corbo and Hebbel. Their argument was that such assets limit households dependence on current income sources, and whenever there is a sudden decline in income, households will draw from their assets. Thus holding a high stock of assets over a business cycle allows the household to maintain a high consumption rate and therefore save less.

2.1.3 Saving and dependency

Dependency is the most commonly used demographic variable in studies involving household savings. It is defined differently from country to country. It is postulated that a high dependency ratio would mean increased household expenditure. This cuts more into the resources that would have otherwise been saved, and as a result reducing possible savings.

In his study, Leff (1969) tested the hypothesis that high dependency rate leads to low savings. He defined it as a ratio of those below 14 and above 65 years of age to the total population. He used a multivariate regression analysis with the dependent variables being per capita savings and aggregate domestic savings ratio. He estimated loglinear equations using data from 74 countries and the results indicated that dependency ratios were statistically distinct and quantitatively an important determinant of savings. Per capita saving was most significant with R^2 of 94%. Pickersgill (1976), also found dependency to be inversely related to savings in a study of the Soviet household saving.

Klaus et al (1991) study defined dependency ratio as the share of the people below age 15 and above 65 years to total population. They argued that older people work less and at least partially live off their savings while households with more children at home are thought to save less because they would defer saving for retirement

until the children moved out. The results of this study were mixed and the dependency ratio was found to possess widely varying effects unlike Leff's results. This could be attributed to the differences in model specification.

2.1.4 Saving and age

The analysis of savings and age is better explained in reference to the life cycle hypothesis. By this hypothesis individuals will be net borrowers in their early years of life, net savers in the middle years and net dissavers in late years (Branson 1989). It is built on the assumption that a typical individual is mainly active economically in the middle ages and that in early ages he depends on others to live while at late ages he is assumed to be retired.

Implicit in this argument is that at early and late ages one does not work and has no income. Instead he dissaves by borrowing from others or consumes part of the already saved resources. Pickersgill (1976) supports the life cycle theory and asserts that savings is influenced by the age distribution of the household. The theory is criticized for its inability to define the definite ages and for its extremist assumption that after retirement one cannot save.

On the other hand, we expect from theory that savings and age are positively related. It stems from the fact that one's thriftiness increases with age. However, beyond some limit (defined in this

study as the retirement age - 55 years old), the individual becomes less thrift and hence is expected to save less or even dissave, going by the life cycle theory.

2.1.5 Saving and education

Education may be related to saving both directly and indirectly. Directly in the sense that investment in human capital can be classified as a form of resource accumulation which is expected to create future returns through some multiplier effect and indirectly because education may influence expected future income and hence present consumption behaviour. Higher education in many developing countries are associated with high paying jobs. If the saving - income hypothesis is true, then an educated man/woman would be expected to save more.

It is also recognized that education increases ones awareness about the surrounding and investment opportunities as an example. This can influence those educated to save more. Kelly & Williamson (1967), considered it to be a potential determinant of savings but could not conduct an econometric analysis due to lack of data.

2.1.6 Saving and bank distance

Save for the studies of Kagira (1988) and Kariuki (1993), no studies on savings were found to have incorporated the bank

intermediation in their analysis. In spite of this, it is generally agreed that expansion of bank branches within a region would be a bold step towards savings mobilization. This is because depositors would take the advantage of the facilities offered near them.

2.1.7 Saving and employment status

Kelly & Williamson (1967), in a study of household saving behaviour in Jogjakarta, Indonesia, (1958-1959) examined the impacts of occupation and sources of earnings on savings. They used a sample size of 490 households, divided into 6 occupational groups namely, farmers (296), traders & craftsmen (35), owners of business (33), Government employment (43), other wage earners (47) and unclassified occupations (36). For each of the groups they regressed a simple Keynesian function defined by per capita saving and per capita income and the following results were achieved. In all cases the income coefficient was positive while the intercept term was negative. This implies that $MPS > APS$ as earlier shown by Pickersgill (1976) study. All the estimated coefficients were significant at the 99% level with a goodness of fit of 0.081, 0.619, 0.442, 0.239, 0.170 and 0.113 respectively. It can therefore be observed that businesslike occupations are likely to contribute more to savings than occupations defined by wage employment.

In another study, Williamson (1968), attempted a comparative evaluation of some of the determinants of aggregate personal

savings in Asia. The countries he considered included Korea, Japan, Malaysia, Vietnam, China and Philippines. He defined employment status using sources of income namely salaries and wages, non labour incomes (property and entrepreneurial income) and net farm incomes. Obtaining data from the United Nation Yearbook of National Accounts Statistics, he lagged them by one period. His results indicated that MPS for all the countries were quite substantial with a negative but significant intercept. Furthermore, the coefficient attached to non-labour income in all the tests far exceeded that of labour income. This supports the view that employment defined by businesslike activities have a higher propensity to save than the salaried employments.

Similarly Gupta (1970), made a follow up of Williamson's study. In his case he was only specific to India because Williamson had no adequate data for India to warrant a concrete analysis. Gupta collected data on India from the India Reserve Bank. Using same equation as Williamson, Gupta confirmed that the MPS for the non wage earners is higher than that of the wage earners and that functional distribution of income improves considerably the explanatory power of the savings function.

2.1.8 Saving and interest rate

According to economic theory, interest rates is expected to influence savings positively. The argument that may be advanced is

that economic agents will forgo current consumption in favour of future high returns on their deposits with savings institutions. However, empirical evidence reveals contradictory results.

Studies as of Gupta (1970), Mackinnon (1973), Shaw (1973), Brown (1973), Boskin (1978), McDonald (1983), Summers (1982), Yusuf and Peters (1984), Leite & Makonnen (1986), and Rossi (1988), have shown that savings and interest rate are positively related.

In his study of the personal savings in India, Gupta observed that higher prices and direct taxes tended to discourage real saving. Still in another Indian study using time series data for rural and urban household saving behaviour for 1950-1966, he identified several interest rates. For the urban sector many interest rates were tested and the commercial bank saving deposit rate was found to give good results. The goodness of fit was estimated at 67%. For the rural sector, the relevant interest rate was that of post office saving deposits which gave an impressive R^2 of about 94%. Savings responded positively to interest rate in both sectors. The view is also held by Mackinnon and Shaw.

Brown arrived at similar results for the Korean data at 1% level. This was expected because only the long term time and deposit interest rates was used. Yusuf & Peters also conducted a similar study in Korea and reached the same conclusions.

Boskin on the other hand, using United States of America time series data between 1929-1969 tested the effect of interest rates and taxation on savings. Both his estimates for the loglinear and semilog equations yielded identical results. Interest elasticity of savings was substantial at 0.4. McDonald's findings also showed the interest elasticity to cluster at around 0.2 for a sample of twelve Latin American countries studied. The finding was confirmed by Summers in a study of tax rate policy and Leite & Makonnen, whom found interest rates to influence savings positively.

In a related but more diversified study, Rossi collected data for 49 LDCs over the period 1973-1983 to test the relationship between rate of growth of consumption and expected real interest rates. From his results, the relationship was positive and in line with theory. The strength of the relationship however, was such that increases in the real rate of return were less likely to elicit substantial increases in savings, especially in low income developing countries.

Other studies as of Williamson (1979) and Giovannini (1985) found the relationship between savings and interest rate to be negative. Whereas Williamson used Korean time series data between 1973-1976, his results contradicted Brown's. This may be attributed to Brown's use of only the long term time and deposit interest rates. Similarly, Giovannini used time series data from seven Asian countries to test the positive savings and interest rate

relationship. He used a non linear model and even his findings were statistically significant, the real interest rate was inversely related to savings thus disapproving his hypothesis.

Still in an earlier study to investigate the determinants of savings in developing countries using intertemporal cross section data from some six Asian countries, Williamson (1968) found mixed results. Three of the regressions revealed a negative link with the remaining three showing a positive link.

Based on this review, the direction that interest rate will take in determining savings remains unclear. Otherwise going by theory, interest rate will influence savings positively.

2.1.9 Savings and exports

Not many studies on savings in developing countries include exports earnings as an explanatory variable. A possible reason for this is that exports (majorly from primary raw materials) contributes little to GDP. In fact at times net exports is negative implying poor terms of trade. Despite this, studies have shown exports and savings to be positively related.

Maizels (1968) study using data for 11 countries and running individual regressions tested the hypothesis of a positive link between savings and exports. His results indicated that export

earnings in eight of the eleven countries, were positive and significant. Treating Maizels sample to be small, Lee (1971), tested the same hypothesis with a sample of twenty LDCs and eight DCs. He collected data for 15 years from United Nations Yearbook of National Accounts Statistics. The export variable was found to be significant with an average goodness of fit being about 82%. The equation fitted well the DCs than the LDCs with the Australian and Japanese exports being singled out as more responsive to GDS.

Similarly Weisskoff (1972), in a study of the impact of foreign capital on domestic savings, found the export coefficient to be positive. In Yusuf and Peters (1984) analysis, an expanding export sector had a high propensity to save. Higher exports increases taxation which then boosts domestic savings.

2.1.10 Saving and taxation

Increased taxation in any economy would increase government revenue and so is expected to increase domestic savings. Contrary, as reported in Mikesell and Zinser (1973) study, Landau found that an increase in tax rate has a negative effect on aggregate saving ratio. Besides, Krishnamurty (1968) study found marginal tax rate to have no effect on MPS, though it reduces the households' MPC.

In a different study to establish the effects of public policies in raising savings in developing countries, Corbo and Hebbel (1991)

estimated consumption functions of 13 countries using time series and panel data. From their findings, national savings could either be increased through reducing government expenditure or increasing government revenue by a way of taxation. In this case taxation appears to have a positive relationship with savings.

2.1.11 Savings and foreign capital inflow

Majority of developing countries depend on foreign capital inflow to augment their domestic resources in the process of development. This dependence leads to large amounts of resources flowing back to foreign donors in form of debt servicing. Studies as of Chenery and Strout (1966), Leff (1968), Weisskoff (1972), Papanek (1972), Williamson (1979), Yusuf & Peters (1984), Klaus et al (1991) have found a negative link between savings and foreign capital inflow.

The hypothesis of a negative relationship was first put forward by Haavelmo in 1965 and has since then been tested by many researchers. In a theoretical analysis Chenery and Strout found a negative relationship even though they were able to show a positive secondary impact of foreign capital inflow in capacity growth.

Leff tested the hypothesis based on the Brazilian experience. He found it to be inverse and statistically insignificant on domestic savings and concluded that any programme of sustained expansion of the Brazilian economy financed by foreign borrowing will

substantially weaken the domestic saving efforts. This view was shared by Weisskoff who pooled data for 17 countries.

Papanek found similar results but with a different explanation. He tested the hypothesis using 1960s data for 51 developing countries. He observed that foreign capital inflow in majority of LDCs is caused by third factors like wars and poor weather conditions leading to low agricultural output. These initially "eat" on the domestic savings before resorting to foreign borrowing. As long as these undesirable events continue, then the inverse relationship sheds little light on the causal relationship.

In his study to investigate the reasons behind Korean low private domestic savings during a period of rapid accumulation (1972-1976), Williamson identified foreign capital inflow which was on the increase during this time. This suggests an inverse relationship between the inflow and savings. Yusuf and Peters study on savings and resource mobilization in Korea revealed similar results. The findings were further confirmed by Klaus et al.

Gupta (1970) challenged the validity of the Haavelmo's hypothesis. He used a fairly larger sample of 50 countries and found virtually no effect on domestic savings in LDCs. One can thus conclude that the results on the empirical analysis shall depend on the sample and the model specification employed.

2.1.12 Saving and inflation

From theory, the effect of inflation on savings is unclear. High inflation for instance creates uncertainty about the future economic variables e.g. incomes and real rates of return. This will either encourage savings for precautionary motive or discourage it due to substitution effect on the lower effective rate of return.

Leff (1968), in a study of the Brazilian experience with marginal interest rates found inflation to be inversely related to savings. The coefficient was statistically significant. Similar results were obtained by Brown (1973) and Klaus et al (1991).

Other studies (Lahiri 1988), divide inflation into expected and realized components as separate variables. In his sample of Asian countries, Lahiri found mixed results for the 8 separate country regressions using a simple savings function. This therefore supports the view of sign ambiguity of inflation rate on savings.

Specific to Kenya, Lillydahl (1976) studied the economic and demographic influences on household saving in urban Kenya. The variables she considered included income, wealth, household size, age, family structure, tribal affiliation, education and number of earners in the household. She obtained data from the 1968/69 Kenya Urban Household Budget Survey. In her findings income was by far the most significant determinant of urban household saving. It was

an increasing but non linear function of income. She tested the age variable by the life cycle hypothesis. This was found inapplicable to the Kenyan urban situation. Contrary to earlier findings about dependency ratio, Lillydahl found the impact of children on savings and consumption not significant. What she noticed to be influencing savings inversely was the extended family institution. Hence she concluded that attempts to alter family size, improve literacy and promote urbanization will not significantly affect the level of household savings directly. The factors however may indirectly have impacts on savings through their influence on household income. The study however did not incorporate other variables like the bank distance, membership of ROSCAs, interest rate and employment status. It did not also focus the rural setting.

Vandermoortele and Hoeven (1982) conducted a study whose objective was to reveal systematic tendencies in the urban and rural household savings behaviour. The MPS was estimated using an extended linear expenditure model. For the urban households, 1977 Urban Food Purchasing Survey data was used, while for the rural households, data used came from 1974-1975 Integrated Rural Savings. The study found similarities between urban and rural household savings. The "rich" in both cases had a higher APS than the poor households. Distinctions between the two sectors saving behaviour was also identified. APS declined with family size in the urban areas but in the rural areas it increased. APS also increased with occupational status and education level in urban households. This

can be supported by the correlation between these variables and total household income. On the contrary the rural household survey gave a mixed picture of the impact of occupational status and education on household income. The MPS for the urban households ranged between 0.081 for the unskilled workers to 0.467 for the skilled, while for the rural household it went as high as 0.835 for the unskilled agricultural workers. Therefore they concluded that rural areas are an important source of household saving in Kenya. Since different sets of data were used for the rural and urban sectors, it is not in order to compare the consequent results for the sectors because they have no common base.

In a summary of the main findings of the 1981/82 Rural Household Budget Survey, the Kenya Economic Survey (1988) found rural savings to have an APS of 36.6% and this varied from district to district. This further supports the potentiality of savings in rural areas. The APS was found to significantly increase with income as expected from economic literature. Fitting a semilog regression model, a 10% increase in income was associated with a 3.34% increase in the APS. Therefore programmes intended to boost rural incomes should have a positive impact on rural savings.

Kagira (1988) did an empirical study to identify the determinants of private savings in Kenya. He defined private savings to include household and business savings. Other variables included were income, exports, foreign inflow, dependency, bank intermediation,

taxation and interest rate. He applied time series data and estimated linearized equations. He obtained a positive coefficient for current and permanent income and a negative one for transitory income. This means that transitory income is consumed hence depressing savings. Contrary to his hypothesis, the export variable turned out to be negative and taxation positive. Another unexpected result was the dependency ratio that gave a positive sign. Foreign inflow had mixed results. It was positive in two equations and negative in one. Bank distance coefficient had also a negative sign and so does interest rate. Kagira's study however did not include other explanatory variables as age, membership of ROSCAs, employment status and education. It also treated the determinants of household and business savings to be the same.

A study of interest rates and saving mobilization was conducted in Kenya by Mwega et al (1990). The objective of this study was to test the hypothesis that interest rate has a significant positive effect on financial and non financial saving in Kenya. An extended linear regression was used to test the responsiveness of private saving rate to real deposit rates on 1966-1985 annual data derived from the International Financial Statistics Yearbook. The coefficient was -0.295 with a t-statistic of 0.235 . They thus concluded that real deposit rate has an insignificant impact on the real saving rate in Kenya and disapproved the hypothesis.

In another development, Mwega (1991) carried out a study on the mobilization of domestic saving in Kenya. His objective was to investigate the potential and constraints that Kenya faces in the mobilization of household, business and public savings and the scope of the financial and capital markets in the country to efficiently allocate the mobilized savings to investment. Although a substantial aspect of Mwega's study is irrelevant to the current paper, contribution on interest rate is vital. Unlike the former study, this study found the effect of real interest rate to be mixed and therefore ambiguous as depicted by theory. This can be explained by the fact that the former study used only real deposit rate and the latter used several interest rates.

More recently, Kariuki (1993) conducted a study on interest rate liberalization and the allocative efficiency of credit in Kenya. Of special relevance to this paper was her analysis of the non economic factors determining savings, especially the bank intermediation factor. Among others, she argues in favour of branch proximity as a potential factor in raising saving ratios. This is based on the explanation that an expanded bank branch network can increase the catchment area and encourage savings in formal institutions due to reduced transaction, travel and opportunity costs involved in general. However, she cautions on the inadequacy of only branch expansion without bank adjustments to local conditions and easing of the transaction modalities.

2.2 Motives for Savings

Kamau (1973) conducted a study on the effects of Kenyanization on personal savings. He investigated the motives behind savings by Europeans, Asians and Africans. It was noted that Asians were particularly instrumental in saving for investment and educational purposes while Europeans saved for use at old age. The Africans on the other hand saved to be able to consume high value consumer goods and educate their children. In combining the three groups in a descriptive analysis, the majority of the respondents prioritized children education motive above all others, followed by a better future for family motive and savings for emergencies. 27.9% of the respondents saved for children education, 15.7% for better future for family and 13.6% for emergencies. Others were investment motive (11.4%), provision for old age (5.8%), purchase and development of farm land (5.8%), supporting relatives (4.3%) and marriage (1.4%).

In her study, Lillydahl (1976) reviewed Hubner's findings on the motives for private savings in Uganda. In his descriptive analysis, Hubner found out that 35% of the respondents saved for children education, 20% to provide for old age, 17.0% for household investment, 14.0% for emergencies and 10% to support relatives. The saving motive to purchase high grade consumer goods received less attention in this study. From the two studies, it can be observed that most households save for children's education as a priority.

Boskin (1978) on the other hand mentions two motives for household savings in United States. In his theoretical analysis, households save so as to smoothen their consumption over the life cycle and for bequests. The first motive includes saving for old age and purchase of valuable consumer goods, while the second encompasses provision for education as well as pure financial assets.

In the study of urban and rural household saving in China, Qian (1988) also analyzed the motives for savings between the two sectors. The urban Chinese had a strong desire for consumer durables (TVs, washing machines, refrigerators etc). They do not save for housing since houses are provided for by the employment unit. Even saving for retirement was minimal because the state had a welfare scheme that provided for pension of between 60% to 100% of the retired worker's final wage. Saving for marriage also was uncommon. For the rural sector, saving for housing and pension funds was significant. This was due to the rural economy where incomes were unstable due to uncertainty in farming as weather conditions etc. He concluded that savings for consumer durables played a major role in urban areas while saving for housing and pensions were the main motives for the rural households.

Studies as of Kanogo (1978) and Kariuki (1993) have touched on the saving outlets that is common in rural areas. They emphasize on the prevalence of informal institutions like rotating savings and credit associations (ROSCAs) than formal institutions like the

banks. Kanogo's study was based on a sample of 74 traders randomly selected in a market in Karatina town, Nyeri District. He wanted to investigate the operations of the informal financial markets in Kenya. Of relevance to this study, he found that 60% of the traders were members of ROSCAs with many belonging to more than one at a time. Members were making equal contributions and the lump-sum accumulation was distributed to them in turn. The ROSCAs were interest free with a very minimal default rate of 1 to 2 members out of 40. 89% of the members were women who mostly used the funds generated for investments and/or children education motives.

Kariuki refers to these informal savings institutions as mutual savings groups. It comprises ROSCAs, credit unions, savings clubs, self-help organizations and family and community associations. In savings mobilization, she argues that the ROSCAs are the most widespread in developing countries and that their operations vary from country to country. Like Kanogo, she agrees that in ROSCAs, participants contribute a fixed amount of funds to a common pool which is then given to each member in turn. Her study was based in Kenya. It therefore appears that the popularity of ROSCAs emanate from the close ties within the group, minimal administrative formalities and simple rules and procedures that govern it.

It can be noted from the already reviewed literature that the determinants of rural household savings behaviour are not adequately covered. This is because many studies have tended to

CHAPTER THREE

3.0 MODELLING

3.1 Analytical Framework

This section presents a theoretical approach to the analysis of the rural household savings behaviour. It involves developing a model that would help demonstrate the responsiveness of certain key variables that influence household savings. These variables include among others, household income, number of dependents, age of household head, education level, employment status, bank distance, interest rates, membership of ROSCAs and savings motives².

3.1.1 Income

From economic theory, income and savings move in the same direction. It is expected that as income level rises, savings level also rises. The MPS therefore is positive. It is evident from the literature review that most studies eg Gupta (1970), Qian (1988), Kagira (1988) have used the simple Keynesian model to estimate the savings function. The function is found to fit quite well in explaining the variations in savings due to changes in income. Hence it is further expected that income will influence savings positively.

3.1.2 Dependency

Households with more children at home are normally assumed to save less because they currently spend more on consumption. Such households would also tend to have a lower per capita savings (defined by the absolute savings level divided by the number of dependents or family size). Dependency is not limited to children alone, but also the economically unproductive like the unemployed, not to mention the old persons, defined by the life cycle theory as the retired. They live on borrowing/past savings and thus dissave.

Many dependents in the household may increase present consumption at the expense of savings. Thus, the coefficient of the dependency variable on household savings is expected to have a negative sign.

3.1.3 Age

The life cycle hypothesis by Ando and Modigliani explains the relationship between savings and age. An individual will plan his consumption - savings pattern in a way that net savings over the lifetime are zero. It postulates that the typical individual has an income stream that is relatively low at the beginning and the end of his life. The theory suggests that the individual will be a net borrower in his early years of life, a net saver in his middle years to pay for debts and provide for retirement and a net dissaver in his late years (Branson 1989). Because of the cross

sectional nature of this study, the life cycle theory is to be tested using two age distributions namely the middle and the old. The old is defined by the retirement age, 55 years and above while those below 55 years will fall in the middle age group.

3.1.4 Education

Education imparts knowledge, ability and develops the character and mental powers of human beings. It is argued that an educated mind is likely to be enlightened on the virtues of savings and hence individuals with more years of schooling will relatively save more compared to those with no or few years of schooling. Expenditures on education and training is seen by economists (Meier 1991) to contribute to productivity by raising the quality of the population and yielding a continuing return to economic growth in future. Indeed it is observed that higher levels of education are associated with higher levels of earnings, and with "big" earnings, one is expected to save more. The expectation therefore is that savings is an increasing function of the education level.

3.1.5 Bank distance

Proximity to saving institutions particularly the bank branches is expected to encourage savings with the formal institutions because according to Kariuki (1993), the transaction costs of acquiring deposits are reduced in terms of travel and opportunity cost of the

time to get to the banks. However, successful application of this argument depends on an enlightened population. "Ceteris paribus", bank distance is expected to influence savings negatively under the assumption that the households would take advantage of the bank facilities offered at/near their door steps effectively.

3.1.6 Employment Status

Employment status here refers to the source of earnings of the household. From the review it is expected that the non-wage earners will save more compared to the wage earners. Hence the MPS for those in non-labour (non-wage) employment is anticipated to be greater than those in the labour (wage) employment. This is based on the observation that wages tend to be low and are received once in a month compared to non-wage earnings which may be higher and more frequent.

3.1.7 Interest Rate

From empirical evidence, the final impact of interest rates on savings is conflicting because of income and substitution effects. Whereas the substitution effect encourages savings following a rise in interest rate, the income effect encourages consumption and thus limits the amount available for savings. Empirical evidence has shown conflicting results. Some studies (Gupta 1970, Mackinnon 1973, Shaw 1973) support the significant positive interest

elasticity of savings while others as Rossi (1988), Mwega et al (1990) and Klaus et al (1991) do not. However, theory postulates a positive relationship between savings and interest rate, since by saving, an individual forgoes present consumption and expects higher returns on savings in future. The study therefore predicts a positive relationship that is in line with theory.

3.1.8 ROSCA membership and motives for saving

From the literature review ROSCAs would be expected to be dominant in the rural areas and thus greatly mobilize savings amongst the households. On the other hand, the education motive for savings, would be expected to be the predominant motive for savings in the households decision to save.

3.2 Model Specification

The study postulates a relationship between household savings and its determinants which include among others income, dependency, age, education, bank distance, employment status, interest rate and ROSCA membership. Therefore the general specification for the household savings function, based on the discussion of the previous section, is the following;

$$S = f (Y, D, A_g, E, B, E_s, R, R_m);$$

Where,

S = Household savings, Y = Household income,
 D = Number of dependents, A_g = Age of household head,
 E = Education level of household head, R = Interest rate,
 B = Bank distance, E_s = Employment status.
 R_m = Rotating savings and credit association membership,

The function will be estimated using a multiple linear regression model. The model is used also by the previous studies reviewed like Kagira (1988) and Klaus et al (1991). These studies find the model suitable for such analysis as it may yield dependable results. The model is not complicated and the effects of the determinants of savings may easily be read and understood at a glance. The model can also accommodate many explanatory variables and this has the advantage of reducing the stochastic error and hence the residual variance. Conversely many variables in the model reduces the degrees of freedom, making the results not precise.

To solve the precision problem, the researcher has ensured a data set with sufficient independent observations to increase the degrees of freedom so that the estimates become precise. More specifically the model will be of the form,

$$S_i = a_0 + a_1Y + a_2D + a_3A_g + a_4E + a_5B + a_6E_s + a_7R + a_8R_m + U_i$$

Where U_i = Stochastic error
 a_s = Coefficients

3.3 Hypothesis

Seven related hypotheses will underpin this study and these are,

- 3.2.1 Savings varies positively with income. A rise in household income increases savings.
- 3.2.2 Large number of dependants in the household will have a negative influence on savings.
- 3.2.3 The life cycle hypothesis will apply to rural household saving behaviour.
- 3.2.4 Savings will positively vary with the number of years spent schooling.
- 3.2.5 Improved accessibility to banking institutions encourages savings i.e the nearer the banking facility the higher the probability to save.
- 3.2.6 Education of children rather than other motives as old age security, business investments etc plays the most significant role in the household decision to save.
- 3.2.7 Savings varies positively with interest rate. Arise in the interest rate level will increase savings.

4.2 Data Analysis

Two models were used to analyse the data. The first model was a simple linear regression model where the dependent variable was savings and the independent variable was income. The second model was a multiple regression model where the dependent variable was savings and the independent variables were income, number of dependants, years of schooling, distance to banking facility, education of children, and interest rate.

CHAPTER FOUR

4.0 DATA SOURCES AND ANALYSIS

4.1 Sources of Data

To achieve the objectives of the study, both primary and secondary data were collected and fitted in the estimation model stated in chapter three. Data collected was on savings, income, education level, dependants, interest rates, bank distance, age, employment status, membership of ROSCAs and motives for savings. The primary source provided the bulk of the data, with the secondary source being applicable to the interest rate variable. In the former case a structured questionnaire was administered to the sampled household. Systematic random sampling procedure was used to sample the respondents³. A total of 82 responses was realized out of 100 questionnaires administered.

To assist in data collection, research assistants were recruited and initially trained on how to administer the questionnaire and coordinate other relevant research activities.

4.2 Data Analysis

Initially, two modes were used in collecting data specifically on savings. First, was the direct answer to the question how much the

respondent saved monthly and second, was through a mathematical device of monthly income less monthly expenditure. Because of consistency and simplicity, the former mode was finally adopted. The refined data was then analyzed using both descriptive and inferential statistics. Descriptive statistic was used in analyzing the households participation in ROSCAs and motives for savings while inferential statistics (regression and correlation analysis) was used to understand empirically the relationship between household savings and its investigated determinants. In this latter case, suitable computer packages - Lotus 123 and SPSS - were used to analyze the data collected.

4.3 Definition and Measurement of Variables

Households is defined to comprise a person(s) generally bound by ties of kinship, who normally reside together under a single roof or several roofs within a single compound and who share a community life in that they are answerable to the same head and share a common source of food. This definition is adopted from the CBS National Sample Survey and Evaluation Programme of 1980.

Dependent Variable

Savings: This is the only dependent variable and it is measured in Kenya Shillings (Kshs). In this paper it is defined as the total household monthly savings.

Independent Variables

Household income: It is defined as all the incomes received by the household head from employment, farm, business, relatives and any other source that is disclosed. It is measured in Kshs.

Dependants: This is measured in physical numbers and includes all children in the household below 16 years of age, non working adults (husbands, wives, relatives) and any other person(s) who depends on the household for survival.

Age: This refers to age of the household head measured in years from the date of birth to the last birthday.

Education: It is measured by the total number of years the household head has spent schooling.

Bank distance: This is defined as the distance between the banking or savings facility that the household operates and his/her location. It is measured in Kilometres.

Employment status: It is defined by the source of earnings of the household head, whether wage income or non-wage income. It is captured by a dummy variable that takes the value

$$E_s = 1 \text{ for wage income employment and}$$

$$E_s = 0 \text{ for non-wage income employment.}$$

Interest rate: It is a rate that savings institutions offer for the deposits of the household head with them. It varies between households depending on the saving institutions. Those saving with ROSCAs registered zero (0) rates as ROSCAs offer no interest.

ROSCA membership: This too is a dummy variable that takes the value one (1) for the members and zero (0) for the non members.

Savings motive. This is the reason why households save. It is divided into six categories depending on the saving motive in question as below;

M_1 = Education

M_2 = Better future⁴

M_3 = Emergency

M_4 = Business investment

M_5 = Old age security

M_6 = Others not in the list eg family marriage

CHAPTER FIVE

5.0 STUDY RESULTS

The study findings/results are presented in this section in two parts. Part one presents descriptive results, while part two shows regression and correlation results.

5.1 Descriptive Results

Based on the membership of ROSCAs, the descriptive results indicate that 75 respondents were members and only 7 were non-members as shown in table 5.1.1 below. This is in line with earlier prediction that ROSCAs are quite dominant in the rural areas. The percentage of members therefore stood at 91.5% against 8.5% for non-members.

Table 5.1.1 Savings level by ROSCAs membership

Savings Level	Members	Non-members	TOTALS
< 2500	62	6	68
2500-5000	3	1	4
5001-7500	7	0	7
> 7500	3	0	3
TOTALS	75	7	82

ROSCAs existed in various forms which included women groups saving associations, family and clan saving associations, "merry go round" establishments especially amongst friends, teachers and farmers,

church saving associations and business groups. The non-members felt that ROSCAs were an inferior way of saving, while the members supported them because they promoted socialization and were more secure since there is interaction at personal level with the people one knows. Others liked ROSCAs for being near and for having traditional beginnings that they feel should not be relinquished. Compared to the banks, ROSCAs received a backing for charging no interests, being indiscriminate, accepting little contributions and having less formalities. In addition, it helps members maintain strict discipline amongst themselves in money disbursement, not to mention other non financial assistance such as weeding and building particularly with church oriented associations.

The management of the ROSCAs were basically similar. Members agreed to form the groups and appointed their leaders which in most cases were the chairman, secretary and treasurer. They further agreed to contribute a fixed amount monthly to a common pool. Consequently, the amount was disbursed to members on a monthly rotational basis. Some ROSCAs were noted to operate beyond this level. These had with time evolved into business groupings and could afford to secure credit from non-governmental organizations (NGOs) as CARE International, for investment purposes.

Despite the widespread existence of ROSCAs in the rural areas, the observed chi-square of 2.35 (see appendix XI), is less than the tabulated chi-square of 11.3 from the distribution table at the 99%

confidence level. This shows that there exists a weak association between the savings level and membership of ROSCAs.

The association between savings level and motives for saving was also investigated. Households gave various reasons/motives for saving as summarized in table 5.1.2 below.

Table 5.1.2 Savings level by motives⁵

Savings level	M ₁	M ₂	M ₃	M ₄	M ₅	M ₆	TOTALS
< 2500	23	5	28	11	1	0	68
2500-5000	2	0	0	0	2	0	4
5001-7500	2	0	0	2	2	1	7
> 7500	0	0	0	0	3	0	3
TOTALS	27	5	28	13	8	1	82

From the table, approximately 67% of the households saved for emergencies and education purposes. Only a third of the households prioritized saving motives as better future, business investment, security for old age and family marriages among others. Even though this finding does not conform to the hypothesis 3.2.6, note should be taken of the importance of the education motive that is ranked second after emergencies motive i.e 34.1% of the households save for emergencies while 32.9% save for education. Earlier studies as of Kamau (1973) had shown education motive to be most significant in determining the savings motive. This formed the hypothesis basis. The finding can therefore be attributed to the urgent need to deal with some of the pressing emergencies as

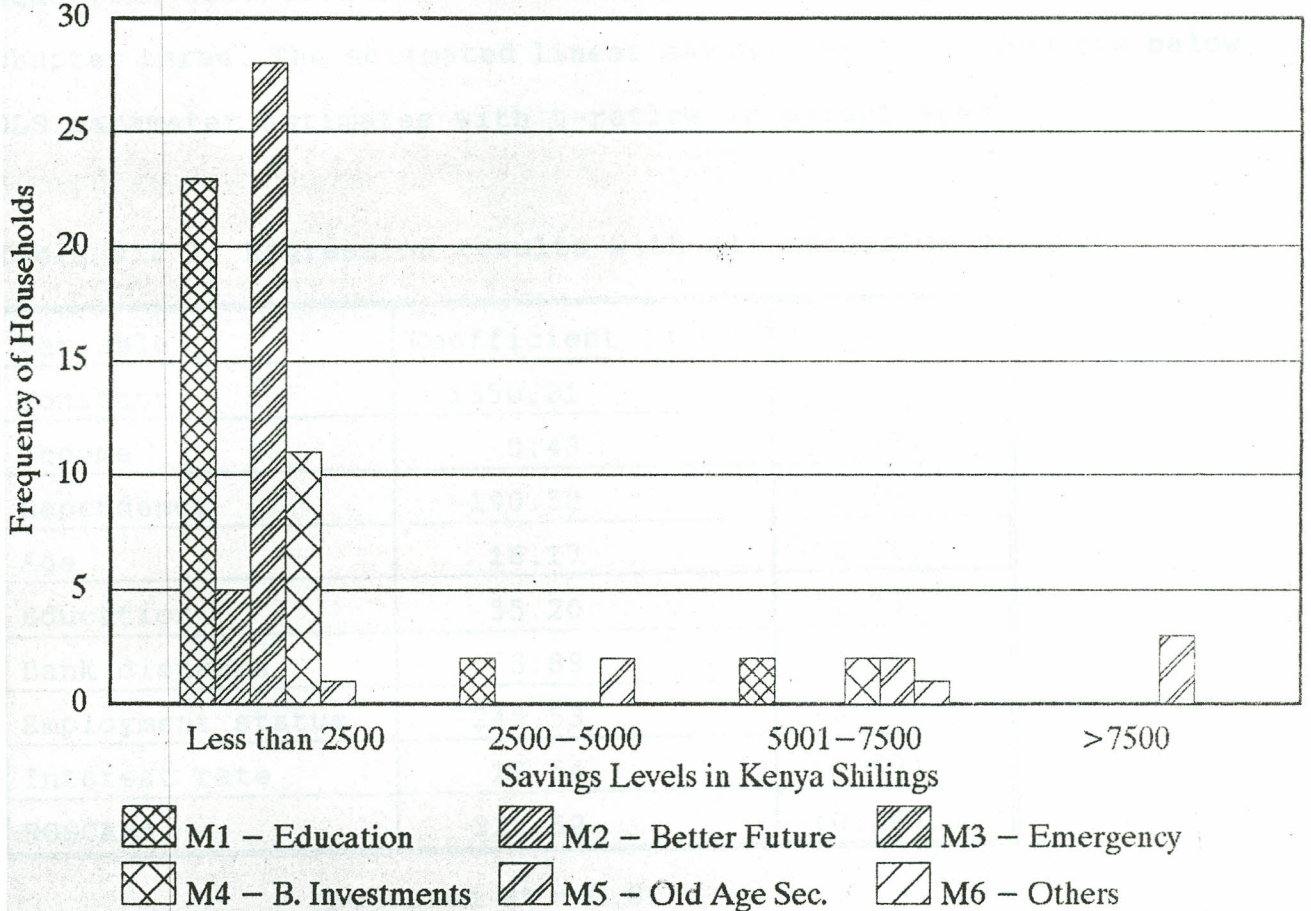
sickness and death, that cannot wait. Secondly, it seems the rural households are yet to fully appreciate investment in education due to some cultural connotations

Further into the analysis, a chi-square of 59.45 was observed (see appendix IX). This is greater than the chi-square of 30.6 from the distribution table at 99% confidence level with 15 degrees of freedom, indicating that the level of savings is associated with the motives as earlier envisaged.

Table 5.1.2 displays a situation where most households who save for education motive have lower levels of savings. Intuitively this implies that the households in question have low levels of incomes since savings and income are positively related as shown by the regression results (page 48). The same observation can be said of better future, emergency and business investment motives. However, at high levels of savings and therefore incomes, households tend to prefer savings for old age security. It could be so because, with high incomes, the households are able to meet their immediate needs/motives and still spare some amount for use in old age. Indeed, from the table, the number of households who save for old age security increases with the savings level, although only 9.8% of the households interviewed saved for old age security. This reflects the low income levels that characterize many rural areas in the developing world, Kenya inclusive. The above scenario can easily be visualized from the graph that follows (next page).

A Bar Graph Showing Households

Frequency by Motives for Savings



5.2 Regression and Correlation Results

Regression results equally had intrinsic findings. Several linear equations were estimated to test the various hypotheses stated in chapter three. The estimated linear savings model yielded the below OLS parameter estimates with t-ratios in parentheses⁶.

Table 5.2.1 Regression results with all variables entered

Variable	Coefficient (a`s)	t - Ratio
Constant	-1350.21	(-2.08)
Income	0.43	(15.08)
Dependency	-190.50	(-5.49)
Age	18.17	(2.21)
Education	55.20	(1.76)
Bank distance	3.89	(0.66)
Employment status	-245.53	(-0.83)
Interest rate	18.54	(0.69)
ROSCAMS	223.62	(0.56)

$$\text{Adjusted } R^2 = 0.81$$

$$F = 42.87 \text{ compared to } F_{0.00} (8,73) \text{ DF}$$

Table 5.2.1 above, presents regression results for all the variables studied, with savings being the only dependent variable. The results portray income to be the most significant variable influencing savings as shown by a t-ratio of 15.08. Its coefficient is positive, suggesting that for every shilling earned, the households save 43 cents. The finding is true of the other studies

reviewed eg Pickersgill (1976), Johnson & Chiu (1986), Elbadawi & Majd (1993).

The dependency coefficient is negative and significant. This indicates that an increase in the number of dependants in the household, increases present consumption and consequently discourages savings.

Age of the household head has a positive effect on savings, and the effect is statistically significant. It shows that individuals become more thrifty as their age increases and therefore will be able to save more with age.

The coefficient of education also has a positive effect on savings as theory predicts, but the effect is not statistically significant as shown by a t-ratio of 1.76. The result reflect a situation whereby years of schooling does not significantly affect the savings level - probably the education level⁷ attained would.

Contrary to our expectations is the positive sign of the bank distance coefficient whose effect is insignificant on savings. It implies that the further the bank, the greater the savings. This could be attributed to the lack of banking services in the area and that most public servants and farmers, who were the majority in the study, get their pay through banks which are located in Kisumu town. The arrangement leaves them with no otherwise, but to travel

long distances to reach the banks. Another reason for this positive relationship could be the preconceived prestige⁸ associated with savings in a town environment by some households.

Employment status also has a non-significant influence on household savings. Its negative coefficient suggests that savings among the wage earners is low compared to that of non-wage earners. This conforms to theory and may be explained in light of the low monthly incomes that characterize the formal rural employments. The incomes of the informal rural employments eg business undertakings on the other hand, tend to be comparatively higher and more frequent, hence contributes more to savings.

The coefficient on interest rate is positive, meaning that savings will rise with increases in interest rate. The results agrees with theory since only interest rate on deposits was considered. Unfortunately, its impact on savings is not significant. Field experience reveals that majority of the households were not aware of the interest rates they were paid by the banks on their deposits. Secondly, it is probable that they used their bank accounts only for salary clearance⁹. In essence, they may not get an opportunity to earn an interest and therefore they have no incentives to increase their bank savings.

Membership of ROSCAs also has a positive coefficient which is not statistically significant by the analysis of the t-ratio. Being a

dummy variable, the positive coefficient of ROSCAMs implies that the mean savings by the members of ROSCAs is higher than that of the non-members. This conforms to the expectation. The insignificance of this explanatory variable was earlier established in the descriptive results when a weak association between itself and savings levels was obtained using the chi-square test. It is most likely that the insignificance is due to the low levels of contributions that members of ROSCAs make.

The overall fit of the equation under review is satisfactory. R^2 is found to be approximately 82% and when adjusted for the lost degrees of freedom, it reduces slightly to 81%. The estimate is significant in explaining the variation in savings as given by F statistic of 42.87. This leaves about 19% of the variation in savings to be explained by other factors not captured by the model like cultural values and low levels of awareness.

The constant term which takes care of the variables excluded from the model, has a negative but significant coefficient. This means that, if all other factors included in the model are held constant, then households will dissave. That is, they will either borrow or consume part of the already saved funds. The result confirms Pickersgill (1976) study findings and reflects reality.

By omitting the insignificant variables, the regression results do not improve substantially (see appendix IV). The significance and

signs of income, dependency and age coefficients are maintained. The intercept term also retains its sign and significance. R^2 remains at 81% although with F statistic of 87.60 which makes it more significant. It is only the education coefficient that despite maintaining its sign, it turns out to be significant.

Appendix III & IV shows that the residual variance reduces with an increase of more variables into the model as anticipated¹⁰.

On the account of this discussion, several hypotheses have been tested and found to hold. This includes the positive relationship between savings and income, the negative relationship between savings and dependency, the positive relationship between savings and education and the positive relationship between savings and interest rate. The hypothesized negative relationship between savings and bank distance was found to be contrary.

Next is the life cycle hypothesis test. According to this theory individuals are net savers in their middle years of life to pay for debts incurred in their early years of life and provide for retirement, and net dissavers in their late years of life. This is based on the understanding that income streams are relatively low at the beginning and late years of life, compared to the middle years. From data collected, equations 5.2.3 (a) & (b) below, provide the estimated equations for the two age distributions designed.

5.2.3 Age distribution equations entered with savings and income variables only

(a) Below 55 years old

$$S = - 672.83 + 0.44Y \quad R^2 = 0.73$$

(-2.98) (13.33)

(b) 55 years old and above

$$S = - 396.33 + 0.39Y \quad R^2 = 0.76$$

(-0.94) (7.03)

Examining the two equations side by side, both have a positive and significant coefficient on income, although the MPS, in absolute terms, for the age distribution - below 55 years old, is greater than that of the age distribution - 55 years old and above. This means that those in (a) have a higher potential (MPS) to save (MPS) any additional income than those in (b). This disapproves the theory that the retired are net dissavers. The life cycle theory therefore breaks down in this respect and this conforms to Lilydahl's (1976) findings. For the theory to hold, then MPS_b should have been negative which is not the case.

A similar analysis was extended to the employment status variable. Two regression equations were run for savings and income only, to compare the MPS for the wage and non-wage earners as below.

5.2.4 Regression equations for employment status entered with saving and income variables only

(a) wage/salaried employment

$$S = -462.60 + 0.41Y \quad R^2 = 0.68$$

$$(-1.05) \quad (8.38)$$

(b) Non-wage/non-salaried employment

$$S = -755.38 + 0.46Y \quad R^2 = 0.77$$

$$(-4.04) \quad (12.58)$$

Earlier, it was postulated that the MPS for the non-wage earners will be greater than that for the wage earners. In absolute terms, the above results concurs with the earlier prediction and the effect income on savings is greater in equation (b) than in (a). Similar results were achieved by Kelly & Williamson (1967) in an Indonesian saving study. Using the Z statistic to test the same, we obtain the below;

$$H_0: (MPS_a - MPS_b) = 0 \quad (\text{Null hypothesis})$$

$$H_1: (MPS_a - MPS_b) \neq 0 \quad (\text{Alternative hypothesis})$$

$$Z_c = \frac{MPS_a - MPS_b}{\sqrt{\left(\frac{Sx_a^2}{n_a} + \frac{Sx_b^2}{n_b}\right)}} = \frac{0.41 - 0.46}{\sqrt{\left(\frac{0.05}{34} + \frac{0.04}{48}\right)}} = -1.00$$

At 95% level of confidence, $Z_{\alpha/2} = 0.0250 = \pm 1.96$,

Where H_0 is null hypothesis, H_1 is alternative hypothesis, Z_c is Z

calculated, Z_a is Z from distribution table, Sx^2 is standard error and n is the sample size for the respective distributions. Since $Z_c < Z_a$ i.e. (1.00 < 1.96), we accept the null hypothesis and conclude that MPS_a and MPS_b are statistically insignificant.

However, because wages are generally low in the rural areas and are usually received once in a month, much of it tend to be kept in cash for daily transactions. This is opposed to the non-wage earnings whose frequency is high and allows for much flexibility. Based on this anticipated reason and the fact that $MPS_b > MPS_a$ in absolute terms, it may be accepted that non-wage earnings would contribute more to savings than wage earnings. This is true of the regression results obtained earlier in table 5.2.1, except that its impact on savings was not significant.

5.3 Econometric Difficulties Experienced

The examination of the above econometric results reveal some correlations between the independent variables as shown by the correlation matrix in appendix IX. The highest correlation identified is that between interest rate and the bank distance, which is shown by the coefficient 0.618. Others, (above the coefficient 0.5), are between E_s & E (0.590), E_s & B (0.533), E & B (0.521), and E_s & R (0.501). The correlations reflect a multicollinearity problem in the equation.

Because multicollinearity is a phenomena inherent in many economic relationships, the results of this study should be interpreted with caution and in light of this existing problem. The other problem that could arise due to the cross sectional nature of this, is heteroscedasticity. But from the analysis of the variance and the F statistic, the problem is taken care of and does not impair the findings of this study.

CHAPTER SIX

6.0 SUMMARY, CONCLUSION AND POLICY IMPLICATION

6.1 Summary and conclusion

Savings potential in rural areas was found to be encouraging. At least all the respondents had something extra to save in the banks and/or ROSCAs in recognition of its economic importance. The membership of ROSCAs stood at 91.5% of the households and this supports Kanogo's (1978) findings about the prevalence of informal savings institutions in rural areas. In spite of the weak association, ROSCAs membership influenced savings positively.

A strong association was found to exist between levels of savings and motives for savings. Households characterized by high level savings preferred savings for old age security, while those with low savings, who were the majority, preferred allocating their savings to immediate needs like emergency and education motive. This explains why 34.1% and 32.9% of the households prioritized savings for the emergency and education motive respectively. Indeed studies as of Kamau (1973) found education motive for savings to be the most adored by households.

The measure of income explained most of the variation in rural household savings. Households tended to save larger share of their

income when that income was high, and lower shares when income was low. This depicted a positive relationship between savings and income. Similarly other studies (Gupta 1970, Johnson & Chiu 1968, Qian 1988, Klaus et al 1991, Kagira 1988) have reached the same conclusion despite using different models, data and sample sizes.

Dependency variable was found to be inversely related to the level savings. This confirmed results of past studies as of Leff (1969) and Pickersgill (1976) and therefore we can conclude that, with many dependants in the household, present consumption is increased and consequently reducing possible savings.

The life cycle theory was found not applicable in this rural setting because the retired persons had a positive MPS. Similarly, Lillydahl (1976) obtained the same result for the urban households savings behaviour. The theory was further disapproved by the regression results that revealed that savings increases with age.

Savings and years of schooling were positively related despite being insignificant. The view of the positive relation is also shared by Kelly & Williamson (1967).

Other findings indicated that bank distance encouraged savings. This was insignificant and contradicted theory. It was attributed to several factors already mentioned.

Employment status inversely influenced savings, although the relationship was insignificant. Wage earners had a lower propensity to save relative to non-wage earners as shown by Gupta (1970).

The effect of interest rate on savings was positive, though not significant. The positive relationship is in line with theory and supported by earlier studies as of Summers (1982), Yusuf and Peters (1984), Leite & Makonnen (1986), and Rossi (1988).

The current study therefore stands out unique from the others reviewed because it has captured savings determinants that seem not to have been studied or have been given less attention in Kenya like education, age, bank distance, employment status and membership of ROSCAs. It has also used micro data and addressed household savings strictly in the rural sector, a sector that seems to have been neglected. As such the results of this study are free of wide margins and errors associated with macro data. They are also rural specific and therefore escapes the criticism of assuming similar behavioural patterns between rural and urban savings or between business and household savings.

6.2 Policy implications

The savings potential in rural areas should be tapped. In order to tap and promote rural household savings, efforts should be directed to implementing policies geared towards savings mobilization. Below

are some related recommendations derived from the study to achieve increased rural household savings.

From the study findings, more savings can be realized by promoting non-wage rather than wage employment in rural areas. This calls for establishment of more income generating activities such as business undertakings. To achieve this, the role played by ROSCAs should be recognized and where possible such associations be encouraged to form stronger and more dynamic groupings which can receive credit from NGOs to start investment projects. Already some NGOs are operating in the rural areas with an objective of steering business undertakings or economic activities in general. It is therefore important that such NGOs play a leading role in educating the members of ROSCAs on the possible areas they can venture to prosper. Individual households should also be incorporated in this business promotion. Given time therefore, it would be expected that such income generating activities would grow and through a multiplier effect be self-sustaining and create more avenues for diversified business ventures and hence savings mobilization.

Second, in addition to promoting income generating activities in rural areas, the Government in collaboration with other relevant bodies should intensify family planning measures to ensure small families in the rural areas. In doing so, the dependency level which is noted to discourage savings, will be reduced as the savings level likely to increase.

Third, savings facilities should be made accessible to the rural households through the provision of banking services and the freedom of choice on where to save. This would help tap the local resources. Although this policy is hard to achieve considering that majority banks are commercial and profit oriented, planners should consider proposing more cooperative societies in the rural areas.

Fourth, programmes on the virtues of savings as a step towards household and economic sustainable development should be included among the other public awareness and education programmes conducted in the rural areas. This would provide valuable information that is not covered in the schools' curricula to rural folk.

6.3 Potential for further research

It would be necessary for a more elaborate research cutting across many districts to be undertaken to investigate further the rural household savings behaviour. Such a study may need to put emphasis on the possibility of uplifting the functions of the informal saving groups because they are highly appreciated in rural areas yet they seem to have a weak association with the level of savings. Such groups are a source of resource mobilization in rural areas. Future studies should also consider a detailed investigation of the relationship between level of savings and motives for saving. It would be interesting to understand the factors that influence the household to rank their savings motives the way they do it.

ENDNOTES

1. Readily available data was missing in some cases, while the cost of collecting data itself was expensive. The data problem was overcome by making reliable estimates based on the information provided by the respondent, as the expensive cost was contained by limiting the study site to a location and to a representative and manageable sample.
2. Savings motive does not determine the amount to be saved but apportioned the total savings into the various motives. The motives on the other hand are not mutually exclusive and therefore excluded from the regression model but covered in the study descriptively.
3. The location was divided into four clans/villages namely Kamgan, Kodul, Kamnua and Kobong'o. In each of the villages respondents were drawn using systematic random sampling.
4. Better future motive refers to the need to live a luxurious life through the purchase of luxurious and prestigious items.
5. Note that some households saved for more than one motive but for the purposes of analysis, the prioritized motive was taken into consideration.
6. The results of the equations with many variables are presented in a tabular format as in table 5.2.1 to ease interpretation.
7. Education level would be in this case be defined in terms of Primary, O level, A level, University etc and may be captured by a dummy variable. It is likely that an individual may spend many years schooling but does not go beyond primary level. This may have been the shortcoming of the education variable hence causing the insignificance.
8. The prestige of exposure and of having an opportunity to enjoy many social services particularly entertainment, that may be lacking in the rural areas.
9. It refers to the bank accounts that are only operational at month ends. That is, immediately the salary is credited to the account, the whole amount (except the minimum deposit), is withdrawn and the account becomes dormant awaiting next transaction at the next month end.
10. Note that appendix III which has a relatively lower residual variance includes all the variables, while appendix IV with only significant variables, has a relatively higher residual variance.

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1980	6.8
1981	7.5
1982	5.9
1983	4.1
1984	1.3
1985	1.5
1986	1.7
1987	4.3
1988	7.1
1989	3.9
1990	6.2
1991	4.7
1992	4.3
1993	1.5
1994	-0.7
1995	1.1

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APPENDICES

Appendix I: Growth rate of Gross Domestic Product, Savings & Investments and Government Deficit (Million Kshs)

Year	GDP in %	GDS * (%)	GDI * (%)	GDI - GDS	Govt. Deficit
1970	- 4.7	23.6	24.4	0.8	--
1971	22.5	17.4	23.9	6.5	--
1972	18.3	20.2	22.3	2.1	566
1973	5.3	24.5	25.8	1.3	902
1974	3.6	18.5	25.8	7.3	587
1975	1.3	13.5	18.1	4.6	1151
1976	2.2	20.9	20.2	- 0.7	1709
1977	9.4	27.0	23.7	- 3.3	1327
1978	6.8	20.0	29.8	9.8	1627
1979	7.5	16.4	22.3	5.9	3015
1980	5.4	18.1	29.2	9.1	2409
1981	4.1	19.6	27.7	8.1	4002
1982	1.9	18.1	21.8	3.7	5463
1983	1.5	20.4	20.8	0.4	3838
1984	1.7	19.4	20.7	1.3	4281
1985	4.3	24.9	26.0	1.1	6245
1986	7.1	21.9	21.8	- 0.1	5144
1987	5.9	19.2	24.3	5.1	8329
1988	6.2	19.7	25.0	5.3	6242
1989	4.7	17.3	24.7	7.4	11193
1990	4.2	19.1	24.3	5.2	7412
1991	1.5	20.0	21.3	1.3	5755
1992	-0.7	17.6	17.5	-0.1	1047
1993	1.1	21.1	16.1	-5.0	11543

Source: African Development Indicators, 1992; World Tables, 1993, 1995; International Financial Statistics Yearbook, 1994.

* The GDS and GDI are shown as a percentage of GDP.

Appendix II: Questionnaire

The objective of this study is to analyze the factors that influence household savings in Kenya. The questionnaire is intended to collect the necessary data that will assist in the analysis. Since savings plays a significant role in economic development, the study is important because it seeks to establish policies that would encourage savings amongst the rural households. The success of this exercise substantially depends on your cooperation which is called upon and highly appreciated in advance.

Household Number Interview Date Sex
 Household Name (Optional) Sublocation
 Name of Research Assistant

1.0 Demographic Variables

1.1 How old are you? Years

1.2 What is your marital status?
 Married = A Single = B Divorced = C Widowed = D
 If married, how many wives do you have (for males)?

1.3 Do you have any children?..... Yes = A No = B
 If yes, how many?.....
 How many of them are below 16 years old?.....

1.4 Do you have any relatives staying with you?... Yes = A No = B
 If yes, how many?
 From above, is there any depending on you?... Yes = A No = B
 If yes, how many?

1.5 Are there any other persons (other than the above) that depend on you? Yes = A No = B
 If yes, how many?

2.0 Education Particulars

2.1 Did you attend school? Yes = A No = B
 If yes, how many years did you spend schooling?..... Years

2.2 Have you attended any other training other than the formal schooling? Yes = A No = B
 If yes, how many years did you spend? Years

3.0 Economic Particulars

3.1 Are you working? Yes = A No = B
 If yes, are you..... self employed = A or wage employed = B?

3.2 What is your occupation? (Probe) e.g farmer, teacher, clerk, doctor etc

3.3 From the income brackets shown below, which one tallies with your monthly earnings?

(Less)	<	1000	Kshs	=	A
1001	-	2000	"	=	B
2001	-	3000	"	=	C
3001	-	4000	"	=	D
4001	-	5000	"	=	E
5001	-	6000	"	=	F
6001	+		"	=	G

3.4 Do you have any other source of income?Yes = A No = B
If yes, name them

Estimate in total how much they earn you monthly?.....Kshs

3.5 How much of your total income do you averagely spend on the household monthly? Kshs

3.6 Based on your total monthly earnings, do you make any monthly savings? Yes = A No = B

If yes, approximately how much? Kshs

3.7 Why do you save? (Prioritized your motives)

.....
.....
.....

3.8 If your answer to 3.6 is NO, give reasons

.....
.....
.....

3.9 Where do you save?

A = House B = Banks C = Informal Institutions like ROSCA
D = Non-Bank Financial Institutions e.g Post Office etc
E = Others

From your choice(s) specify the name of the institution you save the highest amount

.....

3.10 What is the approximate distance (in Kms) of the institution you have specified above from your home?..... Kms

3.11 What interest rate does your savings institution charge (in percentages)?

3.12 Is the institution the nearest from your home?
Yes = A No = B

If NO, state the nearest

Give reasons why you avoid the nearest institution?

.....
.....

3.13 Are you aware of the existence of savings/credit institutions (groups) in this location? Yes = A No = B
If yes mention the types that exist

Are you a member of any of them? Yes = A No = B
If Yes, which one?
How is your savings group organized (run)

But if Not a member, why?

What benefits do these informal groupings have over formal institutions like the banks?

3.14 In general terms, what is your attitude towards saving in savings institutions?
A = Positive (appreciation) B = Negative (disillusionment)
Give reasons for your answer

4.0 Comments
Do you have any comments you would wish to make on household savings that are not captured by the questionnaire?

=====

5.0 For official use only

5.1 Interest rate charged by the saving institution of the household's banker identified in 3.9%(percent)

5.2 Comments. The interview was
Successful = A Fairly Successful = B Below Average = C

Explain

APPENDIX III Regression results with all variables entered into the equation

Equation Number 1 Dependent Variable.. SAVINGS

Variable(s) Entered on Step Number

1.. ROSCAMS
 2.. DEPENDS
 3.. EDUC
 4.. INCOME
 5.. AGE
 6.. INTEREST
 7.. EMPLOYST
 8.. BANKDIS

MORE

***** MULTIPLE REGRESSION *****

Equation Number 1 Dependent Variable.. SAVINGS

Multiple R .90802
 R Square .82451
 Adjusted R Square .80528
 Standard Error 967.87848

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	8	321293064.76250	40161633.09531
Residual	73	68385579.13993	936788.75534

F = 42.87160 Signif F = .0000

MORE

***** MULTIPLE REGRESSION *****

Equation Number 1 Dependent Variable.. SAVINGS

----- Variables in the Equation -----

Variable	B	SE B	Beta	T	Sig T
ROSCAMS	223.622193	403.216745	.028664	.555	.5809
DEPENDS	-190.498621	34.686728	-.283556	-5.492	.0000
EDUC	55.197125	31.364155	.126378	1.760	.0826
INCOME	.428733	.028440	.863648	15.075	.0000
AGE	18.173221	8.211923	.127239	2.213	.0300
INTEREST	18.541370	27.063628	.046011	.685	.4954
EMPLOYST	-245.532654	294.566694	-.055489	-.834	.4073
BANKDIS	3.889138	5.942112	.045253	.655	.5148
(Constant)	-1350.205566	649.444943		-2.079	.0411

End Block Number 1 All requested variables entered.

APPENDIX IV Regression results with significant variables entered into the equation

***** MULTIPLE REGRESSION *****

Equation Number 1 Dependent Variable.. SAVINGS

Variable(s) Removed on Step Number
12.. INTEREST

Multiple R .90545
R Square .81984
Adjusted R Square .81048
Standard Error 954.86621

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	4	319472393.91935	79868098.47984
Residual	77	70206249.98309	911769.48030

F = 87.59681 Signif F = .0000

MORE

***** MULTIPLE REGRESSION *****

Equation Number 1 Dependent Variable.. SAVINGS

----- Variables in the Equation -----

Variable	B	SE B	Beta	T	Sig T
DEPENDS	-186.013738	33.772655	-.276880	-5.508	.0000
EDUC	58.292183	25.370844	.133464	2.298	.0243
INCOME	.435704	.025844	.877689	16.859	.0000
AGE	17.180170	8.022154	.120286	2.142	.0354
(Constant)	-1097.574722	502.005095		-2.186	.0318

MORE

***** MULTIPLE REGRESSION *****

Equation Number 1 Dependent Variable.. SAVINGS

----- Variables not in the Equation -----

Variable	Beta In	Partial	Min Toler	T	Sig T
BANKDIS	.042885	.082753	.568331	.724	.4713
INTEREST	.048257	.093560	.595845	.819	.4152
EMPLOYST	-.037061	-.068138	.515097	-.595	.5533
ROSCAMS	.022153	.051332	.691884	.448	.6554

APPENDIX V Step regression results for the age
distribution below 55 years old

* * * * MULTIPLE REGRESSION * * * *

Equation Number 1 Dependent Variable.. SAVINGS

Variable(s) Entered on Step Number
1.. INCOME

Multiple R .85738
R Square .73510
Adjusted R Square .73097
Standard Error 1127.84897

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	225920555.81350	225920555.81350
Residual	64	81410771.45923	1272043.30405

F = 177.60445 Signif F = .0000

MORE

* * * * MULTIPLE REGRESSION * * * *

Equation Number 1 Dependent Variable.. SAVINGS

----- Variables in the Equation -----

Variable	B	SE B	Beta	T	Sig T
INCOME	.442394	.033196	.857382	13.327	.0000
(Constant)	-672.826080	225.991123		-2.977	.0041

End Block Number 1 All requested variables entered.

APPENDIX VI Step regression results for the age
distribution 55 years old and above

* * * * MULTIPLE REGRESSION * * * *

Equation Number 1 Dependent Variable.. SAVINGS

Variable(s) Entered on Step Number
1.. INCOME

Multiple R .88268
R Square .77912
Adjusted R Square .76334
Standard Error 1138.59525

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	64019586.96783	64019586.96783
Residual	14	18149588.03217	1296399.14515

F = 49.38262 Signif F = .0000

MORE

* * * * MULTIPLE REGRESSION * * * *

Equation Number 1 Dependent Variable.. SAVINGS

----- Variables in the Equation -----

Variable	B	SE B	Beta	T	Sig T
INCOME	.387948	.055206	.882677	7.027	.0000
(Constant)	-397.326640	425.085058		-.935	.3658

End Block Number 1 All requested variables entered.

APPENDIX VII Step regression results for the wage
employment group

* * * * MULTIPLE REGRESSION * * * *

Equation Number 1 Dependent Variable.. SAVINGS

Variable(s) Entered on Step Number
1.. INCOME

Multiple R .82872
R Square .68678
Adjusted R Square .67700
Standard Error 1508.89225

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	159750358.21068	159750358.21068
Residual	32	72856185.90697	2276755.80959

F = 70.16578 Signif F = .0000

MORE

* * * * MULTIPLE REGRESSION * * * *

Equation Number 1 Dependent Variable.. SAVINGS

----- Variables in the Equation -----

Variable	B	SE B	Beta	T	Sig T
INCOME	.410210	.048972	.828724	8.377	.0000
(Constant)	-462.596288	441.787749		-1.047	.3029

End Block Number 1 All requested variables entered.

APPENDIX VIII Step regression results for the non-wage
employment group

* * * * MULTIPLE REGRESSION * * * *

Equation Number 1 Dependent Variable.. SAVINGS

Variable(s) Entered on Step Number
1.. INCOME

Multiple R .88025
R Square .77484
Adjusted R Square .76995
Standard Error 763.02673

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	92165097.69213	92165097.69213
Residual	46	26781650.22454	582209.78749

F = 158.30221 Signif F = .0000

MORE

* * * * MULTIPLE REGRESSION * * * *

Equation Number 1 Dependent Variable.. SAVINGS

----- Variables in the Equation -----

Variable	B	SE B	Beta	T	Sig T
INCOME	.463878	.036869	.880252	12.582	.0000
(Constant)	-755.377943	187.425651		-4.030	.0002

End Block Number - 1 All requested variables entered.

APPENDIX IX Correlation matrix for the independent variables

Correlations:	INCOME	DEPENDS	EDUC	BANKDIS	INTEREST	AGE
INCOME	1.0000	.2121	.2799*	.3362*	.4045**	.0428
DEPENDS	.2121	1.0000	.1063	.2255	.1535	.1282
EDUC	.2799*	.1063	1.0000	.5209**	.4929**	-.4535**
BANKDIS	.3362*	.2255	.5209**	1.0000	.6183**	-.1733
INTEREST	.4045**	.1535	.4929**	.6183**	1.0000	-.1809
AGE	.0428	.1282	-.4535**	-.1733	-.1809	1.0000
EMPLOYST	.3588**	.1248	.5903**	.5328**	.5005**	-.1978
ROSCAMS	.1126	-.0287	.0483	-.1481	-.0726	-.1229

N of cases: 82 1-tailed Signif: * - .01 ** - .001

" . " is printed if a coefficient cannot be computed

MORE

Correlations:	EMPLOYST	ROSCAMS
INCOME	.3588**	.1126
DEPENDS	.1248	-.0287
EDUC	.5903**	.0483
BANKDIS	.5328**	-.1481
INTEREST	.5005**	-.0726
AGE	-.1978	-.1229
EMPLOYST	1.0000	-.0972
ROSCAMS	-.0972	1.0000

N of cases: 82 1-tailed Signif: * - .01 ** - .001

" . " is printed if a coefficient cannot be computed

APPENDIX X Summary of raw data

NUMBER	SAVINGS	INCOME	DEPENDS	EDUC	BANKDIS	INTEREST	AGE	EMPLOYST	ROSCAMS
001	2000	4500	1	17	50	8	31	1	1
002	800	6500	5	14	50	12.75	42	1	1
003	200	1500	7	15	1	0	43	0	1
004	2000	7000	8	17	55	12.75	32	1	1
005	400	6500	9	14	40	12	42	1	0
006	500	5500	6	7	1	0	35	0	1
007	700	3500	3	11	5	8	24	1	1
008	400	2500	0	14	5	9	22	0	1
009	500	6200	7	14	60	12	36	1	1
010	1000	3500	4	12	60	9	27	0	1
011	1500	9000	14	14	5	13	43	1	1
012	900	2540	11	14	5	13	43	0	1
014	50	3000	3	10	1	0	22	0	1
015	900	4850	3	3	1	0	60	0	1
016	1200	4500	4	14	1	0	24	1	1
017	800	4500	4	14	5	9	22	1	1
019	150	2500	3	8	1	0	21	0	1
020	50	1600	0	8	1	0	40	0	1
021	400	1500	6	6	1	0	64	0	1
023	350	1800	5	9	1	0	47	0	1
024	500	3500	4	7	5	12.75	23	0	1
026	50	1700	5	4	1	0	80	1	1
028	1000	3700	9	14	60	7	36	1	1
029	1500	4200	4	11	60	6	52	0	1
031	500	2500	6	6	60	6	26	0	1
032	100	1800	2	12	5	11	28	1	0
033	800	4300	2	13	1	0	36	1	1
034	30	1500	2	9	1	0	50	0	1
035	1500	3500	0	13	5	9	20	1	1
036	1500	6500	10	17	50	8	40	1	1
037	1000	3600	3	12	1	0	22	0	1
038	800	2800	1	13	1	0	21	0	1
039	2000	6700	8	20	50	10	45	1	1
040	1200	3500	7	14	5	8	42	1	1
041	1200	3500	4	17	50	12.75	24	0	1
042	1000	3500	5	12	55	12	38	1	1
043	2000	4000	0	4	1	0	39	0	1
044	2000	7500	3	13	50	12.75	29	0	1
045	3500	8200	4	6	1	0	60	0	1
046	7000	16100	1	13	5	12.75	40	0	1
047	4000	6500	0	16	50	12.75	35	1	1

NUMBER	SAVINGS	INCOME	DEPENDS	EDUC	BANKDIS	INTEREST	AGE	EMPLOYST	ROSCAMS
049	10000	27500	5	14	50	8	40	1	1
050	3000	5500	3	15	72	10	37	1	0
051	50	1600	5	0	1	0	90	0	0
052	50	1750	2	0	1	0	55	0	0
054	2000	5100	11	14	60	6	52	0	0
055	30	2800	7	10	1	0	25	0	1
057	80	1800	7	6	60	12.75	44	0	1
058	6000	10500	2	9	8	12.75	60	0	1
059	7000	10000	0	19	50	12.75	32	1	1
060	3000	6500	1	3	7	12.75	58	0	1
061	1500	3500	6	6	1	0	50	0	1
062	8000	11500	0	10	8	8	50	1	1
063	20	600	0	1	1	0	65	0	1
064	100	2500	8	0	1	0	32	0	1
066	100	2600	6	7	1	0	28	0	1
067	300	2500	2	10	1	0	22	0	1
068	2000	7500	7	14	60	6	32	1	1
072	1000	4500	7	15	50	6	36	1	1
074	500	7500	5	4	1	0	40	0	1
075	1000	6500	6	15	1	0	58	0	1
076	2000	6500	5	9	7	12.75	60	0	1
077	6000	11500	3	10	50	12	50	1	1
078	300	1500	7	7	1	0	37	0	1
079	6000	7000	4	17	50	6	45	1	1
080	2500	4500	0	15	50	12.75	35	1	1
081	2000	3500	5	15	5	12.75	31	0	1
082	6000	12000	8	6	48	6	60	0	1
083	2000	4800	5	13	1	0	23	0	1
084	1000	7100	3	14	50	8	46	1	1
085	1500	5500	7	10	1	0	50	0	1
086	6000	20500	16	12	40	12	63	1	1
088	8000	18500	6	17	50	12	26	1	1
090	200	4500	5	7	1	0	40	0	1
091	1000	7000	9	16	60	12.75	26	1	1
092	100	6500	9	0	5	7	69	0	1
093	500	4500	3	14	65	12.75	27	1	0
094	500	3500	2	5	1	0	40	0	1
096	30	600	1	15	1	0	82	0	1
098	40	1700	5	0	7	7	62	0	1
099	1000	2900	2	3	1	0	54	0	1
100	1200	7600	7	15	55	12.75	36	1	1

APPENDIX XI: Calculation of Chi-Square.

Chi-Square Formulae (X^2)

$$X^2 = \frac{(F_o - F_e)^2}{F_e}, \quad \text{and, } F_e = \frac{(C_t)(R_t)}{N}$$

Where, F_o = Observed frequencies
 F_e = Expected frequencies if there was no association
 C_t = Column total of the cell in question
 R_t = Row total of the cell in question and
 N = Total number of observations.

A X^2 for table 5.1.1 - savings level by ROSCAs membershipTable for F_e

Members	Non-members
62.20	5.80
3.66	0.34
6.40	0.60
2.74	0.26

$$X^2 = 2.348654 \approx 2.35$$

B X^2 for table 5.1.2 - savings by motivesTable for F_e

M1	M2	M3	M4	M5	M6
22.39	4.15	23.22	10.78	6.63	0.83
1.32	0.24	1.37	0.63	0.39	0.05
2.30	0.43	2.39	1.11	0.68	0.09
0.99	0.18	1.02	0.48	0.29	0.04

$$X^2 = 59.447425 \approx 59.45$$