Analyzing Household Saving determinants in Bhutan

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Abstract— The aim of this paper is to examine the determinants of households' saving in Bhutan. The study provides an analysis of household saving determinants and documents the extent of savings in Bhutanese households. The data comprise a random sampling of 404 respondents drawn through a field survey. Household saving function is estimated to test households' responses to income and household characteristics. The first stage analysis describes the descriptive statistics and correlation matrix. Ordinary Least Square method is used for estimation, which presents the determinants of household saving in Bhutan. The results show that household income and age of the household head are inducing factors increasing the household saving significantly, while family size, dependency, liabilities to be paid, location are reducing factors decreasing the household saving. No relationship is found between savings and household assets. The savings increases with age and tends to decline after crossing a certain age limit. Also, the percentage share of retirement (31%) and children's education (23%) are more among the households indicating motives related to life cycle saving are stronger in case of Bhutan.

Keywords— Bhutan, Children's educational expenditures, Life Cycle Hypothesis, Savings.

I. INTRODUCTION

BHUTAN has had rapid socioeconomic progress with the real annual economic growth averaged about 7-8 per cent over the last two decades. While Bhutan has shown remarkable progress in economic growth it has also faced high current account deficit (25.7% of GDP during FY 2010/11 (Nu.18.6 billion)). One among the major internal limitations the country faced in funding its developmental plans has been simply because it has not been able to accumulate enough domestic savings. In the past, Bhutan's economy was limited to agro-pastoral subsistence activities and barter system. Due to the absence of modern banking system there were no domestic savings to be mobilized for development projects. Hence, Bhutan remained heavily dependent on external findings especially during the period 1960-1975. The Official Development Assistance (ODA) levels that financed around 70% and 60% of the total development outlays of the Seventh and Eighth Plans financed around half of the total Ninth Plan outlay (2002-2007). Over the years, the country's dependence on external assistance has decreased however there are domestic constraints such as low rate of monetized savings, small population and market, unskilled labor force, limited trade possibilities, mountainous topography, etc.

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According to World Bank, Bhutan's Gross domestic saving (% of GDP) was 33.98 as of 2009. Its highest value over the past 28 years was 44.57 in 1995, while its lowest value was -7.93 in 1981. Although there is an upward saving trend, the savings were always insufficient to finance the volume of investment, i.e. existence of investment saving gap. Despite the increase in Gross domestic savings there are concerns for sustainable economic development. Nevertheless, the existence of high incidence of poverty (23.2%) among the rural households in Bhutan is a serious problem. Rural parts are defenseless to severe adversities arising out of economic fluctuation and natural calamities. Savings plays an important role while household experience such kind of shocks as credits and insurance markets are not well developed especially in rural parts. In addition domestic savings helps an economy in developing productive investment.

Domestic savings has become increasingly important to contemporary policy discussion at Ministerial Level making the issue of household savings pertinent for sustainable economic development. During the Ninth Five Year Plan, total consumption grew steadily at 10% and on average amounted to around 64% of GDP. Private consumption was recorded to be 68% of total consumption. Investment grew at 9.4% and on average amounted to around 58% of GDP during the plan period. Private investments were 79% of total investments. Savings was found to be on higher growing rate in comparison to consumption and investment. It amounted a third of GDP between 2002 and 2007. Private savings accounted for over 90% of the total gross domestic savings at the end of the plan period. Development is constraint by the low level of capital formation and thus it becomes important to understand the saving behavior determinants. However, no studies have been conducted in this area to understand its implications or to provide any policy recommendations. A study and analysis of saving determinants could, therefore, shed some light on this issue.

The rest of the paper is arranged as follows: section II describes the literature review, section III discusses the data and research methodology, section IV shows the results and section V gives the study's conclusion and recommendations.

II. LITERATURE REVIEW

There are numerous published literatures on household saving determinants and its effects on household saving behavior. The determinants contributing to the household saving behavior are well established. Studies on saving behavior using urban household information in advanced countries had led to development of useful theories [24]. However, very less is known on rural household savings in

low-income countries. Studies on saving behavior are indebted to Absolute Income Hypothesis by Keynes. One of the earliest attempts on the consumption-income relationship came from James Duesenberry (1949) through his relative-income hypothesis (RIH) forwarding the consumption/saving as a function of ratio of current income to previous level of income. Friedman's hypothesis recognizes permanent and transitory components of income to be the household saving determinants. Although PIH provided the first breakthrough, it also faced criticism. One major criticism faced was that the theory did not consider the systematic variation in income and needs i.e. maturing, retirement and changes in family size over the life cycle of a household. In 1954 Franco Modigliani and Richard Brumberg came up with life-cycle theory (LCH) of savings behavior which was developed further by Albert Ando and Modigliani in 1963 postulating that young people save too little as they earn less, middle aged people save more as they earn more and old will have no saving.

The literature review had been made with an intention to understand the household characteristics that explains the household saving behavior. The theory of consumption describes consumption to be directly proportional to the household size i.e. consumption increases with the increase in household members. Studies in developed countries consistently observed a negative relationship between family size and household savings. Large family size inversely affects on household welfare [31]. The estimation of saving function was based on a cross sectional data from 2002 Annual Poverty Indicator Survey (APIS). The study found that an additional child reduced the savings rates by -14%. Similarly, a decrease in a child alleviated the household budget constraints, thus increasing the savings rates [21]. The finding was in contradiction to where extended family possibly had effects on effective planning horizon to make saving decisions [14]. In Morocco, household size was not significant in the rural case and an additional member in the house reduced the saving in urban area [1]. An increase in the family size reduces the saving but the children under the age of 18 do not affect it [33].

Studies analyzed the relationship between the socio-economic characteristics and household saving behavior. A study in Pakistan was carried out based on the micro level data of the Household Income and Expenditure Survey (HIES) that covered 16850 households for the year 1984-85. Three different non-linear saving functions attributed to Keynes, Klein and Landau has been estimated separately for urban and rural using the Ordinary Least Square (OLS) method. The study found that dependency ratio, education attainment level of household head had a negative impact on the household saving behavior. Employment status and occupation of the household head did not explain the savings while life cycle hypothesis was found consistent in case of Pakistan [7].

A good example on household saving which uses cross sectional data in determining the relationship between domestic saving and economic development is the analysis of household saving behavior in the Jogjakarta region of Indonesia for the period 1958-59 [22]. The data used was from a sample survey of 490 families from the Daerah Istimewa Jogjakarta region of Indonesia taken in 1959 by the Bureau of Economic Research-Faculty of Economics at Gadjah Mada

University. The marginal propensity to save is approximately 10 percent. The highest income earners i.e. the government employee, were found with very low average and marginal savings rates. This was partly because the group was highly educated [23], [2] [7]. Education had negative effect on saving as educated household have higher consumption because they have to maintain a certain standard of living and usually spend more on children's education, health, clothing, food and necessary luxury goods. However, educated households have a relatively higher consumption while on the other hand they are likely to earn more. Therefore, it is difficult to define the composite index of household education level [3] [22]. In Jogjakarta the non-farm entrepreneurs i.e. the trader and the business owners were found with very high marginal savings with coefficients of 0.4257 and 0.3077, respectively. Similarly, nature of occupation of the household head has a significant impact on the level of investment saving and broad saving [21].

A study showing the applicability of permanent income hypothesis is shown by a study in South Korea for the period 1962-96. [18]. The study hypothesized that various permanent household characteristics that have been used for the test of the permanent income hypothesis explains permanent income through a functional relationship [5] [6]. The result from the estimation showed that Marginal Propensity to Consume out of permanent income is much greater (3/4) than the MPC out of transitory income [5]. The study found mixed results pertaining to other explanatory variables. The interesting findings from the study are that (a) there was remarkable household's savings; and (b) the useful measures of permanent and transitory income can be estimated from cross-section data. A similar study found that, the estimated saving rates of rural households in many regions are higher than that of their urban counterparts [2] [7].

A study based on macroeconomic indicator on household saving behavior was carried out in Estonia [23]. The study was household budget survey for the period covering 2002-2005. The study showed savings depended positively on income but more on transitory income. Household ownership from property such as house and real estate has no significant effect in household savings. Further, households in possession of durable goods had a significant effect on household savings. In particular household owning cars were the ones with lowest savings. The study also found that Estonian households borrowing rate had been increasing since 2002 due to easy access to credit. The households had accumulated debts and were saving less. One interesting finding was that the middle-aged groups were found saving less than the young and old group. This finding is in contradiction to the life cycle hypothesis, however, the author thinks it is most likely due to the difference in the cross sectional households saving behavior across generation.

III. DATA AND RESEARCH METHODOLOGY

A. Data collection

The data to analyze the household saving determinants was gathered through a survey. The data comprised a sample survey of 404 households covering observation for last 12

months. The primary data was collected mostly through an interview while some were distributed. The main variables of interest related to households include, age of the household head, education level of the household head, dependency ratio, the various expenditures, income from various sources, region of residence. The survey was entirely based on the information provided by the households and the current savings obtained as a result of the difference of income and expenditure could be measured with errors. During the course of interview it was found that most households in Bhutan do not record their income and expenditure.

B. Data Methodology

The analysis of the household saving determinants has been carious out in two steps. During the first stage of analysis, the data gathered was analyzed using descriptive statistics. Descriptive statistics explains the mean, median, minimum, maximum and standard deviation of the data. Examination of the characteristics of the sample was carried out which showed the level of household income, consumption and savings all distinguished by age group, occupation and region of residence. Then the next stage used multiple regressions model using the ordinary least square method. The general saving function is as given below:

$$Y_i = f(X_1, X_2, X_3, \ldots, X_n)$$ Where, Y_i is the dependent variable, X_i is the independent variables. Accordingly, the examination of determinants of household's saving as per the multiple regression model is as given;

$$Y_i = \beta + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k + u_i$$

$$S_i = \beta_0 Y + \beta_1 Age + \beta_2 Asq + \beta_3 Edu + \beta_4 Loc + \beta_5 Fsz + \beta_6 TDR + \beta_7 Ocu + \beta_8 HA + u_i$$

Where,

S_i is the amount of saving, defined as the amount of annual income minus the annual consumption, B_0 is the constant term, **Y** is the disposable income, **AGE** is the age of the household head, **ASQ** is the age square of the household head, **EDU** is the education attainment level of the household head, **LOC** is the region of residence, **FSZ** is the family size, **TDR** is the dependency, **OCU** is the occupation of the household head and **HHA** is the household assets.

The variables that will be used for analyzing the saving determinants in Bhutanese households are as tabulated in Table I.

The ordinary least square analysis used included t-test, F-test, prob. value and coefficient of determination. The multiple regression models suffered from econometric analysis problems such as Multicollinearity, heteroskedasticity and autocorrelation, which have been carefully examined and removed using appropriate tests.

B.1 Descriptive Statistics

Descriptive statistics explains the mean, standard deviation, minimum and maximum of data series. The table interprets average household savings to be Nu.81.003.40, average income is Nu.291,159.36, average age of the household head is 38.66 years, the average number of completed years is 9.6 years, average family size is 4.5, average young dependency is

4.5, average old dependency is 0.28, liabilities to be paid is Nu.4,035.31 per month, average size of dry land holding is 1.9 acres, average size of wet land holding is 1.16 acres and average size of orchards is 0.45.

TABLE I VARIABLES AND THEIR EXPECTED SIGN OF COEFFICIENTS

Explanatory variable	Description	Expected Sign
Y	A continuous variable used for household income	+
AGE	A continuous variable used for the completed years of age of the household head	+
ASQ	Square of age of the household head	-
EDU	A continuous variable used for the completed years of schooling by the household head	-
TDR	Total dependency in the house	-
FSZ	A continuous variable for total number of household members	-
LAB	A continuous variable for liabilities to be paid by the household head	-
MAR	A dummy variable that will represent the marital status of the household head =0, if the household head is married; and =1, if not married	-
LOC	A dummy variable that will represent the location of the household =0, if the household is settled in rural; and =1, if the household is settled in urban	+
OCU	A dummy variable that represent the occupation of the household head =0, if the household has farm income =1, if the household has nonfarm income	+
HHTL	A continuous variable for size of the land holdings	+
HHD	A dummy variable for ownership of house	+
HHLS	A dummy variable for livestock hold	+

The Minimum values of savings, income, age, education, family size, young dependency, old dependency are liabilities - 115000, 7000, 19, 0, 1, 0, 0 and 0 respectively while the maximum values for the same are 581,000.00, 2,064,000.00, 83, 15, 13, 2, 7 and 96,000.00 respectively.

TABLE II SUMMARY STATISTICS

VAR	Minimum	Maximum	Mean	Std. deviation
SAV	-115000.000	581000.000	81228.639	114399.278
INC	7000.000	2064000.00	292094.218	242813.172
AGE	19.000	83.000	38.644	11.971
AGSQR	361.000	6889.000	1636.282	1071.496
EDU	0.000	15.000	9.624	5.682
LOC	0.000	1.000	0.374	0.484
FSZ	1.000	13.000	4.559	2.125
LAB	0.000	96000.000	4022.021	9978.016
TDR	0.000	5.000	0.565	0.625
MAR	0.000	1.000	0.240	0.428
GEN	0.000	1.000	0.730	0.444
OCU	0.000	1.000	0.681	0.467
HHD	0.000	1.000	0.554	0.498
HHDL	0.000	33.000	1.898	3.271
HHWL	0.000	25.000	1.163	2.321
HHO	0.000	9.000	0.449	1.182
HHLS	0.000	1.000	0.359	0.480

B.2 Correlation Matrix

The problem of multicollinearity arises when two or more variables in multiple regressions are highly correlated. The concern is that the coefficient estimates changes erratically in response to a small change in the model or data. We use correlation matrix and variance inflation factor (vif) to detect multicollinearity. As a rule of thumb, in the correlation matrix if the coefficient of correlation among the explanatory variables is equal or more than 0.80 it indicates severe problem of multicollinearity. Similarly, a variable of tolerance of less than 0.20 or 0.10 and/or a VIF of 5 or 10 and above to indicate a multicollinearity problem. The Correlation matrix shows the coefficient of correlation among the explanatory variables to be less than 0.80 indicating no problem of Multicollinearity. Similarly, the test for VIF also confirms that there is not problem of multicollinearity.

B.3 Estimated result from Multiple Regression

TABLE III MODEL PARAMETERS

Source	Value	Robust Standard error	t	Pr > |t|
Intercept	-87104.49	42353.3	-2.06	0.040
INC	0.359	0.0411	8.73	0.000
AGE	3951.48	1751.36	2.26	0.025
AGSQR	-37.32	16.85	-2.21	0.027
EDU	342.80	1182.86	0.29	0.772
LOC	9814.45	10145.28	0.97	0.334
FSZ	-5154.25	2113.30	-2.44	0.015
LAB	-1.19	0.688	-1.73	0.003
TDR	-2260.52	5585.07	-0.40	0.686
MAR	6795.44	10218.68	0.67	0.506
GEN	5535.64	9878.41	0.56	0.576
OCU	-7987.83	9798.37	-0.82	0.415
HHD	3008.14	9189.39	0.33	0.744
HHDL	-2249.45	1734.83	-1.30	0.196
HHWL	2039.95	1631.81	1.25	0.212
HHO	-3935.02	3588.58	-1.10	0.274
HHLS	-10674.95	10887.04	-0.98	0.327

R-squared 0.59   F-statistics 33.433
Prb (F-stat) 0.00   Observation 404
Results are estimated using Stata 12.

The standardized coefficient against the variables is given figure 1.

The table describes the estimated results of the saving function and show that the coefficient of income is significantly positive. Savings depends positively on household income as when income increases by Nu.1.00 household saving increases by Nu.0.36. The result also show coefficient of age to be significantly positive. This reveals that there is positive and significant relationship between the age of the household head and the household savings. Age squared is significant too but it is negatively related to savings as shown by its coefficient (-37.32). Age appears to have life cycle effect on the saving level of the households, as the age of the household's head increases by 1 year the saving on average will increase by Nu.3951.48.
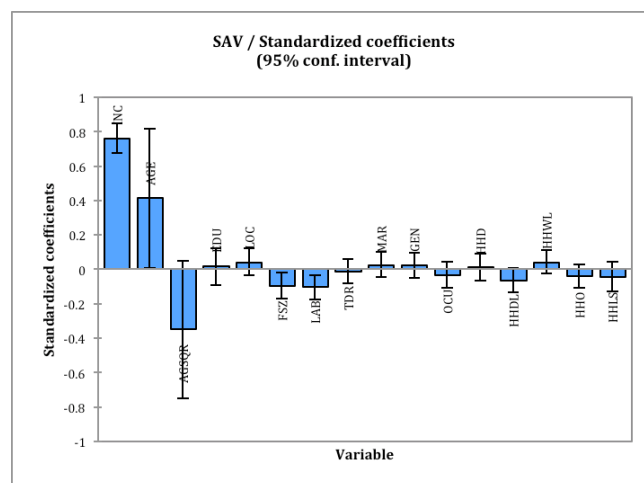

Fig. 1 SAV/Standardized coefficient

Both education attainment level of the household head and location exerts a positively insignificant effect on the household savings. The probability that the household is in urban area increases the household saving by Nu.9,814.45. Family size exhibits an inverse relationship with household saving, An additional member in the household would reduce the savings by Nu.5,154.25. Similarly, liabilities of the household are significantly negatively related to the household savings. On average, an increase in liabilities to be paid reduces the household savings by Nu.1.19.

Occupation of the household head and Dependency in the households exhibits negatively insignificant relationship with household savings. Gender and Marital status, however have positively effect on household savings. The empirical results also suggest that there is no statistical significance of household's assets on its savings. The households who own lands and livestock have a negative effect on the household's savings. However, households who own dwelling show a positive coefficient though insignificant.

The estimated results show a R^2 of 0.59. R^2 indicates how well the regression line fits the data and how well the future outcomes can be predicted by the model. The result shows that our explanatory variables are explaining 59% of the variations in the dependent variable. The overall significance test (F-statistics) is significant (0.000).

IV. CONCLUSION

The study empirically analyzed household saving determinants in Bhutan by constructing an econometric model to study the effect of various factors such as income, age, family size, education, liabilities and locality on household savings. Income is the main determinants in explaining the cross sectional variation of household savings in Bhutan. The marginal propensity to save is 0.36 among the households. Family size and liabilities were found significant and showed evidence for an inverse relationship with the household head. Variable such as occupation, gender, marital status, dependency and household assets were found insignificant.

To test the life cycle hypothesis, age was considered and findings were significant. The result showed coefficient of age to be significantly positive. Age squared too was significantly

negatively. The study found that the percentage share of retirement (31%) and children's education (23%) are highest among the households indicating motives related to life cycle saving are stronger in case of Bhutan. On the other hand the motives to save for bequest is relatively very low in Bhutanese households.

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